DART® Plus Software Manual
for Rectifiers and Test Points

BORIN Manufacturing
5741 Buckingham Parkway,
Corporate Offices, Building B
Culver City, California 90230
Ph: 310-822-1000 Fax: 310-338-3434
www.borin.com

DART Plus Software Manual

Dart Plus Software Installation

Install the Dart Software from the Dart Plus Software CD and follow the installation wizard. The Dart Plus Software icon will show on your desktop after installation is finished.

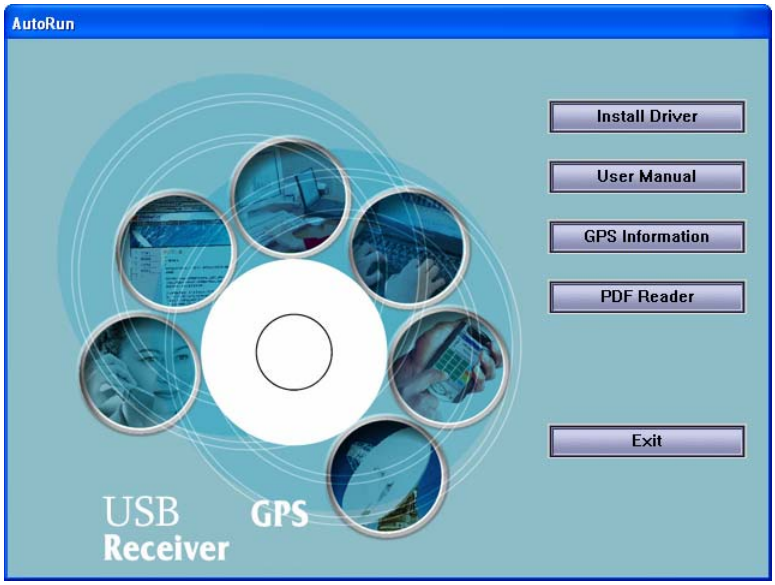
Connecting the USB Radio to your computer

Connect antenna to USB radio
Connect USB cable to USB radio
Connect Radio to USB port in your computer

Connecting the USB GPS Receiver to your computer

Install the driver for the GPS receiver in your computer. This driver is available in the Installation Manual CD.

Just click on “Install Driver” and follow the installation wizard.



Connect the GPS receiver to an available USB Port in your computer

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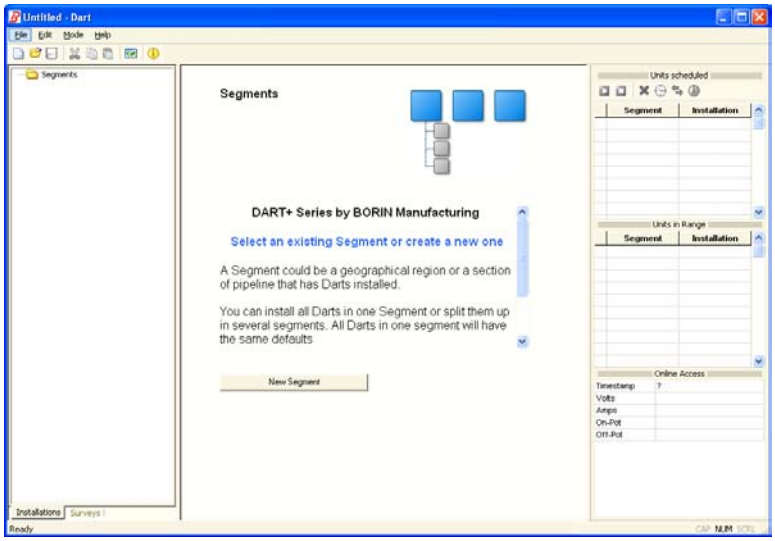
Installing the Teletype Mapping Software
Install the teletype software from the CD provided with your Interrogator package and follow the installation wizard. This software will enable you to install the maps of the specific regions where you will be operating your DART Plus Modules

Now you should be able to run the Dart Software in your computer:

Start the Dart Plus Software by double-clicking on the Dart Plus icon on your desktop, once the software is open you will see a screen like the one below.

The Dart Plus Software main screen works similarly to the File Explorer from Windows®. On the left side shows a list of all of the Dart Plus Modules that have been configured in the Software. The middle section shows the detail of whatever Installation or setting are selected on the left section. The right section is mainly used when the Software is set to Survey Mode and it shows the information about the units in range for interrogation or the recently taken readings from a selected unit.



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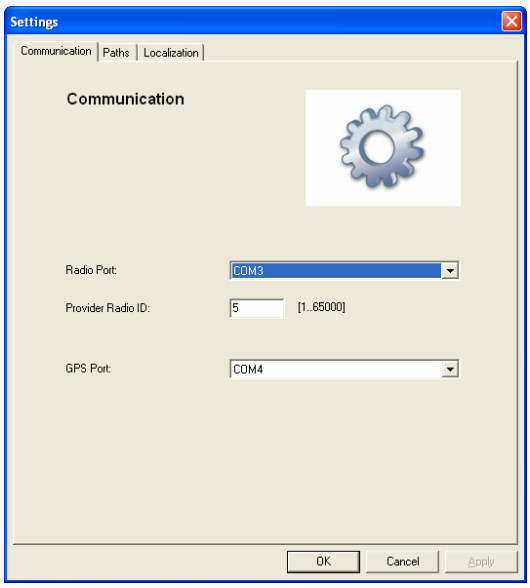
Dart Plus Software Settings

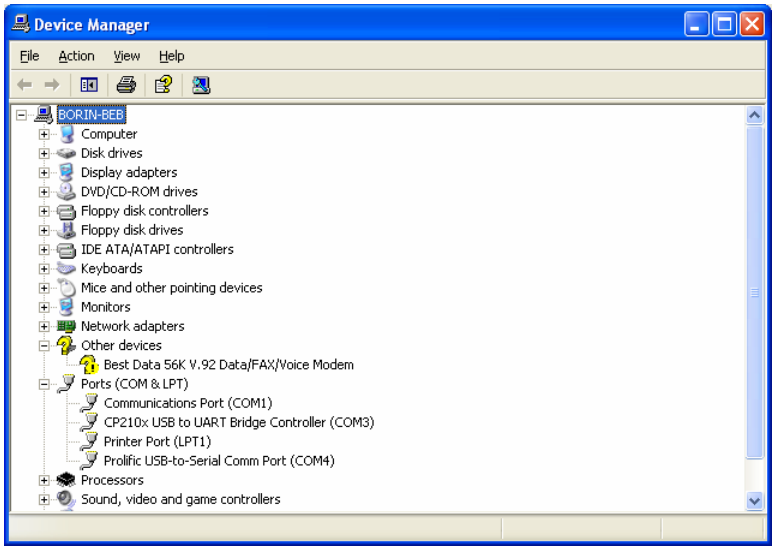
From the main menu go to File/Settings/Communication to set the Radio Port, The Radio ID and the GPS receiver port.



To identify the Ports in your computer in which the Radio and GPS receiver are connected go to Start/Control Panel/System/Hardware/Device Manager/Ports(Com & LPT)

Radio Port

Locate CP210x USB to UART Bridge-Controller, in the example below the Port is COM3, so you would select COM3 from the list



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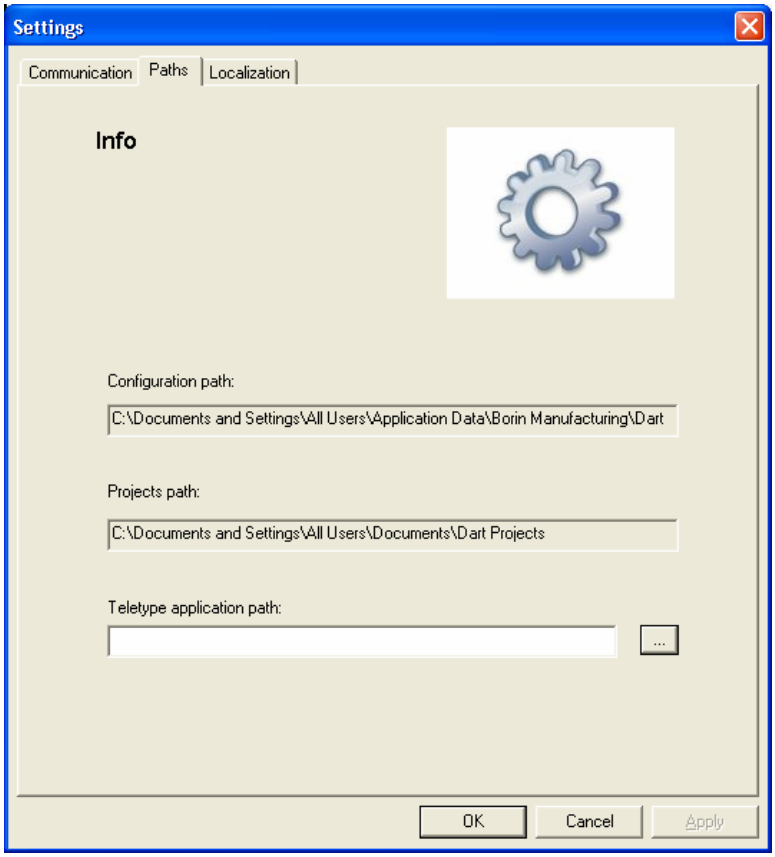
Provider Radio ID

This is an ID for each computer in your company as an end user of the Dart Plus Software, for example if 10 different people will be performing Rectifier or Test Point Surveys, each with a different computer, the first computer will have ID 1, the second will have ID 2, etc. This is done so that the Dart modules in the field can identify who is interrogating them so that when they respond, they will address the specific computer which is interrogating them. This is as a precaution in case there was more than one computer interrogating units in close proximity at the same time.

GPS Port

Locate Prolific USB-to-Serial Comm Port , in the example above the Port is COM4, so you would select COM4 from the list.

Paths Tab



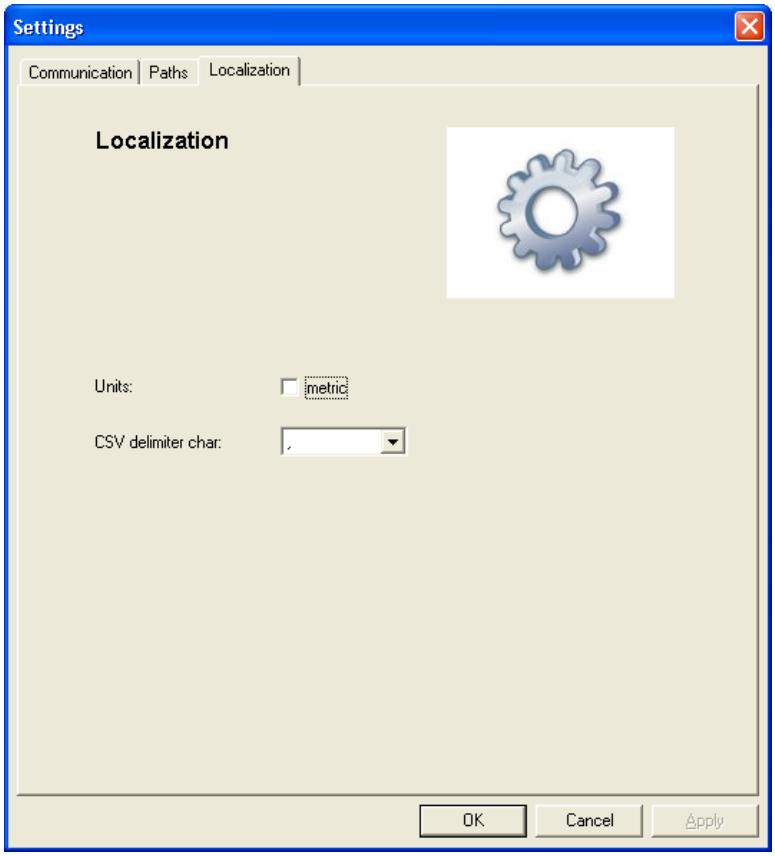
The first two Paths are for information purposes only. They **should not be changed unless one of our technical support engineers instructs you to do so**, as some operating systems like Windows Vista will need further settings configuration when they are installed in a different folder, and this will only complicate your software setup process.

Configuration path: Contains default Dart Software pictures and text files. This path should only be changed as mentioned above.

Projects path: contains your data base and sample pictures that you can display on the Segments and Installation windows. You can store additional pictures of each specific installation and then display them in the Installation Window for your reference. This path should only be changed as mentioned above.

Teletype application path: has to be set manually. Just press on the "…" button and select the folder where the application is located. By default it should install under "Program files\GPS". But different languages will cause different defaults.

The Localization Tab



On this window you can select how the Dart Software will format your data in terms of units and punctuation style. These setting generally vary from country to country; the default setting is the English system, which will show distances in "feet and yards". To change the setting to metric, just check the box next to metric, now distances will show in meters. The "**CSV delimiter char**" selection is used when exporting data into a different software. This also varies from country to country. Identify the delimiter that is used as a standard in your country and select it from the list.

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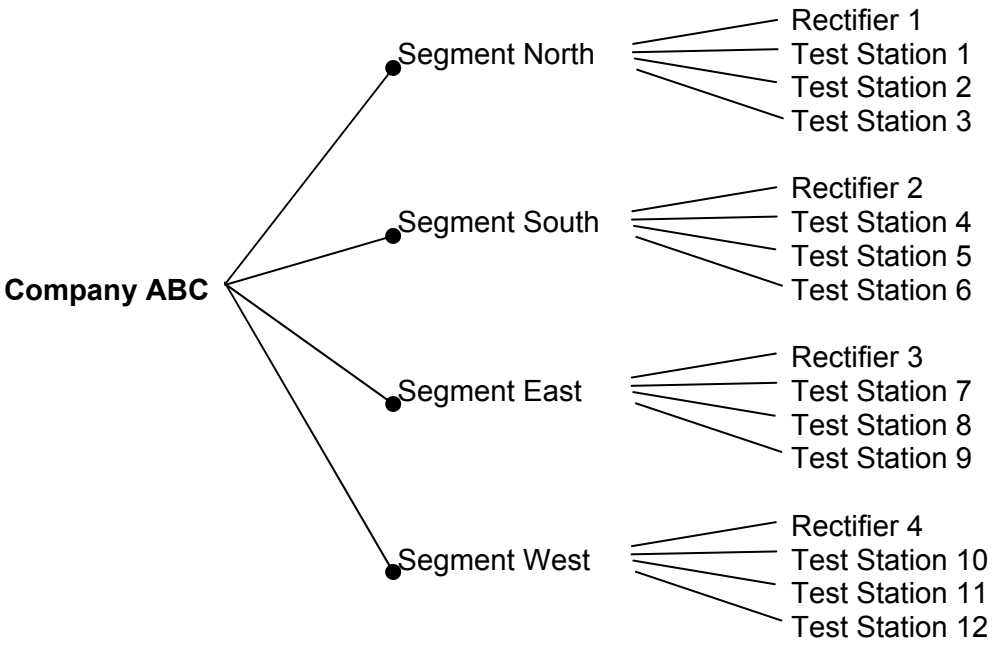
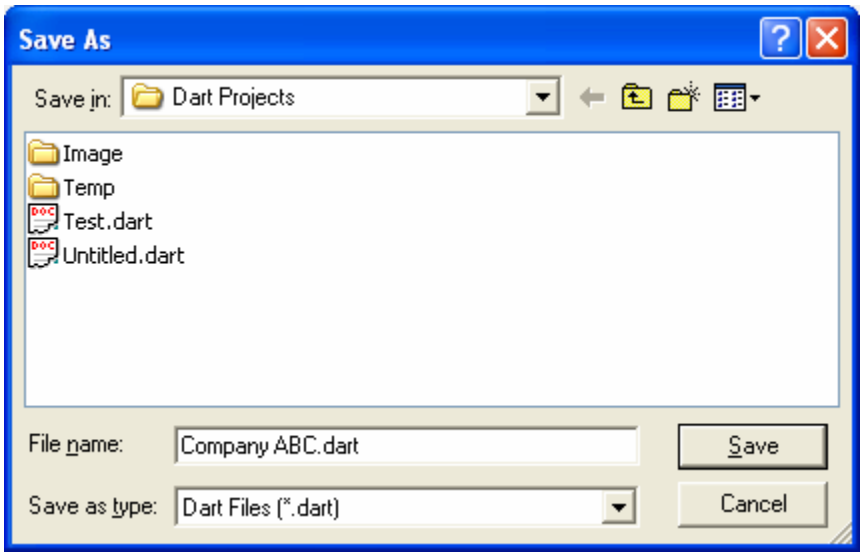
Your Database

The software is configured to save all of your information as a Company database where you can create different segments, for example:



Or you can create more than one database, for example if you are a consultant servicing a number of companies, you would want to create a separate database for each of your customers.

To assign a name to your database go to File/Save as and assign a name to the file. In the example the Database file name is Company ABC



Note: It is recommended to save the database on the default assigned folder to facilitate technical support from one of our engineers.

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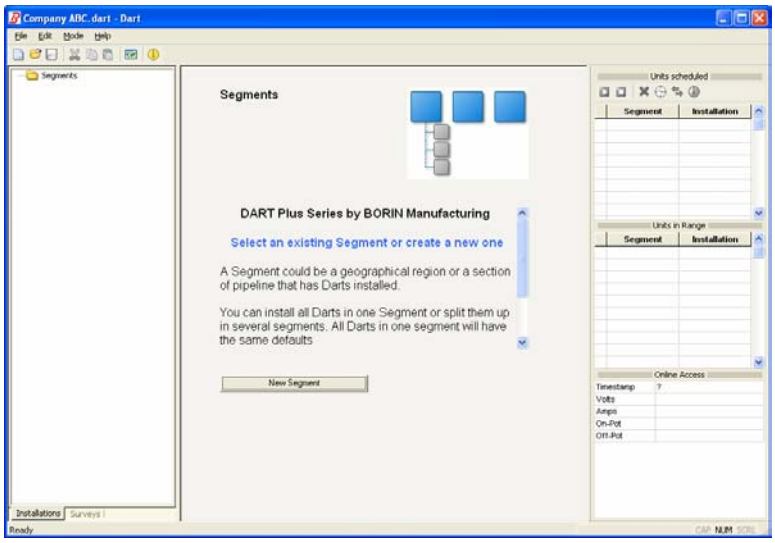
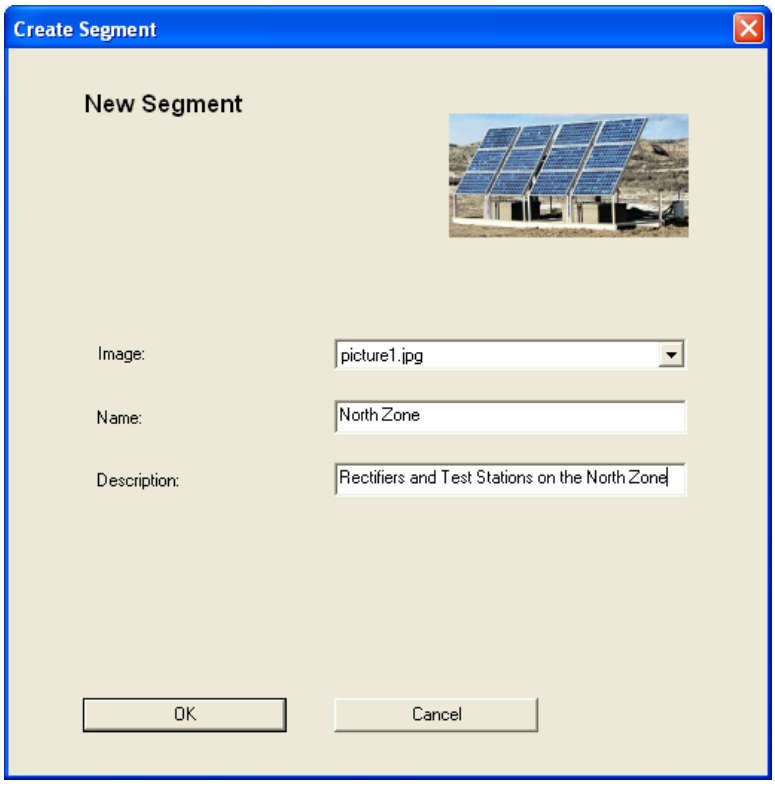
Creating a New Segment



From the main window click on the “New Segment” Button

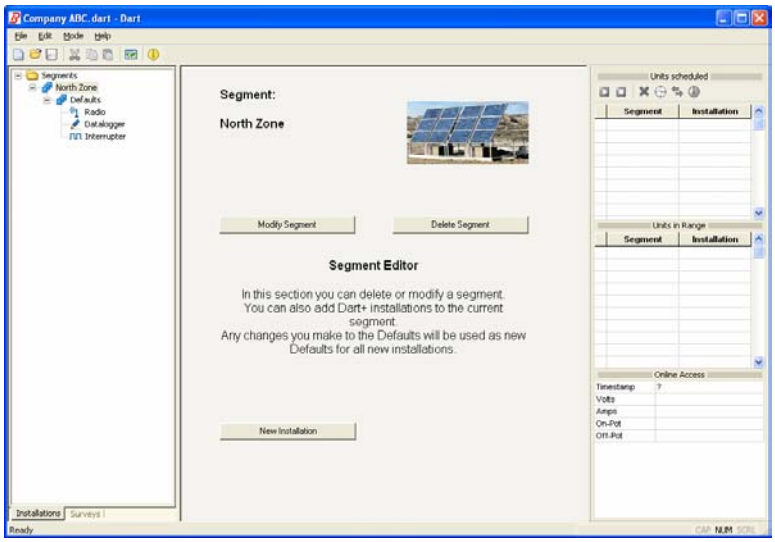


The “Image” field allows you to select a picture to show in the upper right hand corner of this window. This image must be previously saved in the “Projects path” folder under “images”. For example you could show a picture of the physical site so that the technician performing the survey has a graphical reference of the site as he/she approaches it.

Following the example in this manual, we will create the first segment as North Zone, and type a brief description of the segment as shown below.

This information can be changed at any time by pressing the “Modify Segment” button.

Once the Segment has been created it will show on the menu on the left hand side of your screen. If you click on the segment you will see the window below, which allows you to go back and modify the Segment, delete the Segment (Caution, if you delete the segment, the information pertaining to this segment will be deleted) or create a New Installation



Segment Default Settings

To facilitate the set up of New Installations you can set default settings for the Radio, the Datalogger and the Interrupter.
These settings will show everytime you make a new installation so all you have to do is enter the name, description and location of the site.
If when installing a new Dart Plus module you want to change these settings, this can always be done in the field for that specific site.

To set the Defaults, select the default section on your new segment.

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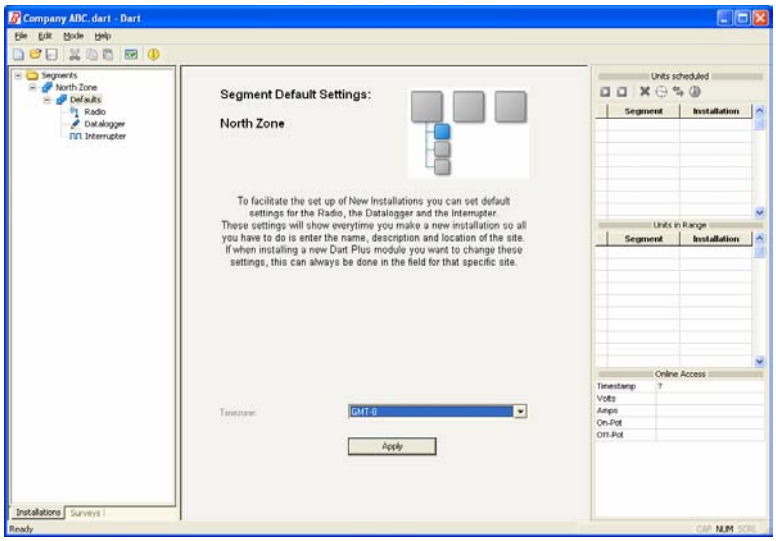
Time Zone

The first setting will be the time zone.
The time zone is set in reference to the GMT (Greenich Mean Time). For example if you are in Los Angeles the time zone willl be GMT-8, select it from the list and click on Apply.



Note: Because this product is sold worldwide and there are many countries that do not adjust for daylight savings, the software will not make the daylight savings adjustment, therefore the user will need to adjust the survey times when performing surveys during daylight savings months.

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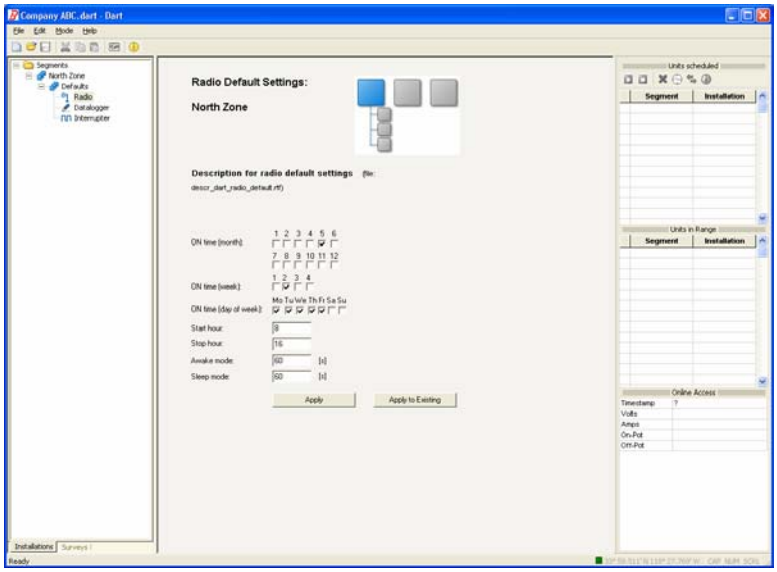
Radio Default Setting



This screen is to set the awake and sleep mode of the Dart Plus Module for Test Stations (it has no effect on Dart Plus for Rectifiers modules). These settings are very important since they will have a direct impact in the Dart Plus module battery life.

If the radio is in **awake-mode,** it is ready to be interrogated by a drive by interrogator. In this mode it will wake up more frequently (recommended setting is 7-8 sec) and wait for a radio transmission. In **sleep-mode** the radio will wake very seldom with the purpose of saving power (recommended setting is 120 sec).
In either mode the Dart Plus will always be reachable, but the reaction time will be very different. In the awake mode, you will be able to pick up the information as you drive by or fly by. In sleep-mode, you might have to stop close to the site and wait for 120 sec to be able to get information to/from the Dart Plus.

It is very important to save power in this kind of application, so make a wise choice in your settings. Remember that the battery life of the Dart Plus is estimated at 10 years, provided that the Dart takes 1 reading per month and stores the readings, and then it is interrogated **ONE** time a year to recollect the readings of the last 12 months.

The operator should set the awake parameters according to his annual survey schedule (or more frequently, understanding that the number of interrogations is directly related to the battery life).

For example, if the operator performs the annual survey during the second week of May and his working hours are from 8:00 AM to 4:00 PM, the Radio settings should be as displayed on the screen below. For power savings it is recommended to set the awake mode at 7 seconds and the asleep mode as 120 seconds. After typing the settings click on “Apply” to save the Radio Default Settings.

Click on “Apply to Existing” if you want to copy the default settings to all the installations of this segment.

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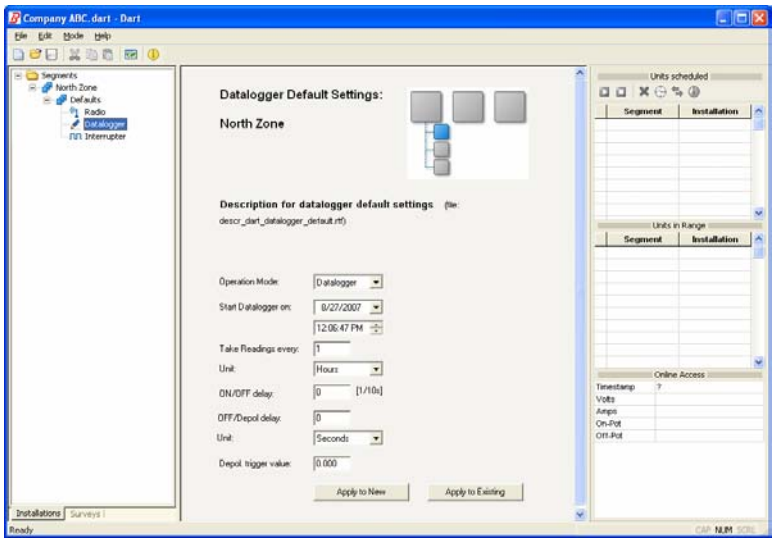
Data logger Default Settings



The Default settings can be applied to all new installations that you will create or also to all existing installations, if you want to change them.

Operating mode:
Lets you select what mode you want to set the units into by default. The Datalogger mode is used for recording data at given intervals. The Interrupter mode can be set to program all Dart Plus for Rectifiers to do ON/OFF cycling e.g. for a CIS.

Start Datalogger on:
This is the time when the data loggers should take their first reading. By setting this date and time, all data loggers will do their recordings at the same day and same time. So you will get a picture of your CP-system that is not influenced by temperature or humidity differences due to weather changes over the days.

Take readings every:
Here you have to enter how often you want the Dart Plus to take a reading, like take a reading “1” per “month”. Keep in mind, that the Dart Plus stores 12 readings only! That being said, setting the Data logger to take weekly readings but planning to collect the data once a year only obviously does not make much sense.

ON/OFF delay:
This is the time in 10^{th} of a second after the interruption, when your Off-Potential reading should be taken. If you want the Dart Plus to take the Off-Potential reading after 500ms of interruption, then type “5” in this field.

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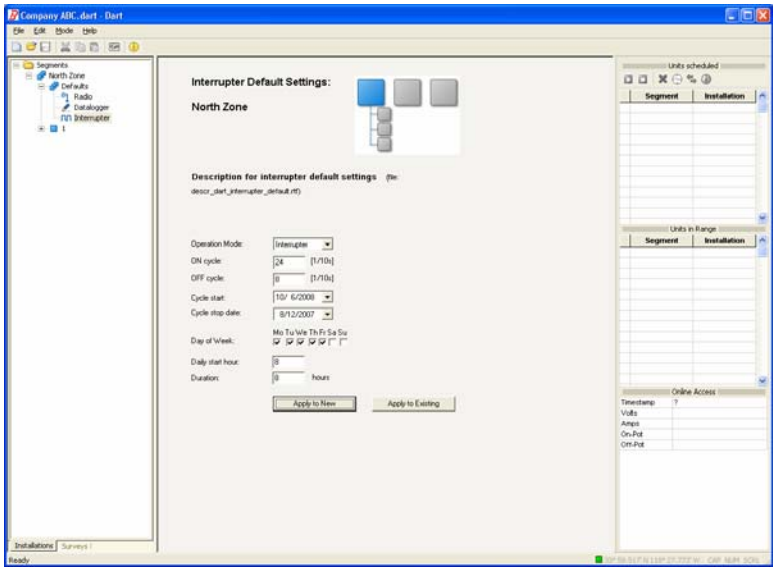
OFF/Depol delay:
This will indicate the time that you want to give the coupon to depolarize, before you take the Depolarized Potential. It is hard to give you a default for this time, as it differs significantly from the size of the coupon and the soil and resistivity of the soil. The coupon will depolarize faster than your pipe! Typical settings could be from minutes to hours. In a typical environment the coupon should be depolarized after 2 hours. To check if your settings are adequate with your installation conditions just run a test. Take your native potential and let the coupon polarize. After polarization, disconnect it manually and take you readings manually. Determine the time that the coupon needs to get back or close enough to you native potential reading.

Depol Trigger value:
This is a reference value to compare with the actual potential reading. If the Off-potential reading is less negative than this value, then the Dart will automatically proceed to take the depolarized potential reading. If the Off-Potential reading is above this value, no depolarized potential reading will be taken.

Interrupter Default Settings



This feature of the software is designed to automate the synchronized interruption of rectifiers. This will be done using the GPS clock in each Dart (which should be specified when purchasing your Darts).

ON-cycle:
Time in 10th of a second that the rectifier should be on.

OFF-cycle:
Time in 10th of a second that the rectifier should be off.

Cycle start:
The day when the Interruption should start.

Cycle stop:
The day when the Interruption should stop.

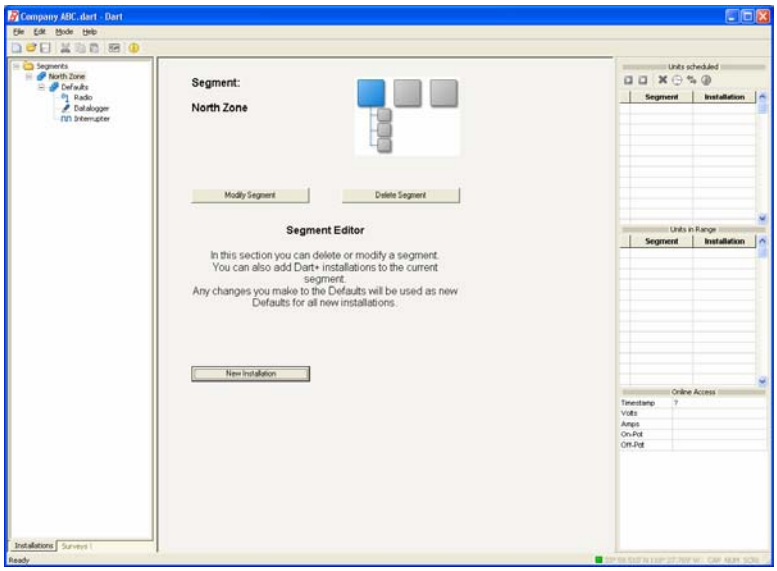
Day of the week:
Select the days, when an interruption should be done. This window allows you select which days you will be in the field to perform your CIS and if weekends are not selected, this gives the structure time to depolarize over the weekend.

Daily start hour:
This is the time of the day when you are scheduled to be in the field to perform the CIS. The Dart Plus for rectifiers will start cycling at that hour.

Duration:
How many hours do you plan to be out in the field? If it is form 8a.m. to 5p.m. it would be "9" hours.

Create New Installation

To create a new installation, choose the segment that this installation will be part of; in this case we will use the "North Zone" segment, then click on the New Installation button.



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Installation of a Dart for Test Stations or Dart for Rectifiers

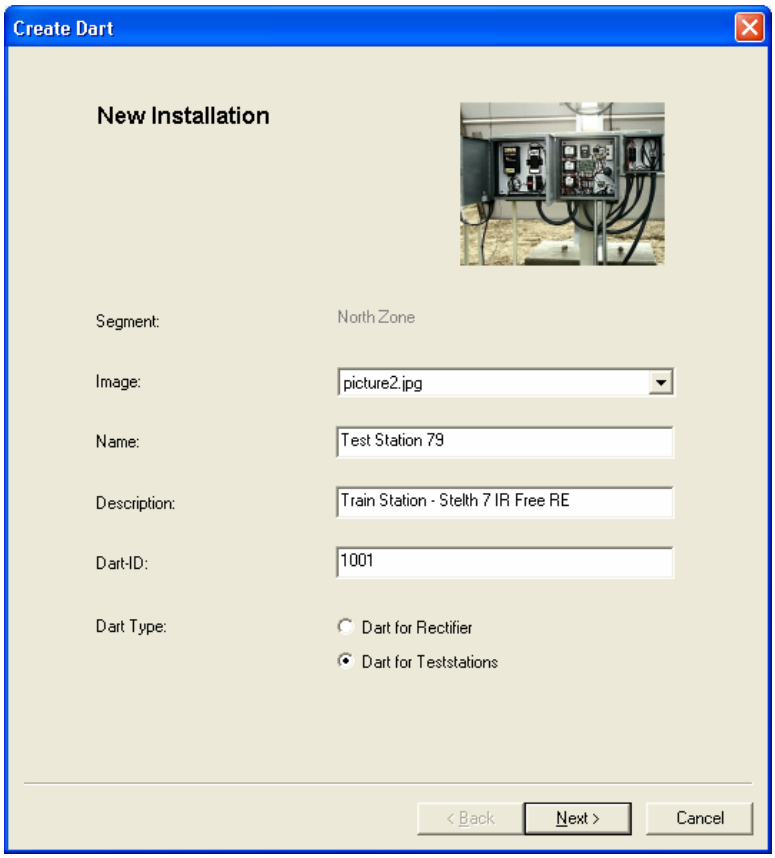

Image: If you have stored a picture of your installation in the Projects Path mentioned on the settings section of this manual, here you can select the picture to display in this window, or just use the default.

Name: Type a name for your installation. This will be displayed later on in the main window on the left hand side. The description is optional. You can add special information for this installation, like installation date or depth or type of the reference electrode.

Description: This is optional. You can add special information for this installation, like installation date or depth or type of the reference electrode.

Dart ID: You can find this number on the enclosure of each Dart Plus Module. This is a unique ID given to each radio for identification.

Dart Type: Select depending on the type of unit you are installing, either for Test Station or for Rectifier.

Click on the Next button to continue installation and set the Dart position.

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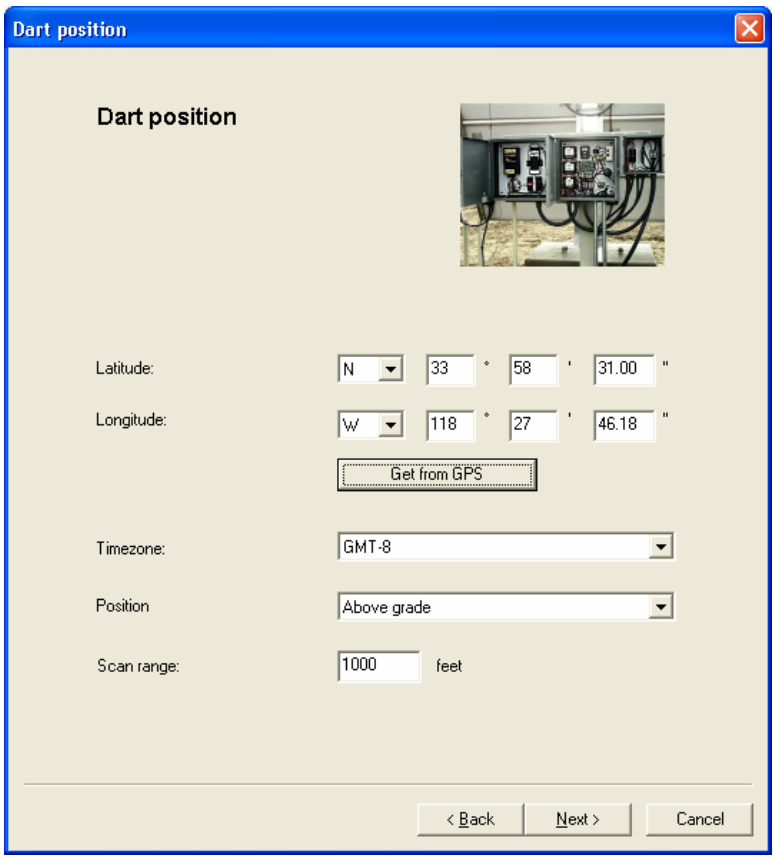
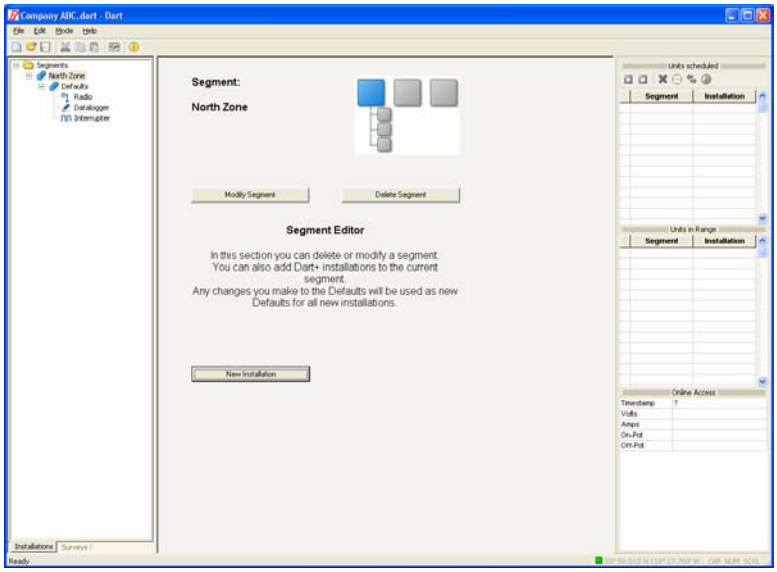


Setting Dart position: If you are at the site and have a GPS receiver connected to your computer, just click on Get from GPS, make sure you have good GPS reception indicated by a green square in the bottom of the main screen shown below. If you do not have a GPS receiver or if you are not at the site, you can enter the coordinates manually.



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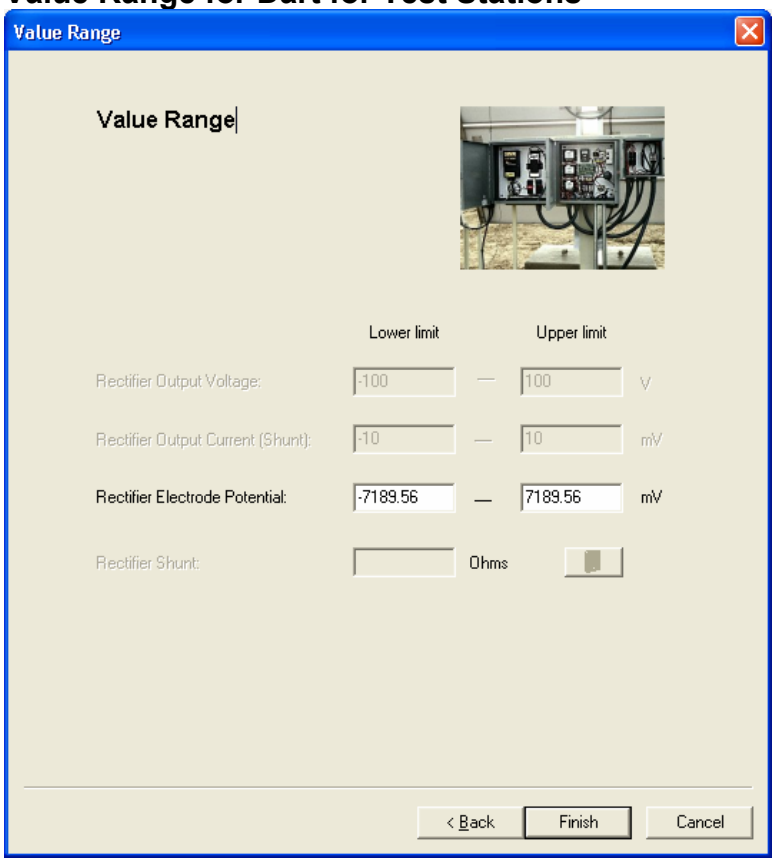
Time zone: Should be set automatically by the software if you programmed the default settings previously.

Position: Choose “above grade” when the Dart Plus module is installed above ground and “below grade” when the Dart is installed in a manhole. Other procedure during survey apply for these units.

Scan range: This refers to the distance from where you can successfully interrogate the Dart Plus module. The default scan range is set up for 1000 feet (300 meters), which is recommended for above grade installations with a clear sight of the test station. For below grade or above grade with obstacles, the scan range will vary depending on the specific characteristics of each installation. For fly-by applications the scan ranges will increase.

Click on next to continue installation and set Value Ranges.

Value Range for Dart for Test Stations



For the Dart Plus for Test Stations, all of the channels are set to read Pipe to Structure Potentials from Reference Electrodes. The value range for this channel is +/- 7189.56 milivolts.

!!! DON’T CHANGE THESE SETTINGS. THE UNITS ARE CALIBRATED TO THESE RANGES!!!

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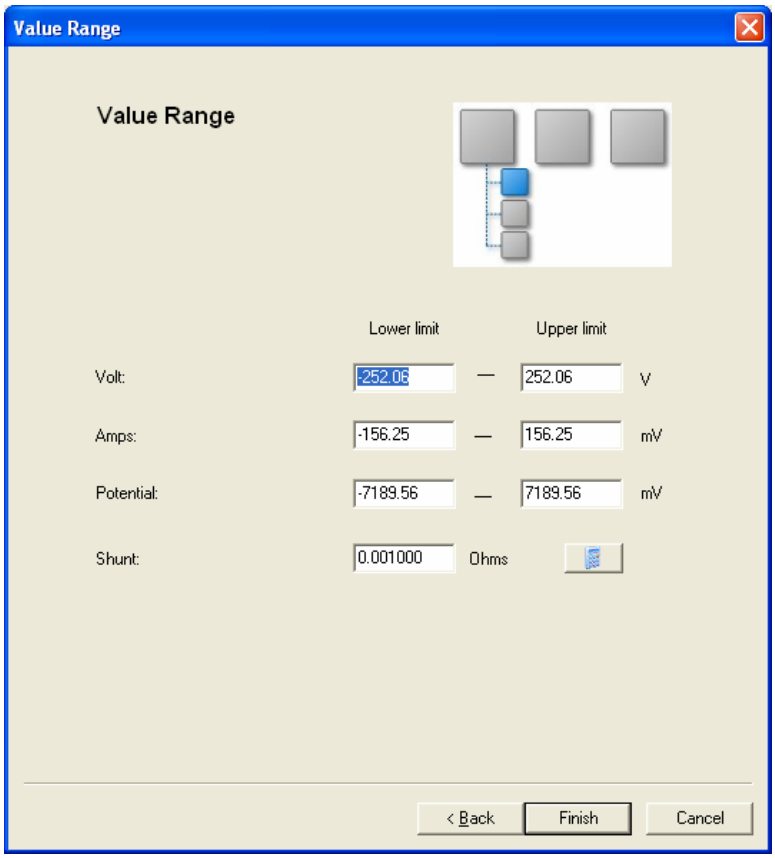
Value Ranges for Dart for Rectifiers



The Dart Plus for Rectifiers has three different inputs .

Rectifier Voltage Output: +/- 256.02 Volts.

Rectifier Current Output: +/-156.25 mill Volts. The reading is taken from the shunt in mill volts and then the software converts it to Amps to show in the reports using the shunt values below.

Potential: +/- 7189.56 mill Volts.

!!! DON'T CHANGE THESE SETTINGS. THE UNITS ARE CALIBRATED TO THESE VALUES !!!

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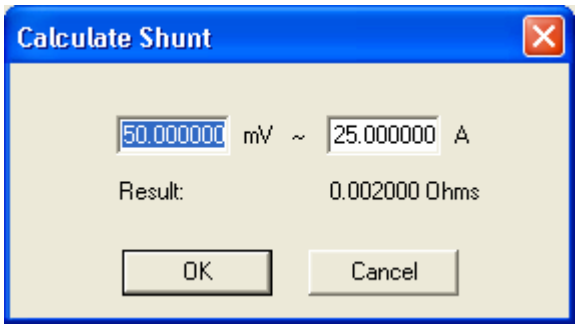
As mentioned above, the Shunt value for the installation can be added, so that you get an automatic conversion into Amps as shown below

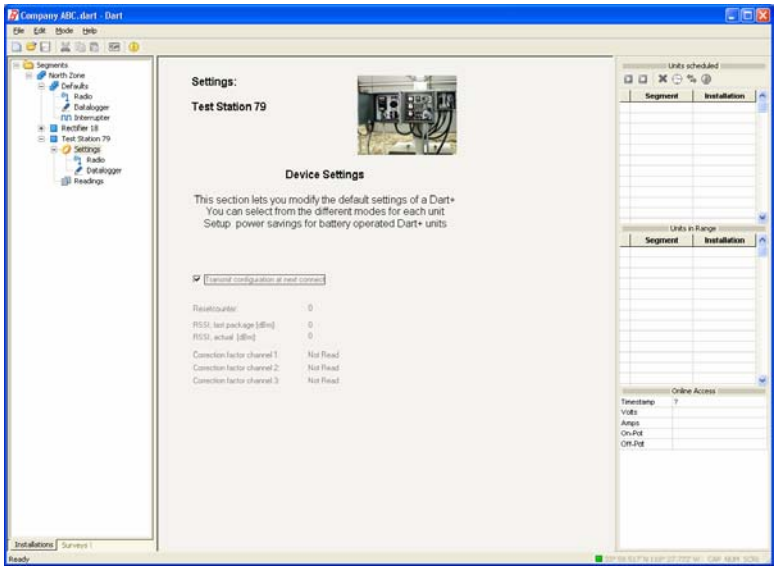


Just enter the Shunt value and the Ohms will be calculated automatically.

Installation Settings

Once you have created an installation, it will show on the left side of the main screen and if you click on the name of the installation, you will open a settings subsection where you can set the Radio, Data logger and Interrupter settings for each installation. Remember that if you want to program the same default parameters to all of the installations in the same segment, you need to set them just one time on the default section of the software. In that case you do not need to reenter them on each site, this will be done automatically.

If you want to program setting into only one installation or change the default setting in one of the units in a segment, check on the “Transmit configuration at next connect” box



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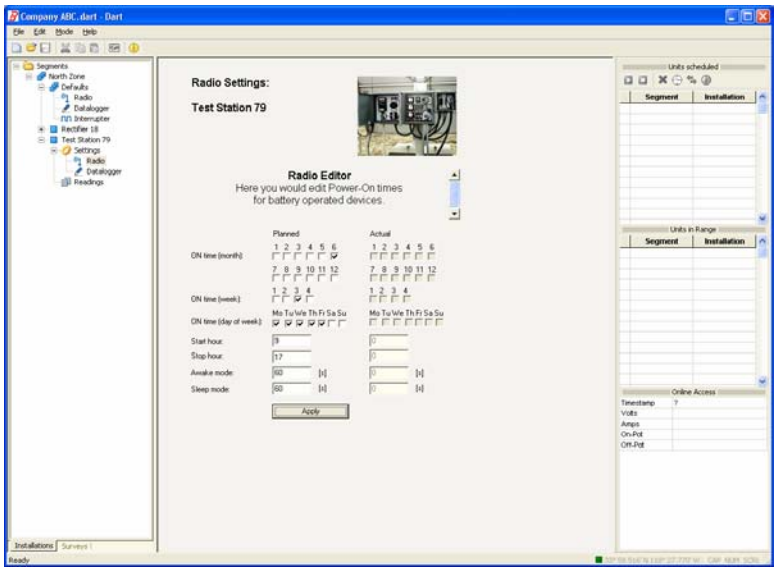
Installation Radio Settings

As mentioned before these settings are only for the Dart Plus for Test Stations, which are battery powered and need to preserve power to extend battery life.

To set the Radio Parameters follow the instructions in the Default Radio Settings section of this manual.

Radio Parameters Verification:
The other very useful feature of this screen is that it allows you to verify the settings programmed in the Dart Plus module, shown on the Actual column on the right side. These settings will only show after you have established communication with the Dart Plus module.



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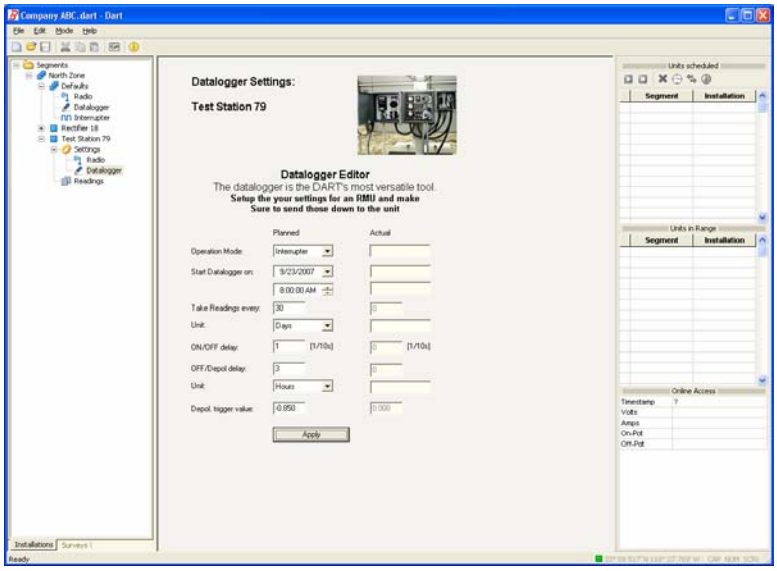
Installation of Data logger Settings

To set the Data logger Parameters follow the instructions in the Default Parameters Settings section of this manual.

Data logger Parameters Verification:
The other very useful feature of this screen is that it allows you to verify the settings programmed in the Dart Plus module, shown on the Actual column on the right side. These settings will only show after you have established communication with the Dart Plus module.



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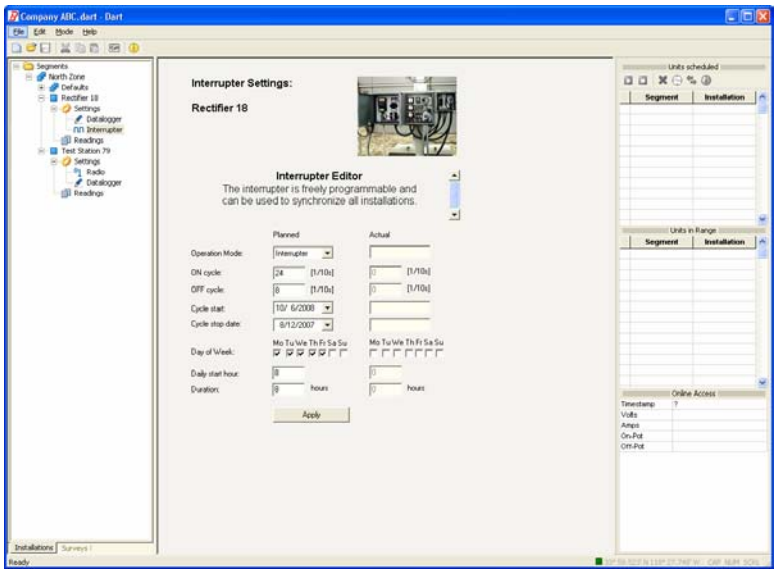
Installation Interrupter Settings

These settings only apply to Dart for Rectifiers

To set the Interrupter Parameters follow the instructions in the Default Parameters Settings section of this manual.

Interrupter Parameters Verification:
The other very useful feature of this screen is that it allows you to verify the settings programmed in the Dart Plus module, shown on the Actual column on the right side. These settings will only show after you have established communication with the Dart Plus module.



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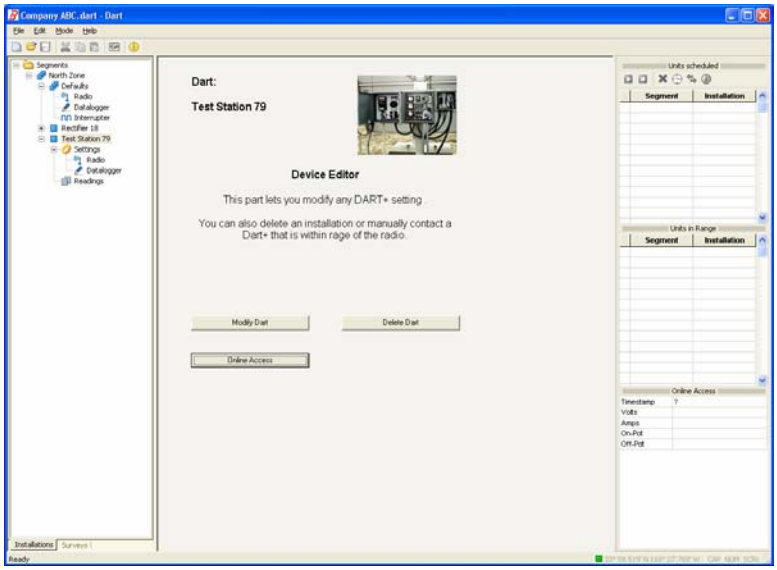
Installation Editor

If you need to modify, delete or reprogram an installation: from the left section of the main screen, click on the desired installation and then click on the desired button.

If you want to modify an existing installation, click on the Modify Dart button and follow the same steps described on the “Creating an Installation” section of this manual

If you want to delete an installation click on the “Delete Dart” button be aware that this information will be lost once you delete the installation.

Online Access:
Click on this button if you are at scan range from the Dart Plus module and you want to establish communication with it.



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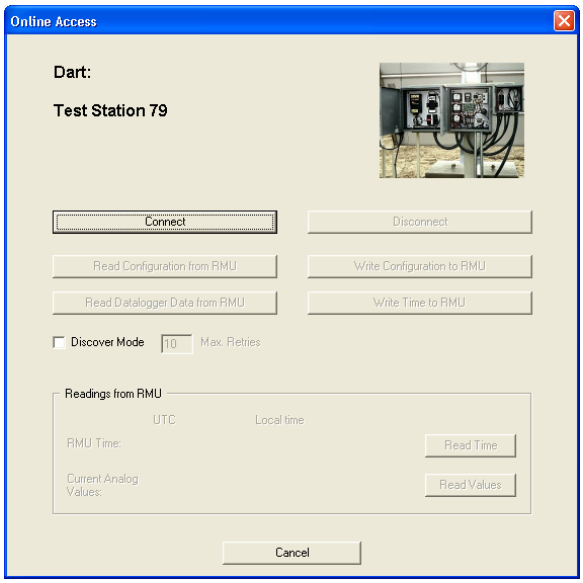
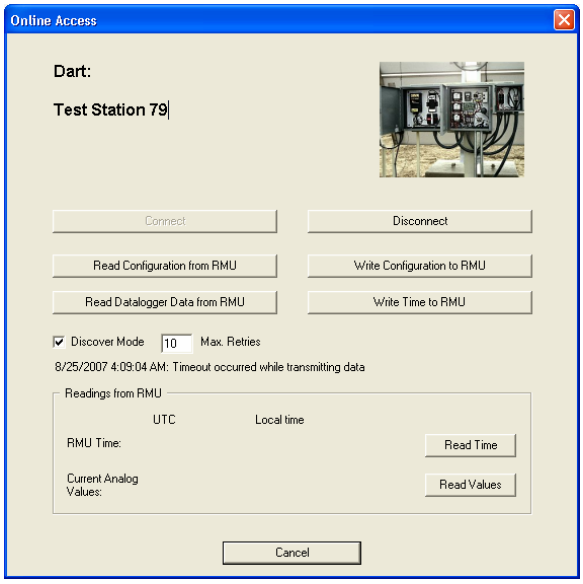
To establish communication with the Dart Plus module, click on the “Connect” button



Once you have established communication with the Dart Plus module, you can start sending parameters or reading parameters and values.



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Read Configuration from RMU: Retrieves settings information from the Dart Plus module like: Radio Settings, Data logger Settings and Interrupter Settings. This information can be verified on the Installation Settings section of the software.

Write Configuration to RMU: Sends parameters and programs the Dart Plus module with these settings, like: Radio Settings, Data logger Settings and Interrupter Settings.

Read Data logger Data from RMU: Retrieves the last 12 readings for all of the channels of the Dart Plus module. This information will be stored and displayed in the Readings section of this Installation.

Write time to RMU: Sets the time on the Dart Plus Module as the time in the Computer, from the GPS if connected to a GPS receiver or from the internal clock in your computer.

Discover Mode: When the Dart Plus operator is in the field and cannot find or establish communication with one Dart Module, with this feature enabled, the Dart Plus interrogator will make "n" attempts to establish communication until it succeeds or until it reaches the Maximum number of attempts. This is necessary, in case the Dart Plus might be sleep-mode.

Read Time: Will retrieve the time from the Dart Plus module and display it in the "Readings from RMU" window on this screen.

Read Values: Will take current Analog Values from the Dart Plus module, these readings will be displayed in the "Readings from RMU" window on this screen.

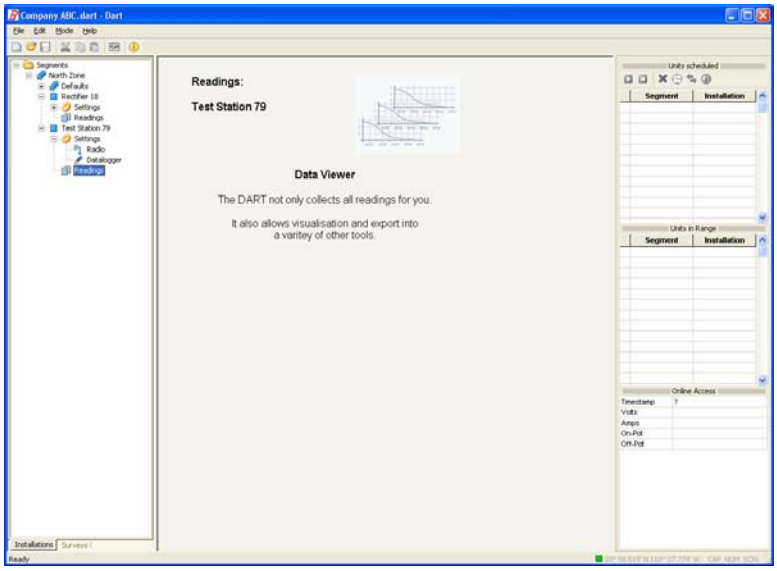
If the Dart Plus Interrogator is not successful in sending or receiving messages to or from the Dart Plus module, the message below will pop up. In this case you should try your command again or make sure that the Dart Plus Interrogator radio is connected to your computer, has an antenna connected to it, is powered and you have selected the correct COM Port from your computer.

Readings:

The Dart Plus not only collects information for you, it also provides you with a graphical visualization of the readings and the capability of exporting the data into other software, like excel and other databases.

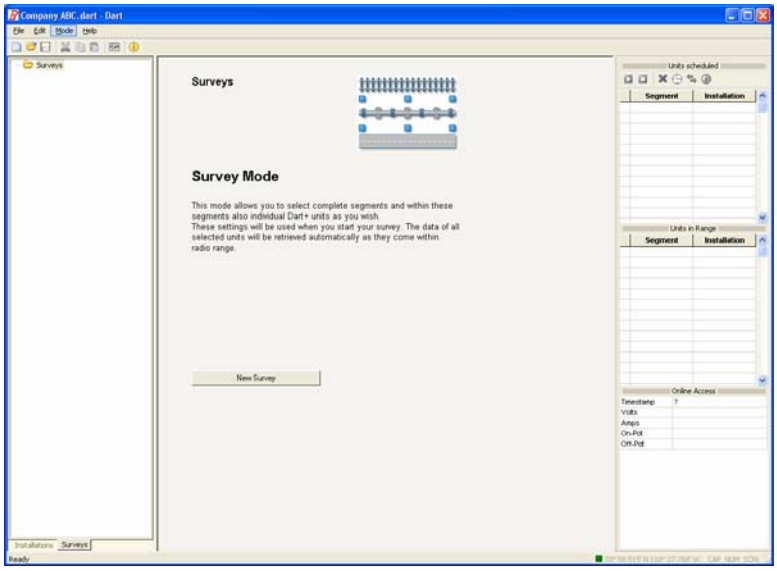
Click on the “Readings subsection of the installation.

To export the data, from the Main Menu go to Edit/Export Readings and Save the file in the default folder “ Dart Projects”



Survey Mode

To enter on this mode, click on the Survey tab on the bottom of the left section of the main screen.



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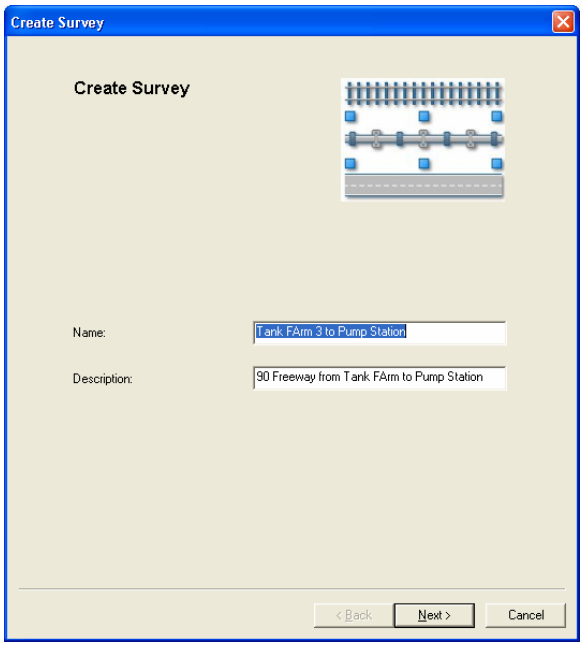
The Survey Mode is an Automatic function that will allow you to Drive by or Fly by Dart Plus units within Scan Range and Automatically collect the information from the Dart Modules previously assigned to a Survey.
The Survey Mode allows you to set the Dart Plus Segments or Installations that you want to include on a Survey.

Create a New Survey
Assign a name and description to the survey, and click on “Next”.



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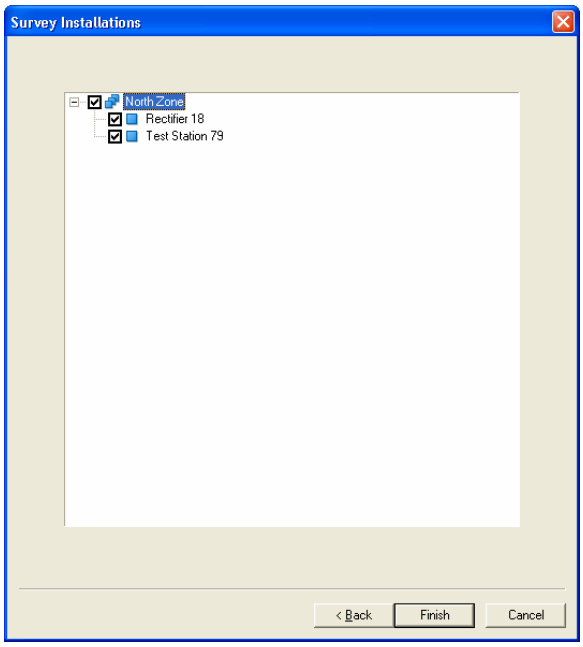
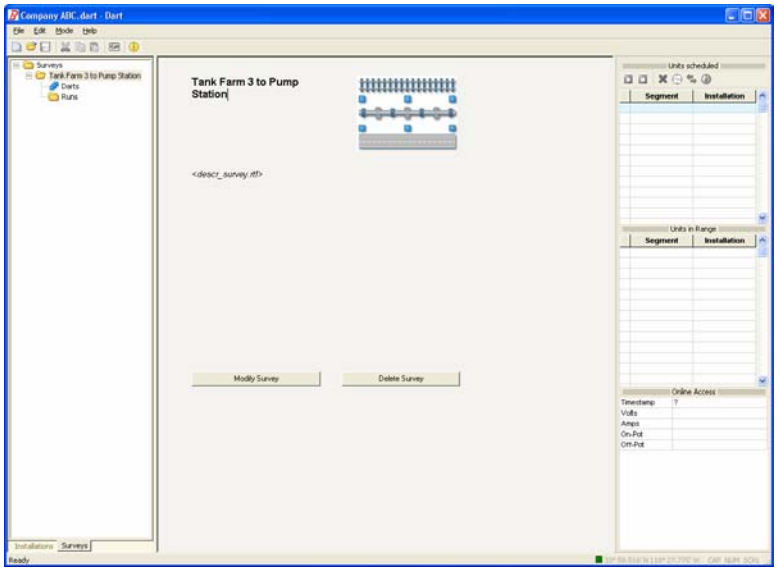
Then, from the list, select the Installations or Whole segments that you want to include on this survey and click on “Finish”



The new Survey will show on the Left Section of the Screen under Surveys.
If you click on the Survey desired survey, you will have the options to Modify the Survey or Delete the Survey.



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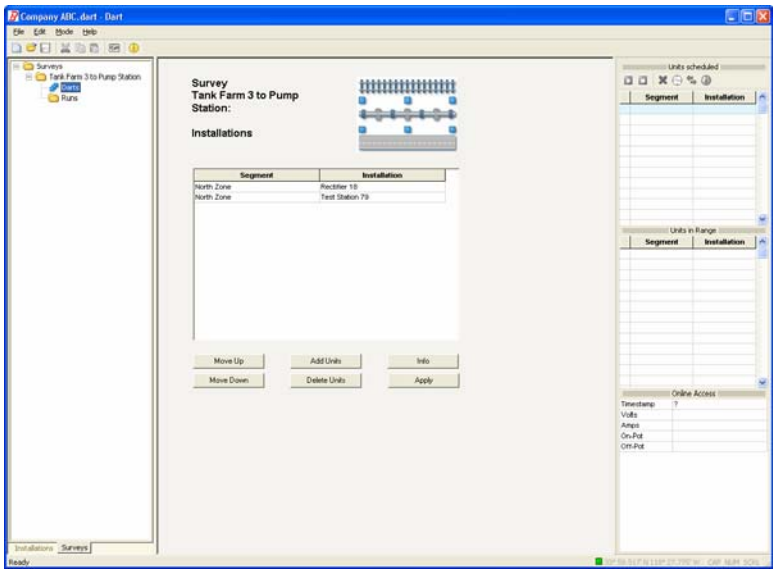
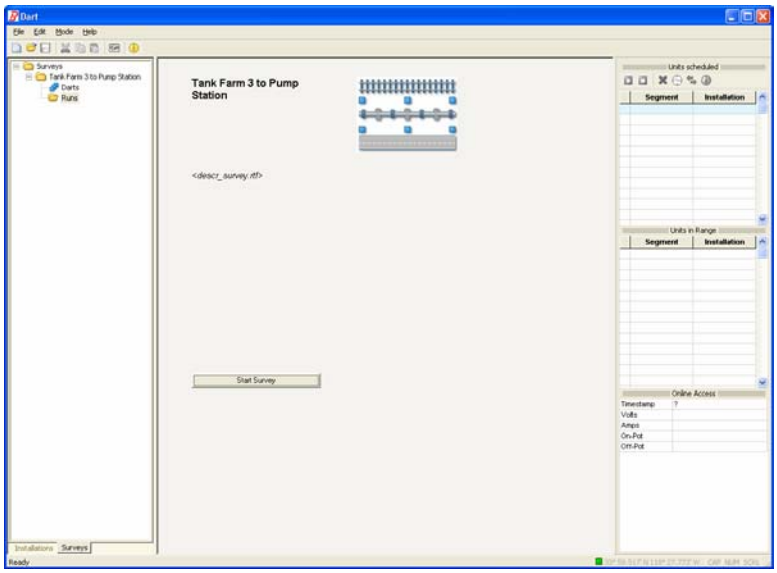
If you Click on the Darts subsection of the survey, it will show you a list of the Darts included in that survey.



Initiate a Survey

To start the survey mode, click on the “Runs” subsection of the desired survey and click on the “Start Survey” button.



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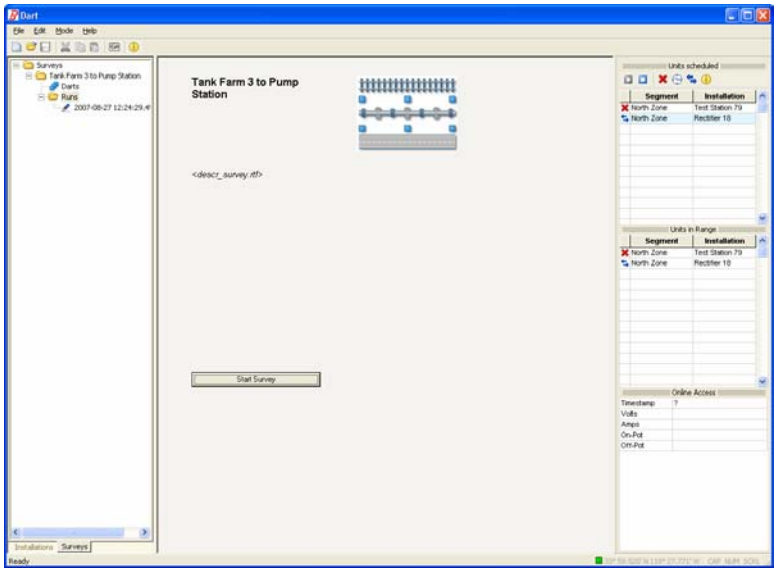
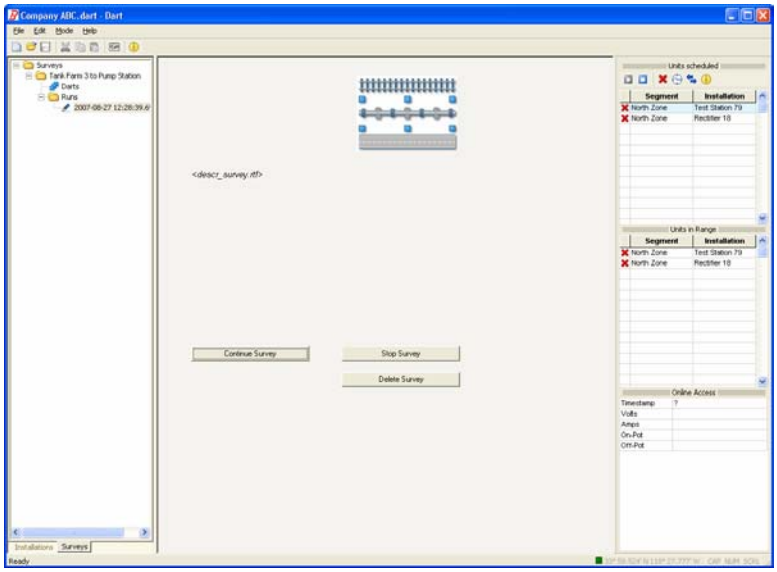
Once you start a survey, the Darts included in that survey will show on the right section of the main screen. The top section shows the scheduled Darts, the middle section shows the Dart units in Scan Range, and the bottom section will display the readings from the last Dart Plus module interrogated.



The Red X means that the survey failed for that Dart Plus unit.
The Clock symbol means that the Interrogator will try to connect to the selected unit.
The Arrows facing opposite sides mean that the interrogator is trying to connect with the Dart Plus unit.

If you click on the desired Run section, the middle screen below will display and allow you to select between “Stop Survey”, “Continue Survey” or “Delete Survey”.



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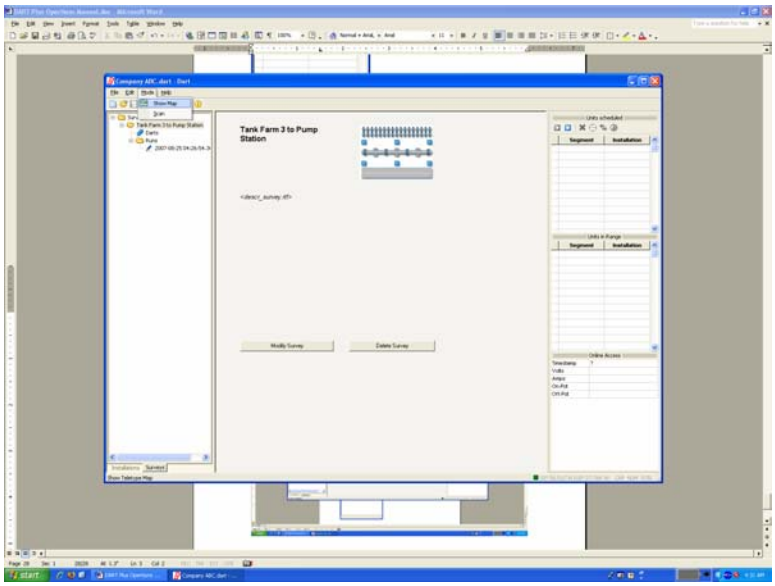
Map Mode

To switch the screen into map Mode, on the Main Menu go to Mode and select show map. The map will show on the left side of the screen.



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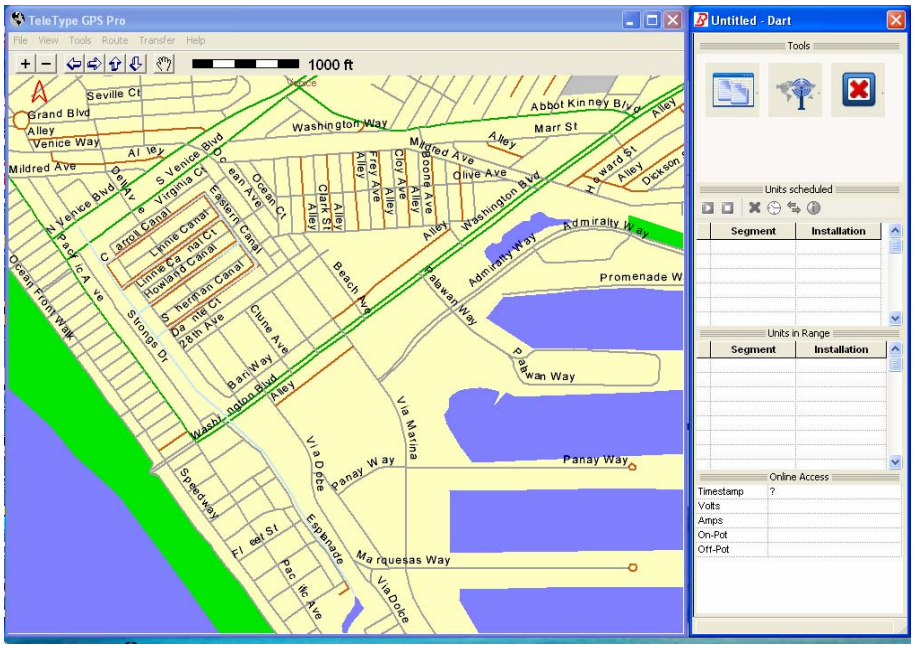
To return to the Main Screen mode click on the documents icon.
To Scan click on the antenna icon.
To quit click on the red X in blue square icon.



If you have any questions regarding this manual or the Operation of the Dart Plus Software or Dart Plus modules, please contact our Technical Support Engineers at 310-822-100

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