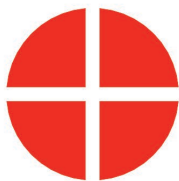


Read 11 Operations Manual

***Multiple-Readout Display Software
for 15 Targets***

Version 1.0.0

***May 2020
Revision D***



**HAMAR
LASER®**
ALIGN WITH THE BEST

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Multiple Display Readout Software– System Requirements

Hardware Requirements

Quantity	Device Model # / Description
1	A-910 Radio Transceiver or A-910-2.4ZB
15	A-1519-2.4ZB Unitargets
1	USB Cable
1	A-910 Power Supply
15	A-1519 Power Supply/Charger

Software Requirements

Quantity	Description
1	Common USB Driver
1	Read11 Multi-Readout Software, version 1.0 or later

Installing and Configuring the Hardware

Warning!

Do not plug the A-910 into your computer's USB port before installing the USB driver.

Ensure that the A-910 Radio Transceiver and all the A-1519 Targets are fully charged. The A-910 Radio Transceiver requires a Windows driver to communicate with Hamar Laser Software. This driver must be installed *prior* to connecting the A-910 to your computer and installing the Readout software.



Figure 1 -- A-910 Rear Panel

1. Connect the A-910 power supply (see Figure 1, #4).
2. Browse the installation CD to locate the *Common USB Driver* folder. Click the **Setup** icon in this folder and follow the instructions to install the driver. Restart the computer if required.
3. Plug one end of the USB cable into the A-910 USB port (see Figure 1, #2). Plug the other end of the USB cable into a USB port on the computer.
4. Power on the A-910 (see Figure 1, #3).
5. Follow the screen prompts to complete installation of the USB driver.

Verify that the driver is installed and that a virtual COM port has been created for the A-910 Radio Transceiver.

1. Open the **Control Panel** and click the *System* icon to open **System Properties**.
2. Click the **Hardware** tab and select *Device Manager*.



Figure 2 -- System Properties

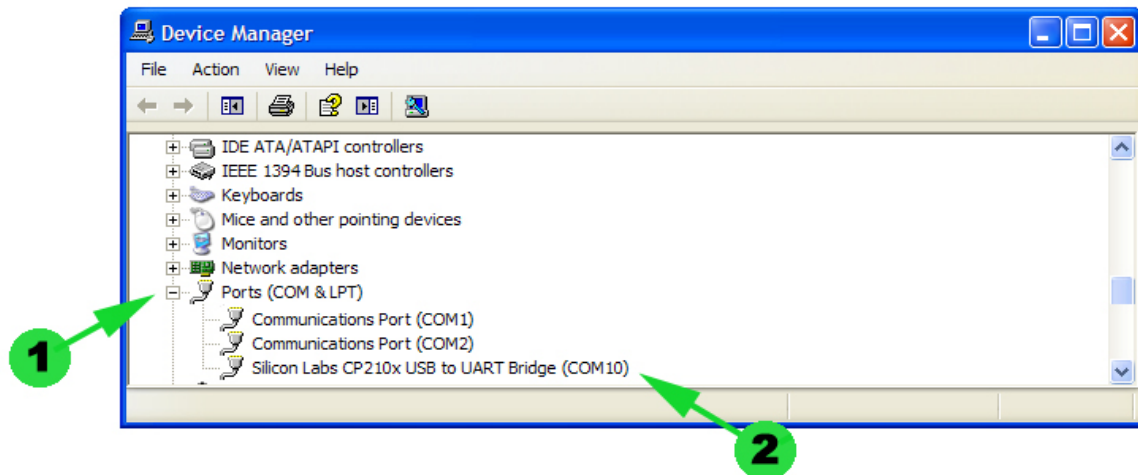


Figure 3 -- Device Manager Screen

3. Scroll down the list of devices to Ports (COM & LPT) shown in Figure 3, #1. Click the + (plus sign) to expand this section and display all available ports. The virtual COM port (see Figure 3, #2) assigned to the A-910 is listed as *Silicon Labs CP210x USB to UART Bridge*.
4. In Figure 3, COM10 is assigned as the A-910 virtual COM port that the software uses to communicate with the A-910 Radio Transceiver and the A-1519 Targets. Your computer may assign a different port number. Jot down the virtual COM port number assigned by your computer, as you will need this port number to configure the software.

Configuring the Radio Network

Configuring the A-910 Radio Transceiver

All A-1519 targets must be configured to communicate with the Software through the A-910 Radio Transceiver by performing the following steps.

NOTE: Ensure that the Power LED is ON, the Low Battery LED (4-1) is OFF, the USB Link LED (4-2) is ON, and the TX and RS LEDs (4-3) are OFF. The Bluetooth LEDs (4-4) are not used.



Figure 4 – A-910 Front Panel

1. **Set the A-910 System ID**
Use a small screwdriver to rotate the switch (see Figure 4, #5) so that the arrowhead points to the desired setting (1 through 9). The default setting is System ID = 1.
2. **Set all A-1519 Targets to the same System ID**
Use a small screwdriver to rotate the switch (see Figure 5, #1) so that the arrowhead points to the same setting as the A-910 System ID selected in Step 1.
3. **Set the Target Network ID for all targets**
These settings should be in accordance with the Wing Alignment Station position number 01 to 15.



Figure 5 – A-1519 System ID and Network Switches

4. **To set Target Network ID 01 to 09**
Use a small screwdriver to rotate the switch (see Figure 5, #2A) so that the arrowhead points to 0. Rotate the switch (see Figure 5, #2B—lowest switch) to 1-9.
5. **To set Target Network ID 10 to 99**
Use a small screwdriver to rotate the switch (see Figure 5, #2A) so that the arrowhead points to the first digit of the ID number, and then rotate the switch (see Figure 5, #2B) to the second digit of the ID number. **For example: If Target Network ID=9, set switch 2A to 0 and switch 2B to 9.**

Configuring the A-910-2.4ZB Computer Interface

The A-910-2.4ZB computer interface is a small, compact USB dongle wireless receiver that communicates with up to 99 A-1519-2.4ZB targets. Power is supplied by a laptop computer's USB port.

Pre-installing the Common USB Port Driver (A-910-2.4ZB)

This driver is required for the A-910-2.4ZB Transceiver and to communicate with targets via the computer's USB port. The driver creates a virtual COM Port that is recognized by the applications as a standard serial port.

***Note:** You must pre-install this driver prior to connecting the device(s) to the computer through the USB port.*



Figure 6 – A-910-2.4ZB Dongle

Installing the Driver

1. Insert the A-910-2.4ZB Radio Programmer CD in the CD ROM drive.
2. Select **My Computer**, locate the CD ROM icon and click to open it.
3. Select the USB Drivers folder.
4. Select the correct Operating System installed on your computer (Windows 2000, Windows XP, etc.) and open the folder.
5. Locate the **CP210x_VCP** icon and click to initiate the installation process. The **Install Driver** dialog box displays.
6. Click **Browse** to select an installation folder different from the default folder (optional).
7. Click **Install** to continue. Once the installation is complete, the **Installation Successful** message displays.

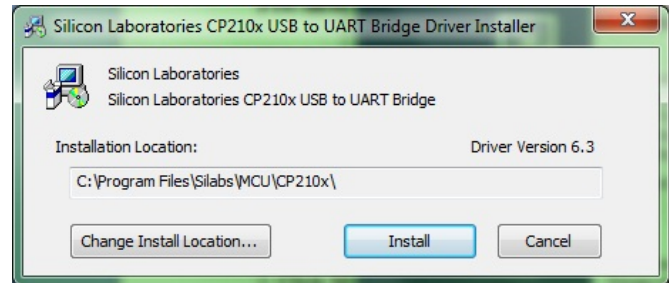


Figure 7 - USB Common Driver Install

Installing the A-910 Utility Software

1. Insert the A-910-2.4ZB Radio Programmer CD in the CD ROM drive.
2. Select **My Computer**, locate the CD ROM icon and click to open it.
3. Locate the **Setup** icon and click to initiate the installation process. Click **NEXT** to continue.
4. Click **Browse** to select an installation folder different from the default folder (optional).
5. Click **Next** to continue. Once the installation is complete, the **Installation Complete** message displays. Select **Close**.

Configuring the Hardware and Utility Settings

1. Insert the A-910 AB dongle into any unused USB port. The computer should automatically assign a COM port number to the dongle.
2. Start the A-910 Utility Software. The software should display the COM port assigned to the Zigbee Dongle (see Figure 8). If the utility does not automatically detect the COM port, it must be manually selected (see *Manually Selecting a COM Port* on Page 7).
3. The Target System ID or R-1307 CH (channel) is the number associated with the A-1519/1520 targets or R-1307 Readout. If using both the A-1519/1520 targets and an R-1307 Readout, both need to be set to the same system ID and channel (see Figure 9). Also see the R-1307 user manual for more information.

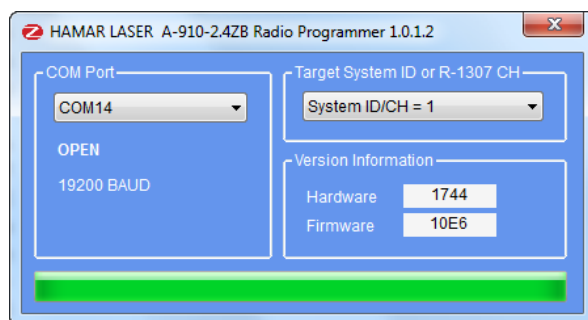


Figure 8 – A-910 Utility showing the COM Port, System ID and Channel settings

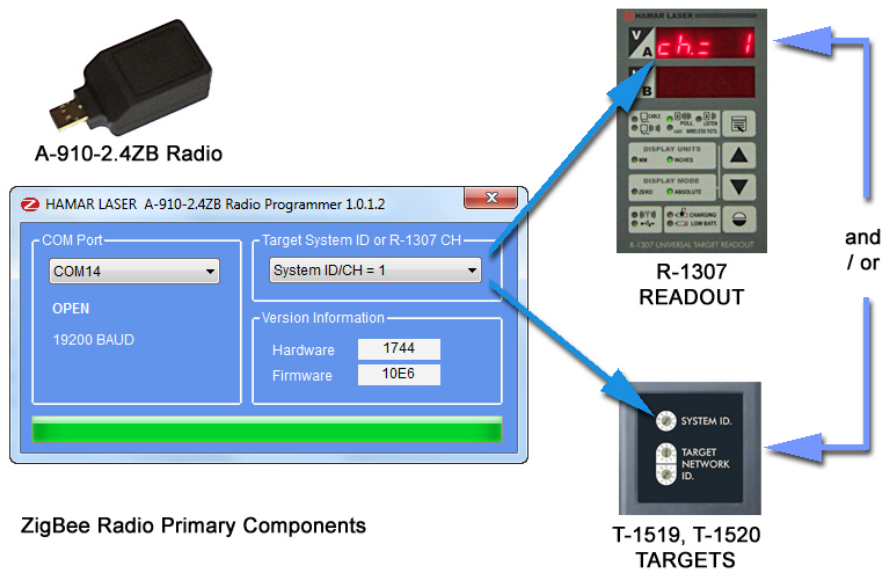


Figure 9 – System ID Setup

Manually Selecting the COM Port

The A-910 Utility should automatically detect the COM Port upon startup. If not, use the following steps to locate the correct COM Port.

Windows XP

1. Right-click My Computer.
2. Click **Properties** and then select the **Hardware** tab.
3. Click **Device Manager**.

Windows 7

1. Click the **Start** button and select **Control Panel**.
2. Click the **System** icon.
3. In the **System** window, click on the Device Manager link located under the **System** heading.
4. In Device Manager, scroll down to **Ports**. Expand the listings under **Ports** to reveal all the ports installed.
5. Locate **SILICONLABS CP210x to UART Bridge (COM x)** as shown in Figure 10.
6. Note the COM Port listed and select that COM Port in the A-910 Zigbee Utility software using the drop-down arrow (see Figure 8).

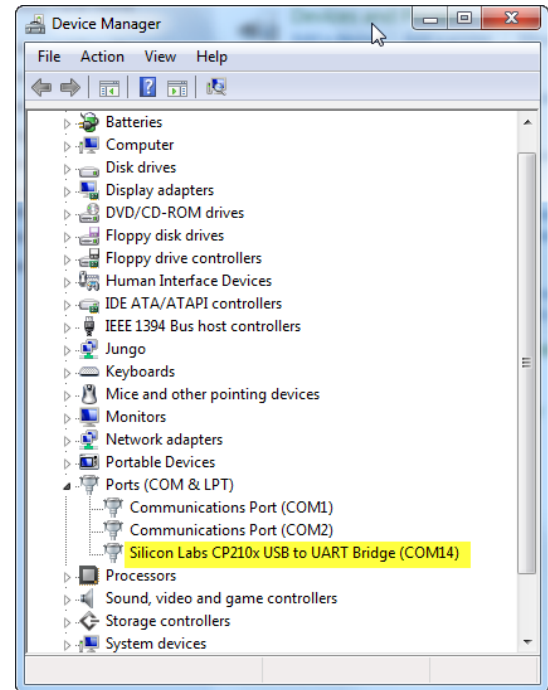


Figure 10 -- Device Manager showing COM Port for A-910 Dongle

Installing and Registering the Software

Run the software setup program from the installation CD and follow the screen prompts. The application should start automatically following a successful installation. If it does not start automatically, locate the software shortcut in the Programs Menu to start it.

The first time the application runs, the following screen displays. The red areas with the Padlock icon indicate the Computer Station License is not installed.

The Station License file is located in **My Documents\Read11 READOUT\LICENSES**.
License files have a .key extension



Figure 11 – Read 11 Opening Screen, license information not installed (locked)

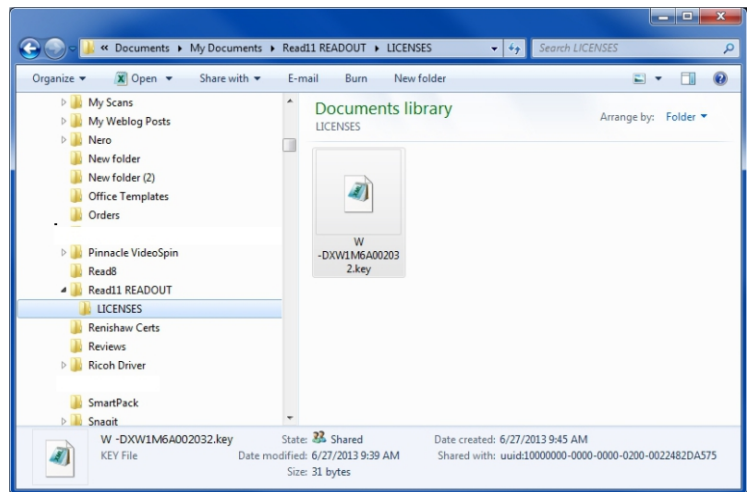



Figure 12 – License file location

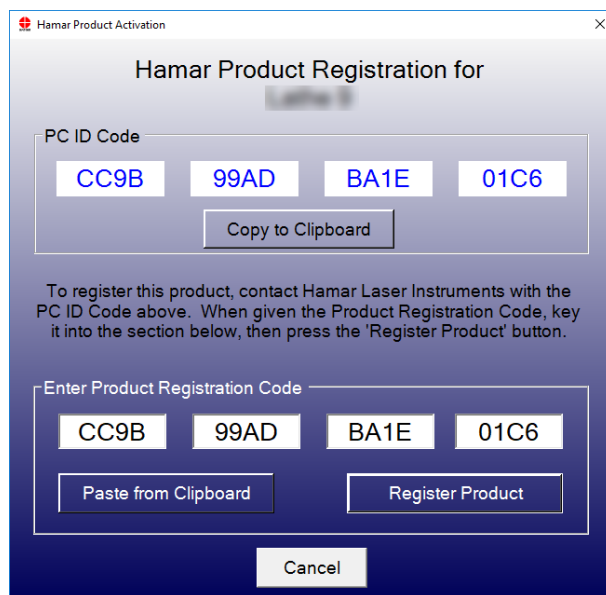
Hamar Product Registration

In order to protect against software pirating, we have implemented a simple product registration procedure. After a Hamar product is installed and when the program is run for the first time, the user is prompted to enter the Product Registration Code (see Figure 13). To obtain the Product Registration Code, send the PC ID Code (automatically generated) displayed on the screen to Hamar Laser Support (Support@hamarlaser.com). A Hamar representative will issue a Product Registration Code via email to complete the registration process. Enter the Product Registration Code and click **Register Product** (see Figure 14). The product is now registered.



The screenshot shows a window titled "Hamar Product Activation" with a close button (X) in the top right corner. The main heading is "Hamar Product Registration for" followed by a blurred label. Below this, there is a section labeled "PC ID Code" containing four white buttons with blue text: "CC9B", "99AD", "BA1E", and "01C6". A "Copy to Clipboard" button is positioned below these. A text block instructs the user: "To register this product, contact Hamar Laser Instruments with the PC ID Code above. When given the Product Registration Code, key it into the section below, then press the 'Register Product' button." Below the instruction is a section labeled "Enter Product Registration Code" with four empty white input boxes. Below these boxes are two buttons: "Paste from Clipboard" and "Register Product". At the bottom center is a "Cancel" button.

Figure 13 – Product Registration Screen



This screenshot is identical to Figure 13, showing the "Hamar Product Activation" window. The "PC ID Code" section and the registration instructions are the same. However, in the "Enter Product Registration Code" section, the four input boxes now contain the same values as the PC ID Code buttons: "CC9B", "99AD", "BA1E", and "01C6". The "Paste from Clipboard" and "Register Product" buttons remain at the bottom of this section, along with the "Cancel" button at the very bottom of the window.

Figure 14 – Enter Product Registration Code

Display modes: *Combined View* displays all target position readings and warnings and the data log. The two *Full Screen* modes show either group of targets (1-10 or 11 to 15).



COMBINED VIEW



FULL SCREEN - PRIMARY AND AUX. TARGETS (ID = 1 TO 10)

SWITCHING VIEWS:

FROM THE COMBINED VIEW,
CLICK ONE OF THE MAGNIFY
ICONS TO SHOW THE RESPECTIVE
SECTION IN FULL SCREEN MODE.

KEY SHORTCUTS:

ESC - EXIT FULL SCREEN VIEW
AND RETURN TO COMBINED
VIEW

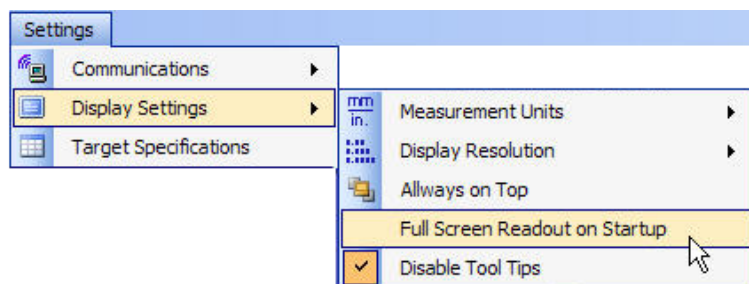
F2 - SHOW PRIMARY AND AUX.
VIEW - FULL SCREEN

F3 - SHOW AUX. SPAR VIEW
ONLY - FULL SCREEN



FULL SCREEN - AUX. SPAR TARGETS (ID = 11 TO 15)

To enable *Full Screen* mode
on startup, click
Settings>Display Settings
and select **Full Screen
Readout on Startup**.



Configuring the Readout Software

Click **Settings** to configure the application. Configurable options are:

- **Communications**
Select COM port assigned to A-910 Transceiver
- **Display Settings**
Units, resolution and other display options.
- **Target Specifications**
Target Description, Tolerances and Offsets

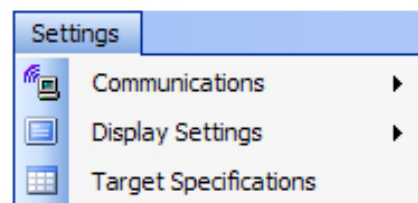


Figure 16 – Settings Menu

Configuring the Communications Port

Click **Communications** to display all available COM ports and select the COM port used by the A-910 Radio Transceiver (see Figure 3).

Observe the TX LED (see Figure 4, #3) located on the front panel of the A-910 Radio Transceiver. This LED should start blinking to indicate that the application is polling the targets to transmit data. If the targets are powered up and properly configured, the RX LED (see Figure 4, #3) will also blink to indicate that the A-910 is receiving data from one or more targets. At the same time, the target position readings should appear in the Display Area of the software (see Figure 15).

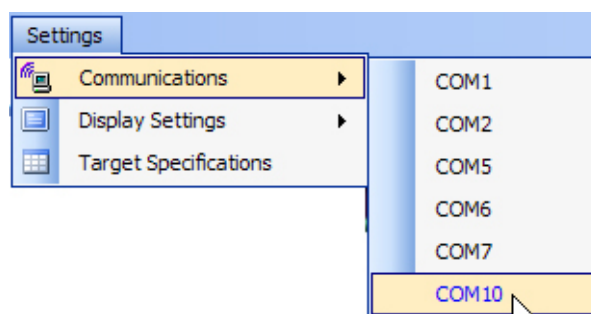


Figure 17 – COM Port Selection

Figure 18 displays a normal position indication. The position value is green on a dark background. Position is within tolerance and no errors are detected.



Figure 18 – Normal Position Indication

Figure 19 displays a valid position indication, but the position value is outside of the tolerance specification. The foreground color changes to red to indicate a warning condition.



Figure 19 – Position Out of Tolerance

When the target is outside the specified tolerance, an arrow displays indicating the direction to move the target to bring it within tolerance.

The target readout boxes may also indicate the following status conditions:

A blank target readout box indicates that the A-910 Radio transceiver is not receiving data from the target. Make sure that the target is powered on and that the A-910 is connected as described in *Configuring the Communications Port* on Page 12.



OFFTGT indicates that the A-910 is receiving data from the target but the target is not detecting the laser beam. Ensure that there is a clear line-of-sight between the laser and the target.

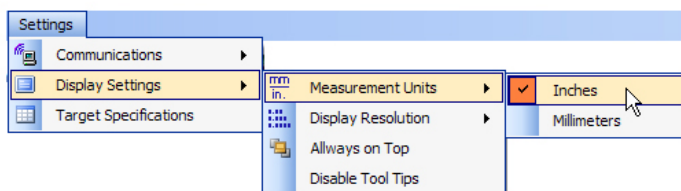


LOBAT indicates that the target battery is below 10 percent of capacity and less than one hour from shutting down. Check the target and connect the power supply/charger as soon as possible.



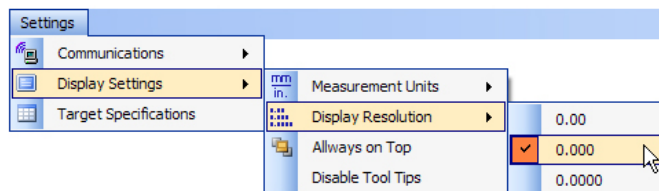
Configuring Measurement Units

Click **Display Settings>Measurement Units** to select the measurement units (inches or millimeters).



Configuring Display Resolution

Click **Display Settings>Display Resolution** to select the number of decimal places to display (2, 3 or 4 decimal places). The latter is available only when the Measurement Units are set to inches.

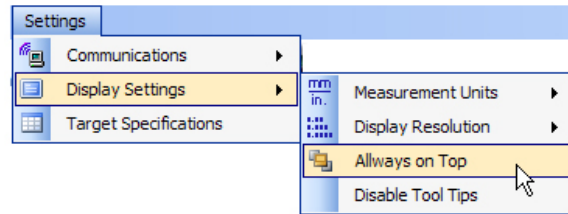


Other Options

Always on Top

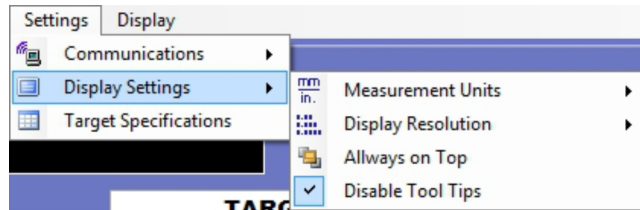
If checked, the main application display in the front, on top of all other windows.

Note: *Disable this option for full-screen mode.*



Disable Tool Tips

Some sections of the software show tool tips when a user hovers the mouse cursor over a control that has that capability. Check this option to keep tool tips from being displayed.



Target Specifications

Click **Target Specifications** to edit the description, tolerance and offset specifications of the measuring targets.

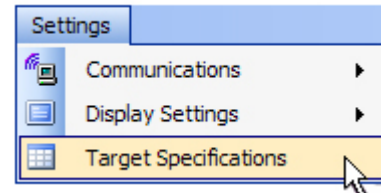
A screenshot of the 'TARGET SPECIFICATIONS' dialog box. The title bar says 'TARGET SPECIFICATIONS'. Inside, there's a section 'Target Description, Tolerances and Offsets' with 'UNITS: Inches'. Below this is a table with 6 columns: TGT ID, READOUT BOX LABEL, + TOL., - TOL., OFFSET, and INVERT TGT. The table contains 15 rows of data for targets 1 through 15. At the bottom, there are controls for 'Description and Tolerances' (including an 'EDIT SELECTED TARGET:' button and tolerance input fields), an 'Invert Target Position' section with radio buttons for NO, YES, and ALL, and a 'Zero Target' section with 'OFFSET' and 'ZERO TGT.' buttons and a 'CLEAR OFFSET' button. An 'APPLY' button is at the bottom left, and a checkbox for 'Same Positive and Negative Tolerance' is at the bottom center.

Figure 20 – Target Specifications List

Editing the Target Display Box Label (Description) and Tolerances

1. Click on the list to select a target to edit.
2. Enter the new data in the three text boxes located below the list.
3. Click **APPLY** to overwrite the previous data.
4. Repeat Steps 1-3 to edit other targets.

Note: *Select Same Positive and Negative Tolerance to enter the same value for both positive and negative tolerance.*

Editing the Target Zero Reference (Offset) – Manual Mode

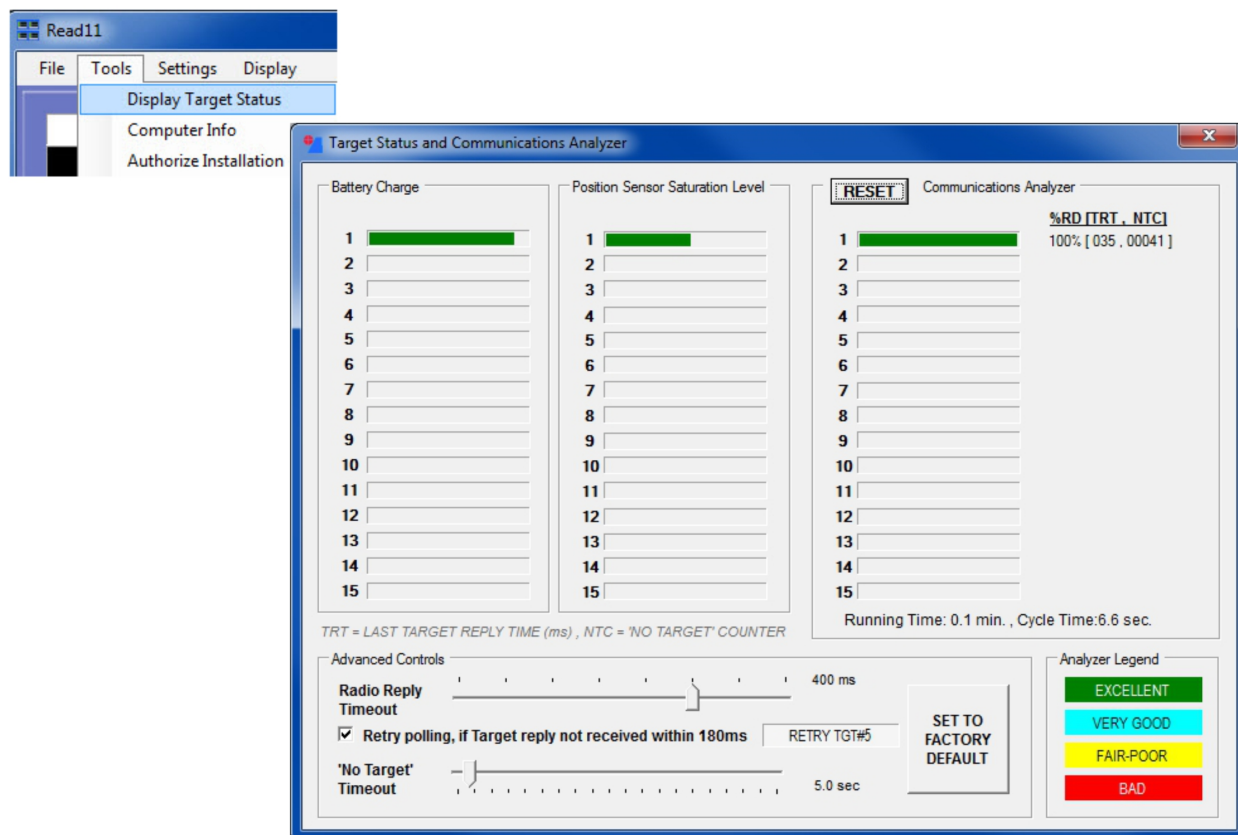
1. Click on the list to select a target to edit.
2. Enter the new data in the offset box.
3. Click **APPLY** to overwrite the previous data.
4. Repeat Steps 1-3 to edit other targets.

Editing the Target Zero Reference (Offset) – Automatic Mode

1. Mount the target on the Monument Tool and make sure that the target displays a valid reading.
2. Click on the list to select a target to zero (*see* Figure 20).
3. Click **ZERO TGT** to automatically calculate and apply the offset.
4. Repeat Steps 1-3 to edit other targets.

Using the Target Status and Communications Analyzer

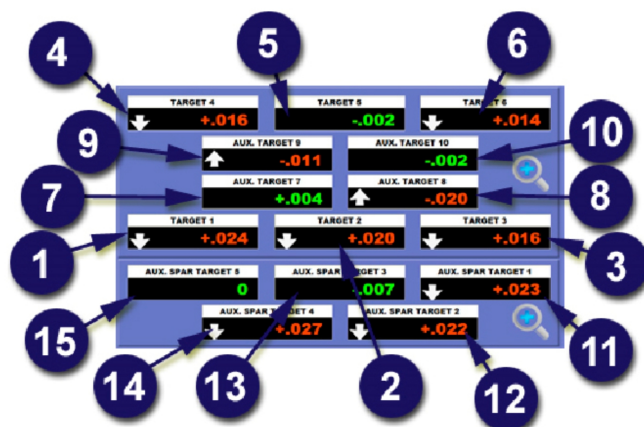
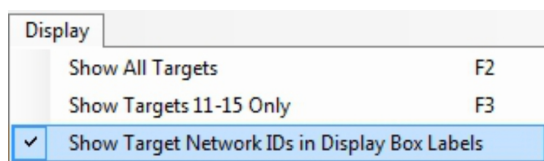
Click **Tools>Display Target Status** to display the *Target Status and Communications Analyzer*. This tool allows you to view targets to check battery levels, target saturation levels and to ensure a target is communicating with the A-910 Computer Interface. Each target is listed by number and will display the TRT information (Target Reply Time) and NRC information (No Target Counter). Timeouts may be adjusted by using the slider bar at the bottom, and the Analyzer Legend indicates how each target is responding.



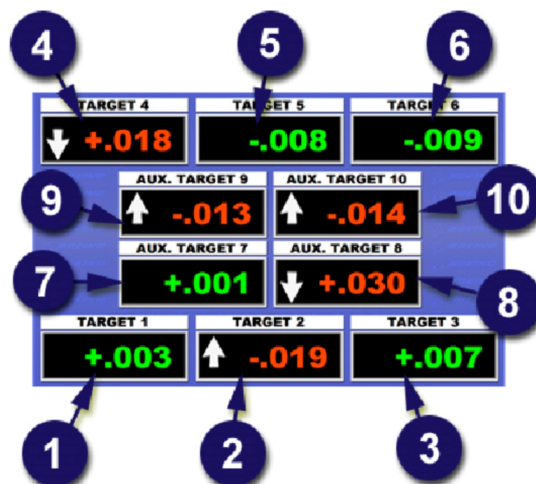
Display Box Target Assignments

Each of the 15 targets is assigned a fixed Display Box location, by Target Network ID. The target with the ID matching the number shown in the following image is always displayed at the indicated location. Refer to Page 14 for instructions on how to configure the Target Network IDs.

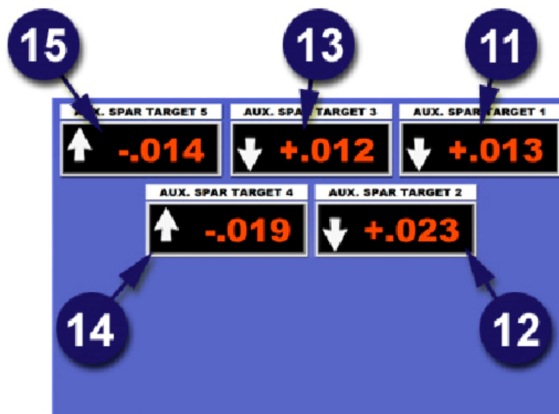
To aid in the setup process, you can display the Target Network IDs instead of the Custom Target Description in the Readout Box Labels. That feature is available from the Display Menu.



COMBINED VIEW

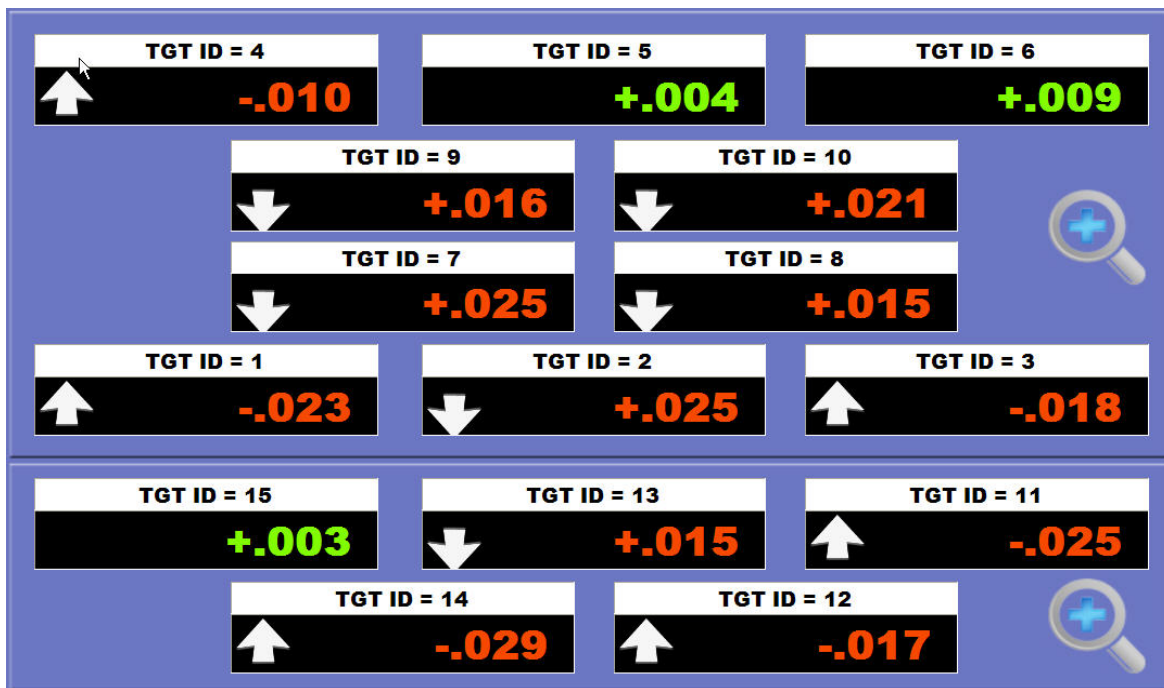


PRIMARY + AUX. VIEW



AUX. SPAR VIEW

When checked, each readout box label will display its Target Network ID, as shown below. Uncheck this feature for normal operation.



Starting an Alignment Project

Select **New Project** from the File Menu to enter information to identify the project.

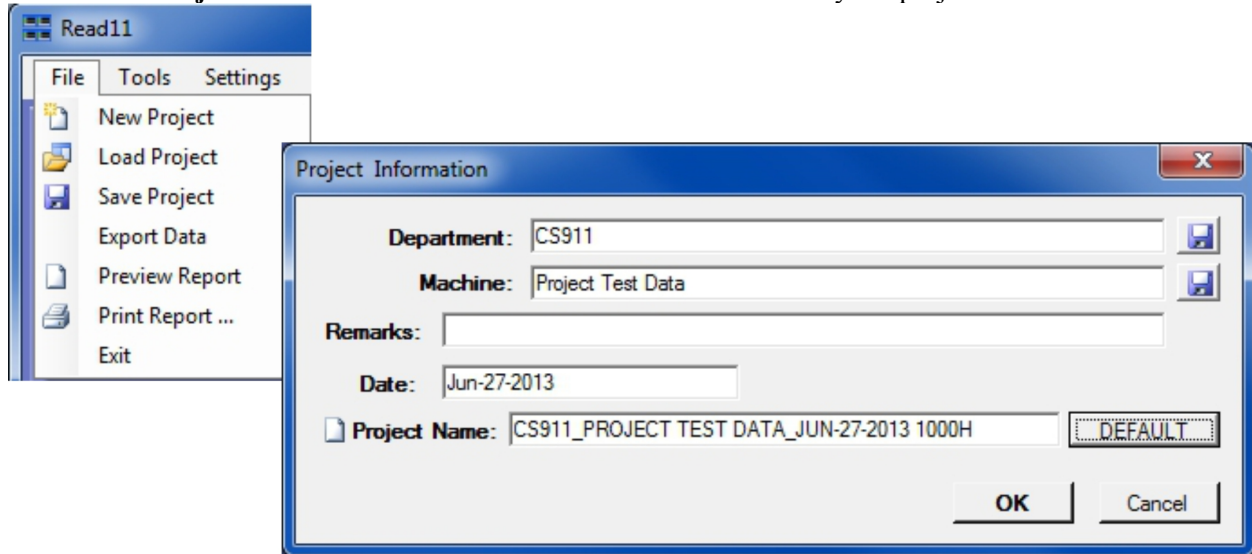


Figure 21 – Project Information

This information is used in the report header and all fields are mandatory, with the exception of *Remarks*. The project name is also used as the data file name for the project. The default project name, shown above, is a compilation of the Control Station Number + Read11 Multi-Readout Software + Date + Time. This is the name that is automatically entered if you click **Default**. You may edit the project name, but you may not use characters that are invalid for a Windows file name.

To save defaults for Control Station and/or Read11 Multi-Readout Software, enter the default values to display every time a new project is started. Click the diskette icon next to each field to save the information.

Click **OK** to continue.

Recording Data

Using the Readings Table

Data is recorded using three buttons located in the **RECORD DATA** panel at the bottom of the screen (see Figure 22).

When you begin a new project, only the **AS FOUND** button is enabled. Click **AS FOUND** when you are ready to log the first set of data. When the first set of data is added to the readings table, the **IN PROCESS** button is enabled. Up to twenty **IN PROCESS** readings may be recorded (see Figure 23).



Figure 22 – The Record Data Panel

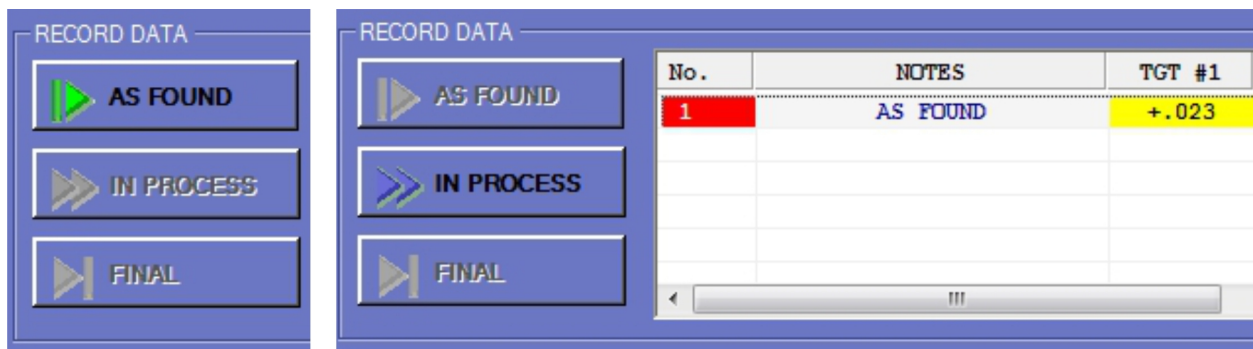


Figure 23 – As Found and In Process buttons

The **FINAL** button (see Figure 24) is enabled after the first **IN PROCESS** reading is taken. Use the **FINAL** button to log the last set of data and close the project.

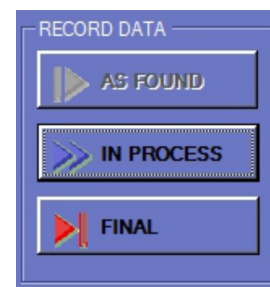


Figure 24 – The Final button

Editing the Data Log

Data may be deleted from the readings table and notes may be edited, as long as the project is active. *No changes can be made to the data once the project is closed.*

To delete a row from the table:

1. Right-click on the row to select it and display the Edit Menu
2. Click **Delete Selected**

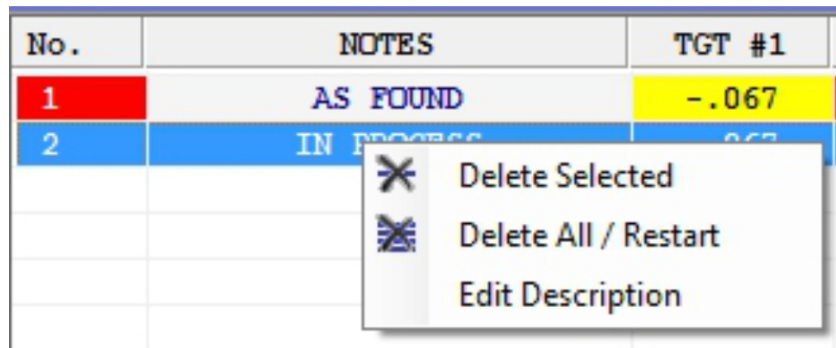


Figure 25 – The Table Edit menu

To delete all rows in the table:

1. Right-click on any row to display the Edit Menu
2. Click **Delete All / Restart** to clear all data

To edit NOTES:

1. Right-click on the row to select it and display the Edit Menu
2. Click **Edit Description** to display the **Edit Dialog** box.
3. Enter the new description and click **OK**.

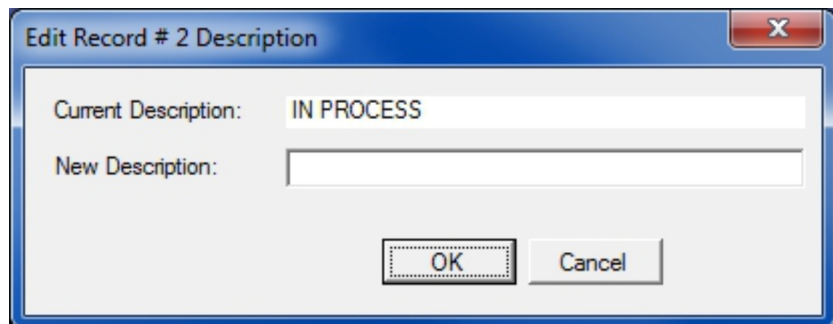


Figure 26 – Editing notes

Saving/Exporting Data and Printing Reports

To save all data related to the active project, click **File>Save Project**. Project files are saved with a file extension of **.axd**. These files may be retrieved at any time for the purpose of printing reports or exporting data to either a **.TXT** file (tab delimited text format, suitable for importing into Microsoft Excel) or an **.RTF** file (Rich Text Format, suitable for loading into a Microsoft Word document). Click **Export Data** to save the data in one of the two formats.

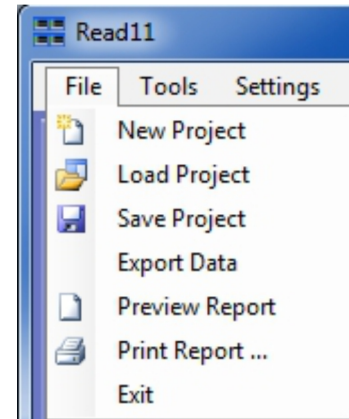


Figure 27 – The File Menu

- Click **Preview Report** to preview how the report will be printed.
- Click **Print Report** to select the printer, to preview the report and to print it.
- Click **Exit** to close the application.

Control Station: CS910P2
Vertical Fin LN: LN0001
Remarks:
Date: Sep-27-2010
Project Name: CS910P2_LN0001_SEP-27-2010 1430H

Units: inches

RECORDED DATA:

No.	NOTES	TGT #1	TGT #2	TGT #3	TGT #4	TGT #5	TGT #6	TGT #7	TGT #8	TGT #9	TGT #10
1	AS FOUND	-002	-025	-012	-006	-027	+016	-013	+001	+014	+013
2	IN PROCESS	-021	+029	+004	+026	-012	+016	+022	-003	+013	+021
3	IN PROCESS	-023	-024	-018	+010	-024	+015	+006	-004	-026	-010
4	IN PROCESS	+004	+016	-019	-009	-006	-004	+027	+029	+012	-025
5	IN PROCESS	+016	-004	0	-027	-013	-002	+029	-024	-029	+027
6	IN PROCESS	-020	+064	-016	-023	+004	+016	+016	+003	0	+003
7	IN PROCESS	-014	+002	+008	+001	-001	-019	-027	+003	+024	+013
8	FINAL	+020	+029	+026	+020	-028	-009	+001	0	-015	-011

COLOR LEGEND: WITHIN TOLERANCE OUT OF TOLERANCE ERROR

TARGET DESCRIPTION AND SPECIFICATIONS:

TGT #	STATION LOCATION / DESCRIPTION	TOLERANCE (+)	TOLERANCE (-)	OFFSET
1	TARGET 1	+010	-010	0
2	TARGET 2	+010	-010	0
3	TARGET 3	+010	-010	0
4	TARGET 4	+010	-010	0
5	TARGET 5	+010	-010	0
6	TARGET 6	+010	-010	0
7	AUX. TARGET 7	+010	-010	0
8	AUX. TARGET 8	+010	-010	0
9	AUX. TARGET 9	+010	-010	0
10	AUX. TARGET 10	+010	-010	0

Figure 28 – Report Preview