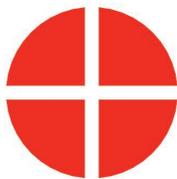


Read 11 Operations Manual

*Multiple-Readout Display Software
for 15 Targets*

Version 1.0.0

March 2019



**HAMAR
LASER**®
ALIGN WITH THE BEST

HAMAR LASER INSTRUMENTS, INC.
www.hamarlaser.com

Five Ye Olde Road, Danbury, CT 06810
Phone: (800) 826-6185 Fax: (203) 730-4611

WARRANTY

Hamar Laser Instruments, Inc., warrants each instrument and other articles of equipment manufactured by it to be free from defects in materials and workmanship under normal use and service, its obligation under this warranty being limited to making good at its factory any instrument and other article of equipment which shall within one year after shipment of each instrument and other article of equipment to the original purchaser be returned intact to Hamar with transportation prepaid, and which Hamar's examination shall disclose to Hamar's satisfaction to have been thus defective; other than this express warranty, Hamar neither assumes nor authorizes any other persons to assume for it any other liability or obligation in connection with the sale of its products.

This warranty is not applicable to instruments or other articles of equipment manufactured by other companies and limited by a warranty extending for less than one year. In such an event, the more limited warranty applies to said instrument or article of equipment.

This warranty shall not apply to any instrument or other article of equipment which shall have been repaired or altered outside the Hamar factory, nor which has been subject to misuse, negligence, or use not in accord with instructions furnished by the manufacturer.

The software described in this manual is furnished under a license agreement and may be used or copied only in accordance with the terms of the agreement. It is against the law to copy the software on any medium for any purpose other than the purchaser's personal use.

The information in this manual is subject to change without notice. No part of this manual may be reproduced by any means, electronic or mechanical, without written permission from Hamar Laser Instruments, Inc.

**© 2013, Hamar Laser Instruments, Incorporated, 2019
5 Ye Olde Road, Danbury, Connecticut 06810**

Table of Contents

Multiple Display Readout Software– System Requirements	1
Hardware Requirements	1
Software Requirements	1
Installing and Configuring the Hardware	2
Configuring the Radio Network	4
Configuring the A-910 Radio Transceiver.....	4
Configuring the A-910-2.4ZB Computer Interface.....	5
Pre-installing the Common USB Port Driver (A-910-2.4ZB).....	5
Installing the A-910 Utility Software	5
Configuring the Hardware and Utility Settings	6
Manually Selecting the COM Port.....	7
Installing and Authorizing the Software.....	8
Authorization Procedure	9
Display Layout and Modes	10
Configuring the Readout Software	12
Configuring the Communications Port	12
Configuring Measurement Units.....	13
Configuring Display Resolution.....	13
Other Options	14
Target Specifications.....	14
Editing the Target Display Box Label (Description) and Tolerances	15
Editing the Target Zero Reference (Offset) – Manual Mode	15
Editing the Target Zero Reference (Offset) – Automatic Mode.....	15
Using the Target Status and Communications Analyzer	16
Display Box Target Assignments	17
Starting an Alignment Project.....	19
Recording Data	20
Using the Readings Table	20
Editing the Data Log	21
Saving/Exporting Data and Printing Reports.....	22

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

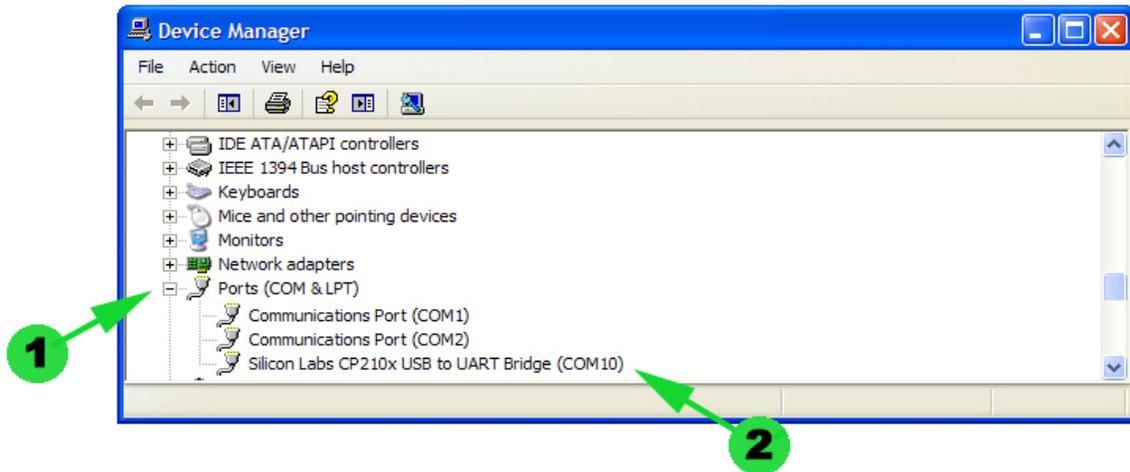


Figure 3 -- Device Manager Screen

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.

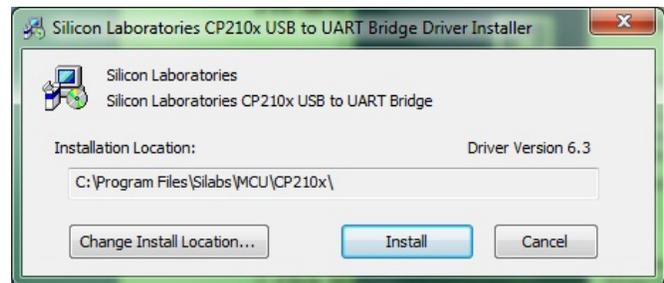


Figure 7 - USB Common Driver Install

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.

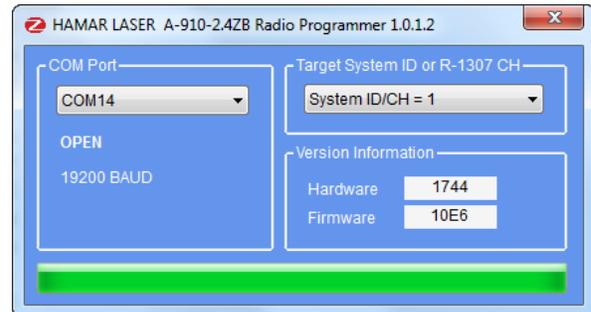


Figure 8 – A-910 Utility showing the COM Port, System ID and Channel settings

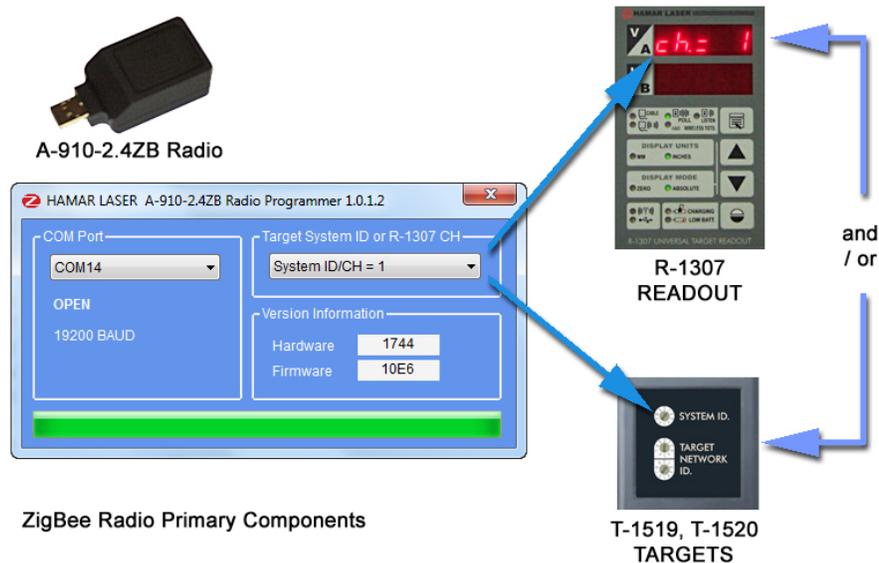


Figure 9 – System ID Setup

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).

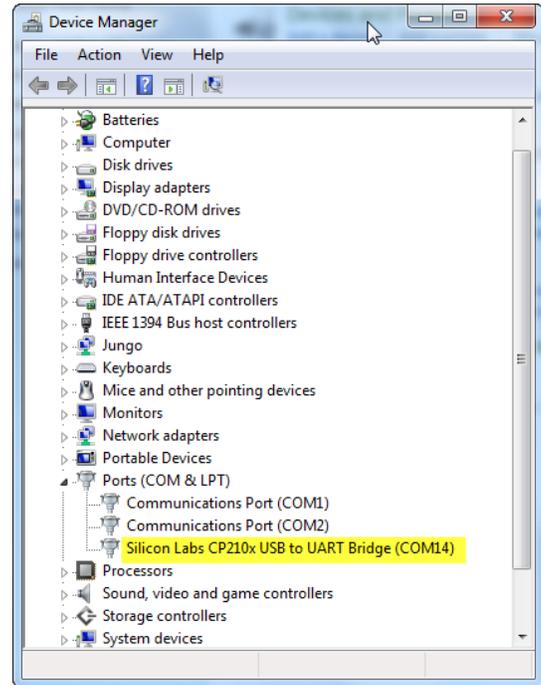


Figure 10 -- Device Manager showing COM Port for A-910 Dongle

Installing and Authorizing 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)

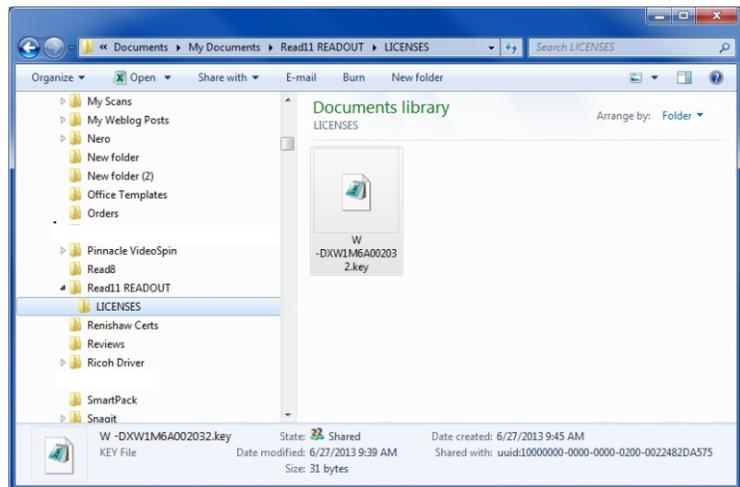


Figure 12 – License file location

Authorization Procedure

1. Click **Tools** and select **Authorize Installation**.
2. Call Hamar Laser's Customer Support Department or e-mail licensing@hamarlaser.com with the HD Serial Number that displays in Box 1. Hamar Laser will provide you with a 28 digit authorization key that can only be used on that computer station.
3. Enter the authorization key in Box 2.
4. Click **Authorize and Save** to validate and save the license.

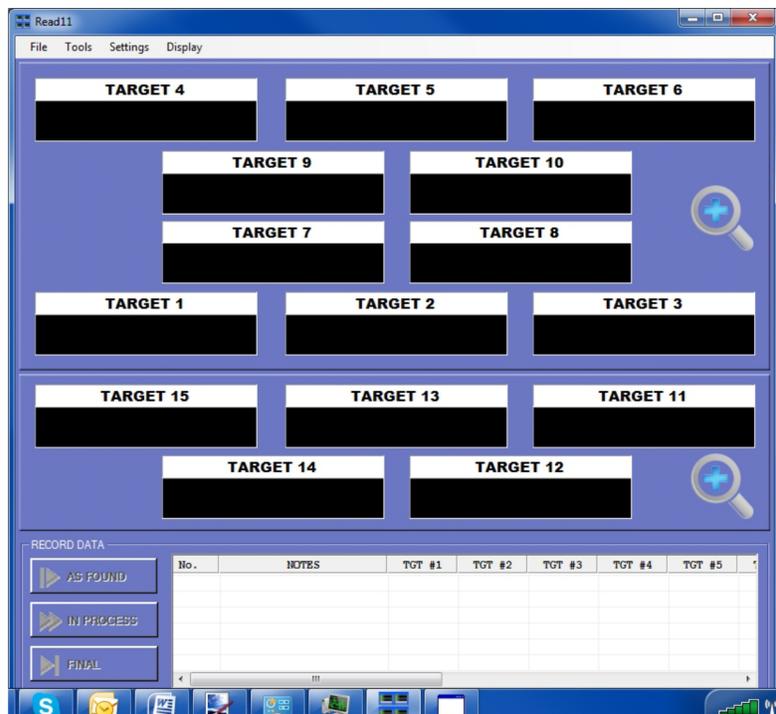


Figure 13 – Read 11 Opening Screen, license information installed (unlocked)

Display Layout and Modes



Figure 14 –Application Layout, combined view

Menu Area: Contains drop-down menus for various functions.

Target Display Area: Shows position reading and error messages for all targets (1 to 15).

Data Log Area: The three buttons are used to record data during the alignment process, which displays in a list. Refer to *Recording Data* on Page 20 for more details.

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

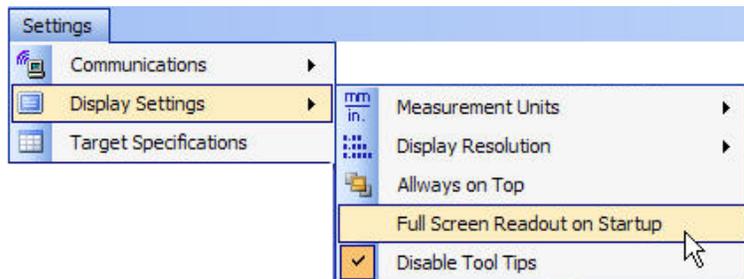
F2 - SHOW PRIMARY AND AUX. VIEW - FULL SCREEN

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

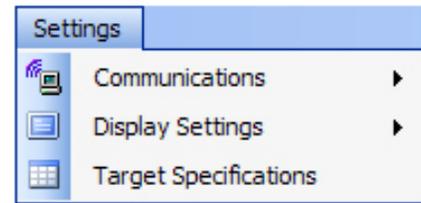


Figure 15 – Settings Menu

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 14).

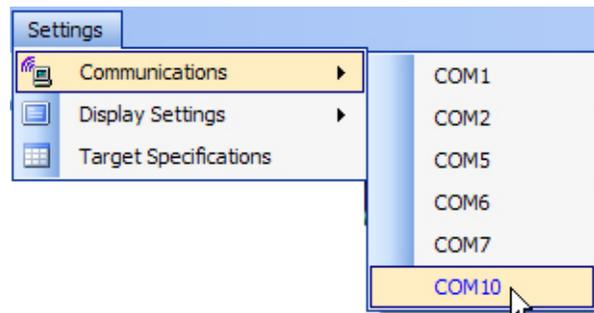


Figure 16 – COM Port Selection

Figure 17 displays a normal position indication. The position value is green on a dark background. Position is within tolerance and no errors are detected.



Figure 17 – Normal Position Indication

Figure 18 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 18 – 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.

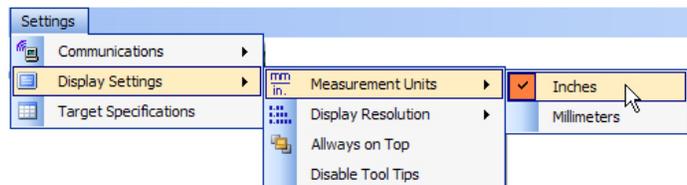


LOBAT indicates that the target battery is below 10 percent of capacity and less than one hour from shutting down. Check the target and connect the power supply/charger as soon as possible.



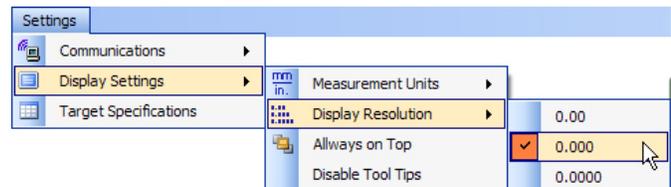
Configuring Measurement Units

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.

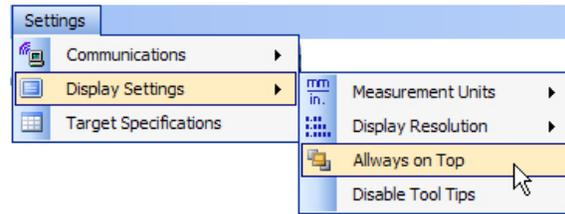


Other Options

Always on Top

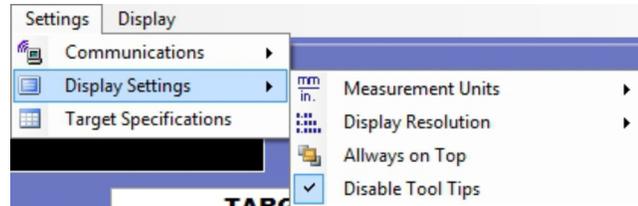
If checked, the main application display in the front, on top of all other windows.

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.

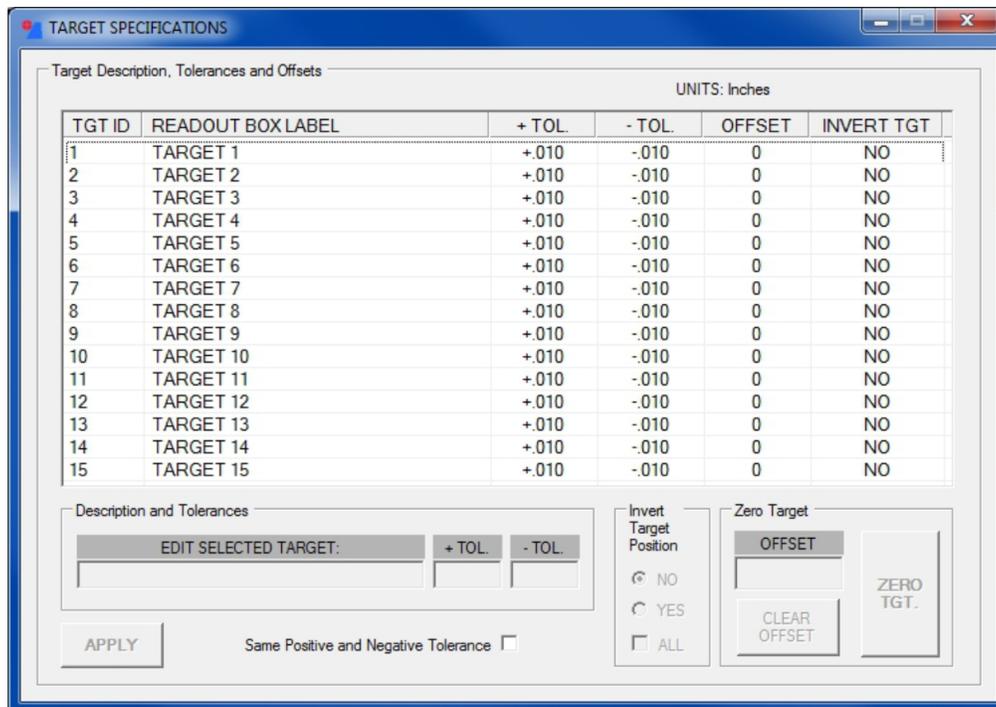
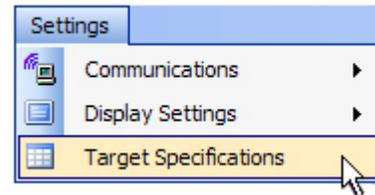


Figure 19 – Target Specifications List

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

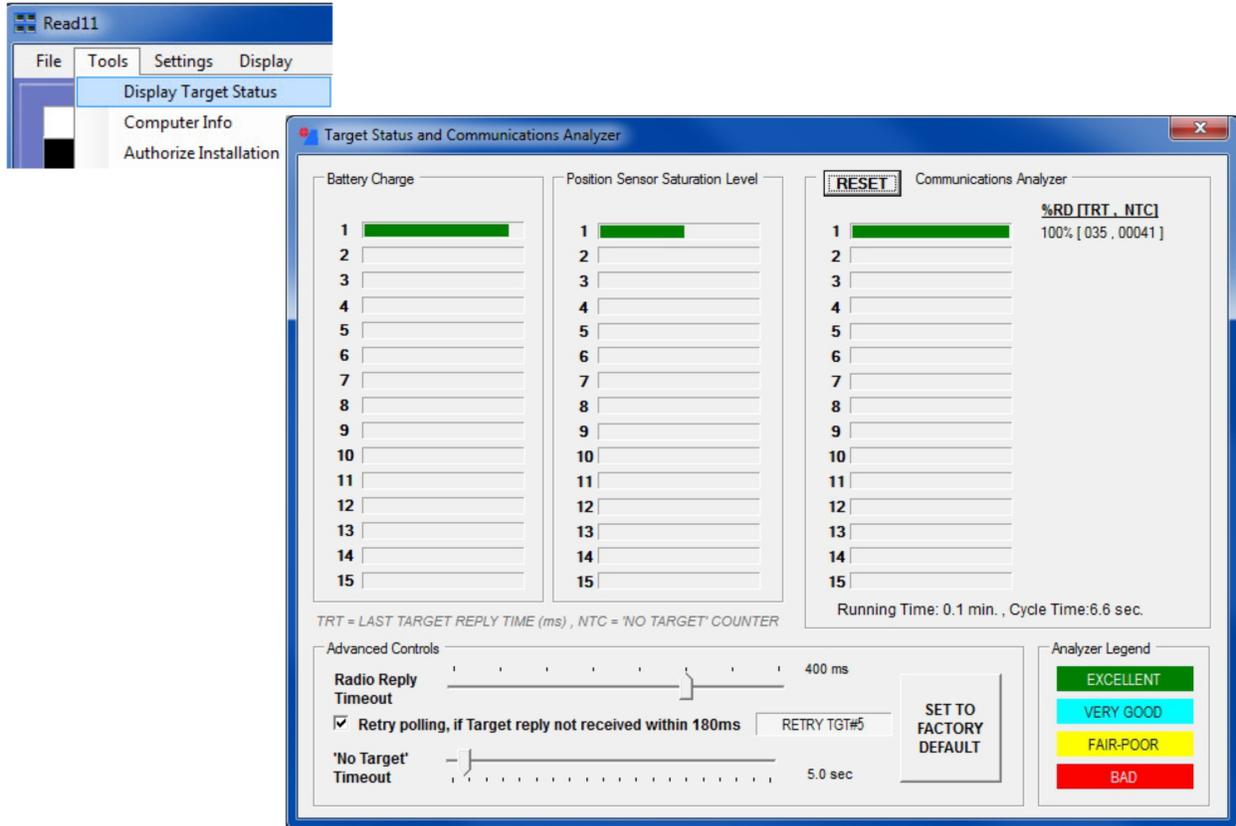
1. Click on the list to select a target to edit.
2. Enter the new data in the offset box.
3. Click **APPLY** to overwrite the previous data.
4. Repeat Steps 1-3 to edit other targets.

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 19).
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.

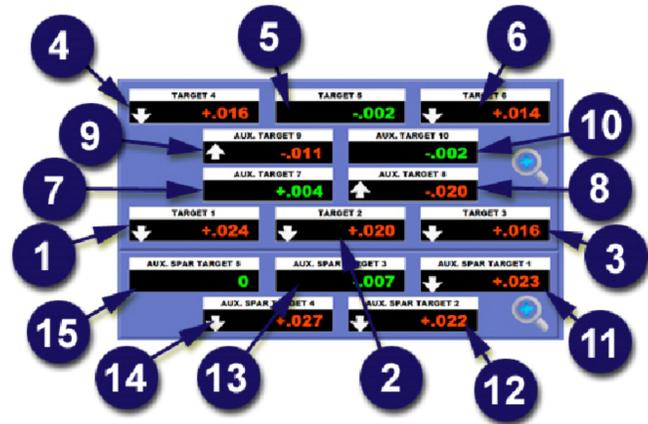


Display Box Target Assignments

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.

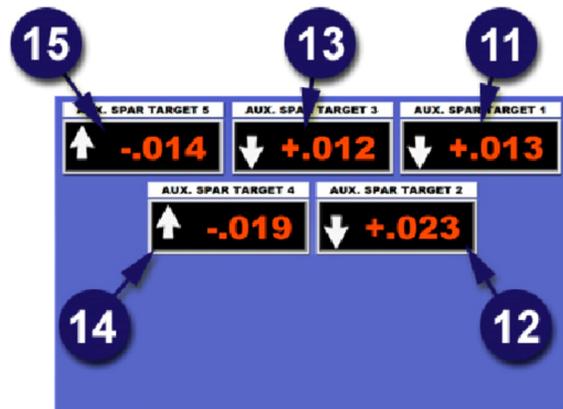
Display	
Show All Targets	F2
Show Targets 11-15 Only	F3
<input checked="" type="checkbox"/> Show Target Network IDs in Display Box Labels	



COMBINED VIEW

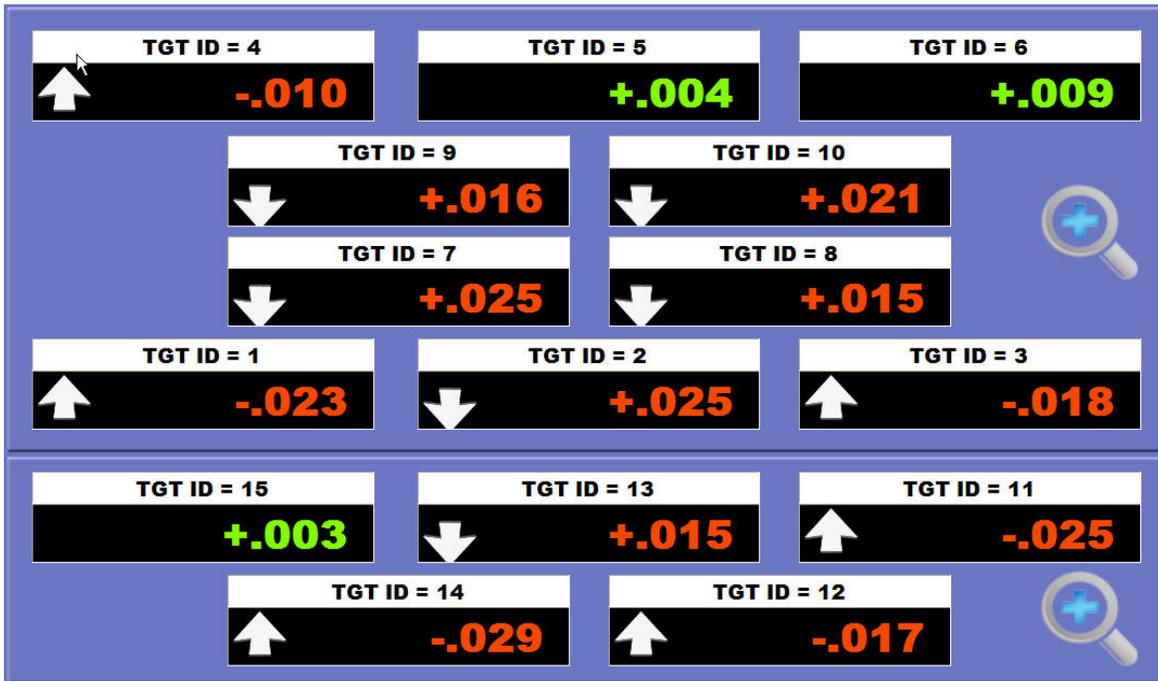


PRIMARY + AUX. VIEW



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.

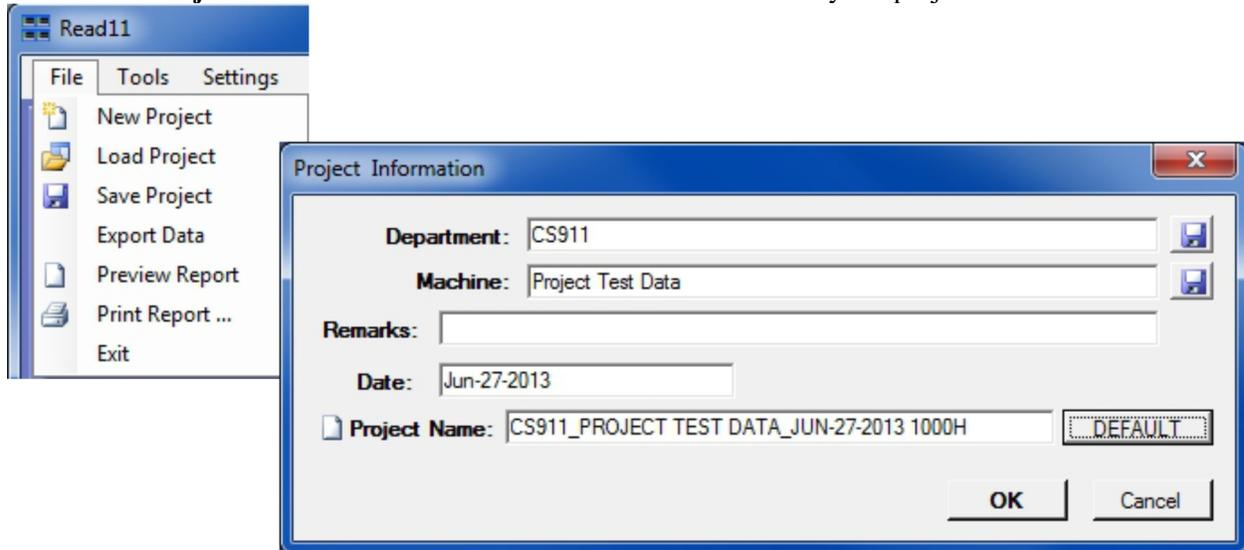


Figure 20 – Project Information

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 21).

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 22).



Figure 21 – The Record Data Panel

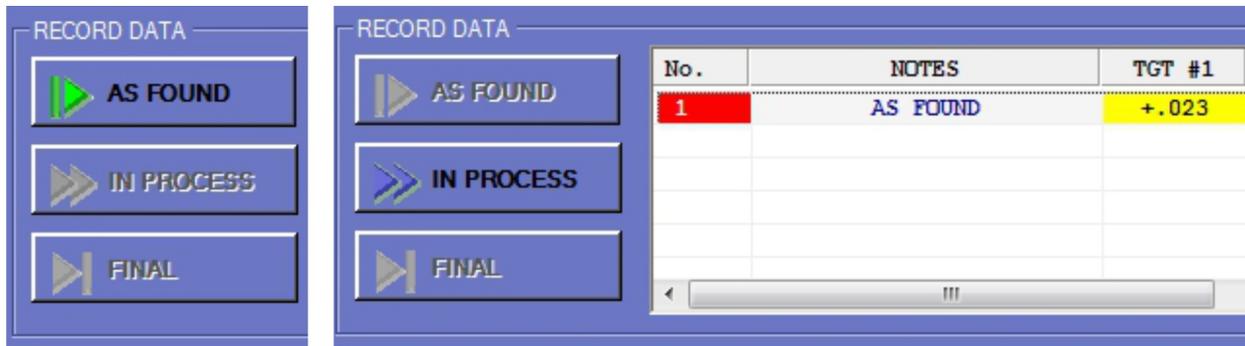


Figure 22 – As Found and In Process buttons

The **FINAL** button (see Figure 23) 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.

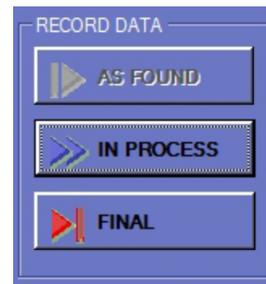


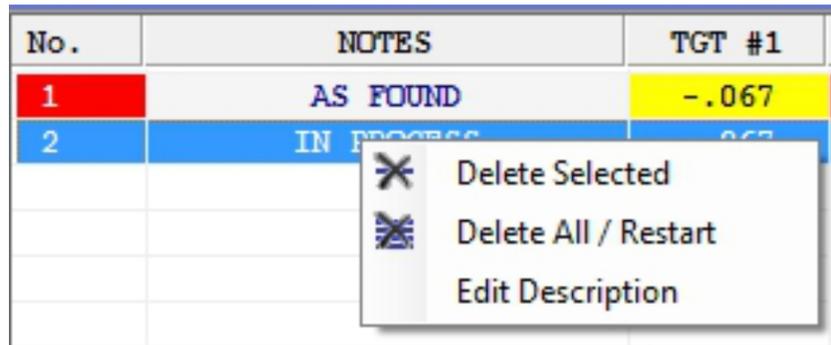
Figure 23 – The Final button

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**



The screenshot shows a table with three columns: 'No.', 'NOTES', and 'TGT #1'. Row 1 is highlighted in red and contains '1', 'AS FOUND', and '-.067'. Row 2 is highlighted in blue and contains '2', 'IN PROCESS', and '0.00'. A context menu is open over row 2, showing three options: 'Delete Selected' (with a trash icon), 'Delete All / Restart' (with a trash icon and a refresh icon), and 'Edit Description'.

No.	NOTES	TGT #1
1	AS FOUND	-.067
2	IN PROCESS	0.00

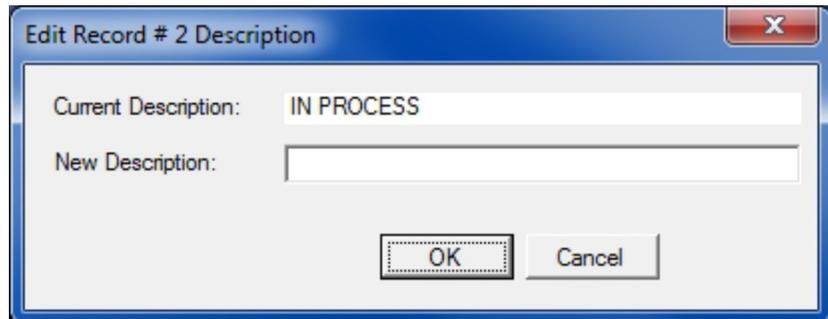
Figure 24 – The Table Edit menu

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**.



The screenshot shows a dialog box titled 'Edit Record # 2 Description'. It has two text input fields: 'Current Description:' with the value 'IN PROCESS' and 'New Description:' which is empty. At the bottom, there are 'OK' and 'Cancel' buttons.

Edit Record # 2 Description	
Current Description:	IN PROCESS
New Description:	
OK Cancel	

Figure 25 – 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.

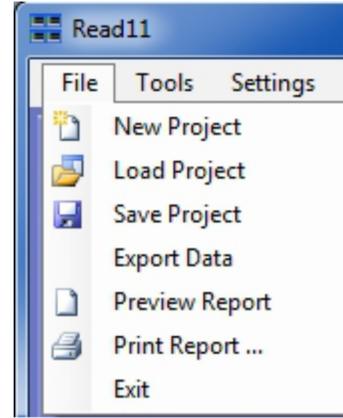


Figure 26 – The File Menu

- 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	+004	-016	-023	+004	+015	+015	+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 27 – Report Preview