Operations Manual

Read10-2D

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, or 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.

Table of Contents

Hardware Overview

Model L-706 Laser

The L-706 Laser has been designed with a .750 in. (19.05 mm) mounting stud and flat face with magnets to hold it flush to fixturing. Since the laser beam is concentric to the OD to within .0005 in. (0.01 mm), a simple flat face and .750 in. (19.05 mm) hole on center is all that is needed to hold the laser.

The L-706 has a range of 110 ft. (33 m), and under good environmental conditions, it is accurate to .001 in. (0.025 mm) over the whole range. The laser is powered by an AC adapter.
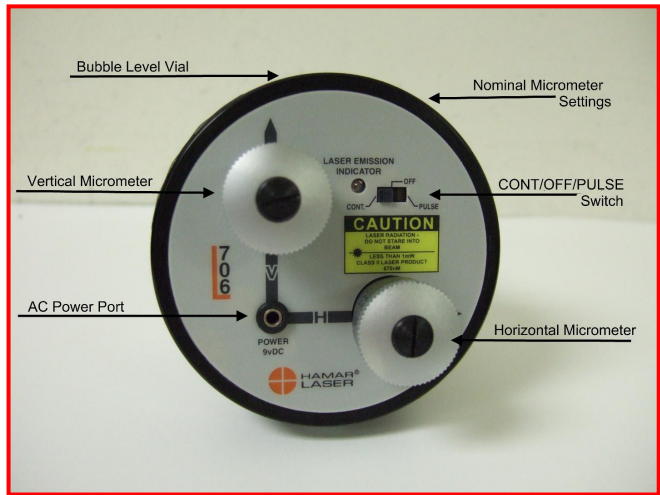

Bubble Level Vial
Nominal Micrometer Settings
Vertical Micrometer
LASER EMISSION INDICATOR
CONT/OFF/PULSE Switch
CAUTION
AC Power Port
POWER 9vDC
Horizontal Micrometer
HAMAR LASER

Figure 1 – L-706 Laser

L-706 Operational Features
The following describes the operational features of the L-706 Laser. These features include bubble level vial orientation, micrometer values and settings, CONT/OFF/Pulse switches and the external battery pack.

Pulse/Continuous Modes

The L-706 Lasers are now equipped with a PULSE/CONTinuous switch, which manually switches the laser beam between Pulsed and Fixed Beam Modes. Pulse Mode automatically removes the effects of excess (ambient) background light for the R-1307 readouts, providing a more accurate reading. The R-1307 Readout is capable of supporting both Pulse Mode and Continuous Mode as well as storing up to nine different target calibration factors for multiple target users. These capabilities must be specified when ordering a system.

The chart below indicates the operational modes for Readouts/Computer Interfaces that operate with the L-706 Lasers:

Mode	Readouts	Computer Interfaces
Pulse	R-1307B-2.4ZB, R-1307BC, R-1307C, R-1307-900/2.4, R-1307-2.4ZB, R-1307+R	A-910-900/2.4 (when used with R-1307-900 or R-1307-2.4) A-910-2.4ZB
CONTinuous	R-307, R-307V	R-358

Notes:
1. *The T-261A and T-266 Targets do not support the Pulsed-Beam Mode and the system purchased is factory-configured to operate in CONTinuous mode when using these targets.*
2. *When using the L-700 Laser with the R-1307 and a 2-Axis Target, the system is factory-configured to operate in CONTinuous mode.*

The CONT/OFF/PULSE slide switch on the L-706 has a lighted LED to indicate that power is ON.
CONTinuous: The laser beam in continuous (Legacy) mode. This mode is compatible with all HLI interfaces. While in CONTinuous mode, there is limited background light noise suppression.

PULSED: The laser beam blinks on and off at a rate of approximately 15 Hz. with background light noise suppression. This is the preferred mode of operation.

When configuring the R-1307 for use with a cabled (local) target, the descriptor selection 'P.10.10' is used for pulsed beam mode and 'F.10.10' is used for fixed beam mode. For a complete description of configuring a cabled (local) target for the R-1307 and the descriptor selections for both pulsed and fixed beam modes, see Page 6.

Bubble level vials on the laser mounting flange are used for rotational accuracy. When the bubbles in the level vial are centered horizontally, all micrometer adjustments (controlling laser beam angle) shift the laser beam vertically or horizontally with reference to the bore/target axis. If the bubbles are not centered, any micrometer adjustment to one laser axis changes the laser beam position in both axes. The levels also provide fixture mounting repeatability (assuming the laser is hard-mounted to fixture).

Micrometer controls are provided for the adjustment of the angle at which the laser beam emerges from the precision ground, mutually concentric steel laser housing. Each laser has a NOMINAL setting for both the V-Vertical and the H-Horizontal micrometer controls. The nominal settings are determined at the factory and correlate to values for the laser beam when it is perpendicular to both the 2 in. and 4 in. mounting faces. When the bubble in one of the level vials is centered, a nominal setting of each micrometer squares the laser beam to that specific axis. For example, if the nominal vertical setting is .120, then setting the micrometer to .120 sets the laser beam square to the vertical axis. When a laser is mounted in the gearbox or bore adapter, vertical and horizontal micrometers should be set in the nominal positions to facilitate the alignment and measurement process.

Adjusting the L-706 Laser

The L-706 Laser beam is factory adjusted to be concentric to the mounting diameters (2.25 in. or 57.15 mm and .75 in. or 19.05 mm) within ±.0005 in. (0.0127 mm). With the adjusting micrometers set at the nominal position, (see the **Nominal Settings** label on the outer flange), the laser beam is perpendicular to the front mounting surface and parallel to the mounting diameters within ±.0003 in/ft.

The circular level vial on the laser mounting flange is used to reference the orientation of the vertical and horizontal axes of the L-706 Laser. When the bubble in the level vial is centered, all micrometer adjustments (controlling laser beam angle) shift the laser beam vertically or horizontally with reference to the bore/target axis. If the circular level bubble is *not* centered, any micrometer adjustment to one laser axis *makes the laser beam position appear to change in both axes*. The level vial also provides fixture mounting repeatability (assuming the laser is hard mounted to the fixture). Only minor readjustments of the laser to the bore and fixture surfaces are required in situations where frequent alignment is expected.

Model R-1307 Readout

The Model R-1307 Readout supports both wireless Unitargets, such as the A-1519, or cabled (local) targets. It is available with a radio frequency of either 900 MHz or 2.4 GHz ISM band. The R-1307 can be used as the primary readout or as an additional readout to copy position data captured by another R-1307.

R-1307 Control Panel

Figure 3 shows the features of the R-1307 Control Panel.
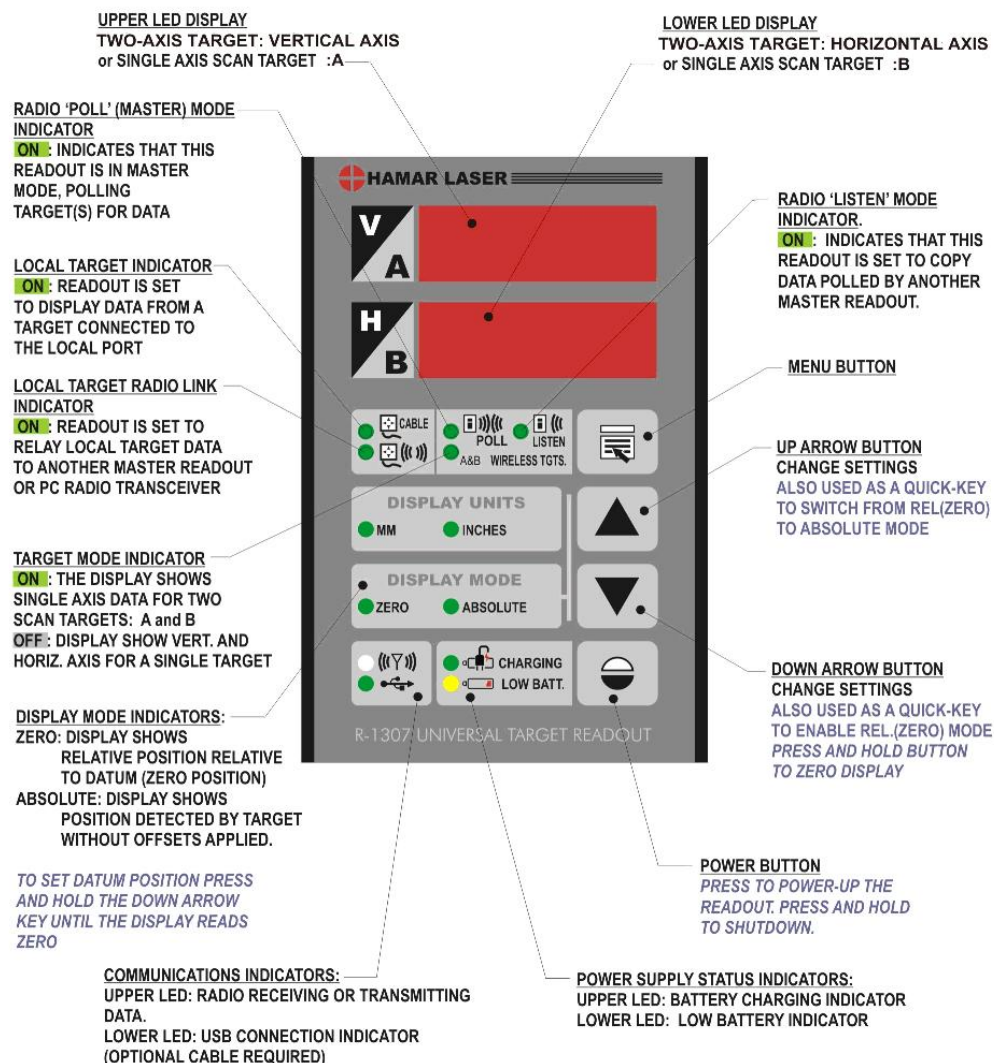

Figure 2 – *R-1307 Readout*

Figure 3 -- *R-1307 Readout Control Panel Features*

The A-910 Radio Transceiver/Hub

Front Panel Features

1. **Power ON indicator and Low Battery indicator**
2. **Internal backup battery charging indicator and USB LINK ESTABLISHED indicator**
3. **TX indicator:** blinks when device is transmitting data to the target(s)
4. **RX indicator:** blinks when the device is receiving data from targets or other transceivers.
5. **System ID setting switch:** set to the same number as the R-1307 CH (Channel) number.

Figure 4 – *The A-910 Radio Transceiver/Hub FRONT PANEL*

Rear Panel Features

1. **Not used**
2. **USB/Data I/O Port**
3. **Power Switch**
4. **External power supply:** required only for computers that cannot provide adequate power (5V, 400 mA) through the USB port.
   Note: *When using the USB Extender™ cable extension kit, plug the A-910-2.4 into an A/C power supply.*
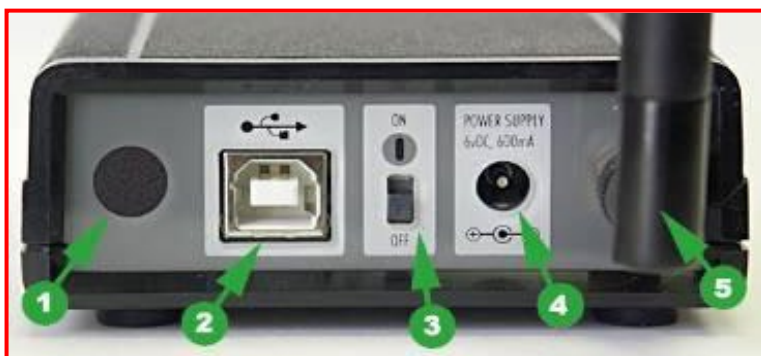5. **Antenna**

Figure 5 – *The A-910 Radio Transceiver/Hub REAR PANEL*

*See Appendix A for radio specification details.

MODEL NUMBER	PRIMARY FREQUENCY
A-910-900	900 MHz
A-910-2.4	2.4 GHz

READOUT FUNCTIONAL MODE:

LocAL : DISPLAY POS. OF TARGET CONNECTED TO LOCAL PORT

Poll : REQUEST AND DISPLAY POSITION OF WIRELESS TARGET(S)

LiStn : DISPLAY POSITION OF WIRELESS TARGETS CONTROLLED BY ANOTHER R-1307 OR RADIO TRANSCEIVER IN POLL (MASTER) MODE.

TARGET (PSD DESCRIPTOR) NUMBER

TARGET NUMBER (TYPE), SELECTION ONLY
NOTE: USE THE R-1307 CONFIGURATION UTILITY TO DEFINE THESE TARGETS AND ENTER CALIBRATION DATA FOR EACH TARGET

LEGACY PSD TYPE INDICATOR "." INDICATES SC TYPE

PSD HEIGHT (MM)

PSD WIDTH (MM)

LASER MODE: F FIXED BEAM
             P PULSED LASER
             S SCANNING LASER

LocAL : DISPLAY ZERO (RELATIVE) CONTROLLED BY R-1307
tArGt : DISPLAY ZERO(RELATIVE) CONTROLLED BY TARGET

FUnct=
LocAL

tGt. 01
F 10.10 .

rELD
LocAL

R-1307 - SETTINGS MENU, FLOW DIAGRAM
NOTE: SOME FUNCTIONS ARE MODEL SPECIFIC.

INSTRUCTIONS: PRESS THE 'MENU' KEY TO SEQUENCE THROUGH THE FOLLOWING SETTINGS; USE THE 'UP' AND 'DOWN' KEYS TO CHANGE THE SETTINGS

CURRENT DISPLAY MODE
rEL RELATIVE (DATUM) POSITION
AbS ABSOLUTE POSITION (DEFAULT)

MEASURMENT UNITS
Inch : INCHES
mn : MILLIMETERS

DAMPENING
NUMBER OF SAMPLES TO AVERAGE
CHOICES: 2, 4, 8, 16, 32

DISPLAY RESOLUTION

(UPPER DISPLAY) ID OF FIRST WIRELESS SCANNING TARGET
(LOWER DISPLAY) ID OF SECOND WIRELESS SCANNING TARGET
FOR FIXED BEAM WIRELESS TARGET, OR LOCAL TARGET:
SET BOTH UPPER AND LOWER ID TO SAME #

SYSTEM ID OF WIRELESS TARGET(S) OR LOCAL TARGET
RANGE: 0 TO 9

DISPLAY BRIGHTNESS
RANGE: 1(DIM) TO 5(BRIGHT)

dISP=
rEL

Unit=
Inch
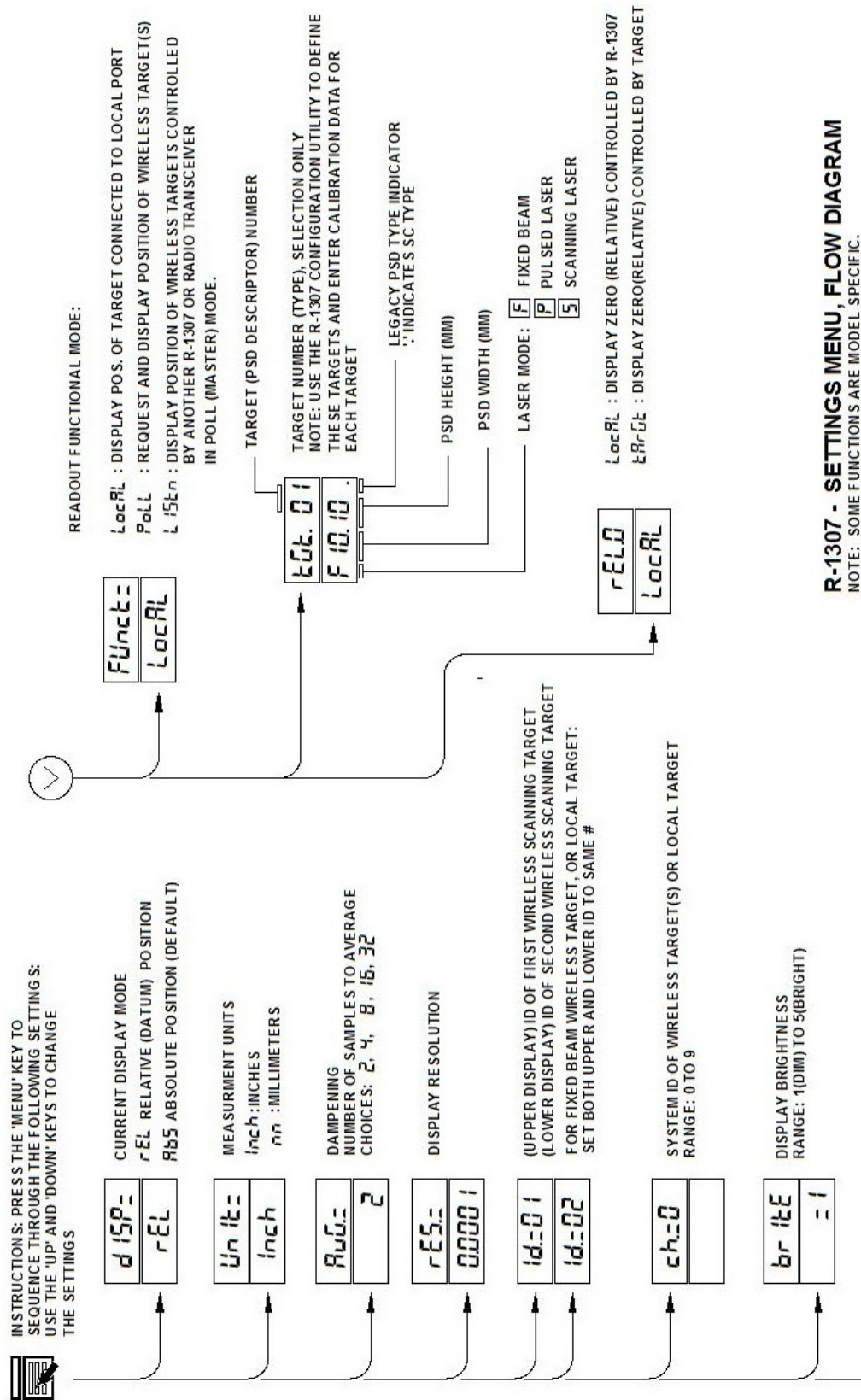
AvG=
2

rES=
0.0001

Id=01
Id=02

ch=0

brItE
=1

Figure 6 -- *Settings Menu, Flow Diagram*

5

Configuring the R-1307 for a Cabled (Local) Target

> **Previously, Hamar Laser offered only Fixed Beam Mode for the L-705, L-706 and L-708 lasers. We now offer lasers with Pulsed Beam Mode (in addition to Fixed Beam Mode) to increase accuracy and reduce the effects of background light errors on the measurement. To determine if your laser is capable of Pulsed Beam Mode, look at the power switch to see if Cont (Continuous) and Pulse are on either side of the switch. We strongly recommend that Pulsed Beam Mode be used whenever possible.**

Note: *Shut off power to the readout before connecting or disconnecting a target from the local port.*

1. **Connect the cabled target to the local port of the readout**
2. **Press and hold the MENU button for approximately 2 seconds to enter configuration mode.**
3. **Set the Measurement Units**
   Press the MENU button until the upper display shows Un it:. Use the UP and DOWN arrow keys to selecting either inch for inches or ˉiˉiˉi for millimeters.
4. **Set the Dampening Level**
   Press the MENU button until the upper display shows Aub:. Use the UP and DOWN arrow keys to set the number of averages. Adjust this value as required to suit the application. The default for this application should be changed to at least 8. For long distance shots, use 16 or 32.
5. **Set the Readout Function to Cabled (Local) Target**
   Press the MENU button until the upper display shows Funct:. Use the UP and DOWN arrow keys to select Funct: LOCAL.
6. **Select the PSD (Position Sensing Device) descriptor applicable to your target**
   Ensure that the Laser Mode switch is set to *Pulse*.
   Note: *If operating in Pulsed Beam Mode, select only the descriptors shown in* **bold** *type. The examples shown for Fixed Beam Mode are provided for compatibility with older (fixed beam) lasers only.*
   Press the MENU button until the upper display shows tGt:nn, where nn designates the target number.

   Each R-1307 can have up to 8 target (PSD) descriptors.
   - The upper display shows the target number (tGt:nn)
   - The lower display shows the PSD mode and size.
     For example:
     F.4.4 = Fixed Beam Mode. 4mm x 4 mm PSD
     P.4.4 = Pulsed Beam Mode. 4 mm x 4 mm PSD
     F.10.10 = Fixed Beam Mode. 10 mm x 10 mm PSD
     P.10.10 = Pulsed Beam Mode. 10 mm x 10 mm PSD
     F.20.20 = Fixed Beam Mode. 20 mm x 20 mm PSD
     P.20.20 = Pulsed Beam Mode. 20 mm x 20 mm PSD
     F.40.40 = Fixed Beam Mode. 40 mm x 40 mm PSD
     P.40.40 = Pulsed Beam Mode. 40 mm x 40 mm PSD

     nn= R-1307 Readout number and matching target number

   Press the UP or DOWN arrow keys to select the correct target number and to change the second window. For example, tGt:02 F. 10. 10 or tGt:02 P. 10. 10 for R-1307 #2

WARNING: *Targets are matched to specific R-1307 Readouts. For example, Target #1 must be connected to Readout #1 or the calibration is void.*

7. **Select the device used for Relative (display zeroing)**
   - Rel.0 = **Local**. R-1307 button(s) used to zero display. Use this mode for cabled targets or local zeroing with wireless targets.
   - Rel.0 = **Target**. Use this mode for the A-1519/A-1520 wireless targets with remote zeroing capability. Disables zeroing by the R-1307.
8. **To exit configuration mode, press and hold the MENU button for approximately three seconds until the display return to normal mode.**
   The R-1307 will also return to normal mode automatically after approximately four seconds of inactivity.

Setting the Target Network ID and System ID for the R-1307 Readout

To make the unit visible to all other radio-enabled devices, you must set the Target Network ID and the System ID for the readout.

1. **Set the Local Readout/Target Network ID**
   Press the MENU button until the *upper* display shows ꞁd = ꞂꞂ (nn is also equal to the R-1307 number) and the matching Target number with the current Target ID (ꞂꞂ) blinking. Use the UP and DOWN arrow keys to set the Target ID.

   Press the MENU button again until the lower display shows ꞁd = ꞂꞂ with the current Target ID (ꞂꞂ) blinking. Use the UP and DOWN arrow keys to set the Target ID to the same value as that of the upper display's Target ID.

2. **Set the System ID (Radio Channel)**
   Press the MENU button until the upper display shows cꞗ = ꞂꞂ, with the current System ID (ꞂꞂ) blinking. Use the UP and DOWN arrow keys to set the System ID.
   Note that **nn** must be set to the same number as the channel switch setting of the A-910 radio transceiver (see Figure 4, #5).

Figure 7– *R-1307 with Cabled (Local) Target and A-910 Radio Transceiver*

Miscellaneous Display Messages

-HLꞀ -	
r ꞁ_00	Startup Message. Lower Display shows firmware Revision Number.
. . .	3 moving dots. Wireless target is not responding to a polling request from Readout. Check ID and Channel settings. Check Target(s).
- - -	3 dashes. Target detected but the laser is not on target. Check laser.
cꞗ_=Ꞃo	
rAd ꞁo	Radio channel cannot be selected because no Radio is present or detected. Standard message for R-1307C. For Models R-1307 or R-1307W, this message indicates a fault in the radio module.
FAuꞁꞁ	
PSd	Indicates a problem with the connection to the Cable (Local) Target's Position Sensing Device (PSD). Check plugs and cable(s).
ꞁꞗꞁ_Ꞃ	
UꞂcAL	Target 'Ꞃ' descriptor does not contain target calibration data.

Using the Read10-2D Software

Installing the Read10-2D Software

1. Unzip the program or insert the product CD.
2. Open the folder where the extracted files are located. Double-click **setup.exe**.
3. Follow the screen prompts to finish installation.

Starting the Program

Note: *The A-910 must be powered up and connected using the USB cable prior to opening the Read10 software so that the COM Port used can be detected. For a new installation, the Hamar Laser Common USB driver must be installed separately. Install this driver from the CD or download the driver from:* **http://hamarlaser.com/support-software**

To begin using the program, click the Windows **START** button and highlight **PROGRAMS>HAMAR LASER INSTRUMENTS, INC.** Click **Read10-2D** to run the program. When the program opens, it automatically searches for available COM Ports. When the A-910 is in use, the adapter driver usually assigns a higher number COM Port (for example, COM 4). If you are unsure of the correct COM Port, use the Windows Device Manager to check the port being used.

Program Settings

To change the settings, click **Tools** on the Action Bar and then select **Options** (see Figure 8). The Options menu allows you to change Units and Tolerances, Display Settings, Communication Settings and Other Options.

Units and Tolerances Tab

Select Units and Tolerances to change the following:

Measurement / Display Units

Changes the measurement units from millimeters, inches or microns.

Figure 8 – *Selecting Program Options*

Resolution

Changes the number of decimal places (for example, from .1 to .123).

Deviation from Center-Allowable tolerance (±)
Enables Measuring and Reference Target tolerance.
Note: *Both the **H**orizontal and **V**ertical axes need to be in tolerance for the numbers to turn green.*
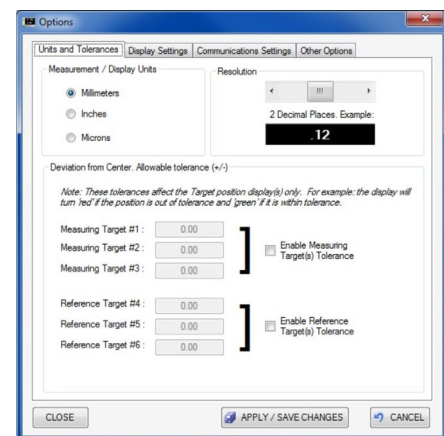

Figure 9 – *Units and Tolerances Settings*

9

Display Settings Tab

Select **Display Settings** to change the following:

Colors used in the target display boxes

Click **Invert Colors** to swap the current colors (for example, changing a black background with white text to a white background with black text). *Right* click the background or *left* click the text color to change it by selecting the desired color from the palette (do not use the same color for text and background).
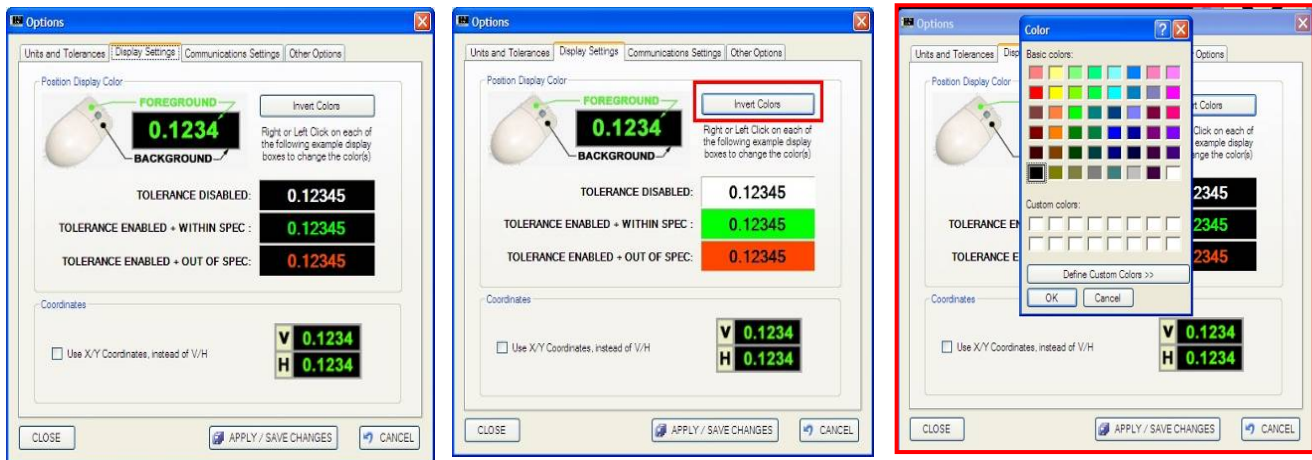

Figure 10 – *Changing color settings*

Changing Coordinates

Check the **Coordinates** box to change V/H to Y/X.

To *close the application without saving changes*, click **Close.**
To *apply and save changes*, click **Apply**.
To *restore previous settings*, click **Cancel**.
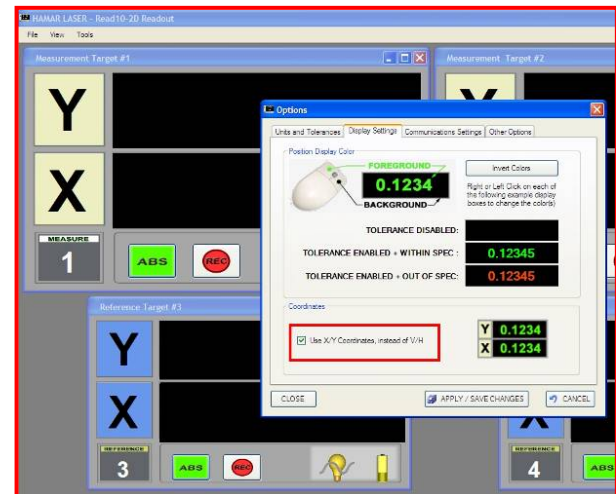
Figure 11 – *Changing Coordinates*

Communication Settings Tab

Note: *Ensure that all R-1307 Readouts are powered on and the A-910 is plugged into the USB port before opening the Read10 software.*

Select the **Communication Settings Tab** to change the COM Port and R-1307 Polling Settings. The software allows only available COM ports to be selected. The green animated icon indicates that the software is communicating through the selected COM port. If data is received from any of the six targets (three measuring targets and three reference targets) or Readouts, the signal bars show the percentage of successful data transfers. Zero percent indicates that the A-910 is not receiving data from the R-1307s. If all signal bars show 0 percent, try using another COM port.

Signal Bars for Targets 1-4 show the communication efficiency rate (0-100%)

- 0 % = Target/R-1307 OFF or not detected because it is on another radio channel or out-of range of the A-910 Transceiver.

Figure 12 – *Communication Settings*

- Less than 50% = Sporadic communication. The targets or readouts are nearly out-of-range of the A-910 Transceiver or the radio signal is blocked by metal barriers.

- Greater than 50% = Normal conditions in an environment that is saturated with other devices on the same frequency band (for example, Wi-Fi devices, Bluetooth devices, ZigBee devices, cordless phones, other HLI wireless systems, etc). This may also be caused by a high level of electrical noise often present in industrial environments.

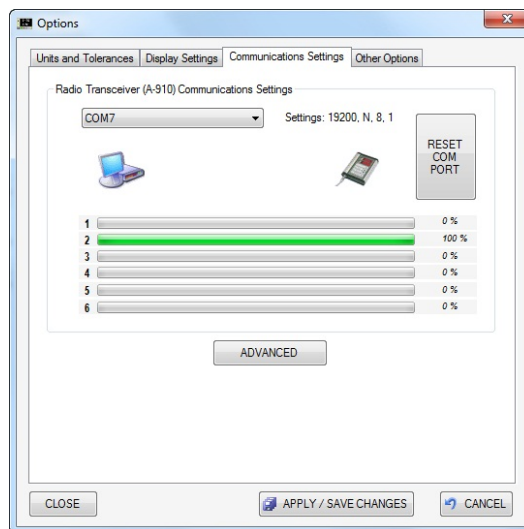- Greater than 90% = Expected under ideal conditions

Communication Tab - Advanced

Radio Reply Timeout
Other systems in the area that use Bluetooth, WiFi, etc. can interfere with the radio, causing the target to have a slower response. Changing the amount of radio reply time allows the radio a shorter or longer time to receive feedback from target. The minimum timeout is 150 milliseconds to maximum of 1000 milliseconds.

Off-Target Timeout
This is the amount of time the software waits before it displays a blank screen in the specific Target display box. If the display box is blank, the software could not detect a target. The minimum timeout is 800 milliseconds; the maximum is 10,000 milliseconds.

Click on **SET to DEFAULT** to reset the timeouts to factory settings.

Other Options Tab

Disable 'Record Data Point?' Confirmation Dialog.
If left unchecked, the user is *not* prompted to confirm the recording of a data point.

Enable Software Averaging
Adds software averaging (2 to 20 samples) in addition to the averaging that takes place within each R-1037 Readout connected to each target.
Warning: *A high number of samples slow the readout response, so use only if necessary. The preferred method is to allow the R-1307 do the averaging and disable averaging in the software.*

Set the Dampening Level for R-1307
Press the MENU button until the upper display shows ⊓⊔斗⊑. For configuration information, see Configuring the R-1307 for a Cabled (Local) Target on Page 6.

Auto Save Data
The software automatically saves a project at the selected number of minutes. For example, entering 120 saves the project every two hours.

Enable Additional sounds
The software plays additional sounds while data is being recorded, when the communication port is opened or closed, and when a communication failure occurs.
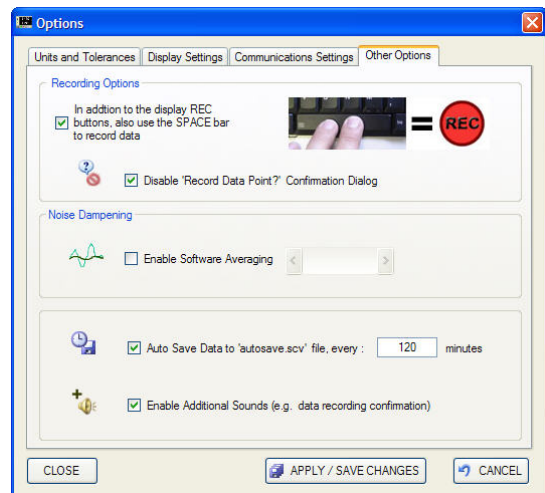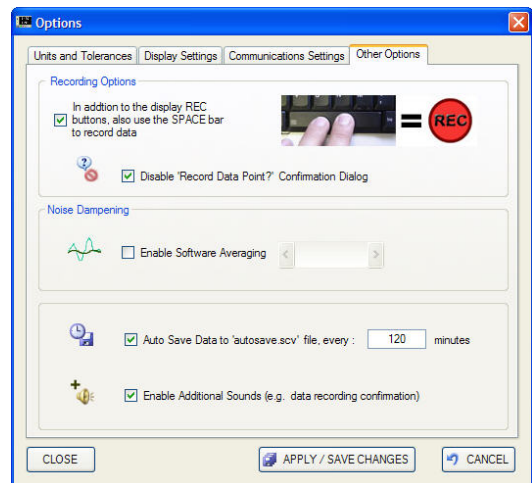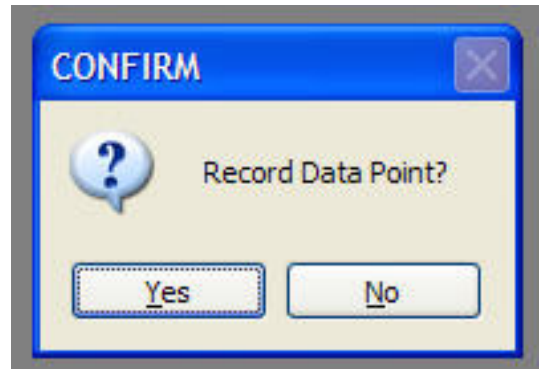
Figure 13 – *Other Options*

12

Target Display Boxes

There are six Target Display Boxes. Each is continuously updated to show the latest target data. The top three boxes display data for the Measuring Targets and the bottom three boxes display data for the Reference Targets. In addition to displaying the target position readings, the following indicators may also display:

Figure 14 – *Target Display Boxes*

Low Battery Indicator (red) displays when the battery level for the R-1307 is very low. The red indicator first displays when less than 13 percent (approximately 30 minutes) of battery life remains.

Low Battery Indicator (yellow) displays when the battery level for the R-1307 is starting to get low. The yellow indicator first displays when less than 33 percent (approximately 2 hours) of battery life remains.

Full Battery Indicator (green) displays when the battery for the R-1307 is fully charged. Place the cursor over the battery image to see the actual percentage of battery life remaining.

Incident Light (white) indicates the ambient background light is normal.
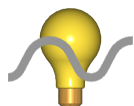
Incident Light (yellow) indicates the ambient background light needs to be reduced.

Incident Light (red) indicates the ambient background light is near saturation and the readings may be affected**.**

**Zero Target Display:** Click **ABS** to zero the target display.
Note: *Zeroing out the R-1307 does not zero the display in the Read10 software and vice-versa.*

Record Button: Click to record measurements. The display shows **OFF TGT** when the target is blocked or the laser beam is not hitting the target.

13

Missing Data Warning Screen

If a target is not reading and **Record** is pressed, a warning message displays. Click **Abort** to cancel record or correct the error condition and click **Retry** to try to record again. Click **Ignore** to record even though a target is not reading the Laser or the R-1307 is not responding.
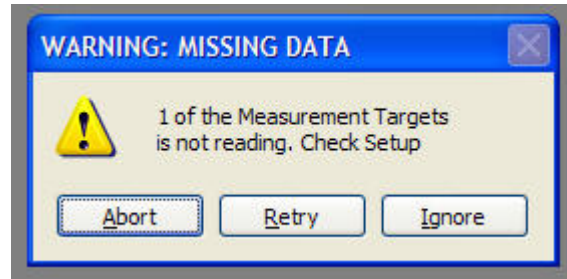
Using the View Menu

Click **View** on the Action Bar to view a single Target Display box, all six display boxes, or Measuring or Reference Targets Display boxes (see Figure 15). Highlight the desired selection and click with the *right* mouse button or use the Ctrl+ key combinations.
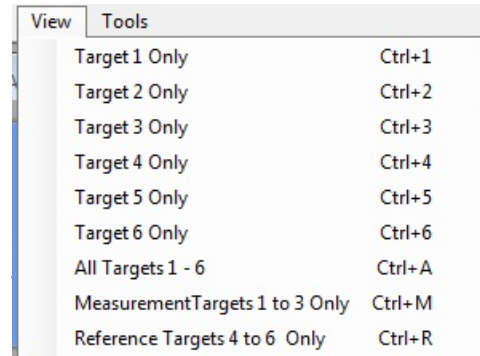
Figure 15 – *The View Menu*

Figure 16 – *Results of the View Menu, showing Measuring Target Readings (left) and Reference Target Readings (right)*

Each target display box shows the target number, the R-1307 serial number and an icon to identify the target type (PSD size), as shown in Figure 17. Clicking on either the Target Number or on the Target Type icon (see Figure 18 for all the Target Type icons) displays the Target/Device information, shown below. This information is specific to each target displayed.

14
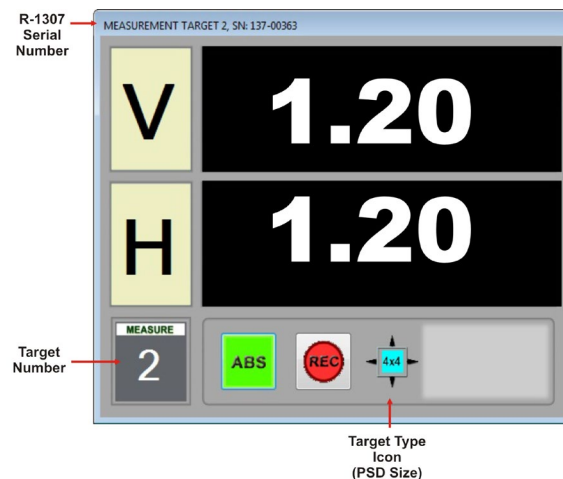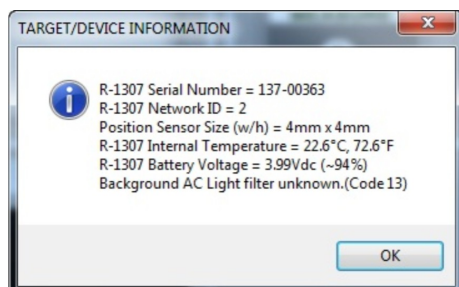
Identifying Target Type Icons

The Target Type icons identify the PSD size in millimeters (width x height). Note that this version of Read10-2D now supports 4x4 mm cells. All the icons except the middle icon represent 2-axis targets. The middle icon (10 x 30) represents a single-axis target, such as the A-1519.

Figure 18 – *Target Type icons*

Starting a New Project

To start a new project, click **FILE>NEW PROJECT**. Enter a name for the project, ensuring that the files type is saved as *.CSV (comma delimited) and begin taking measurements. Hit the spacebar to record or the **REC** button (if selected as an option). The *Unable to Record Data* message displays if there is no project currently open.

To open a saved file, click FILE>EXISTING PROJECT. Select the project from the saved folder.

Viewing Recorded Data

To view recorded data, click **FILE>DATA PREVIEW**. You can add data to the report and all data from previous recordings remain.

To add notes to a recording, *right* click on the line to edit, which displays the Table Editing Menu (see Figure 19).
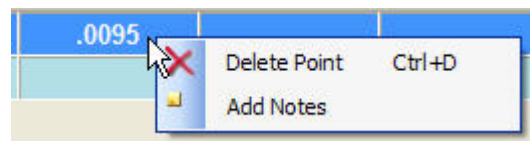

To Delete a Point:
Select **Delete Point** to delete a data point from the database. *This action cannot be undone*.

Figure 19 – *The Table Editing Menu*

To Add Notes:
Select **Add Notes**. Enter text in the box at the bottom of the display and click **OK** to apply the notes (see Figure 21).
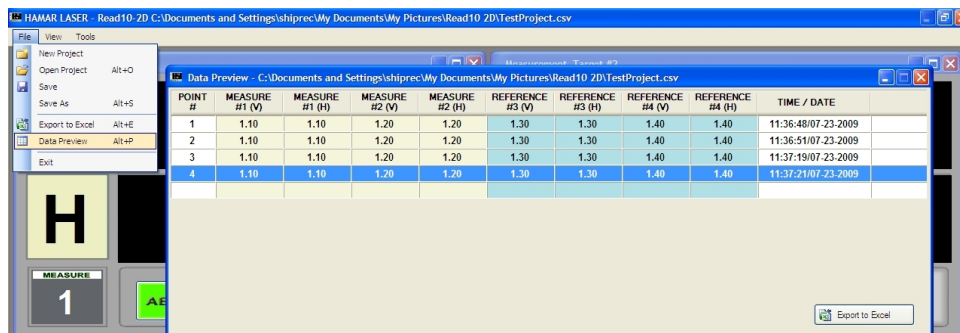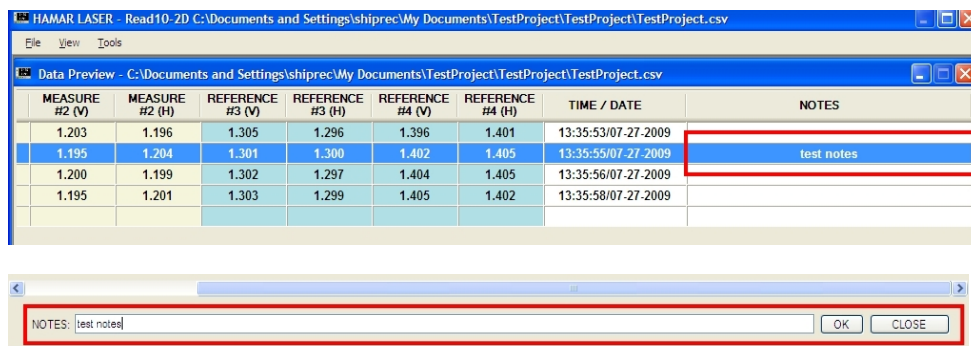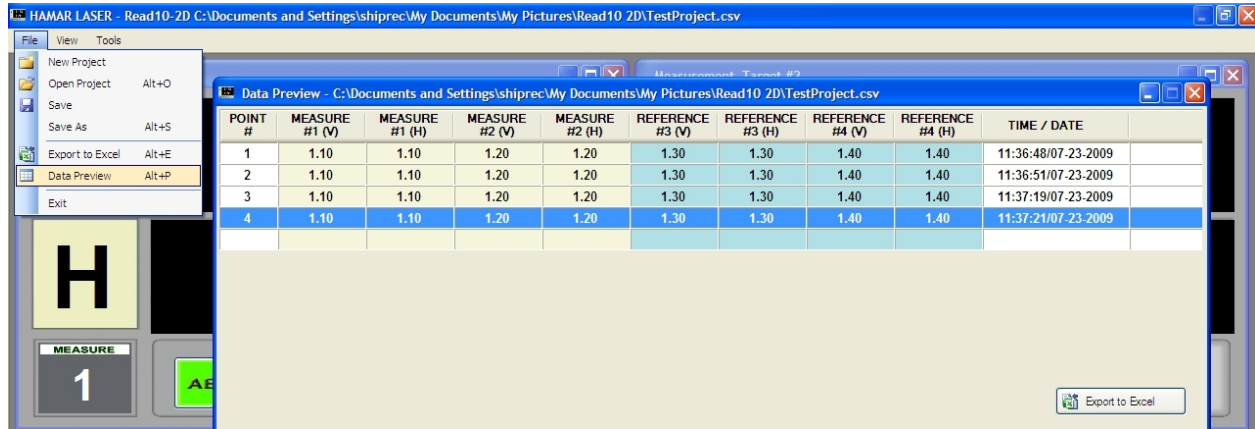

Figure 20 – *Data Preview Screen*

Figure 21– *Data Preview screen showing added notes*

16

Exporting Data to Excel

To export data to a Microsoft Excel spreadsheet, click **FILE>EXPORT TO EXCEL**. Excel automatically opens and displays the report, showing any out of tolerance levels in red (see Figure 22).

Figure 22– *Readings shown in Excel spreadsheet*

Appendix A - Agency Certifications

Agency Certifications for the 2.4 GHz Radio Transceiver

FCC (United States of America) Certification

Contains FCC ID: OUR-24XSTREAM
The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

⚠ RF EXPOSURE WARNING: This equipment is approved only for mobile and base station transmitting devices, separation distances of (i) 20 centimeters or more for antennas with gains < 6 dBi or (ii) 2 meters or more for antennas with gains ≥ 6 dBi should be maintained between the antenna of this device and nearby persons during operation. To ensure compliance, operation at distances closer than this is not recommended

IC (Industry Canada) Certification

Contains Model 24XStream Radio (2.4 GHz), IC: 4214A 12008
Complies with IC ICES-003

CE ⓘ

Complies with ETSI. *France – France imposes restrictions on the 2.4 GHz band. Go to www.art-telecom.Fr or contact MaxStream* ⬦ *for more information. Norway – Norway prohibits operation near Ny-Alesund in Svalbard. More information can be found at the Norway Posts and Telecommunications site (www.npt.no).*

Since the 2.4 GHz band is not harmonized throughout Europe, other restrictions may apply to your country.

Technical Data:
• OEM radio transceiver, model number: 24XStream
• Frequency Band: 2400.0 – 2483.5 MHz
• Modulation: Frequency Shift Keying
• Channel Spacing: 400 kHz
• ITU Classification: 400KF1D
• Output Power: 100 mW EIRP max.
• Notified Body Number: 0891

⬦ The radio Transceiver contained in the A-1519/A-1520 Type II Universal Wireless Targets is manufactured by MaxStream®. For more information pertaining exclusively to the Radio Transceiver please contact MaxStream at 1.801.765.9885 or visit their web site: http://www.maxstream.net

Appendix B – R-1307 Battery Discharge Chart
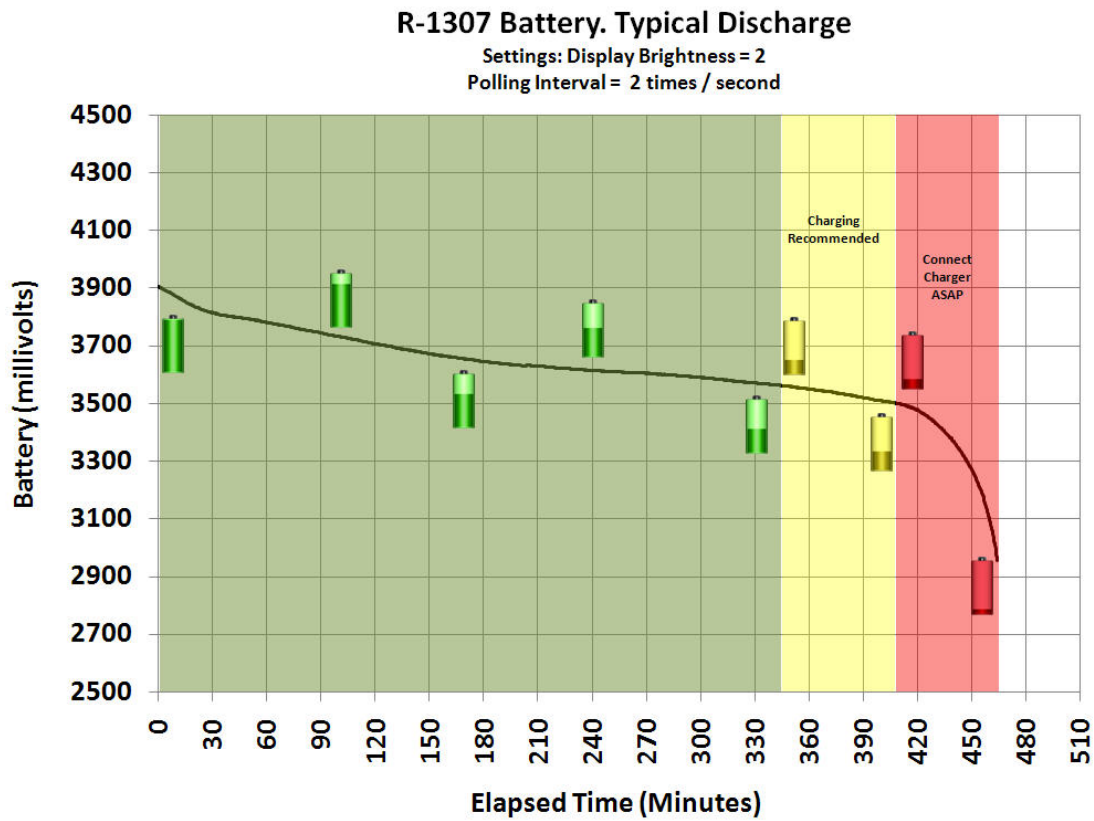
Appendix C – Care and Cleaning of Target Optics

The proper care and cleaning of optical windows and/or lenses of Hamar Laser's position-sensing devices (targets) assures optimum performance. Contaminants on an optical surface increase scatter, absorb laser energy, and eventually degrade the accuracy of the position-sensing devices. Because cleaning any precision optic risks damaging the surface, optics should only be cleaned when absolutely necessary. When cleaning is required, we recommend the following supplies and procedures.

Required Supplies

- **Optics Cleaning Tissue:** Soft, absorbent, lint-free lens tissue
- **Swabs:** Cotton swabs with wooden handles or polyester swabs with polypropylene handles
- **Dust Blower:** Filtered dry nitrogen blown through an antistatic nozzle is best. Canned dusters, such as Dust-Off, will also work.
- **Mild Soap solution:** Neutral soap, 1 percent in distilled water. Avoid scented, alkali, or colored soap such as liquid dishwashing detergents or hand soap. Ten drops of green soap (available at a pharmacies and optical cleaning suppliers) per 100 cc of distilled water is an acceptable alternative.
- **Isopropyl Alcohol:** Spectroscopic grade. Over-the-counter alcohol contains too much water and may have impurities.
- **Acetone:** Spectroscopic grade. Do not use over-the-counter Acetone, such as the type intended for nail polish removal.

NOTE: *When cleaning precision optics, even with the best quality optical cleaning tissue, use gentle pressure to avoid scratching the surface or damaging the optical coating(s). Always wipe using a figure-eight motion in one direction (begin at the top and work toward the bottom in a figure-eight motion).*
Use only moistened (not soaked) optical cleaning tissue, swabs and Spectroscopic grade Acetone and Isopropyl Alcohol. **Never spray any type of liquid directly on the device or submerge any part of the device.**

Removing Dust

Dust can bind to optics by static electricity. Blowing only removes some of the dirt. The remainder can be collected by using wet alcohol and Acetone swabs wrapped with optical lens tissue. Acetone dries rapidly and helps to eliminate streaks.

1. Blow off dust.
2. If any dust remains, twist lens tissue around a cotton swab moistened in alcohol and repeat as necessary.
3. Repeat using Acetone.

Cleaning Heavy Contamination

Fingerprints, oil, or water spots should be cleaned immediately. Skin acids attack coatings and glass and can leave permanent stains. Cleaning with solvents alone tends to redistribute grime.

1. Blow off dust.
2. Using a soap-saturated lens tissue around a swab, wipe the optic gently. Repeat as necessary.
3. Repeat using a distilled water-saturated lens tissue wrapped around a swab.
4. Repeat using an alcohol-saturated lens tissue wrapped around a swab.
5. Repeat using an acetone-saturated lens tissue wrapped around a swab.

Appendix D – Using the Zigbee® Radio Utility

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.

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 (see Figure 23).
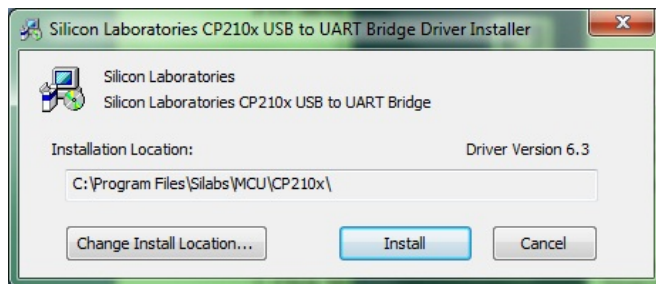
Figure 23 - *USB Common Driver Install*

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 ZB dongle into any unused USB Port (see Figure 24). 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 25). If the utility does not automatically detect the COM port, it must be manually selected (see **Manually Selecting a COM Port** on Page 23).

Figure 24 – *A-910 Zigbee Dongle*

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 26).

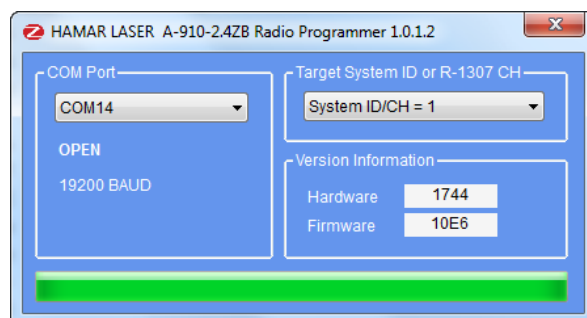**Figure 25** – *A-910 Utility showing the COM Port, System ID and Channel settings*
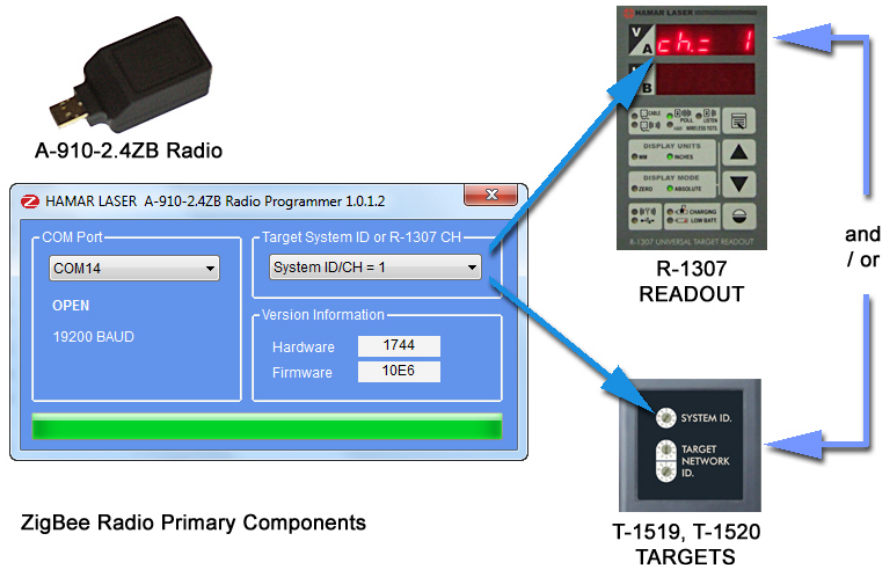

**Figure 26** – *System ID Setup*

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 **SILICON LABS CP210x USB to UART Bridge (COM x)** (see Figure 27**).**
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 25).
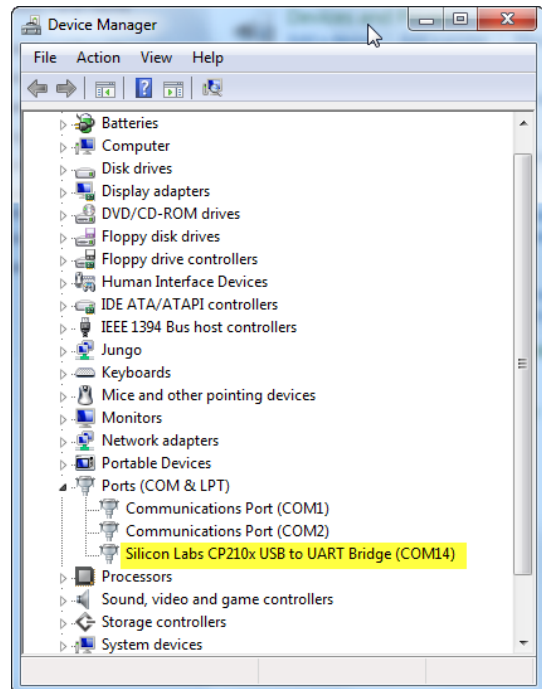
Figure 27 – *Device Manager showing COM Port for A-910 Dongle*

Setting the Target System ID and Target Network ID

The System ID is a Radio Network Address that is used by the Radio Communications Protocol to filter unwanted data from other radio transceivers and targets using a different address. Only targets and radio transceivers that are set to a matching System ID can communicate with each other.

Because no two targets with the same System ID can transmit simultaneously, it is necessary for each target to be programmed to respond only when it is being addressed. The Target Network ID is the target address on the communications network. Under Host (computer) control, the radio transceiver transmits a message called a *polling request* that contains the Target Network ID of one specific target. All targets receive all polling requests, but only the target with a Network ID matching the ID contained in the polling message will reply (Transmit Data to the Host).

There are three rotary DIP switches located on the right side of the target, shown in Figure 28:

- The uppermost switch sets the System ID.
- The two lower switches are used to set the target network ID.

Setting the System ID

Note: Before selecting a System ID, ensure that it is not already in use by another system within the radio coverage area.

Using a small screwdriver, rotate Switch 1 to align the arrowhead with the System ID number (0-9). Figure 28 shows the System ID switch set to 1.

Figure 28 – *Unitarget ID Switch set to 1*

Setting the Target Network ID and System ID for the R-1307 Readout

To make the unit visible to all other radio-enabled devices, you must set the Target Network ID and the System ID for the readout.

3. **Set the Local Readout/Target Network ID**
Press the MENU button until the *upper* display shows ⌐d⌐nn (nn is also equal to the R-1307 number) and the matching target number with the current target ID (nn) blinking. Use the UP and DOWN arrow keys to set the Target ID.

   Press the MENU button again until the lower display shows ⌐d⌐nn, with the current target ID (nn) blinking. Use the UP and DOWN arrow keys to set the Target ID to the same value as that of the upper display's Target ID.

4. **Set the System ID (Radio Channel)**
Press the MENU button until the upper display shows ch ⌐ nn, with the current System ID (nn) blinking. Use the UP and DOWN arrow keys to set the System ID.
Note that **nn** must be set to the same number as the channel switch setting of the A-910 radio transceiver (see Figure 29).
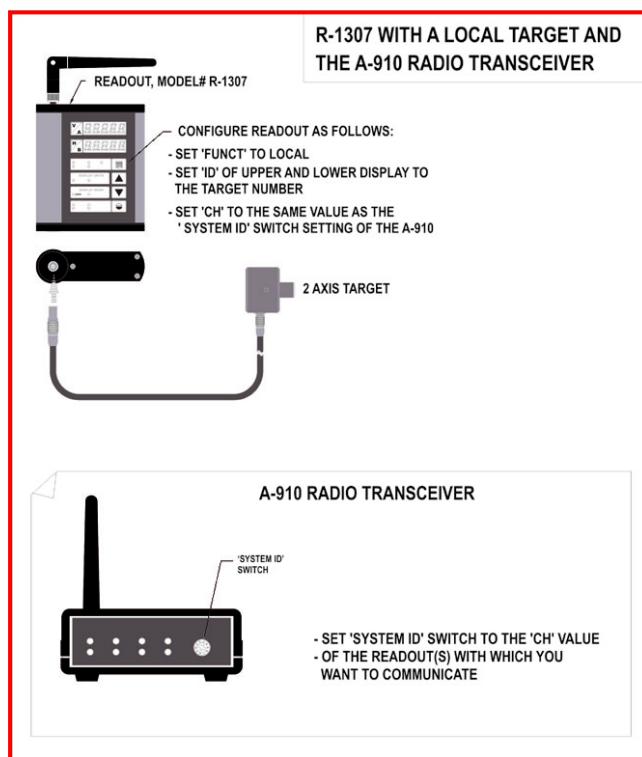

Figure 29– *R-1307 with Cabled (Local) Target and A-910 Radio Transceiver*

Miscellaneous Display Messages

-HLⁱ -	
⌐ⁱ_00	Startup Message. Lower Display shows firmware Revision Number.
. . .	3 moving dots. Wireless target is not responding to a polling request from Readout. Check ID and Channel settings. Check Target(s).
- - -	3 dashes. Target detected but the laser is not on target. Check laser.
ch_⌐no	
⌐Ad ⁱo	Radio channel cannot be selected because no Radio is present or detected. Standard message for R-1307C. For Models R-1307 or R-1307W, this message indicates a fault in the radio module.
FAu∟⌐	
PSd	Indicates a problem with the connection to the Cabled (Local) Target's Position Sensing Device (PSD). Check plugs and cable(s).
⌐6⌐_n	
UncAL	Target 'n' descriptor does not contain target calibration data.