Operations Manual

Read16 Android Alignment Software

Revision C

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Read16 Software for PDAs

Read16 is an alignment program that runs under Android™ on handheld PDAs. Currently, it is only supported on the Handheld X81 PDA (1280x720 displays).

Read16 acts as a multi-target readout when used with Hamar Laser's A-1519-2.4ZB and A-1520-2.4ZB Wireless Targets and L-730/L-740 Series scanning lasers, providing a graphic display for basic alignment functions.

This manual assumes that you are familiar with the operation of the PDA and the Android operating system.

To open **Read16**, click the Hamar Laser Logo on the Home Page or Apps page, as shown in Figure 1. To open the apps page, swipe up from the bottom of the screen.
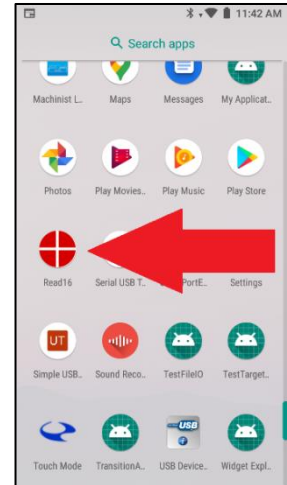
Figure 1 – *Read16 Application in Apps screen*

To navigate through **Read16**, use the pull-out tab on the left side of the screen by swiping the screen from the left side.

Alternately, you could press the **⋮** button on the top right of the screen, then select **OPEN MENU,** or

Select the three bars in the upper left part of the screen (see Figure 2).
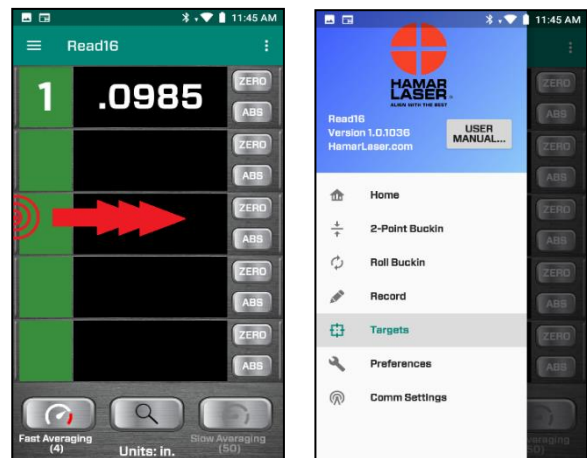
Figure 2 – *Swipe from left edge to open MENU*

If you want to return to the previous Screen, press the BACK button on the PDA.

Press the HOME button to put Read16 to sleep.
Press the OPEN APPS button to series of software programs that are currently open. Scroll to find the screen you want.

Note – *it is recommended that when you are done with Read16, close the app by hitting the **⋮** button and clicking on* **Exit Application**.

Figure 3 - BACK, HOME and APPS buttons on PDA

Running the PDA

The Nomad 5 and Nautiz X81 PDAs work very similar to standard Android cell phones. The operating system and functions are nearly identical.

Some operational notes:

- Power up:
    - o Nomad 5 – Press and hold the power button for 1.5 seconds.
    - o X81 - Press and hold the power button for 3 seconds. *Note - when the PDA is powering up, it does a lot of internal checks before displaying the screen, so it can take up to 30+ seconds to fully power up.*
- Power down:
    - o Nomad 5 - Press and hold the power button for 1.5 seconds.
    - o X81 - Press and hold the power button for 3 seconds. *Note – when powering down, the PDA also does some internal checks, so it can take up to 15 seconds to completely power down.*
- Sleep Mode: Press the power button for 0.5 seconds.

Launching the Read16 Manual

The **Read16** manual is installed on the Nomad PDA. To launch the manual, open the menu by swiping from the left or pressing USER MANUAL. You can also open the Menu by clicking on the three dots in the upper left corner of the screen and clicking **Open Menu**.

Before performing an alignment, it is suggested that you view each program screen and follow the descriptions of the features in this manual.

Note – when installing Read16 for the first time on the Nautiz X81, please see Appendix F for instructions on how to allow Read16 to have access to the manual file on the PDA.
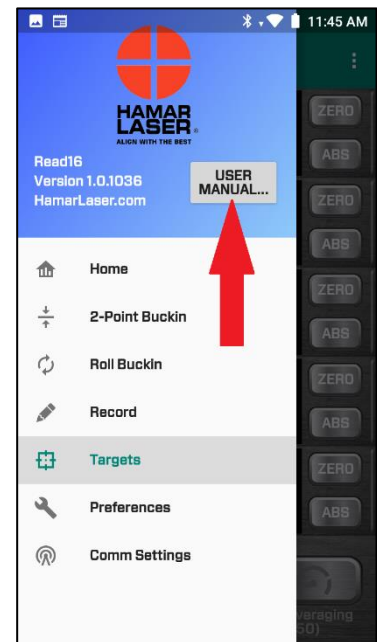

Figure 4 - Opening the User Manual -

Using the Read16 Program

Preferences Screen

When starting to use **Read16**, establish **Preferences** first. Select **Preferences** from the menu to make changes.
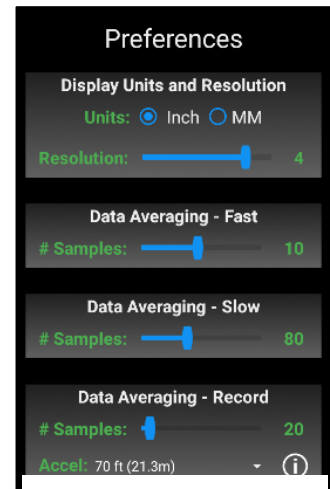
- **Display Units** – Select the preferred units to be displayed: *INCH* or MM.
- **Resolution** – Select the number of decimals to display for all target values.
  Note: *The maximum number of digits for INCH is 5, for MM, 4.*

Figure 5 – *Preferences Screen*

Data Averaging

Readings received from the target are averaged to reduce the amount of data noise (fluctuation) seen on the displays. Noise can typically come from atmospheric turbulence or vibration of the surfaces where the laser or target sits. On the Home screen, users may choose one of three possible settings: BI Fast, BI Slow, or *Measure*.

- **Data Averaging (BI-Fast)** – Controls the number of samples used for the averaging for the *BI-Fast* (Buck-In Fast) selection on the **Home** screen. Use this for buck-ins (setups).
- **Data Averaging (BI-Slow)** – Controls the number of samples used for the averaging for the *BI-Slow* (Buck-In Slow) selection on the **Home** screen. Use this for long distance buck-ins.
- **Data Averaging (Measuring)** – Controls the number of samples used for the averaging for the **Record** screen. Use this when taking data. It uses a slightly better averaging algorithm to minimize noise.
- **Accel – S**elect the approximate distance the target will be away from the laser. This flushes the buffer so the data will update faster when using higher sampling. The threshold is ±.002 in. (0.05 mm) per 10 ft. (3.3 m). Therefore, if the target value is over .002 in. from the average, the buffer will be emptied so that "good data" will be used. This is useful when first putting the target down each time to take a data point, where some large, non-relevant values will be detected by the target since it will start detecting the laser before it is set on the surface. It helps to get the actual measurement faster.

Comm Settings

Click on **Comm Setting** and a new screen displays with:

- **System ID** – The radios used in the A-1519/1520 Xbee® targets allow the ability to set different system IDs, so multiple sets of targets/lasers can be used in the same area. The **System ID** set here must match the System ID on the A-1519/1520-2.4ZBTargets. Click the **System ID** dropdown menu to change the System ID. When returning to the Read screen, wait 15-20 seconds for the change to take place.

  Note on Nautiz X81 – When changing the System ID on the X81, you will see 2 popups:

  a) Click OK to change the ID to your selection.

Figure 6 – *Communications Settings*
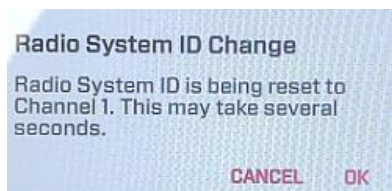
  b) If you see a warning message, just click Wait to allow Read16 additional time to make the changes. You do not need to click on Close App. If you do, then you'll need to redo the radio system ID change.
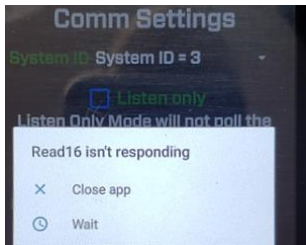
- **Poll Rate** – The rate at which the command for the target to send its data to the PDA is set. It is password protected and generally is not changed. Please contact Hamar Laser Support to get the password.
- **Check for Xbee® Radio** – This is a troubleshooting tool to see if the radio works properly. A message with the radio PCB ID will pop up if it works properly.
- **Launch Trimble Empower App** – Checks to see if the Nomad radio module driver is working properly. To use this feature, each set of laser/targets must have its own unique System ID. See Appendix B on Page 26 to see how to change the System ID on the A-1519/1520 targets.
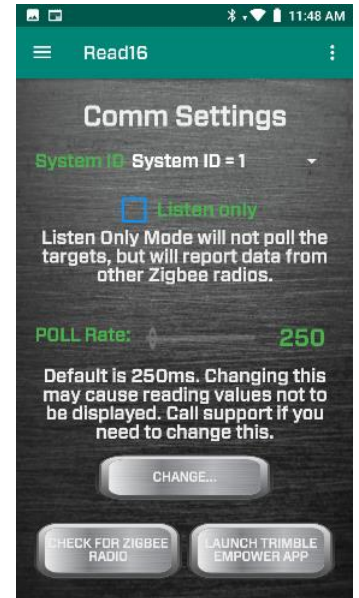
Targets Screen

Use the **Targets s**creen to select each target ID for the displays in the *Read* Screen. Each **Display** field can be changed to a specific Target ID. The Target ID is shown on the side of the A-1519-2.4ZB/A-1520-2.4ZB target housing (see Appendix A beginning on Page 22) and is normally set by the factory and not changed.

The default setting for the *Read* Display is *Single-Axis Target,* showing Target IDs 1 to 5 with each display enabled. The default ID for each display is noted in the *Target* Display by "ID=#".

To change a displayed Target ID, click the dropdown list (down arrow) and select the new Target ID. To disable a target display, select **DISABLED** from the *top* of the drop-down list.
Note: *If only using three targets, select the Target IDs for the first three displays and disable the remaining displays. When disabling a display, the radio stops "polling" that target ID, so the target data update rate will increase for the other targets.*
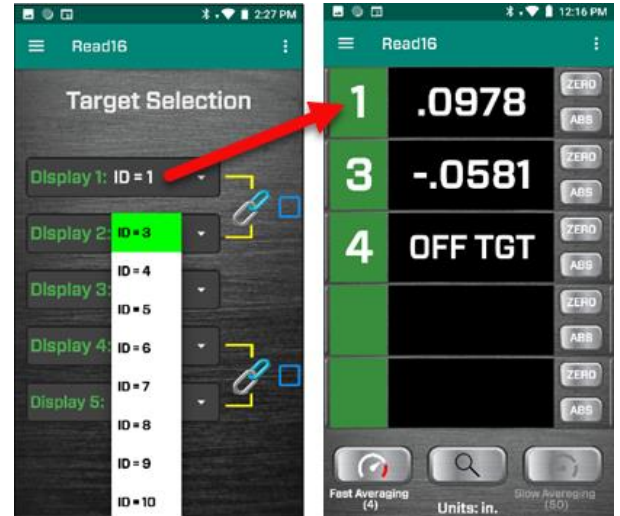

Figure 7 – *Target Selection Screen*

Choosing a 2-Axis Target Display

If using the R-1307-2.4ZB 2-Axis Readout with Xbee® communication capability, you can also display the data for 2-axis targets in **Read16**. To configure the displays, click the checkbox next to the *Chain* icon (chain link) and the two displays will be linked to a 2-axis target. You must pick the target ID to match the target ID set in the R-1307-2.4ZB. In this example, displays 4 and 5 will be linked to an R-1307-2.4ZB Readout with a Target ID = 3 (see Figure 8).
Note: *If you are not using single-axis targets, disable Displays 1 & 2 (or hit the link button for Displays 1 and 2 and disable Displays 4 and 5) to speed up data communication.*

Here is an example of the *Read* Display being configured with two single-axis targets (#1 and #2) and a 2-axis Target with an ID=3.

Figure 8 – *Read16 Target display showing a 2-axis target selected for Displays 4 and 5*

For 2-axis displays, the display ID will change to:
- **V** - Means the target's *vertical* axis
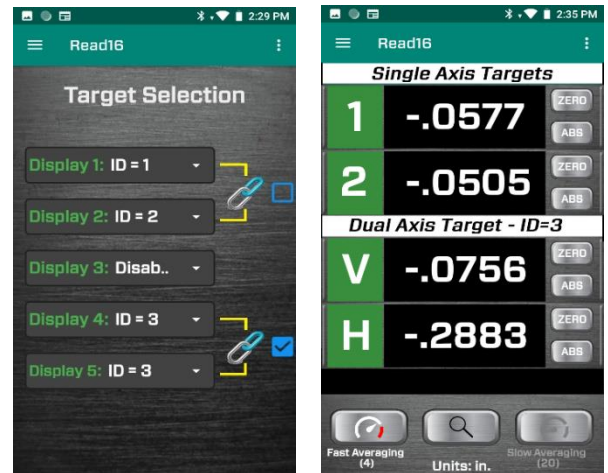- **H** - Means the target's *horizontal* axis.

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Read Screen

The **READ** Display screen provides a real-time numeric display of A-1519-2.4ZB/A-1520-2.4ZB Single-Axis Target data values or two 2-axis wired targets using the wireless function in the R-1307-2.4ZB Readout.

The display numbers 1 through 5 refer to the corresponding Target IDs on the side of the targets. Up to five target data values can be displayed simultaneously. Each **READ** target display can show one of the following:

Value

A numeric value represents the position of the laser plane relative to the target centerline (see Figure 10). A *positive* reading indicates that the point on the surface being measured is *above* the laser plane reference; a *negative* reading indicates that the point is *below* the laser plane reference.

Figure 9 – *Read16 Read Screen*

Figure 10 – *Single-axis Scan Target displaying positive (+) and negative (-) values*

OFF TGT

When the target stops detecting the laser beam, **OFF TGT** displays, which means the A-1519/1520 target is communicating normally with the PDA but the laser plane is *not* hitting the target. This could be due to the target not being pointed directly at the laser or something blocking the laser beam. When the target detects the laser plane, the display automatically updates to show the current value.

COM ERR Readout Displays

If **COM ERR** information is displayed in a target display, either a target is turned off or it is out of range of the Xbee® Receiver.

Low Battery Warning

The A-1519-2.4ZB/A-1520-2.4ZB Single-Axis Target features a battery-life indicator for each target to warn if a target's battery life gets too low. When the battery life is too low, **Read16** automatically displays a warning message.

Blank Target ID

If the target ID (white number in green box) is missing in a display, the target is *disabled* in the **Preferences** Screen. Go to the **TARGET** Screen to enable communication with the targets.

ZERO and Absolute Mode

The buttons located to the right of the target boxes are used to set the data display mode .Click on *ABS* or *ZERO* to toggle between ABSolute and ZERO modes.

- *Absolute Mode* (*ABS*)– the value indicates where the laser plane hits the target cell relative to the target's electronic centerline. The numbers in the display will be white.

- *Zero Mode* – when **ZERO** mode is selected, **Read16** applies an offset to zero the display. All target values then indicate the deviation of a given point relative to the zeroed value. To zero a target, place it on a reference point, wait a few seconds for the display value to settle down and hit *ZERO.* When the display value has been zeroed, it will turn yellow.

You can re-zero a point by clicking **ZERO**. A warning message displays asking if you want to re-zero or not (if you click ABS and then click ZERO, the same message displays).

To keep your existing Zero Offset, click **NO**.

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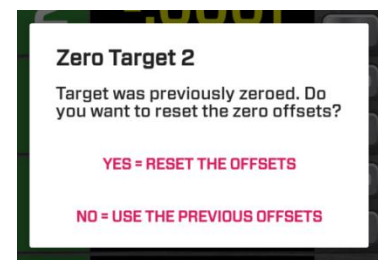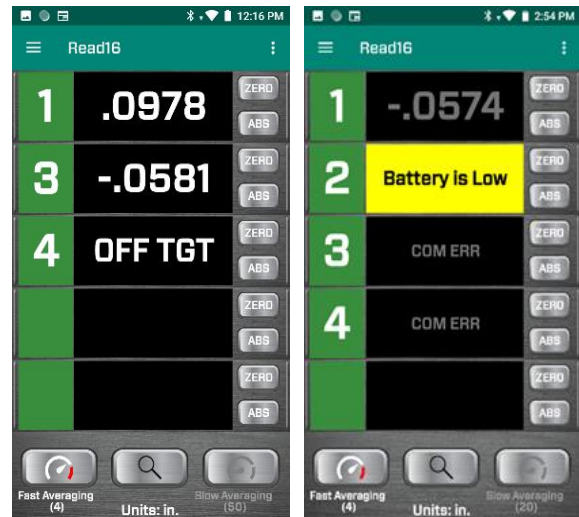
Details Button - Target Status
Click the center icon button to view target details, such as battery life, internal temperature, light level and serial number. Click the button again to restore the standard display.
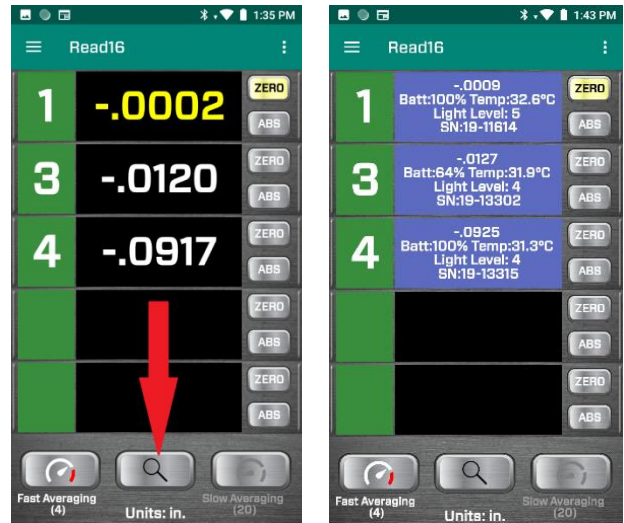

Averaging
Located under the last display box is the *Averaging* selection area, where there are two buttons (**Fast** and **Slow***). Each display value under the button is an average of a user-selected number of data samples. The number of averages for each selection can be selected in **Preferences**. There are two average selection modes:

Fast Averaging (4) – This is "fast" averaging used for buck-ins. On the Read16 screen on the right, the average is set to 4.

Slow Averaging (50) – This is "slow" averaging used for long-distance buck-ins. In the Read16 screen on the right, "slow" averaging is set to 50.

When severe turbulence or vibration exists in an alignment situation, the level of averaging should be increased to help smooth out the target fluctuations (measurement noise). In these situations, first, try *Slow Mode*, and if that doesn't help, go to **Preferences** and select a higher value until the fluctuations decrease to desired levels. The higher the number of averages, the longer the data value will take to update.

Note: *In severe fluctuation environments, such as measuring in direct sunlight or near welding or safety lights, the averaging probably won't provide enough reduction in measurement noise. In these cases, the **source** of the fluctuations must be reduced.*
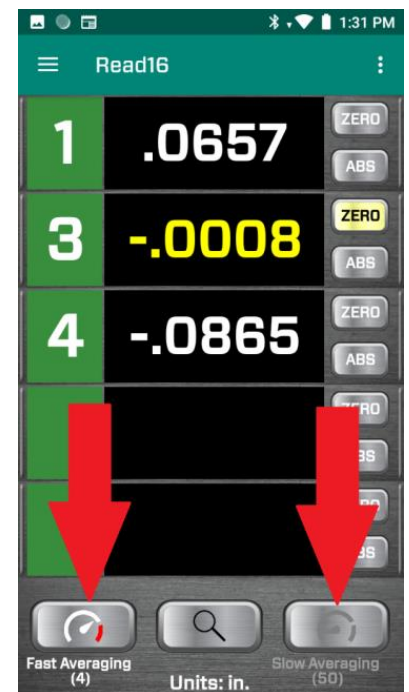
Popup Mode

If you need to see the display values from far away, you can pop up the displays in a *landscape* screen format to get bigger data displays. To pop up the displays, double-click the green area with the Target ID number on the left side of the display box.

To see displays 1 and 2 in the popup window, click **1** (green area) display. To see 2 and 3 in the popup, click **2** (green area) display, etc.

To return to the portrait display, click **Exit**.
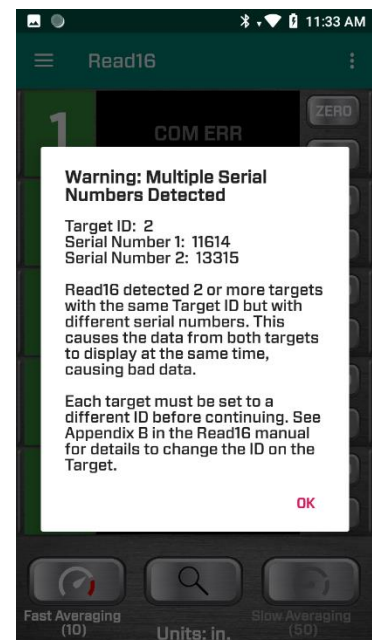
Excessive Light Warnings

The A-1519-2.4ZB/A-1520-2.4ZB Single-Axis Target features an automatic background-light correction function for extremely accurate readings. The targets are able to subtract the effects that background light has on the readings to increase accuracy. Also, if the background light gets too bright for the target to get accurate readings, a warning message displays.

Figure 11 – *READ Screen Popup showing Targets 1 and 3*

Note: *Using target light shields (included with each target) may help reduce the excess background light. In outdoor applications, optional narrow-band light filters are required to block the sunlight so the target can detect the laser beam.*

If 2 targets are configured with the same ID, READ16 sends a message informing you of the target ID number, the serial numbers for both targets, and a warning message.
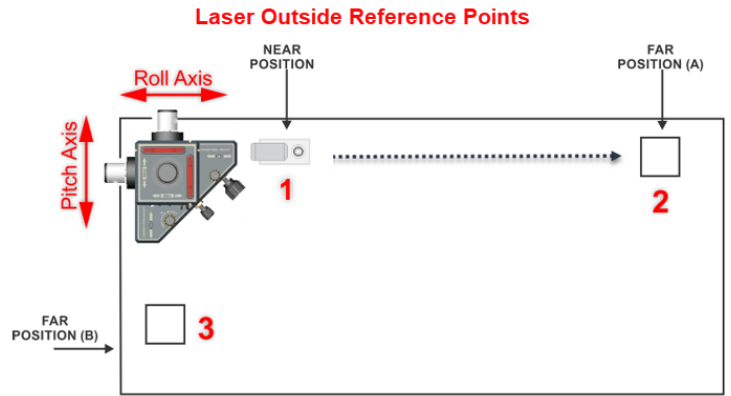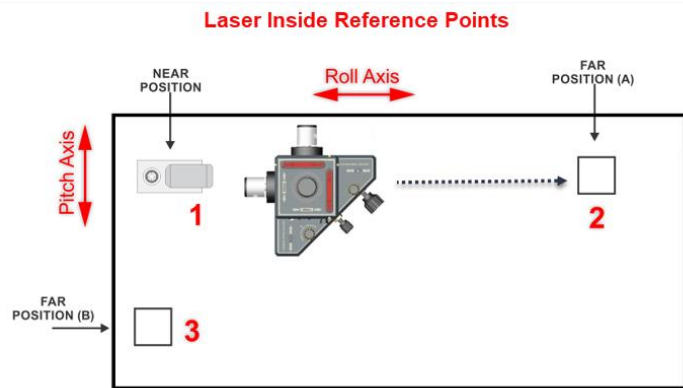
2-Point Buck-In Screen

When measuring straightness or flatness, the laser needs to be aligned (made parallel to) to either 2 or 3 reference points. We call this *bucking-in.* Read16 has an aide (wizard) to make this process go faster typically for the longer axis. The aide is located in the **2-Point Buck-In** tab and there are two modes:

|	
1. The laser located *Outside* of the 2 reference points (Near Position 1 and Far Position 2). This is the most common.	**Laser Outside Reference Points**
2. The laser is located between or *inside* the 2 reference points (Near Position 1 and Far Position 2).	**Laser Inside Reference Points**

The **2-Point Buck-In tab** will ask for the dimension (D1) between the laser's *pivot point* and the center of the target post when it's on the first reference point (1), always located next to the laser. It will then ask for the dimension (D2) between the first (1) and second reference point (2), measuring from center of the post in both locations.

2-Point Buck-in Procedure
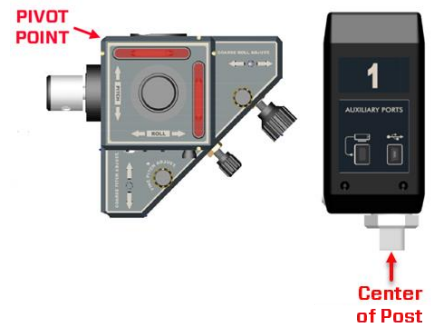
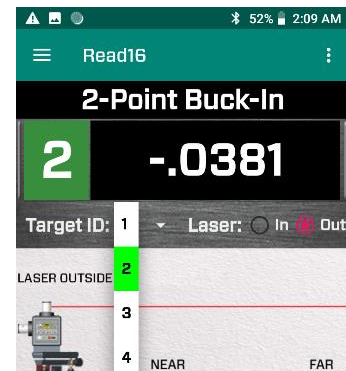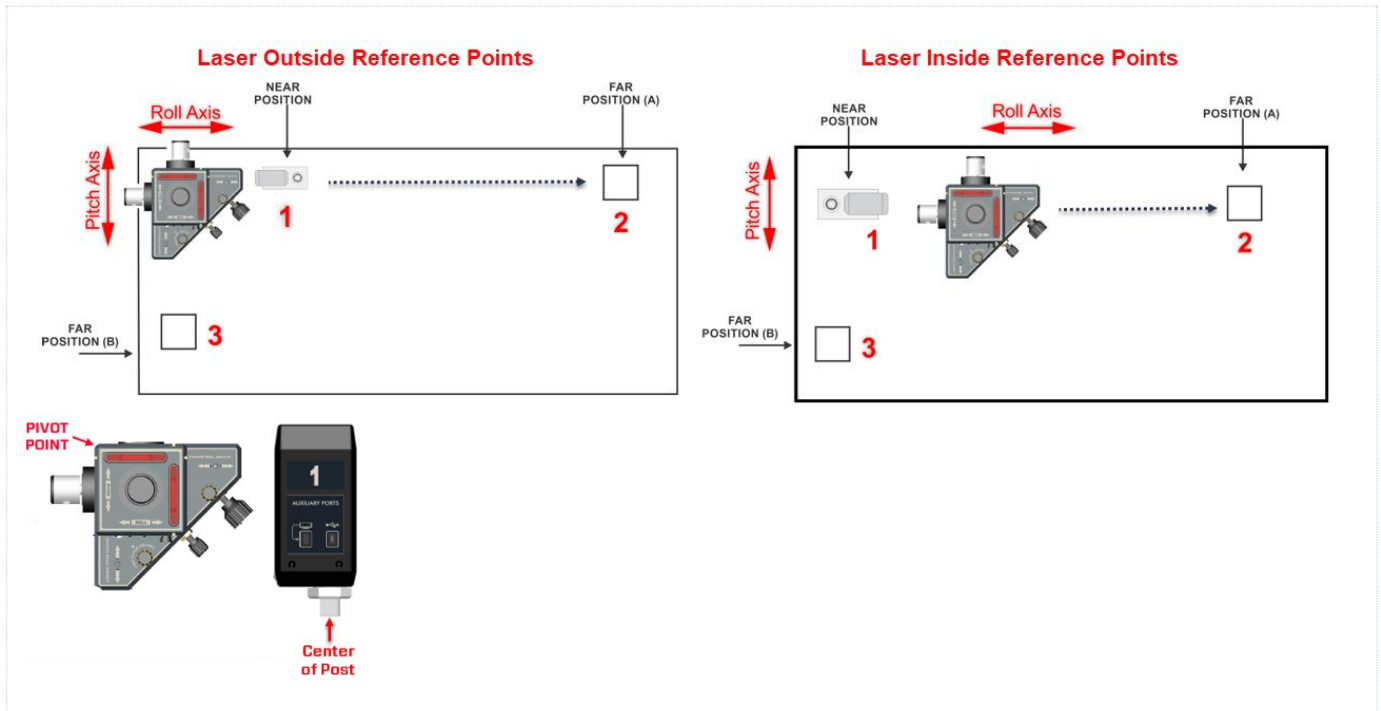|	Laser Outside	Laser Inside
The **2-Point Buck-in** Screen is used to make the process of making the laser parallel (bucked-in) to 2 reference points easier. The following short procedure requires measuring the dimensions between the target and laser. When done with this procedure, the laser will be "bucked-in" (made parallel to) two points on a surface. **Note:** *As noted above, there are 2 modes: Laser Outside (most common) and Laser Inside. We'll list both here side by side.*		
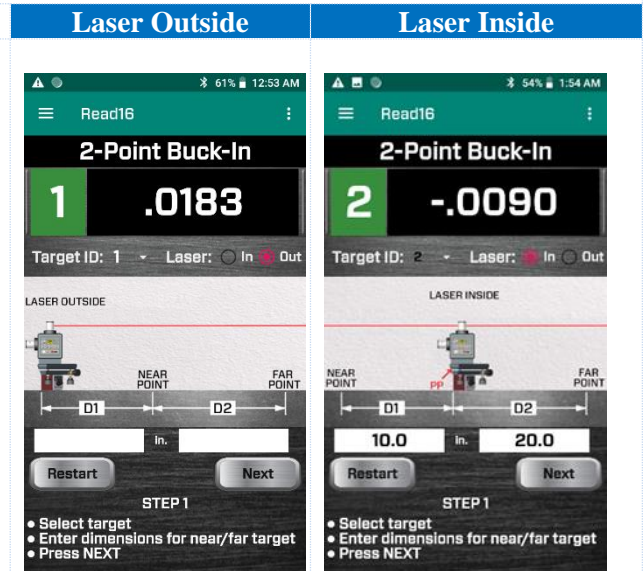
Step 1 – Setup

a. In either case, select the Target ID to use by using the dropdown menu. If you are using Target #2 as the Buck-in target, then select "2" from the dropdown menu below "Target ID". You should see the ID number to the left of the readout display change to the selection. If the laser is running and the target transmitting data, you should see the target value show up in the display.

b. Select a location to place the laser and select either Laser *In* or *Out*.

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Laser Outside Reference Points

NEAR POSITION — FAR POSITION (A)

Roll Axis

Pitch Axis

1 2

FAR POSITION (B) 3

Laser Inside Reference Points

NEAR POSITION — Roll Axis — FAR POSITION (A)

Pitch Axis

1 2

FAR POSITION (B) 3

PIVOT POINT

1 AUXILIARY PORTS
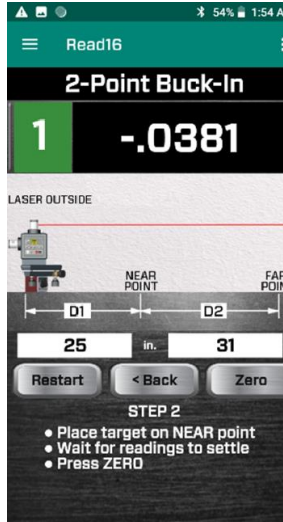
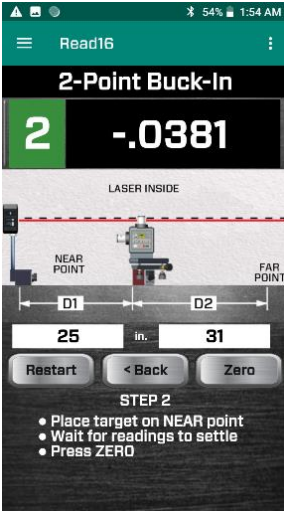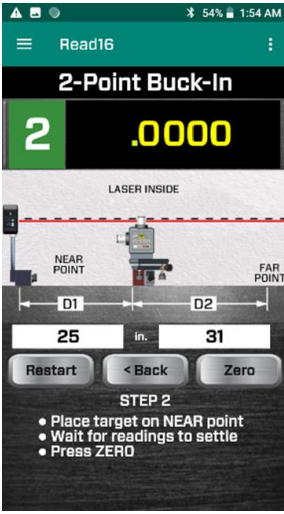Center of Post

	Laser Outside	Laser Inside

c. Locate the *Near* and *Far* reference point positions on the surface to be measured.

d. Enter the two dimensions (D1 & D2) in the entry boxes by clicking the box (this opens the keyboard) and entering the value. After entering *both* values, click **Next**.

e. **Laser Outside** - Measure the D1 dimension from the laser Pivot Point to the center of the target post on the *Near* reference point position (1).

f. **Laser Outside** - Measure the D2 dimension from the *center of the target post* on the *Near* reference point (1) to the *center of the target post* on the *Far* reference point (2).

g. **Laser Inside** - Measure the D1 dimension from the laser *Pivot Point to the center of the target post* on the *Near* reference point position (1).

h. **Laser Inside** - Measure the D2 dimension from the laser *Pivot Point (PP) to the center of the target post* on the *Far* reference point position (2).
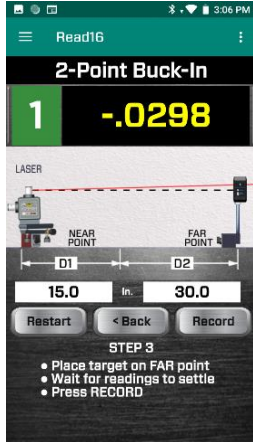

LASER OUTSIDE

NEAR POINT   FAR POINT

D1   D2

in.

Restart   Next

STEP 1
• Select target
• Enter dimensions for near/far target
• Press NEXT

LASER INSIDE

NEAR POINT   PP   FAR POINT

D1   D2

in.

Restart   Next

STEP 1
• Select target
• Enter dimensions for near/far target
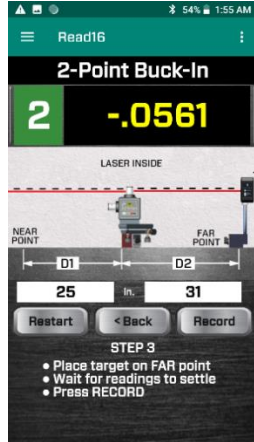• Press NEXT
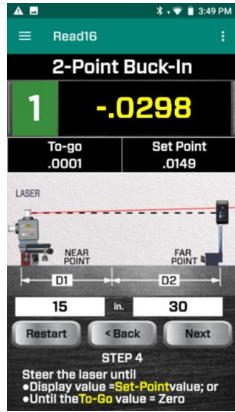
	Laser Outside	Laser Inside

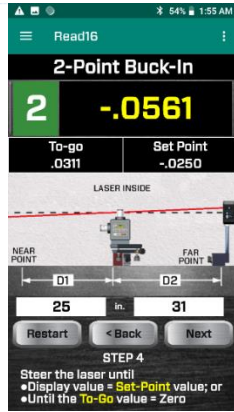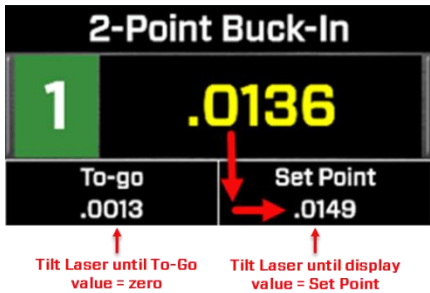**Step 2 – Zero Target and Record Data**

a. Put the target on the Near point. When the displayed readings settle, tap **ZERO**. The display value is the number in the display area next to the green box with the Target ID.

b. Displays are zero.

	Laser Outside	Laser Inside
Step 3 – Place Target on *Far* Point and Record a. Place the target on the *Far* point. When the displayed readings settle, press **RECORD**.		
b. Read16 calculates a **Set Point**, which is the value you want the target to read when you finish tilting the laser beam. This bucks-in the laser to the two reference points.		

Step 4 – Tilt the Laser to Make Display Value Equal to the *Set Point*

a. There are 2 ways to adjust the laser using the Pitch, Roll or Yaw adjustments on the laser base:

- **To Go** – This is the amount the laser beam needs to be tilted in the Roll Axis until the *Far* point value is equal to the *Near* point value. Here you will tilt the laser's adjustment base Roll Axis until the **To Go** value is **zero** within your tolerance.

- **Set Point** - This is the value you want the main display value to be set to. The laser is bucked-in (aligned) when the *display value = the Set Point*.

  Note: for Laser *Outside* case, the sign of the *Set Point* is <u>opposite</u> of the display value. For the Laser *Inside* case, the sign of the *Set Point* is <u>same</u> as the display value. Pay attention to the signs!

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In the *Laser Outside* example, you want to adjust the laser until the display value -.0298 = .0149 (Set Point) or the **To-Go** value is zero.

The second screen shows the laser after adjustment, where you will see the display value is equal to the **Set Point**. Notice also that the **To Go** is zero.

b. After adjusting the laser, move the target back to the *Near* point and the *display* value should be equal to the **Set Point**.
c. If not, then repeat Steps 2 and 3 until the display values are the same at both the *Near* and *Far* points. The laser is now bucked-in (parallel) to the 2 reference points for a line on a surface.
d. Make sure to zero out the display on the *Near* point before measuring the flatness/straightness.
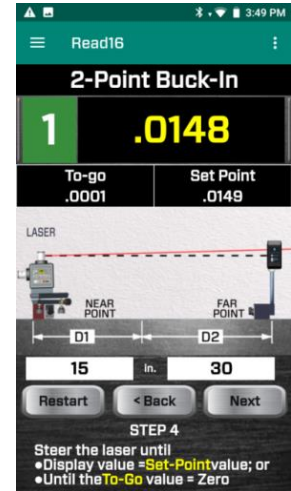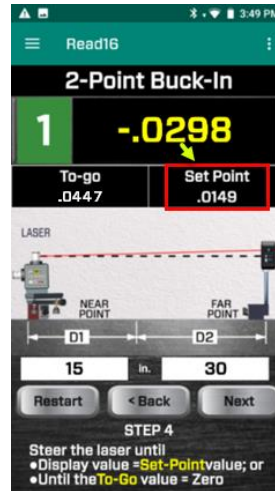
Using 2-Point Buck-In Screen for 3-Point Buck-In (Flatness)

The 3-Point Buck-In procedure requires adjusting the laser plane to be parallel to 3 points on the surface being measured; for example, a tabletop, a surface plate, or a way surface. Any 3 points on a surface may be used, however Hamar Laser recommends the "L" setup illustrated in Figure 12.
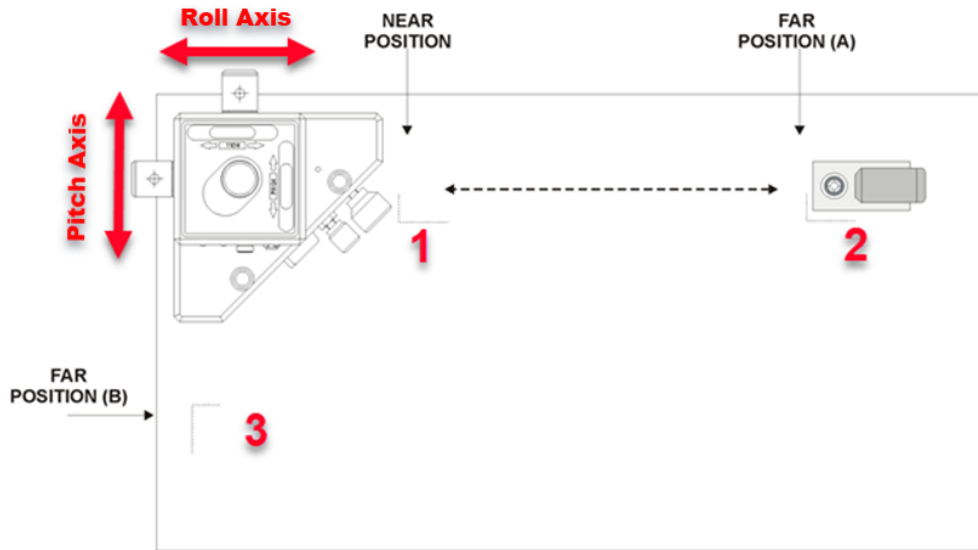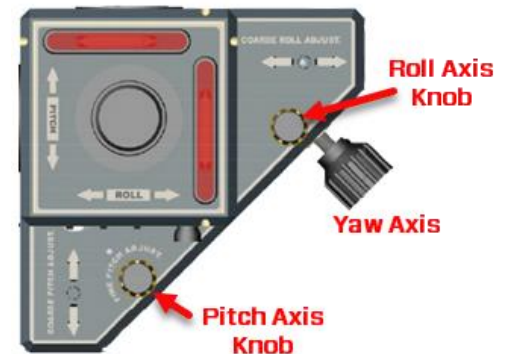

Figure 12 – 3-Point Buck-In Using one Target and the "L" Setup

When performing this procedure, it is best to place the laser source in a position that is as close to the near target position as possible. The third target position should be approximately 90 degrees to these two points.

3-Point Buck-In Procedure Using One Target

1. Follow Steps 1-4 above using the 2-Point Buck-In Screen for the *Roll Axis*.
2. With the target zeroed on Point 1, move the target to Far Position B (3) and tilt the *Pitch Axis* on the laser until the readout reads zero. Use only the laser adjustment knobs that face the target when tilting the laser beam.
3. Recheck the readings at the Near Position (1) and at Far Positions A (2) and adjust to zero if necessary.
4. When target reads zero in all 3 locations without adjustment, the laser plane is parallel to 3 points on the surface and it can be measured for flatness by moving the target to any point on the surface. You can also measure a second surface for parallelism by moving the target to that surface and measuring its flatness.
   a. A "+" sign means the point is higher than the reference points and a "-" value means it is lower than the points.

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3-Point Buck-In Procedure Using 3 Targets

This method requires 3 targets. The procedure is basically the same as with one target, but it saves the time required to move a single target to the 3 different footprints.
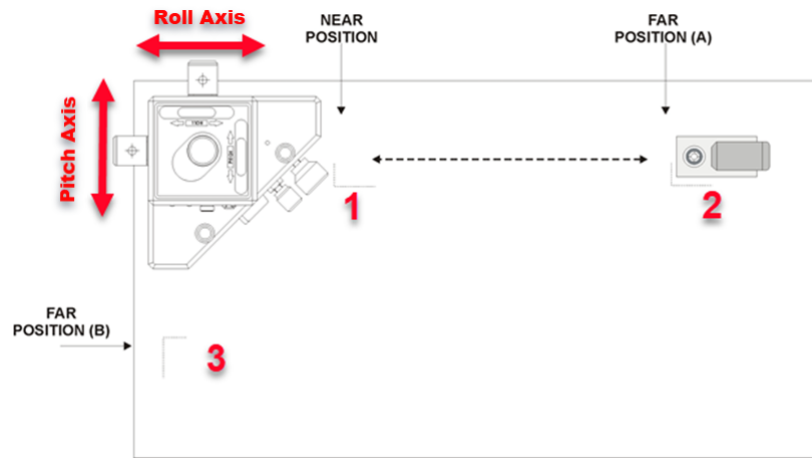

Figure 13 – *3-Point Buck-In Using Multiple Targets*

Using the **Read** Screen, zero all 3 targets, one at a time, on Near Position (1). In other words, place the first target on the near position (1), zero it and set it aside. Then bring the second target and put it on the same point (1) and zero it, etc.

1. Leaving 1 target on the near position (Point 1), place two of the targets on the other two positions (Points 2 and 3).
2. Tilt or aim the laser until all three readout displays read the same numbers and the same sign. In the example above, let's say Target 1 is on Point 1, Target 2 on Point 2 and Target 3 on Point 3. It is best to start with the target that is farthest from the laser (Point 2) and tilt the laser until the Target 2 value equals the Target 1 value.
   a. So first look at the values for Target 2 and tilt the *Roll Axis* until the Target 2 value equals that of Target 1.
   b. Then adjust the *Pitch Axis* until the Target 3 value equals Target 1.
   c. Recheck the Target 2 value to make sure it is still the same as Target 1. If not, repeat the process.

3. When all 3 target values are the same, the laser plane is parallel to all 3 points. To measure for flatness, zero one target on the *near* point and move to the desired locations to measure the flatness. A "+" sign means the point is higher than the reference points and a "-" value means it is lower than the points.

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Roll Alignment Buck-in Screen

The **Roll Buck-In** Screen is used to align the laser plane (usually the side or rear plane) to reference targets in roll alignment. Using the *Yaw* axis knob, the goal is to align one of the vertical laser planes on the L-743/L-733/L-742W/L-732W laser parallel to the offset-centerline reference targets. Please refer to the Hamar Laser's Training Manual for a more detailed description of roll alignment.

Note – when using a reference roll as the initial reference for the laser, it is strongly recommended that you use the 2-Point Buckin Tab on pages 9-14. The procedure here is to transfer the laser along the side of the machine to a new section to measure the rolls for alignment.

Transfer Laser Buck-in Procedure

This procedure is used to transfer the laser to a new section of the machine using the **Roll** Screen, assuming the laser has already been bucked-in to the reference roll and the reference targets have been set up.
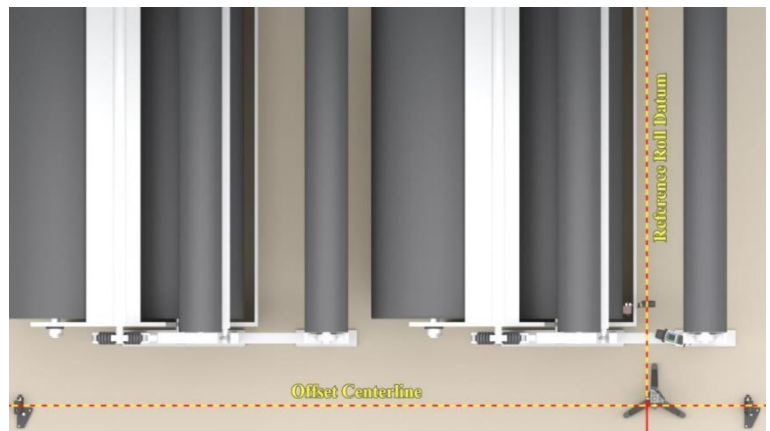
To transfer the laser to another section of the machine:

1. Move the laser to the new section of the machine.
2. With the laser rotation turned off, rotate the spindle by hand and roughly align the laser to the 2 reference targets until you see the laser beam hit in the window on both reference targets.
3. Using the dropdown menus (*ID = X*), select the target IDs for the reference targets. Typically, Target #1 is used to measure the rolls and #2 and #3 are used as the reference targets.
4. Power on the laser. A combined target value is shown in green in the display. This value is the difference between the values of the two target IDs selected above. This value is a measure of how far out of alignment the laser plane is to the reference targets.
5. Use the *coarse* and *fine* (L-743, L-742W) *Yaw* adjustment knobs on the laser base until the display value is zero or within your buck-in tolerance.
6. As you adjust the laser, the laser line angle updates, indicating whether the laser is getting closer (angle is decreasing) or farther away (angle is increasing) from being parallel to the reference targets.
7. When the display value is at zero (or within your tolerance), the laser line is parallel to the white centerline, indicating the laser is now bucked-in to the two reference targets and thus parallel to the offset centerline of the machine. You can now measure the roll on the machine for alignment.
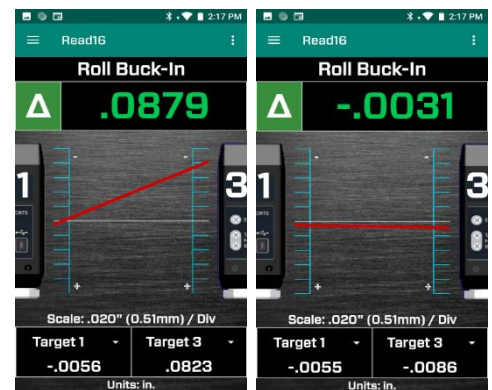
Record Screen

The **Record** *Screen* is used to record data points. You can record up to 500 data points and save the data in an XML or CSV (Excel) format:

- **CSV** – Comma separated values. Commonly used for import to programs such as Microsoft Excel.
- **XML** – Extensible Markup Language. This format can be opened by a number of programs, including Internet browsers.

Read16 records these parameters:
- data point number
- target value
- date/time
- units

The number of digits shown in the display area is set by the value in the **Preferences Screen** (see Page 3).

To record data:
1. Select the target ID that you want to record by clicking on the dropdown menu for **Target**.
2. Click
   - **Single Axis** for A-1519-2.4ZB/A-1520-2.4ZB Single-Axis Targets, or
   - **Dual Axis** for recording the data of a 2-axis target using the R-1307-2.4ZB Readout.
3. Move the target to the first data point, wait a few seconds for the readings to settle down and tap **RECORD** to record a data point. A value and the date/time appear in the display area.
4. Move the target to the next point and repeat.

To re-record a point, click on the row in the data table and click **RECORD.** A warning message provides the following options:

- **Re-Record** – records the new data over the old point.
- **Insert Below** – records the data point and inserts it below the selected item.
- **Add to Bottom of List** – records the data point at the end of the set of data.
- **Cancel** – closes the window and does not record the data point.
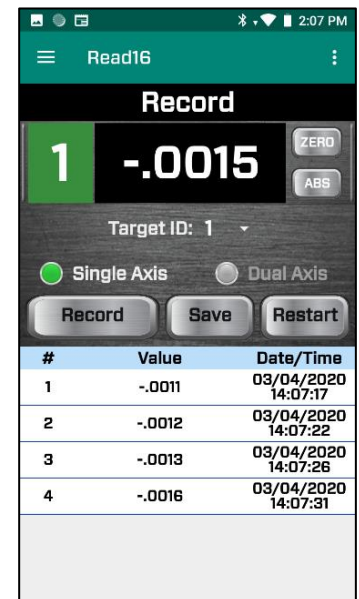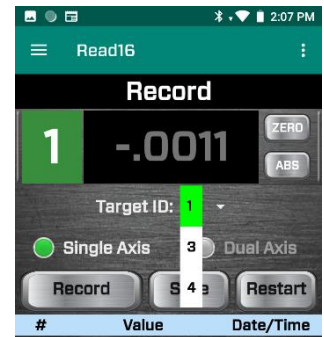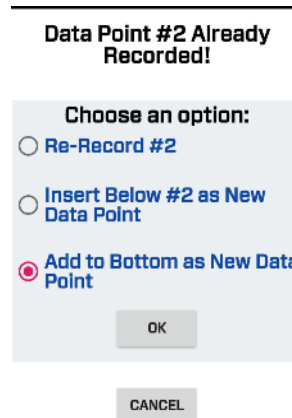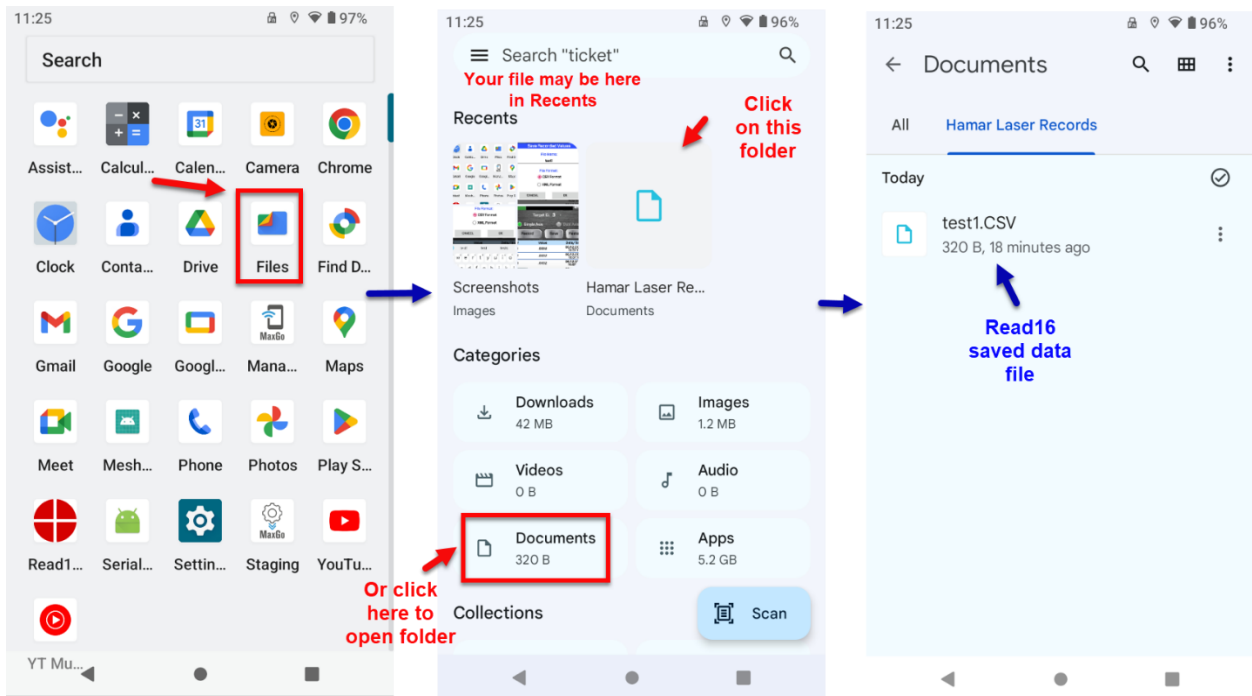
Saving the Data File

Once all data points are recorded, press **Save**. The program will prompt you for a file name.
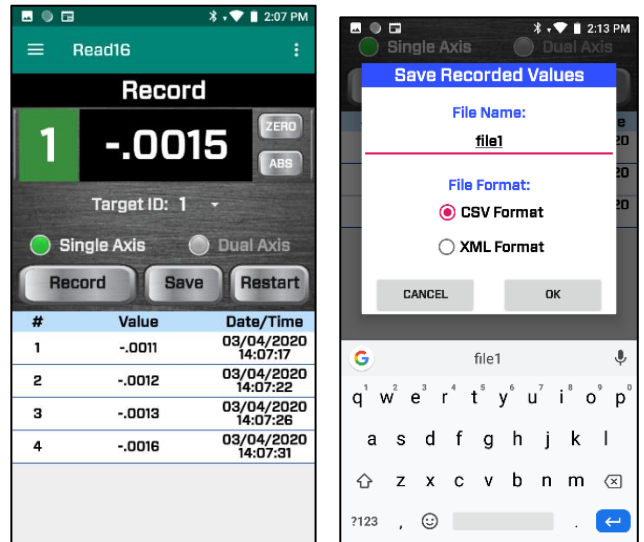
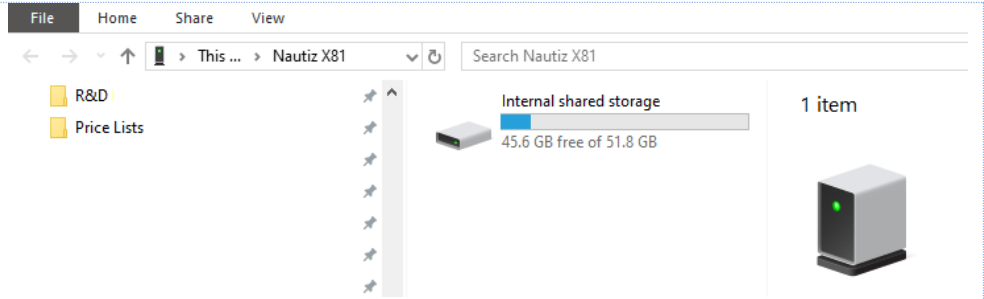The files will be saved in the following folder:

For the Nomad5, the Internal shared storage\Android\data\com.hamarlaser.read16\files\Documents

For the Handheld X81 Nautiz, here is how to find the Read16 Saved data files:
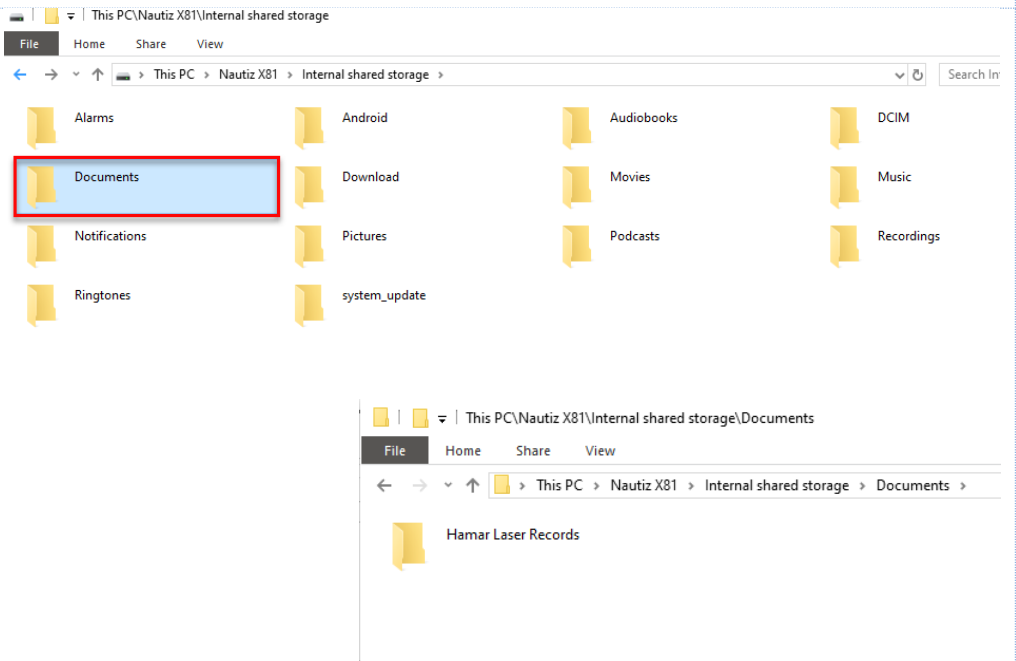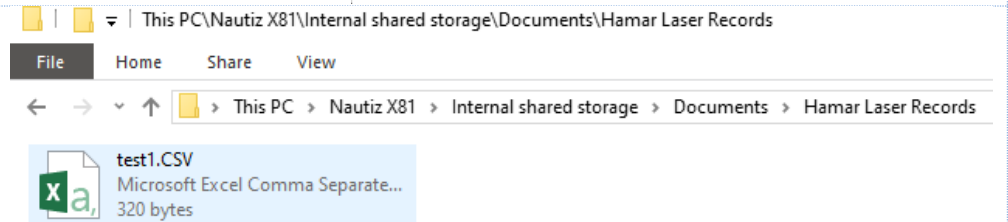
Copying Files from the Nautiz X-81PDA

|	
1. Connect the PDA using the provided USB-C connector. Windows should automatically open a folder with the X81 that will look like this:	
2. Double click on: a. **Internal Shared Storage** and b. then on to **Document** c. and then **Hamar Laser Record**	
3. Then, you will find the CSV or XML files that you saved. 4. Copy the file and paste it into a folder on your PC. 5. Open it in Excel or an XML view (Notepad is one example) to see the data.	

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Copying Files from the <u>Nomad5</u> PDA

1. Connect the PDA using the provided USB-C connector
2. From the Apps screen on the PDA, select **Settings**
3. Click **Connected Devices**
4. Click on **USB** Transferring Files
5. Select **Transfer Files**. A Windows popup with File Explorer displays, showing the folder.
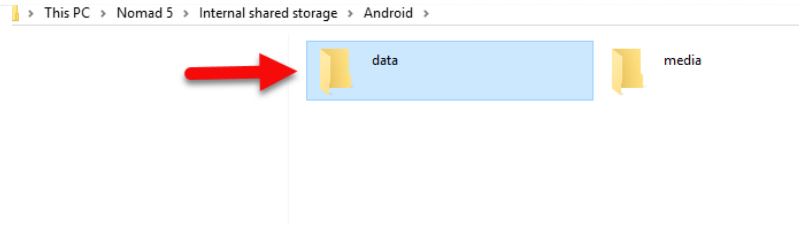
Nomad5 Android OS Screens to Transfer Files
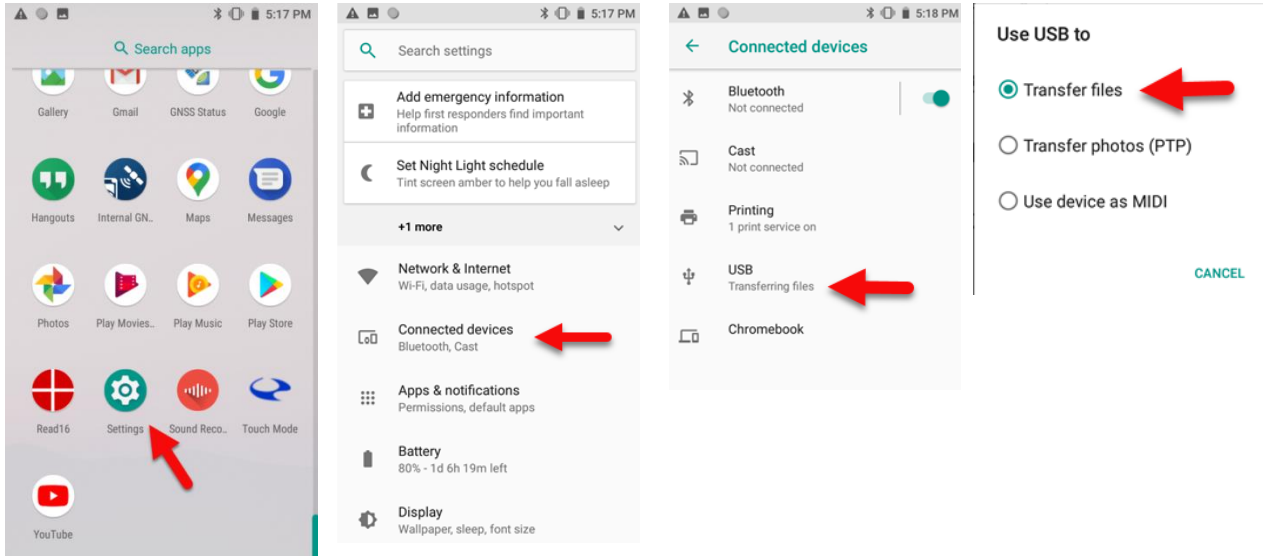
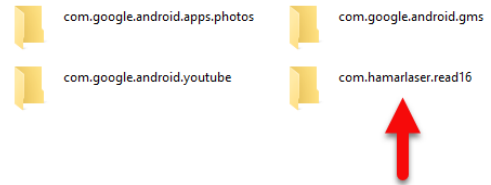|	
6. In the Windows popup, double-click on the "**Internal shared storage**" icon.	
7. Open the **Android** folder.	

8. Open the **Data** folder.	This PC > Nomad 5 > Internal shared storage > Android >

data   media |
| 9. Locate the **com.hamarlaser.read16** folder and open it. | com.google.android.apps.photos   com.google.android.gms

com.google.android.youtube   com.hamarlaser.read16
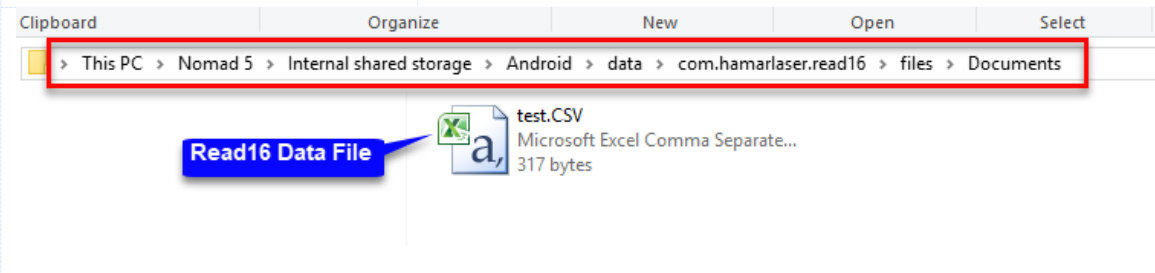
 |
| 10. Open the **Files** folder, then open the **Documents** folder, where the Read16 data files are located. There are two formats:
  - *.CSV – this is an Excel format that you can open in Excel.
  - *.XML – this is a format that can be used in a lot of program, including browsers. | |

Clipboard	Organize	New	Open	Select

> This PC > Nomad 5 > Internal shared storage > Android > data > com.hamarlaser.read16 > files > Documents

Read16 Data File → test.CSV
Microsoft Excel Comma Separate...
317 bytes

Appendix A – A-1519/1520 Type II Wireless Targets - Overview

The A-1519/1520 Type II Universal Wireless Targets incorporate new features and provide greater capabilities than previous wireless targets offered by Hamar Laser. New features include:

- Built-in radio transceiver, available in either 900 MHz or 2.4GHz ISM band
- Internal Li-Polymer rechargeable battery with twice the capacity of previously offered targets
- Rechargeable through a plug-in power supply or an optional charging station/cradle
- Field-Programmability: System ID and Target Network ID programmable via rotary DIP switches. Firmware Updates, Calibration and Other Parameters configurable through the USB Port, using the A-1519/1520 Configuration Utility.
- Three data communication modes: Wireless (Radio), RS-485 and USB
- Auxiliary Port for future expansion, such as a numerical display or external temperature sensor Improved Background light noise suppression
- Internal dampening by averaging of two to 64 laser position scans

Identifying Target Features

Figure 14 -- *Universal Wireless Targets*

(1) Right Side Auxiliary Ports	(2) Front View	(3) Left Side ID Switches	(4) Rear View
1-1 Auxiliary Port. Expansion Port. **1-2** USB Port. Used to update target firmware, upload calibration data, configure operating parameters and run diagnostics. Can also be used as a Data I/O port, compatible with standard applications.	**2-1** Target Status LEDs. *Steady* when the laser scanner is detected and all conditions are normal. *Blinks* at different rates when an abnormal condition is detected. **2-2** Battery Charging Indicator. **2-3** Low Battery Indicator. **2-4** Position Sensor Aperture Window. **2-5** Optional Light Shield Mounting Holes (4x).	**3-1** System ID rotary switch used to set the System ID Group Number 0-9. **3-2** Target Network ID. Used to set the Target Network ID from 01 to 99.	**4-1** Radio regulatory information. **4-2** RS-485 and plug-in power supply connector. **4-3** Serial Number Label.

Using the Target as a Height Gage

The Targets can be easily converted to a height gage by attaching precision spacers and the spherical tip to the base of the target. Since the center of the target has been set to a tightly controlled dimension, the exact dimension from laser plane to the measured surface can be obtained. Optional precision spacers are available in 1 in. (25.4 mm), 2 in. (51 mm), 3 in. (76 mm) and 6 in. (154 mm) sizes, all of which are accurate to .0003 in. (0.008 mm).

The precision spacers screw into the threaded hole in the base of the target where the shaft for the magnetic base is normally installed. The spherical tip screws into the bottom precision spacer. Multiple precision spacers can be screwed together to ensure that the target reaches the laser plane, but the spherical tip, which is used to touch the surface being measured, must be on the bottom.
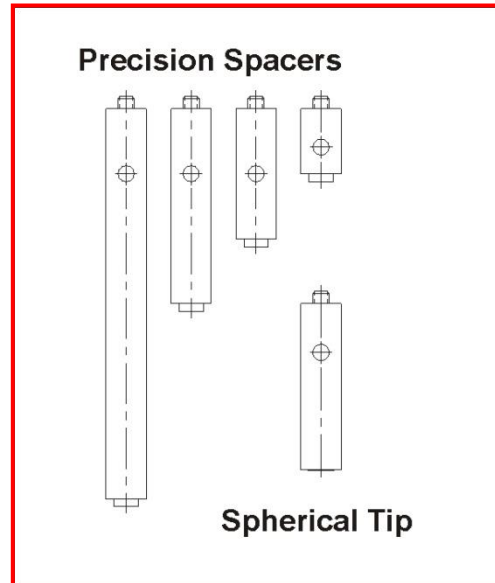
Figure 15 --_Precision Spacers/Spherical Tip_

Appendix B – Setting the Target System ID and Target Network ID (A-1519/A-1520 Targets, A-910-900/2.4, A-910-2.4ZB)

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 16.

- 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.*
- *The System ID on the side of the target must match the System ID in Read16 Software. See page 3 for instructions.*


Using a small screwdriver, rotate Switch 1 to align the arrowhead with the System ID number (0-9). Figure 16 shows the System ID switch set to 1.

Figure 16 – *System ID Switch set to 1*

Appendix C – Restoring the Read16 Software

Android applications are distributed via **.apk** files.

1. Un-install any previous version of Read16.
   - Start the **Settings** app that comes standard with your PDA.
   - Select **Apps and notifications**.
   - Select **See all apps**.
   - Tap **Read16**
   - Select **Uninstall**
2. Copy new Read16 **.apk** file to the PDA
   1. Connect USB cable to the PDA and a Windows PC.
   2. On the PDA, open **Settings** app.
   3. Select **Connected Devices**
   4. Select **USB Connected**
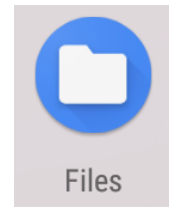   5. Select **Transfer Files**.
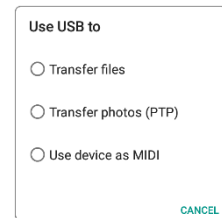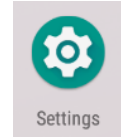
3. On a Windows PC, open Windows Explorer and locate your PDA. If it's not visible within 20 seconds, press **F5** to refresh the Windows Explorer display.
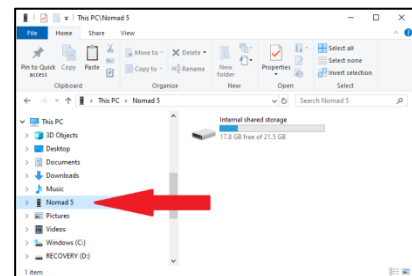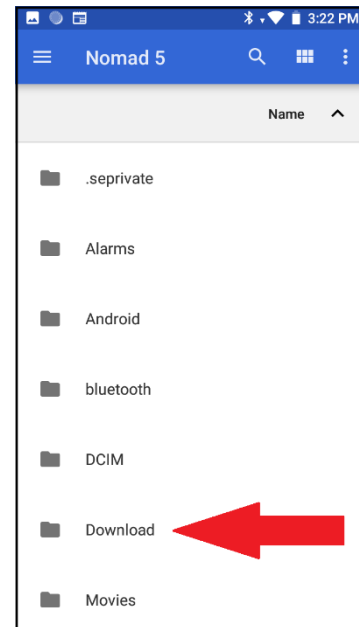
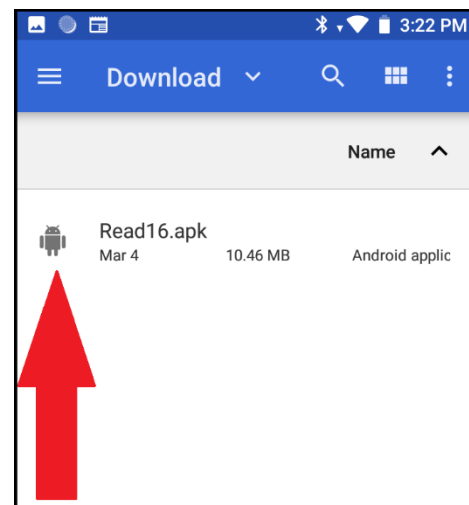4. Paste the new **.apk** file into the **Download** folder on the PDA.
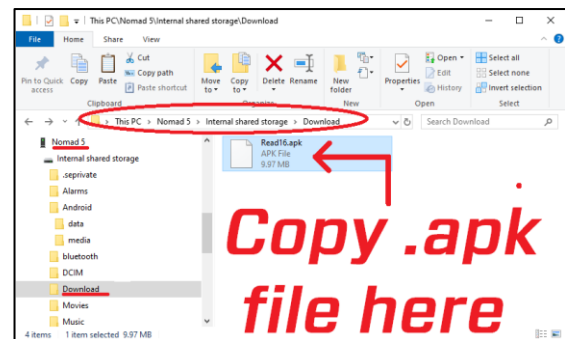
5. On the PDA, open the **Files** app.

6. Navigate to the **Download** folder.

7. Tap the **.apk** file to install the application.

Appendix D – Reinstalling the Xbee® Radio Module – Nomad5 PDA Only

If HLI Support determines there is a problem with the Xbee® radio, follow this procedure for replacing the Xbee® Radio Module to restore communication. This is for the NOMAD5 PDA only.

1. **Power off PDA.**
   Power menu: Hold down the **Power** key for about two seconds to display a message box. Tap **Power Off**.

2. **Remove the Xbee® Radio Module.**
   Using a suitable screwdriver, unscrew the two screws that hold the module to the PDA.

3. **Gently remove the Xbee® Radio module by sliding it out.**

4. **Replace the new radio module in the housing**
   Remove 2 screws on *both* sides of the housing as shown. The housing comes apart, showing the radio PCB card.

5. **Pull out and replace the USB Xbee® Radio Module from the USB port in the housing.**
   a. Remove the 2 mounting screws holding the circuit card to the housing – see below.
   b. Gently pull the USB Xbee® Radio Module from the USB port in the housing as shown below.
   c. Replace with the new USB Xbee® Radio Module.
   d. Reassemble as shown above.

Appendix E – Reinstalling the Xbee® Radio Module – Handheld Nautiz X81 PDA Only

If HLI Support determines there is a problem with the Xbee® radio, follow this procedure for replacing the Xbee® Radio Module to restore communication.

Note: this is for the Handheld Nautiz X81 PDA only.

1. **Power off PDA**
   Power menu: Hold down the **Power** key for about two seconds to display a message box. Tap **Power Off**.
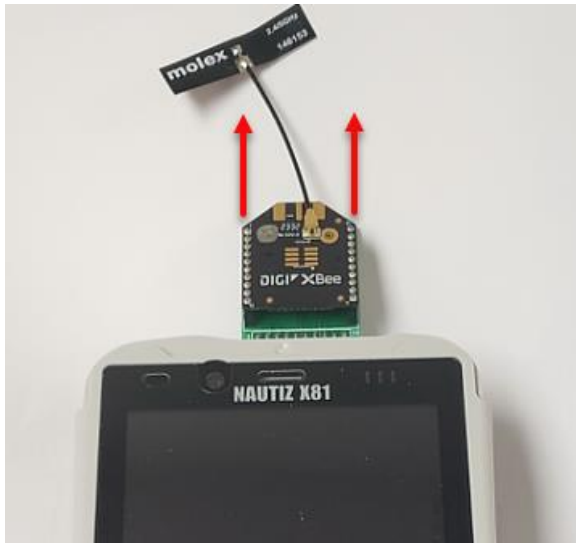
2. **Remove the PDA Radio Cover**
   Using a suitable screwdriver, unscrew the two screws that hold the cover on the PDA.

   Note: slowly pull off the cap since the radio antenna is taped to the inside of the cap. If the antenna can't be peeled off, you can disconnect the antenna from the radio PCB board.
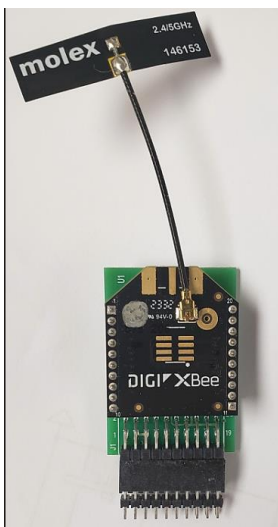
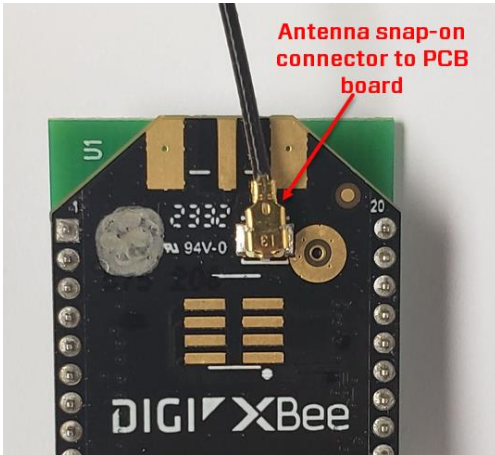3. **Gently remove the Xbee® Radio module by sliding it out.**

4. **Replace the new radio**
   Being careful to make sure that the DIGI XBEE radio module is <u>facing up</u> (see image), insert the new radio module into the connect slots on the top of the PDA

The pins on the radio module slide into this connector

5. **Reconnect the antenna snap-on connector.**

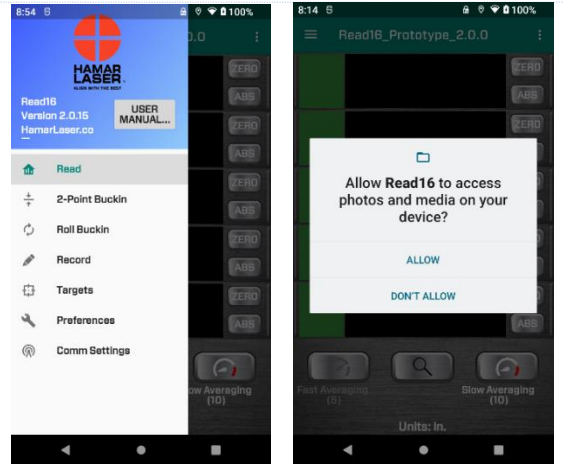6. **When the radio module in installed in the connector correctly, it should look like this**:

7. **Replace the radio cap, making sure to fold down the antenna and re-tape it somewhere inside the curved area in the radio cap.** *Note - the antenna should <u>not</u> be put on top of the radio board but somewhere inside the curved cap area.*
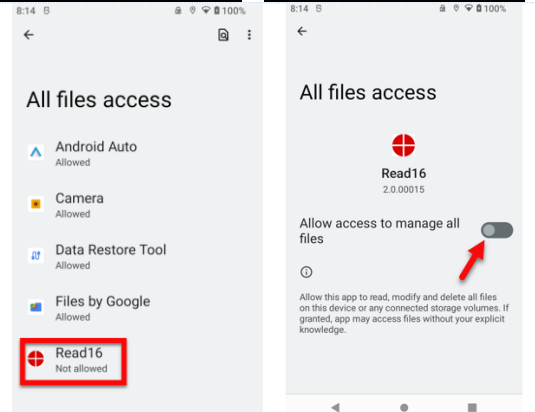
Appendix F - Enabling the X81 PDA to Display the Manual

When first installing Read16 on the Nautiz X81 PDA, you will need to allow Read16 to access media on the PDA. Here is how:

1. Open Read16 and swipe from the left to bring up the menu. Click on **User Manual** to open the manual. 2. Allow Access window will pop up. Click on **Allow**.	
3. The **All files access** Android window will appear. Click on Read16 at the bottom. 4. The All files access window for Read16 will open. Click the button to allow Read16 access to all files.	
5. Click on the back button to return to Read16 and you should see the Read16 Manual file opened. 6. Hit the back button again to return to Read16.	