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Calibration Adjustment Tool

Quick Start Guide

(Rev B)

Welcome from Noraxon

Congratulations on acquiring your new Calibration Adjustment Tool!

This guide will provide you with step by step instructions on how to install your new hardware and software, adjust device settings, and record your first data set.

Let's begin by walking through how to install your new hardware.

Note: This is not meant to be a complete manual, but a guide to help you get started with your system. For more detailed instructions on operating the Calibration Adjustment Tool and its features please refer to the complete **Calibration Adjustment Tool User Manual** also included with your system.

1 System Unboxing

1.1 System Unboxing

Figure 1 – System Electronics Unit (SEU)

Figure 2 – Source

Figure 3 – Stylus

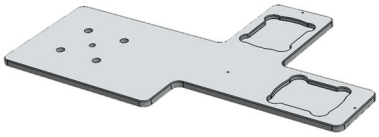


Figure 4 – Alignment fixture

Figure 5 – Tripod

Figure 6 - Driver CD

1.2 Hardware Setup Instructions

Important Notes:
The Source and Stylus can be affected by both magnetic material and electrically conductive materials. Clear the capture area of any material which can cause distortion in the system. Section 2.3 of this Quick Start Guide provides instructions on how to use the Stylus and distortion readout in the MR3 software to check the capture area for magnetic distortion.

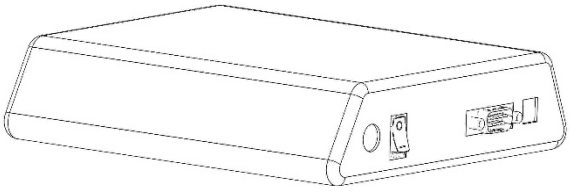
1.2.1 Installing the Patriot M

Step 1

Unpack the PATRIOT M SEU, source, stylus, USB cables, and power supply.

Step 2

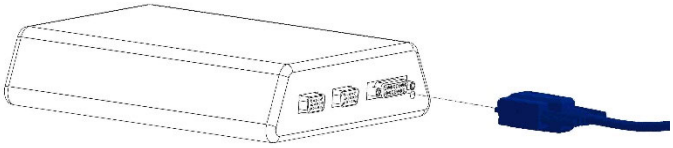
Setup the PATRIOT M SEU close to your host computer.



Step 3

Identify the source (the four-inch gray cube) and insert the source connector into the source receptacle on the PATRIOT M SEU, being careful to firmly engage it.

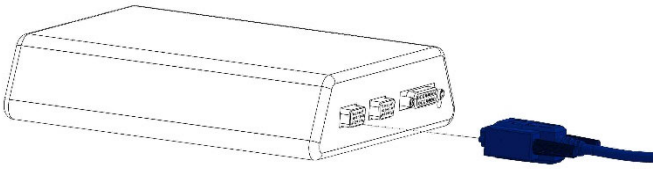
Using your fingers, tighten the two retaining screws to secure the connector.



Step 4

Identify the stylus and insert it into *Sensor 1 receptacle* on the PATRIOT M SEU.

Using your fingers, tighten the two retaining screws to secure the connector.

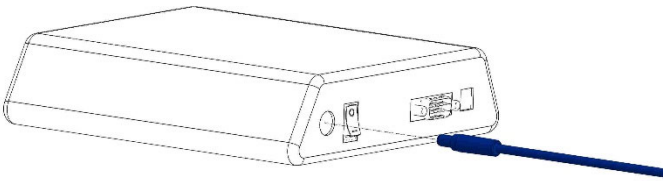


Step 5

Ensure the power switch is in the **OFF** position (logic "0", DOWN).

With the separate power supply UNPLUGGED from the wall, connect the power input cable to the PATRIOT M.

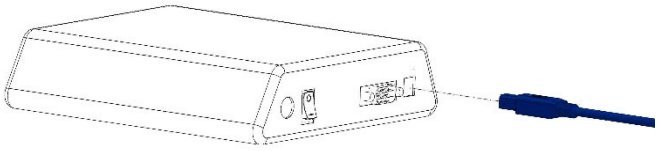
The power supply can now be plugged into a 110/220 VAC outlet.



Step 6

Identify the USB cable and insert it into the receptacle.

Connect the other end of the USB cable to the host computer.



Step 7

At this point, you may turn on the PATRIOT M system using the power switch located on the back panel of the SEU.

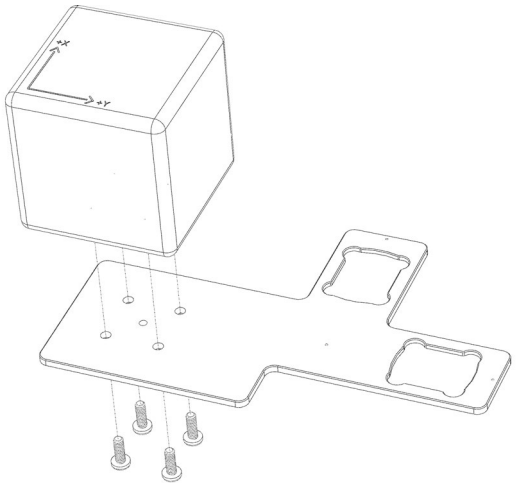
A system status indicator located on the front panel should flash red for 5 to 10 seconds indicating self-test and set-up.

Steady green	System operational – passed startup testing.
Flashing red	Failed self-test and set-up.

Step 8

Mount the Source unit (4 inch grey cube) to the Alignment Fixture using the (4) supplied 1/4-20 Nylon screws.

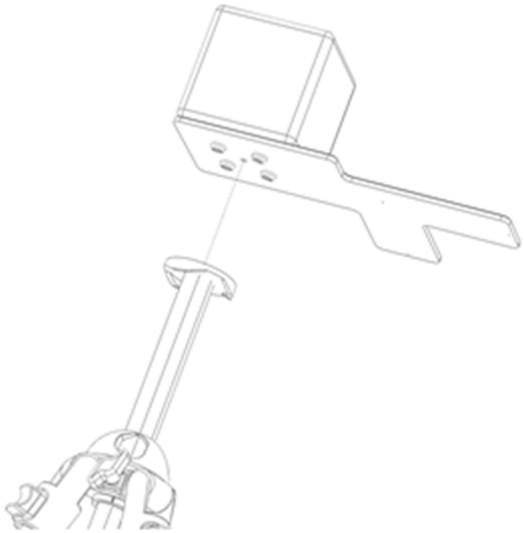
Align the coordinate system on the top face of the Source as shown.



Step 9

Mount the Source unit and Alignment Fixture assembly to the tripod.

Screw the tripod stud into the tapped hole in the Alignment Fixture.



1.3 Installing the Companion Software – myoResearch™ 3 and Companion Hardware – myoMOTION Research Pro

The Calibration Adjustment Tool has been designed to operate with the MyoMotion Research Pro (IMU) system and the companion software system, Noraxon *myoResearch 3* (MR3). Both hardware and software systems need to be installed on your computer before incorporating the use of the Calibration Adjustment Tool. See the myoMOTION and MR3.14 User Manuals for specific installation instructions.

If you have purchased the Calibration Adjustment Tool with a **new** myoMOTION system and have yet to install and operate the MyoMotion system on your computer, please do so now. Then return to Section 1.4 of this document to continue with Hardware installation for the Calibration Adjustment Tool.

1.4 Device Communication (Driver) Software Installation

The Patriot M requires the PatUSBDrvPkgInstall device driver which is pre-installed by the MR3 software installation.

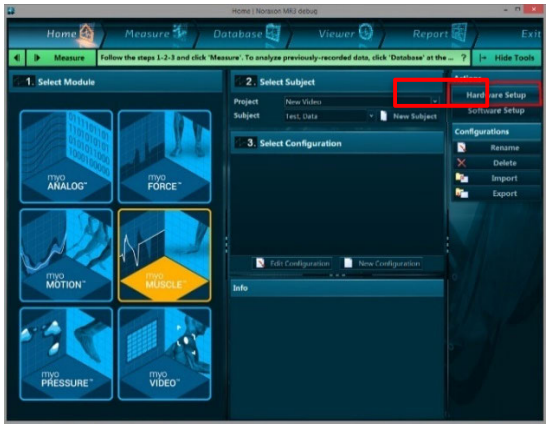
1.5 Configuring the Hardware

These steps should be performed after the MR3 software and myoMOTION hardware systems have been installed on your computer. See Section 1.3 for more details.

Step 1

Open MR3, typically listed under *Noraxon -> MR3*

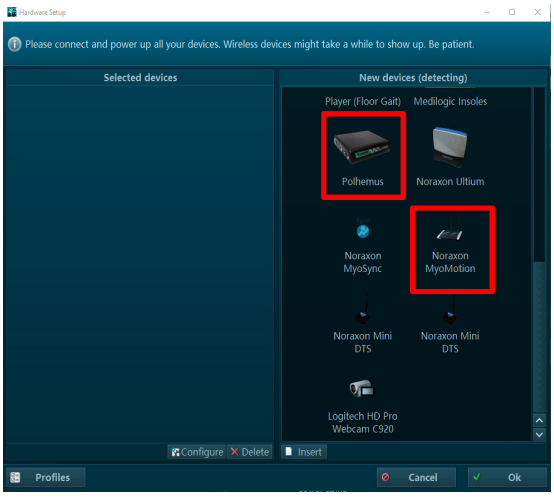
Click on the **Hardware Setup** button in the upper right-hand corner.



Step 2

Select the Polhemus Stylus icon and the MyoMotion icon within the 'New Device' column and click the **Insert** button.

There is no required setup for the Polhemus Stylus.

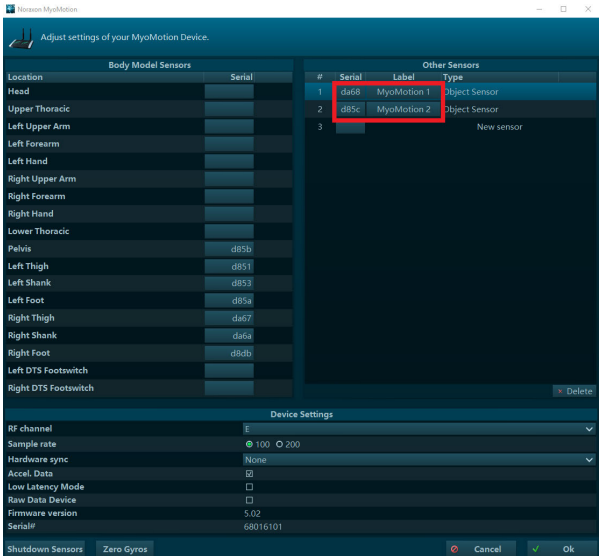


Step 3

Assign the myoMOTION sensors to the body segments to be included in the measurement recording.

Also, assign two myoMOTION sensors as Object Sensors for the Axis Alignment process.

Note: For more information on myoMOTION Hardware setup and Device Settings, refer to the myoMOTION hardware user manual.



2 Basic Operating Instructions

The operating instructions listed here provide instructions on how to perform a Calibration Adjustment within the myoMOTION sensor calibration procedures.

2.1 Recording a Measurement

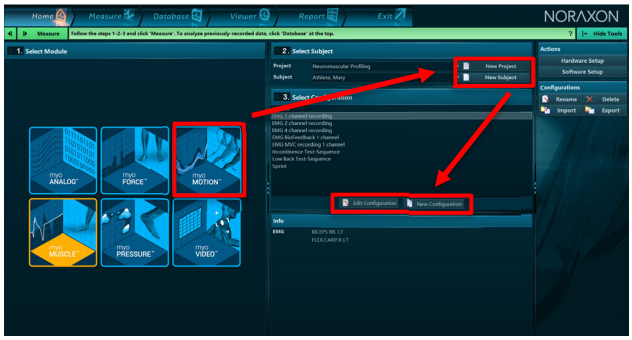
Step 1

If not already open, open MR3, typically listed under *Noraxon -> MR3*

Within the **Home** screen, click on the myoMOTION module icon.

Create a **New Subject.**

Select **New Configuration.**

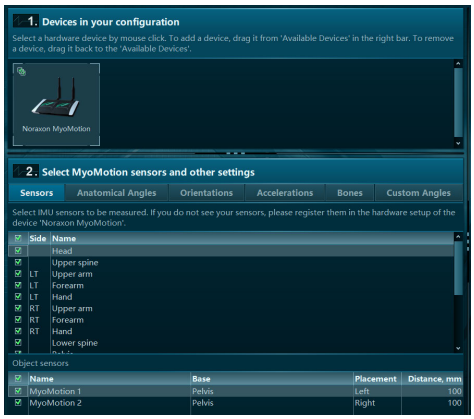


Step 2

Drag the myoMOTION device into the configuration from the list of **Available Devices** and select the sensors/channels of interest.

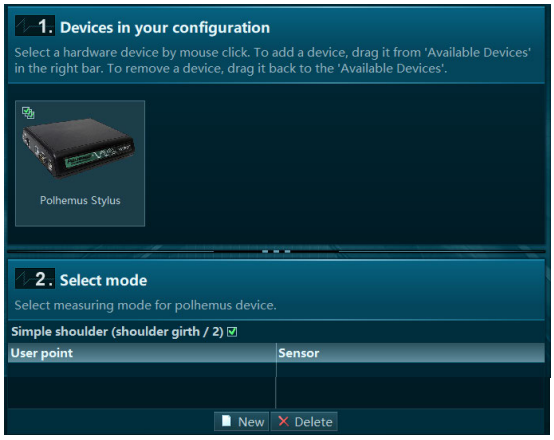
Select the **Object sensors** which will be used for the Axis Alignment procedure.

Assign the object sensors to any Base segment (e.g. “Pelvis”).



Step 3

Drag the Polhemus device into the configuration.



2.2 Entering into the Measurement Screen

Continue to the next step by selecting Measure.

2.3 Positioning the Polhemus Source

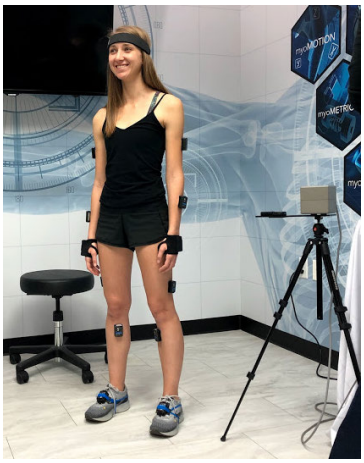
Before beginning a new calibration, it is important to confirm you have a clean magnetic and electrically conductive environment with minimal magnetic distortion for the stylus. Follow the steps below to position the Polhemus source and stylus appropriately for your environment.

Step 1

Position the Polhemus source so that it is approximately waist height and close to the subject.

Ensure the stylus can reach all anatomical landmarks required for your measurement (see Sections 3 for landmark references).

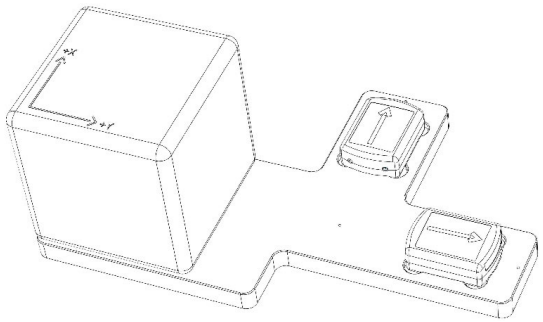
The maximum useable range of the Source is 55 in (140cm).



Step 2

Place the two myoMOTION Object sensors in the slots of the Alignment Fixture.

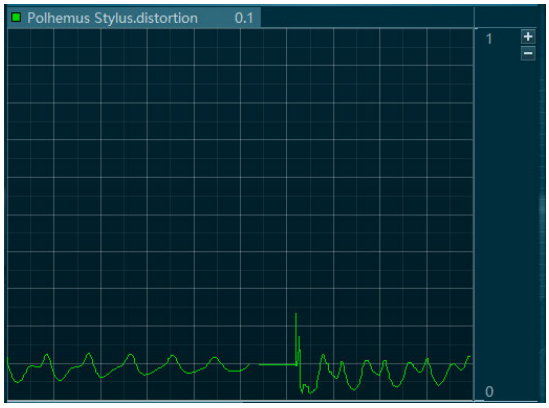
The X-axis of each Object sensor must be pointing in the same direction as the positive (X or Y) axis of the Polhemus source.



Step 3

While referencing the **Stylus Distortion** window, confirm the stylus can reach each landmark without exceeding the distortion threshold by moving the stylus to each landmark you will use during the Calibration Adjustment procedure.

The threshold of 0.7 will be used to accept or reject landmark locations during the Calibration Adjustment process.



2.4 Checking Stylus Signal in Each Feedback Window

When using the Calibration Adjustment tool, feedback on your stylus data is provided in three separate windows. The Stylus Distortion window (referenced above), the Stylus Button window, and the Stylus Position window all give important feedback on the quality of your calibration adjustment as you identify each anatomical landmark needed.

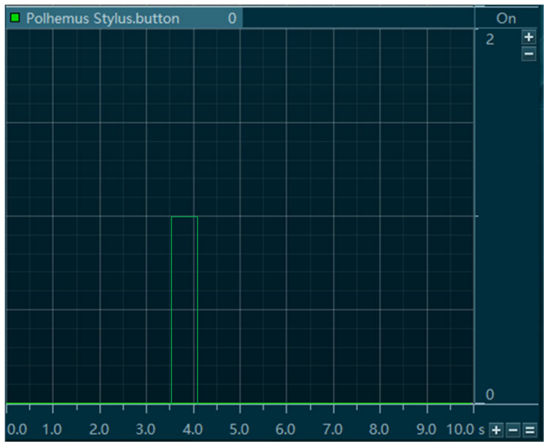
Stylus Button Window

Indicates the button press on the Polhemus stylus

Logic level:
Pressed = 1
Off = 0

For a landmark to be successfully accepted by MR3, the stylus must be held still during the button press and have a distortion level of under 0.7.

If you hold the button of the stylus for approximately 1 second or longer, MR3 will go back to the previous step of the calibration.

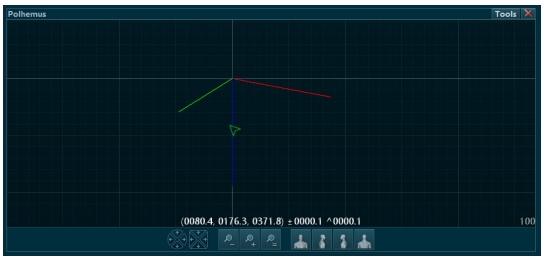


Stylus Position Window

The marker in the Polhemus animation indicates your level of stability.

A red sphere will appear if the stylus is unstable. You must hold the stylus still while identifying anatomical landmarks.

A white sphere indicates magnetic distortion is present and the size of the sphere indicates the degree of magnetic distortion.



2.5 Calibrating the Sensors and Adjusting the Calibration

The Calibration Adjustment procedure follows immediately after the regular myoMOTION sensor calibration. Follow these steps to complete the sensor calibration procedure, select the body segments to be adjusted, and perform the calibration adjustment procedures.

Important Notes:

1. The selected calibration posture (sitting or standing) should always be similar to the activity posture to reduce any issues associated with soft tissue movement.

2. The distortion level indicator on the right (in the toolbar) acts as a go/no-go light for landmark selection. The indicator will turn red if the stylus is in a magnetically disturbed environment. While the indicator is red, any landmark selection will be rejected. The distortion levels must be kept below 0.7.

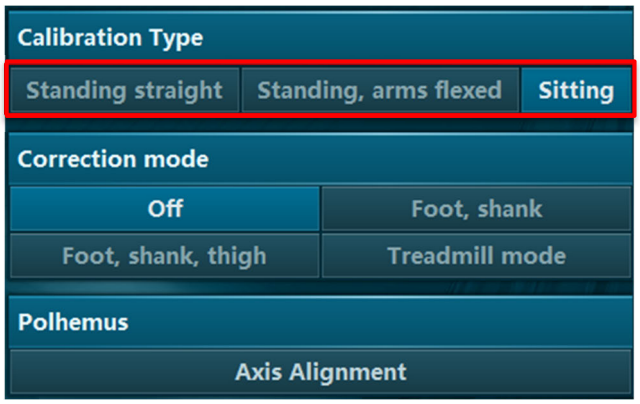
Step 1

Select the desired MyoMotion Calibration Type.

- Standing Straight
- Sitting
- Sitting Arms Flexed

Select **Calibrate** and perform myoMOTION sensor calibration as outlined in the myoMOTION User Manual.

Monitor your subject to ensure that they do not move from their calibration position until the entire calibration adjustment procedure is complete.

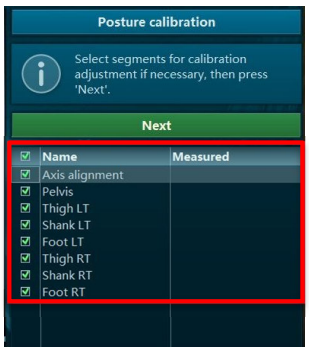


Step 2

Select the segments which will be affected by the Calibration Adjustment.

Ensure that **Axis alignment** stays selected.

Press **Next**.

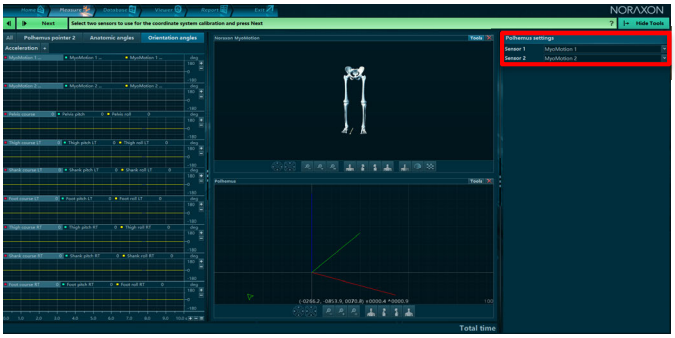


Step 3

The Axis Alignment procedure will automatically begin. This is done to align the Polhemus coordinate system with the myoMOTION coordinate system.

Select the sensors you placed in the Alignment Fixture and identified as object sensors in Section 2.1, Step 2.

It is required that the Object sensors used for the Axis Alignment procedure be placed correctly on the alignment fixture according to Section 2.3.



The order in which you declare these sensors does not matter.

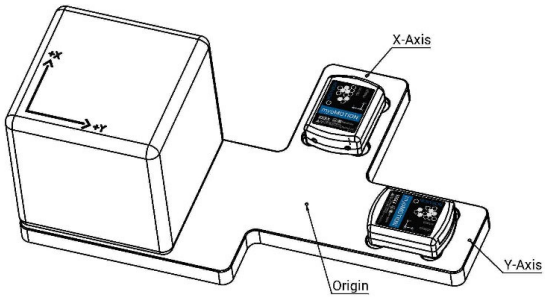
Select **Next**.

Step 4

Find the alignment fixture location, indicated in the **Point description** window, on the Axis Alignment Fixture (see image below for alignment fixture locations).

Touch the landmark with the pointer end of the stylus. While holding the stylus still, press the stylus button.

The software will automatically advance to the next landmark point after pressing the Stylus button.



Step 5

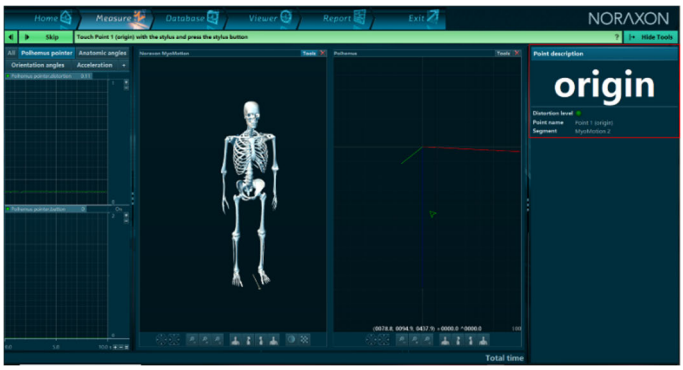
To digitize each anatomical landmark, place the stylus tip against the landmark and press the button on the stylus. MR3 will instruct the user to digitize each required landmark of the selected adjustment to the calibration in a predefined order.

Refer to Section 3 for a description and location of each landmark.

The landmark to be digitized will be listed in the Point Description window on the right side of the screen

Touch each anatomical landmark with the Stylus, hold the Stylus steady, and then click the button on the side of the Stylus.

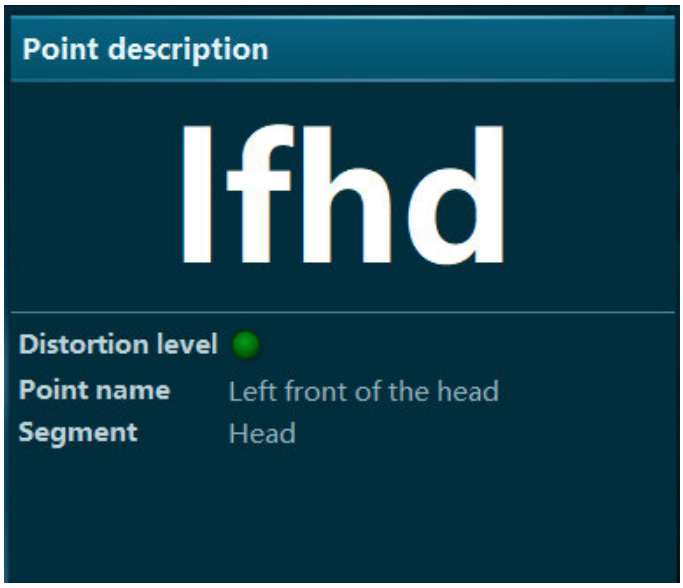
MR3 will automatically switch to the next landmark.



Alignment Fixture Landmarks

1. Origin
2. X-end
3. Y-end

Note: The Axis Alignment will be rejected if the axes are non-orthogonal OR if the axis length is outside the pre-determined limits. Refer to the Calibration Adjustment Tool User Manual for further details.



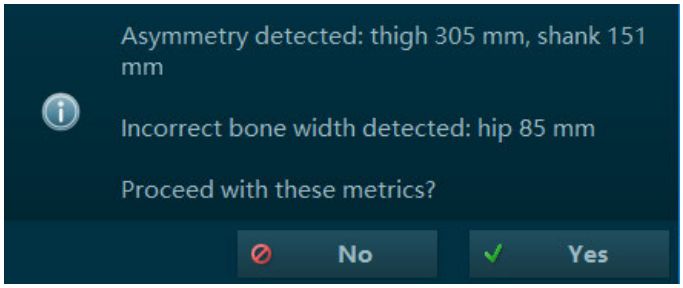
Quality Control

After all landmarks have been digitized, MR3 will display a warning message to the user if any Quality Control constraints are broken.

If no warnings are found, a green check mark will be placed next to each segment

The user can choose to either proceed with the warnings or correct the segments.

Refer to the Calibration Adjustment Tool User Manual for details on landmark and joint constraints.



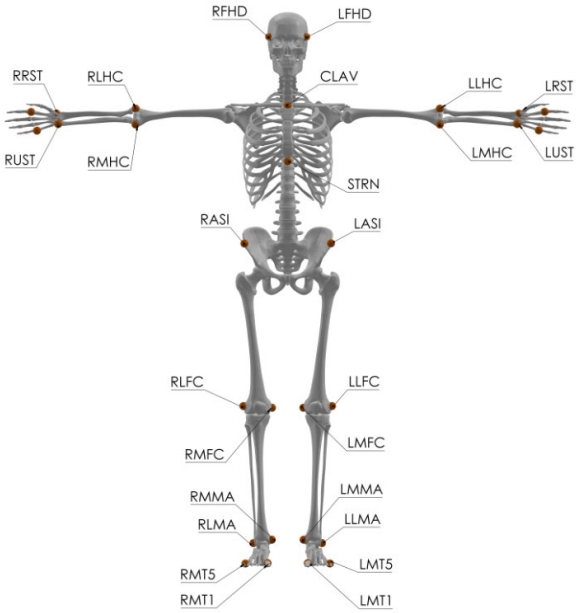
Step 6

After checking for normal signal display, you are ready to record a measurement. Select **Record** at the top left of the screen and begin your protocol.

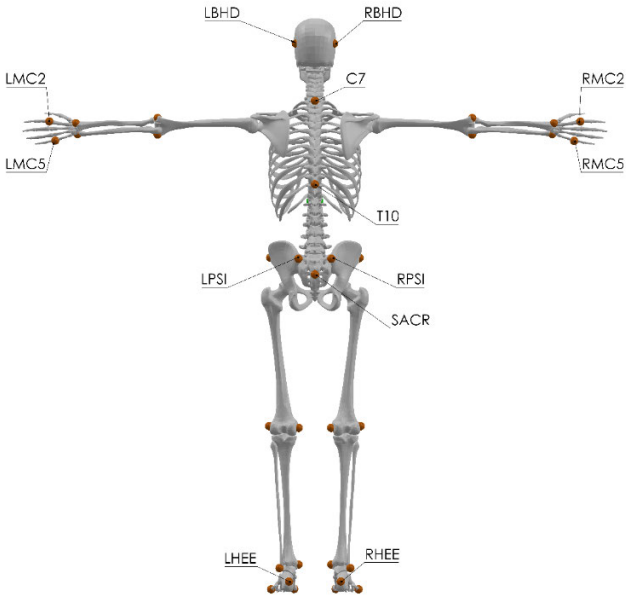
After completing your record, select **Stop** and **Save**. Save the record as the name of your configuration, or type in a new name. After this, save your record or **Discard & measure again.**

3 Anatomical Landmarks

The following figures and tables describe where the anatomical landmarks that must be used for Calibration Adjustment are located.



Anterior Skeleton



Posterior Skeleton

Lower Body Landmark Descriptions

Full name	Acronym	Location
Left\Right posterior superior iliac spine	LPSI\RPSI	The posterior border of the ala of the pelvis
Left\right anterior superior iliac spine	LASI\RASI	The anterior extremity of the iliac crest of the pelvis
Left\right lateral femoral epicondyle	LLFC\RLFC	Most lateral projection of the femoral epicondyle
Left\right medial femoral epicondyle	LMFC\RMFC	Most medial projection of the femoral epicondyle
Left\right lateral malleolus	LLMA\RLMA	Most lateral, bony prominence at the distal end of the fibula
Left\right medial malleolus	LMMA\RMMA	Most medial, bony prominence at the distal end of the tibia
Left\right heel	LHEE\RHEE	On the posterior of the calcaneus, at the intersection of the proximodistal and mediolateral midlines (at the back, in the middle and halfway up the calcaneus)
Left\right first metatarsophalangeal joint	LMT1\RMT1	Joint of the big toe (foot segment)
Left\right fifth metatarsophalangeal joint	LMT5\RMT5	Joint of the small toe (foot segment)

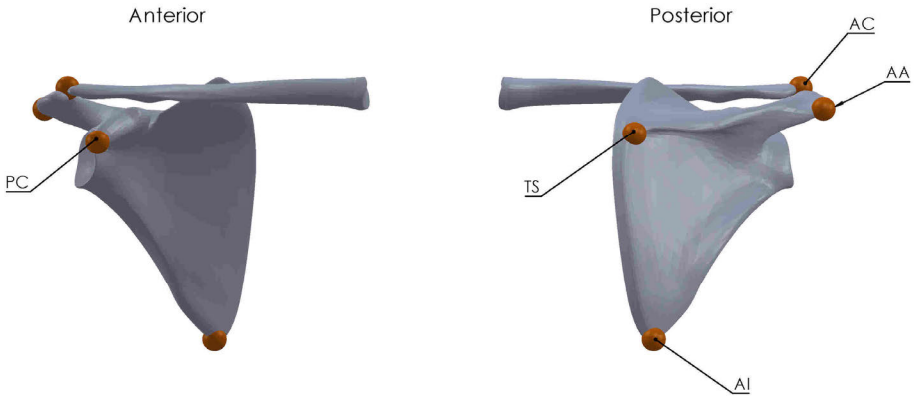
Upper Body Landmark Descriptions

Full name	Acronym	Location
Left\right front of the head	LFHD\RFHD	On the temples
Left\right back of the head	LBHD\RBHD	Same height as front head markers during neutral Posture, symmetrical across the mediolateral axis
7th cervical vertebrae	C7	Cervical spine, spinous process of the 7th vertebrae
8th thoracic vertebrae	T8	Thoracic spine, spinous process of the 8th vertebrae
Jugular notch	CLAV	On the jugular notch where the clavicles meet the sternum
Sternum xiphoid process	STRN	On the xiphoid process of the sternum
Left\right lateral humeral epicondyle	LLHC\RLHC	Most lateral projection of the humeral epicondyle
Left\right medial humeral epicondyle	LMHC\RMHC	Most medial projection of the humeral epicondyle
Left\right radial styloid process	LRST\RRST	Most lateral projection of the radial styloid process
Left\right ulnar styloid process	LUST\RUST	Most medial projection of the ulnar styloid process
Left/right Metacarpal 2	LMC2/RMC2	2nd metacarpal – phalangeal joint
Left/right Metacarpal 5	LMC5/RMC5	5th metacarpal – phalangeal joint

Shoulder Landmarks (simple)

Full name	Acronym	Location
Anterior Shoulder	LASH/RASH	Most anterior point on shoulder, in line with glenohumeral joint
Posterior Shoulder	LPSH/RPSH	Most posterior point on shoulder, in line with glenohumeral joint

Shoulder Landmarks (ISB and ISG)



Full name	Acronym	Location
Processus Coracoideus	LPC/RPC	Most ventral point of the processus coracoideus
Angulus Inferior	LAI/RAI	Most caudal point of the scapula
Trigonum Spinae	LTS/RTS	At the medial scapular border in line with the spina scapula
Acromioclavicular Joint	LAC/RAC	Most dorsal point of the acromioclavicular joint
Angulus Acromialis	LAA/RAA	Angulus acromialis at the dorsolateral curvature of the scapular spine

Landmarks by Segment

Segment	Landmarks	
Head	• LFHD • RFHD	• LBHD • RBHD
Torso	• C7 • CLAV	• STRN • T8
Pelvis	• LASI • RASI	• STRN
Left upper arm	• Left shoulder landmarks • LLHC	• LMHC
Left forearm	• LUST	• LRST
Left hand	• LMC2	• LMC5
Left thigh	• LLFC	• LMFC
Left shank	• LLMA	• LMMA
Left foot	• LHEE • LMT1	• LMT5
Right upper arm	• Right shoulder landmarks • RLFC	• RMFC
Right forearm	• RUST	• RRST
Right hand	• RMC2	• RMC5
Right thigh	• RLFC	• RMFC
Right shank	• RLMA	• RMMA
Right foot	• RHEE • RMT1	• RMT5