



User Manual



Revision 2.0

A2D Fitness Systems, Inc.

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Kinisi Tracking System is proudly made in the USA

Revision History

Revision Date	Description	Revision
June 2016	Initial draft	1.0
November 2016	Added additional sections and detail	1.1
January 2017	Updated feature detail	1.2
March 2018	Added additional section for audible alerts	1.3
June 2020	Changes to reflect new software features	2.0

Table 1 - Document Revision History



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About Kinisi


Congratulations on purchasing the state-of-the-art Movement Tracking System, Kinisi, the most advanced system designed specifically to work with resistance bands or tubing in either a clinical or home care environment. Designed for ease of use and accuracy, this device will facilitate your daily Physical Therapy and Physical Rehabilitation management regimen while adding a new dimension of data never before available. To get the most from your Kinisi Tracking System, we recommend that you read through this manual carefully. Thank you again for purchasing the Kinisi Tracking System.

Safety Precautions

The following items contain information to prevent the risk of harm or injury. Please read these items carefully and be sure to use this product correctly.

	Danger	This symbol indicates <i>"an immediate danger which could result in death or serious injury"</i> .
	Caution	This symbol indicates <i>"the possibility of physical injury or damage to property"</i> .

Precautions for use

<p>Caution</p> 
<ul style="list-style-type: none"> ○ Always follow the instructions of a physician or specialist. ○ Do not step on or jump on the device. It may result in a fall, causing injury. The impact may also cause damage to the device. ○ Do not place or use the device where it may be exposed to excess water or humidity, or where it is exposed to direct sunlight, where it is exposed directly to the air outlet of an air conditioning unit, or near fire. It may cause the device to malfunction. ○ This device is a precision measuring instrument. Do not drop the device, or expose it to vibration or powerful shocks. ○ Do not disassemble, repair or modify the device. It may cause malfunction or injury and will void the warranty. ○ Persons with disabilities should be assisted by a caregiver when using this device. Failure to do so may cause injury. ○ Always keep the Kinisi equipment clean, we recommend cleaning the Kinisi device before each use.

Kinisi Features

The Kinisi device is a small lightweight device that weighs just 8.4 ounces and measures 3 ¼ x 2 x 1 ½ inches. The device can be used with the supplied ankle strap or hand grip, both attach to the Kinisi device using two quick connect clasps. Figure 1 below shows all the features of the Kinisi mobile device.

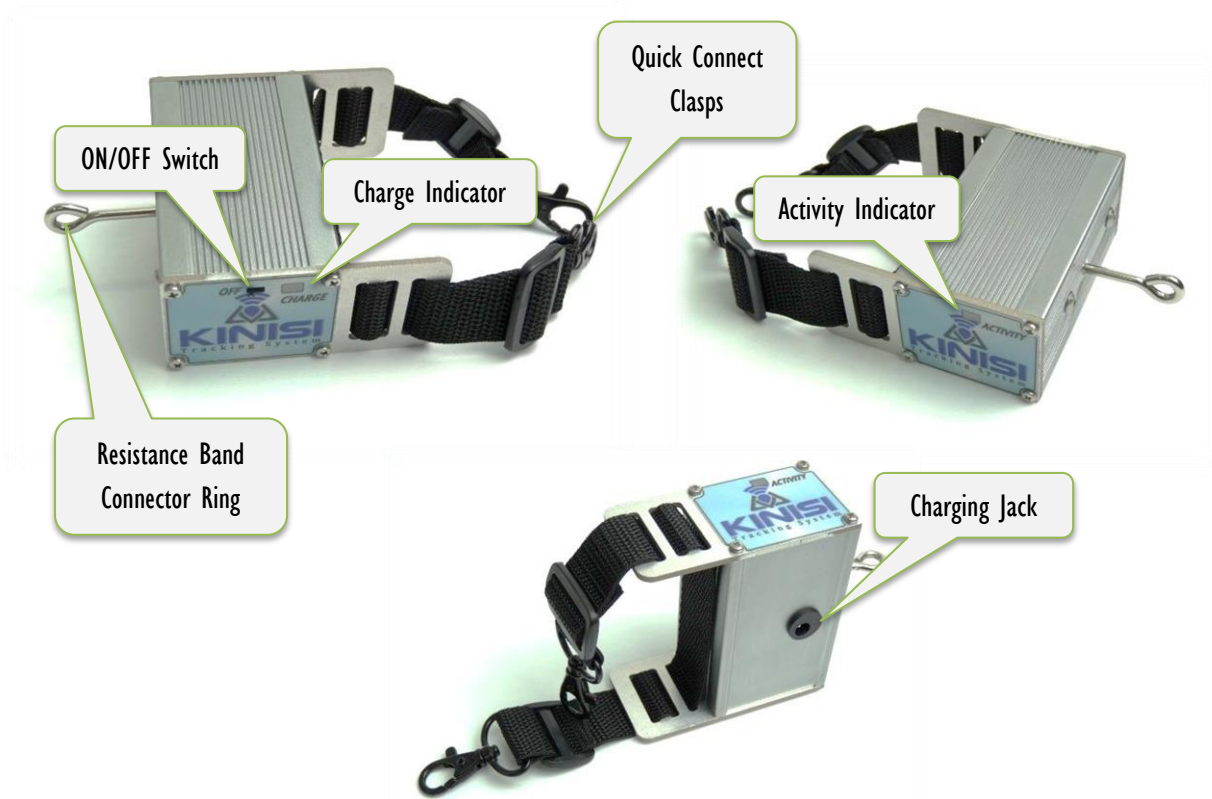


Figure 1 - The Kinisi Mobile Device

- Quick Connect Clasps – Used to attach the supplied hand grip or ankle strap
- ON/OFF Switch – Powers the device ON or OFF (Slide toward the Charge Indicator to turn ON)
- Charge Indicator – Glows RED when charging and GREEN when fully charged
- Activity Indicator – Flashes ORANGE when changes in resistance are detected
- Resistance Band Connector Ring – Attach one end of the resistance band here
- Charging Jack – Connection for the supplied battery charger

Battery & Power Management

This section contains important information about battery and power management features of the Kinisi Tracking System.

Battery

Your wireless Kinisi device uses a rechargeable Lithium Polymer (Li-Poly) battery as the power source for mobile operation, and a power adapter for charging the battery.

The battery is already installed and charged from the factory; however it is recommended that the battery be fully charged prior to using the Kinisi device.



Danger: The battery will last for many years and should not need to be replaced, however if the battery does need to be replaced, only use the correct battery provided by A2D Fitness Systems, Inc. NEVER attempt to use other battery types in your Kinisi device, doing so may damage the device, cause a fire, or personal injury may result.

Please contact your Kinisi Dealer or contact A2D Fitness Systems Inc. directly for information regarding the battery and other important service information.

Charging the battery

Before using the Kinisi device for the first time, A2D Fitness recommends that you plug in the power adapter and allow the battery to fully charge. The battery will take five to six (5 to 6) hours to fully charge assuming the battery is less than 30% charged. Note that fully charging or discharging the battery does not extend the battery life as Li-Poly batteries do not have a memory unlike the older type rechargeable batteries.

To charge the battery, simply plug the adaptor into an active AC power outlet and plug the small power jack into the Kinisi power connector port located on the underside of the device.

NOTE: *The Kinisi user software shows the current battery charge state if the Kinisi device is turned ON and connected with the software.*

The battery immediately begins to charge whenever the power adapter is connected and the battery is not fully charged. The battery will charge whether the Kinisi device is switched ON or OFF, however, Kinisi may not be used while the battery is being charged. The charge time will vary depending upon the current battery level.

Kinisi charging indicator

Charging indicator	Battery charging status
Indicator glows red	Power adapter is connected and battery is charging.
Indicator glows green	Power adapter is connected and battery is fully charged
Indicator off	The power adapter is not connected

Table 2 - Charging Indicator Meaning



Danger: Do not attempt to charge the Kinisi battery with any other power adapter other than the one supplied with your Kinisi Tracking System, doing so may damage the device, cause a fire, or personal injury may result.

If the Kinisi device becomes excessively warm or emits an unusual smell while the battery is charging, immediately disconnect the power adapter from the power outlet and turn OFF the Kinisi device. Contact A2D Fitness Technical Support for assistance.

A fully charged battery should provide approximately five to seven (5 to 7) days of normal use.

NOTE: *It's not necessary to turn the Kinisi device OFF when it's not in use; however Kinisi will draw a small amount of current while in sleep mode. If you do not plan on using Kinisi for a few days, it is recommended that the Kinisi device be switched OFF to conserve battery power.*

Power saving feature

To conserve battery power when Kinisi is not in use, the device will go into sleep mode after five minutes of user inactivity. Any movement detected while Kinisi is in sleep mode will cause Kinisi to wake up and resume normal operations again.

IMPORTANT: Kinisi will only enter sleep mode if the resistance being reported is a stable zero (the orange activity indicator is NOT flashing) and Kinisi is not being moved. Kinisi sees a fluctuating non-zero resistance reading or any movement as user activity and consequently will remain in the fully operational run mode. During normal use the orange activity indicator will flash periodically to indicate changes in current resistance levels.



Kinisi Basics

Kinisi – pronounced (Kin-a-see) the Greek word for “movement”

What is the Kinisi Tracking System?

The Kinisi Tracking System is comprised of two main parts, first is the Kinisi device itself, this is the mobile unit that attaches to the end of a resistance band and has either a hand grip or an ankle strap attached to it. Secondly is the base station receiver, this is a small computer that’s used to run the Kinisi software. The software receives the wireless movement data that’s sent from the Kinisi mobile device and then displays it on your TV or monitor. The base station receiver uses a mouse and keyboard and is all that’s required to interact with the Kinisi application software. The mouse is a wireless device so if interacting with the application software while working closely with your patient is required, you can simply move the mouse around on your thigh or leg.

NOTE: *The latest version of Kinisi software is now available for Microsoft Windows, and as of this writing, the Kinisi software has been tested on Windows 7 and Windows 10 systems. The latest version of software can be found on our website www.a2dfitness.com from the “Downloads” page and is free to use for all Kinisi equipment owners. Please contact your dealer for more information or A2D Fitness Systems directly.*

As you are probably aware, resistance bands are manufactured by many companies, and each company uses a specific color to identify the resistance of each band, typically the lighter the color the less resistance the band has. Unfortunately there is no set standard for the color coding of resistance bands, so ascertaining the rated resistance of a band may not always be easy.

Additionally we know that the more you stretch a resistance band the more resistance the band will yield, so using a resistance band stretched from two feet to three feet will yield a lesser resistance compared to the same resistance band that’s stretched from four to five feet.

Now the big question is, "what is the actual resistance being experienced by the user at any given time?" Until now, this was a question that went unanswered. Kinisi tracks and displays the actual resistance of any resistance band regardless of the manufacturer, in real-time as the user is performing a movement.

Let's say that a patient is tasked with performing a row exercise with only the right arm, and because of a recent shoulder surgery, it's recommended that the maximum load placed on the shoulder should be no more than five pounds.

Now with the Kinisi device attached to a resistance band and the distal end attached to a wall anchor that's set at the appropriate height, the user simply moves away from the anchor point while clasping the hand grip and with elbow touching his/her side, looks to the display (TV or Monitor) until he/she reaches the desired resistance, in this case about 4.5 pounds. The user then stops at that current location and begins the row movement, all the time watching the display to ensure that the five pound maximum load limit is not exceeded. It may be required that the user move closer to, or further away from the anchor point to achieve the optimal resistance through the entire range of motion of the row exercise.

To ensure that resistance load limits are never exceeded, Kinisi has the ability to set specific load limits with an audible and visual alert. If the set limit is exceeded, Kinisi will sound an audible alarm warning the user and trainer that the set limit was exceeded.

With Kinisi, the Physical Therapist, Personal Trainer and even the user can see the exact resistance that's being experienced, all in real-time with a display refresh rate of 20Hz, that's 20 times per second and a resolution of 0.01 Kilograms. Additionally, Kinisi will track and display the maximum resistance achieved during each repetition, this is very useful to ensure load limits are never exceeded.

Kinisi also has the ability to be used to measure range-of-motion digitally with an accuracy of ± 0.5 degrees. Kinisi can be used to measure ROM actively, passively or active-assisted, it can measure absolute angles, relative to 'bubble level' for example or the angle between two absolute angles.

All movement and measurement results can be recorded and printed for patient record retention and submission.

With the ability to accurately measure true resistance, repetitions performed and the exact ROM of the user's extremities, resistance bands as used in fitness, physical therapy and physical rehabilitation can now be used with a new dimension of quality objective data which has previously not been available.

What's in the box

The Kinisi Tracking System includes several parts; please verify that you have received everything.

Parts included



- 1) 1 x Kinisi Device and 1 x Nylon Strap with 2 Clasps



2) 1 x Kinisi Battery Charger



3) 1 x Hand Grip



4) 1 x Ankle Strap



5) 1 x Base Station Receiver



6) 1 x Base Station Power Adapter



7) 1 x Laird USB Bluetooth® Dongle



8) 1 x HDMI Video Cable



9) 1 x Wi-Fi Mouse & USB Wi-Fi Dongle



10) 1 x Carabiner used to attach resistance bands or tubing to Kinisi



11) 1 x Resistance Band Attachment Loop



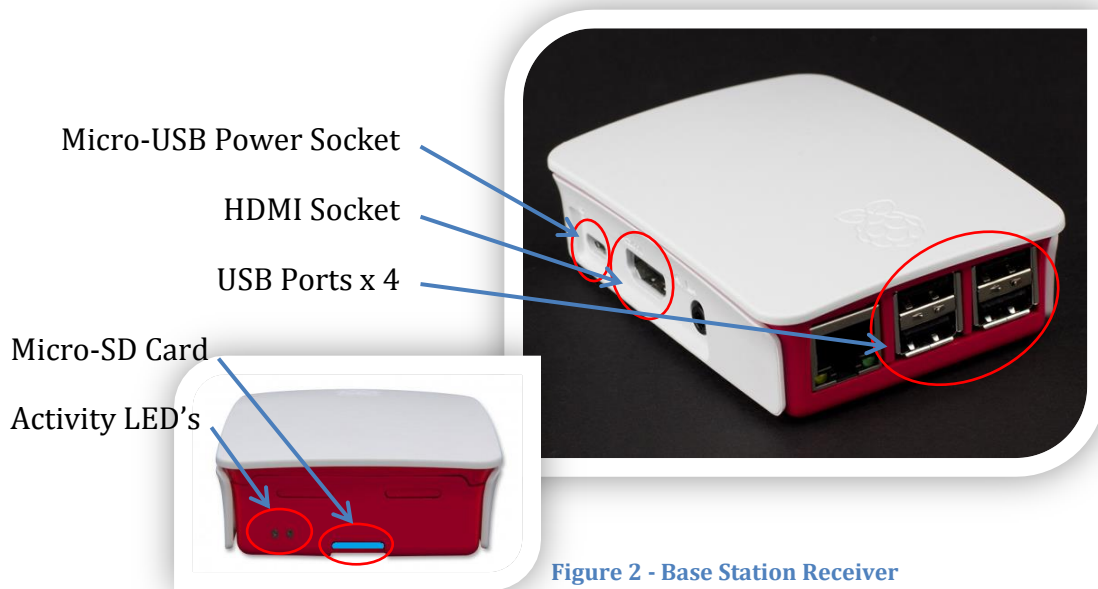
12) The latest version of this Kinisi User Manual (this document) can be downloaded from www.a2dfitness.com

Quick Start Guide

Follow the steps below to get your new Kinisi Tracking System up and running as quickly as possible:

Base Station Assembly Instructions

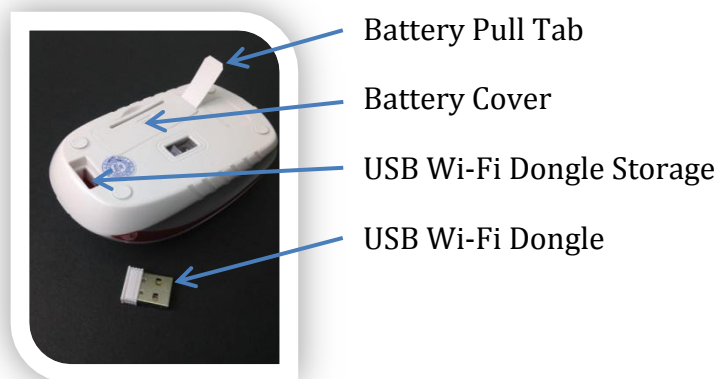
- 1) Remove all parts from the packaging
- 2) Connect the HDMI cable from your TV or Monitor to the Base Station Receiver



- 3) Remove the USB Wi-Fi Dongle from the mouse and plug it into any available USB Port on the Base Station Receiver



- 4) Remove the battery pull tab from the battery compartment; you may need to remove the battery cover and battery



5) If needed, replace the battery while observing the battery's polarity

6) Replace the battery cover

NOTE: After a few minutes of inactivity the mouse will go to sleep to conserve the battery, simply click the left or right mouse button to wake the mouse up from sleep mode.



7) Insert the "Laird™" Dongle into any available USB Port on the Base Station Receiver

8) Turn on your TV or Monitor and ensure that the correct source is selected (HDMI-1, HDMI-2) for example. Make sure that you have the TV's source selected and the correct display size set BEFORE you power up the Base Station (Step 9), this is because the Base Station Receiver adjusts the size of its desktop to best fit the current TV settings

NOTE: If changes to the TV's size settings are made while the Base Station Receiver is powered on, we recommend that you shut down the Base Station Receiver and then restart it, this will ensure that the Base Station Receiver uses the correct desktop display size the next time it's started up. See page 25 for information on shutting down the Base Station Receiver.

9) Plug in the Base Station power adapter into an AC outlet and then plug in the small Micro-USB connector into the base station power socket. The Base Station Receiver will now start up, after a minute the Kinisi application software will automatically start and display the user interface as seen below in Figure 3

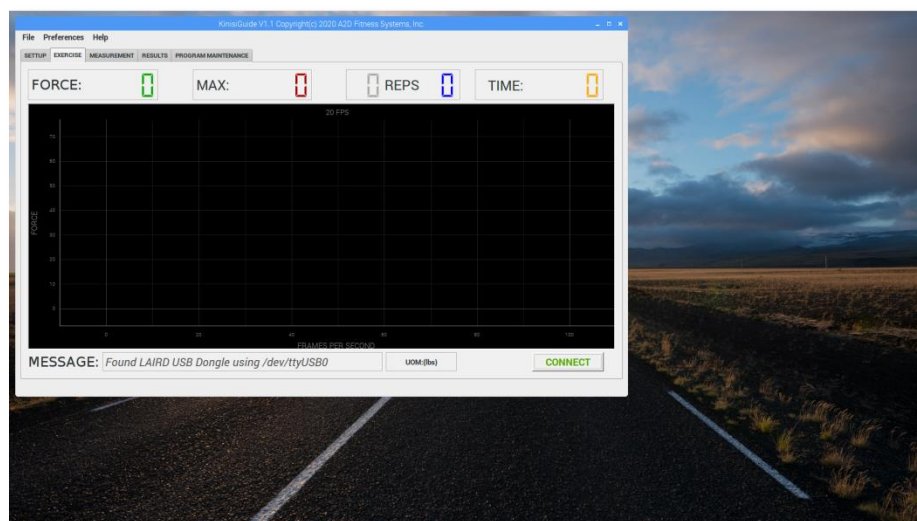


Figure 3 - Kinisi Application Software

You will see the words **“Found LAIRD USB Dongle....”** on the message line when the Kinisi application software has finished loading. Do not click on the **“CONNECT”** button just yet; we will need to ready the Kinisi device first. If you do not see the words **“Found LAIRD USB Dongle....”**, make sure the Laird™ dongle is plugged into any USB port on the Base Station Receiver, exit the Kinisi software then double click the Kinisi-TS desktop icon to re-start the Kinisi software.

NOTE: The **“Found LAIRD...”** message will be slightly different when running the Windows version software.

Setting Up Kinisi for Your TV

The Kinisi application software was designed to work with a screen resolution of 1280 x 720 or better. To achieve the best results you may have to experiment with the TV settings to find the optimal setting for your TV. As each TV is a little different, specific instructions for each TV is beyond the scope of this document, however, setting up the Kinisi application software display size is very easy, here’s how:

When the Kinisi software is started for the first time, Kinisi’s screen size will be minimized as shown below in Figure 4. The full screen size of the desktop can be seen behind the Kinisi application.

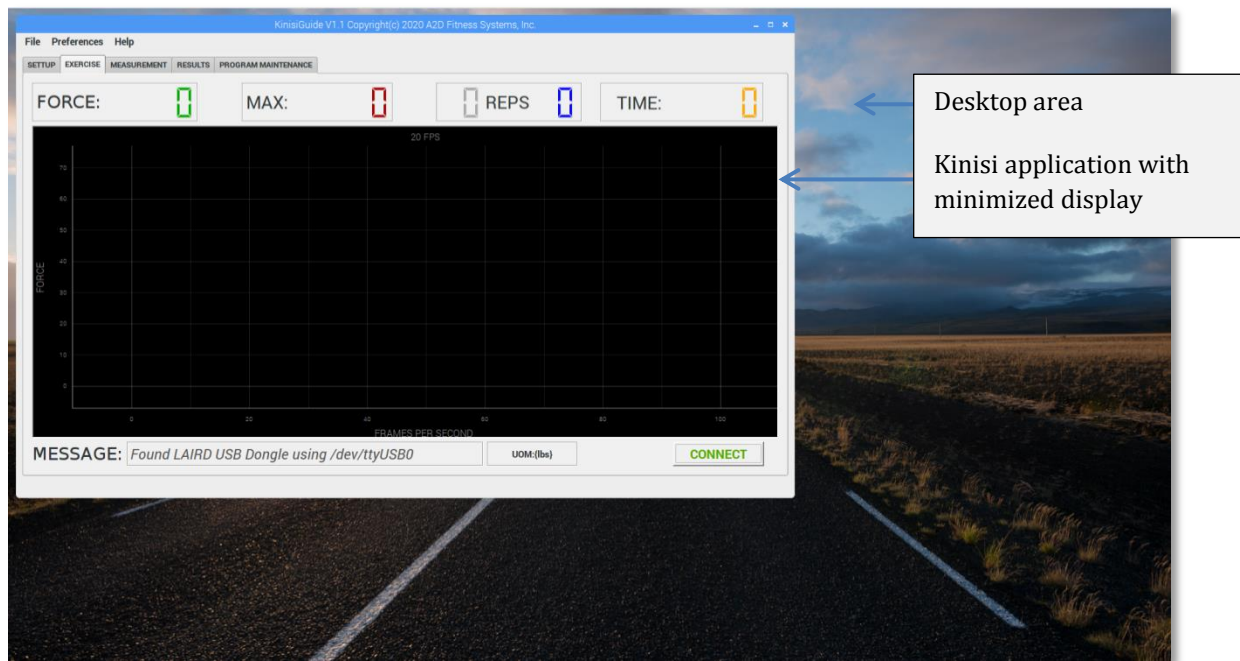


Figure 4 - Kinisi Application minimized screen

Follow the steps below to maximize the Kinisi screen size to fit your TV:

- 1) Using the mouse, move the pointer over the corner of the Kinisi application until the pointer changes to the resize pointer as shown below, now while holding down the left mouse button, move the corner into the corner of the desktop as far as you can, it will stop moving when you have moved it as far as possible into the corner

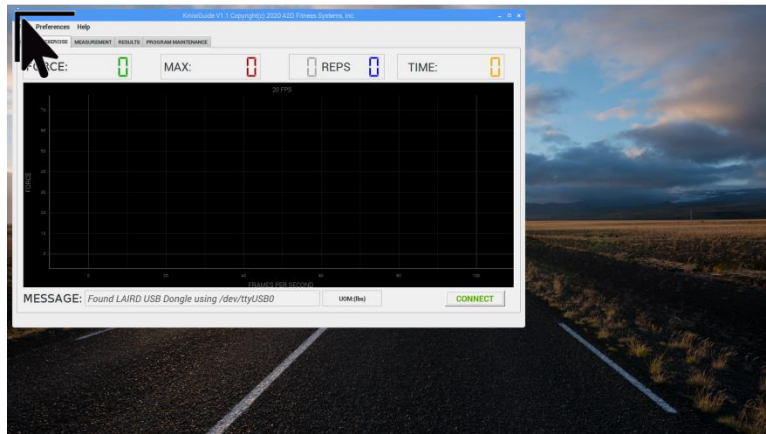


Figure 5 - Move the display into the top left corner of the desktop

- 2) Again using the mouse, move the pointer to the bottom right corner of the Kinisi application and when the pointer changes to the re-size pointer, hold the left mouse button down and drag the corner as far as you can into the corner of the desktop

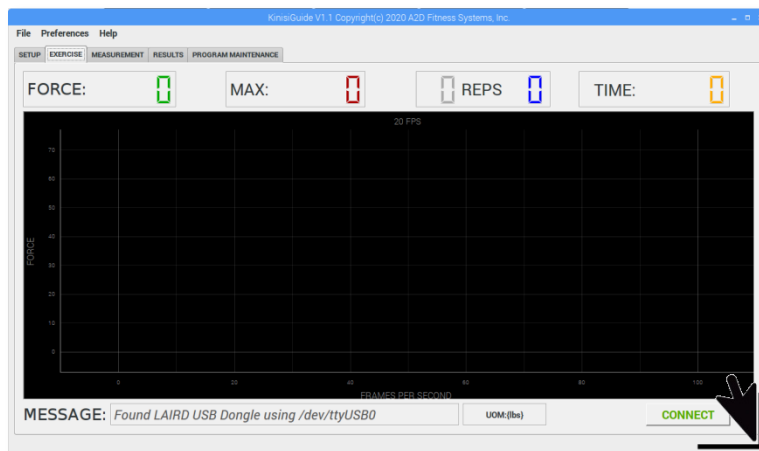
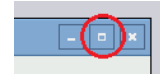


Figure 6 - Drag the bottom right corner of the desktop

3) Once you have positioned and sized the Kinisi application screen to utilize the entire TV's display you can then simply exit Kinisi by clicking the "X" on the top right corner or by selecting "Exit" from the "File" menu, this will save the new screen size and position which will then be used each time the Kinisi application is started

4) You can change the size and position at any time just by dragging the corners of the screen to the desired position and size and then exit Kinisi to save the changes.

NOTE: Ensure that the "Maximize" button looks like this (Not Maximized):



5) If you need to start over, simply select "Reset Display Size" from the "Preferences" menu located in the display top left, Kinisi will set the screen to its minimized size once again. On some TV's the minimized screen size may be the best fit for your TV

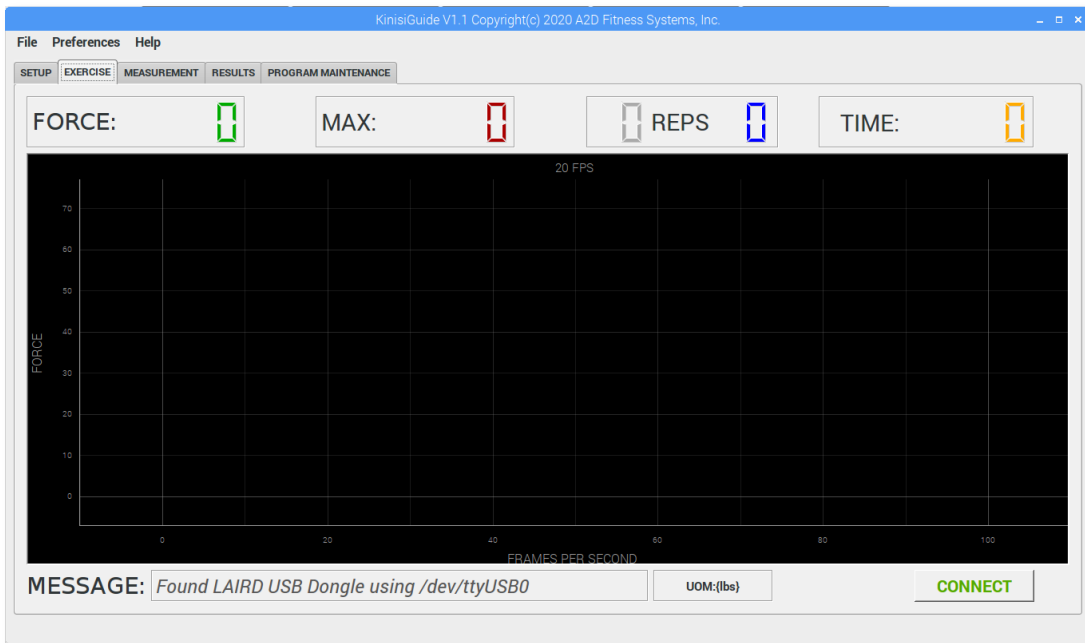
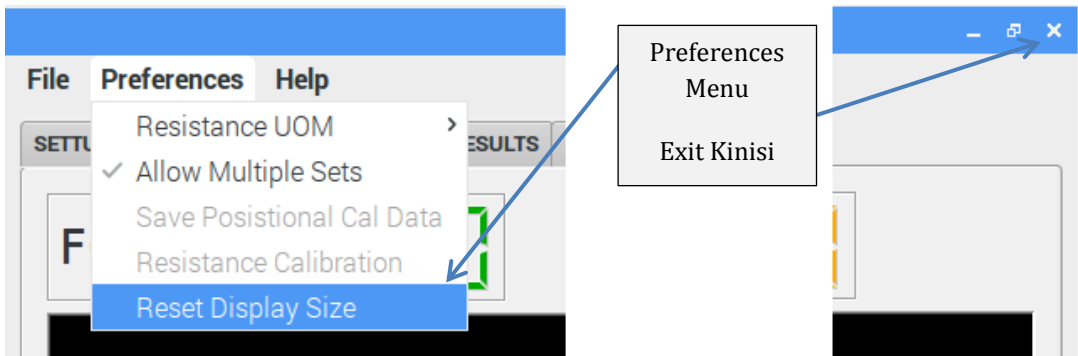


Figure 7 - Kinisi Application fills desktop after resizing

Kinisi Device Assembly Instructions

- 1) Attach the Hand Grip or Ankle Strap to the Kinisi device as required
- 2) Turn on the power to the Kinisi device by moving the slide switch on the left side toward the **"CHARGE"** indicator, the orange activity LED on the opposite side of the device should glow briefly to indicate that the Kinisi device has been turned ON

NOTE: *It is recommended that the Kinisi device be placed on a flat surface with no tension on the Resistance Band Connecting Ring when turning on the Kinisi device, this is because any load detected on startup is calibrated out. As an example, if a resistance of 2 pounds was detected when the Kinisi device is switched on, then only resistances of greater than 2 pounds would be reported, this is called a "TARE" function.*

- 3) Kinisi is now waiting to connect with the Base Station Receiver
- 5) Simply click on the **"CONNECT"** button at the bottom right corner of the display to establish the connection with the Kinisi device. After a successful connection, the words **"Click the "START" button to begin."** will be displayed on the message line. If it did not connect, make sure Kinisi is turned on and then click the **"CONNECT"** button to try again

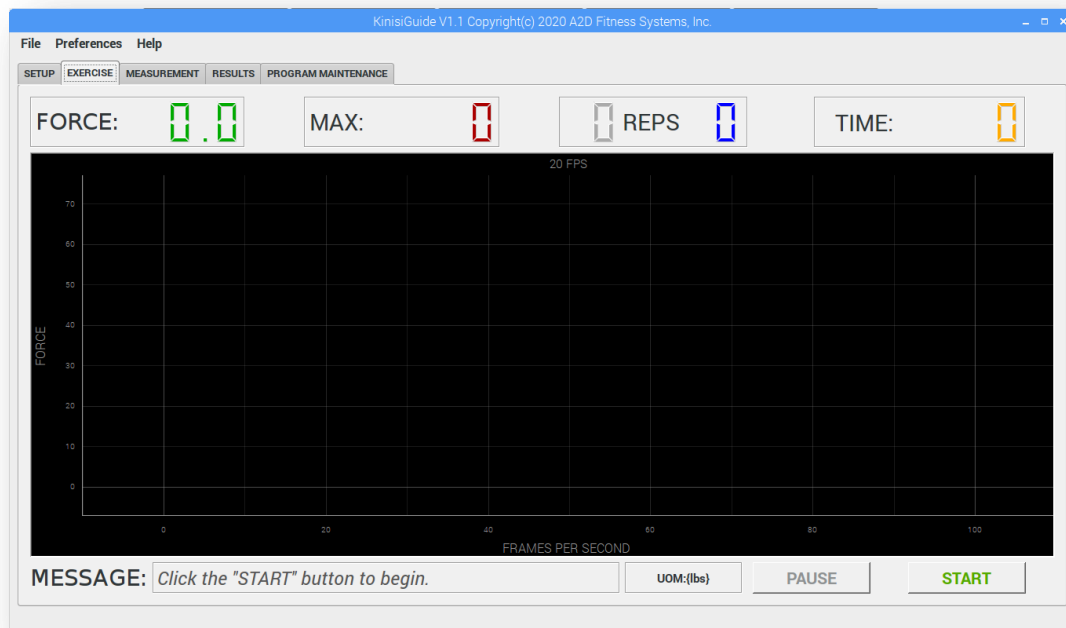


Figure 8 - Kinisi Application after a Successful Connection

NOTE: *If after a successful connection has been made and the Kinisi device is later turned OFF, or the wireless connection has been lost due to Kinisi being moved out-of-range from the base station, you will be notified of a communications error and how to correct it.*

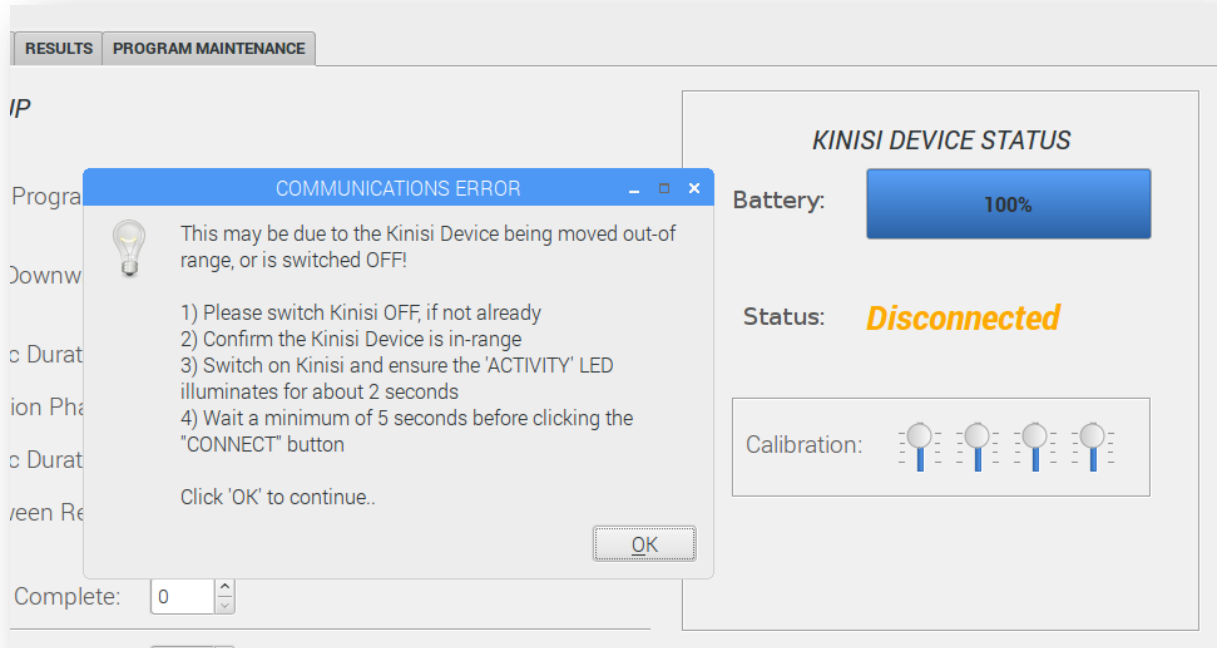


Figure 9 - Connection Error Message

6) The Kinisi device status can always be determined by clicking on the “**SETUP**” tab or from the “**MEASUREMENT**” tab, the “**STATUS**” is located at the top right of either tab and should normally show “**Ready**”, if the “**STATUS**” shows “**Sleeping**”, this indicates that the Kinisi device is in power conservation mode, any movement detected by Kinisi will wake the device from sleep mode with the status changing to “**Ready**”

7) The “**EXERCISE**” and “**MEASUREMENT**” tabs should now show active force and ROM values respectively as the Kinisi device is moved, if so, you have successfully setup the Kinisi Tracking System

Congratulations!

To ensure the most accurate measurements from your Kinisi device, you should read the “**System Calibration**” section before using your Kinisi Tracking System.

Base Station Receiver

The Kinisi software/user-interface automatically starts when the Base Station Receiver is powered ON, or if the software was exited and then started by double-clicking on the Kinisi-TS desktop icon with the left mouse button.

NOTE: *For best wireless performance, please make sure that the Laird™ Wireless Dongle that’s plugged into the Base Station Receiver is in clear view from where the Kinisi mobile device will be used. The dongle should not be obstructed in any way with the Base Station ideally positioned at about 4-5 feet from the floor. It should never be placed behind the TV or monitor. Typical line-of-sight wireless range is around 3-9 meters between the Base Station’s wireless dongle and the Kinisi mobile device.*

Base Station Desktop

Figure 10 below shows the Base Station Computer’s desktop; notice the “**Kinisi-TS**” desktop shortcut located at the left of the desktop. If the Kinisi software is not already running, simply double-click with the left mouse button on the shortcut to start the Kinisi Tracking System Application software.

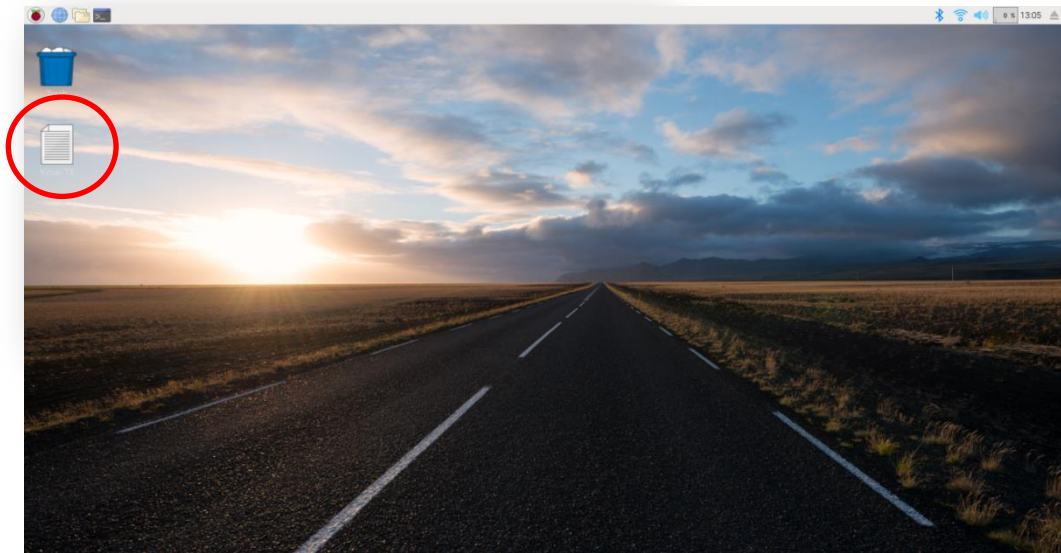


Figure 10 - Base Station Computer Desktop

Another important thing to note about the desktop is how to turn OFF the Base Station Computer. Follow the steps below to turn OFF the Base Station Computer:

1) After exiting the Kinisi application software by left mouse clicking on the “X” at the top right corner of the screen or by selecting “Exit” from the “File” menu, Kinisi will display the message “**Are you sure you want to quit?**”, if you click the “Yes” button then the Kinisi application will be closed and the Base Station Computer desktop will be visible as shown in Fig 10 on the previous page

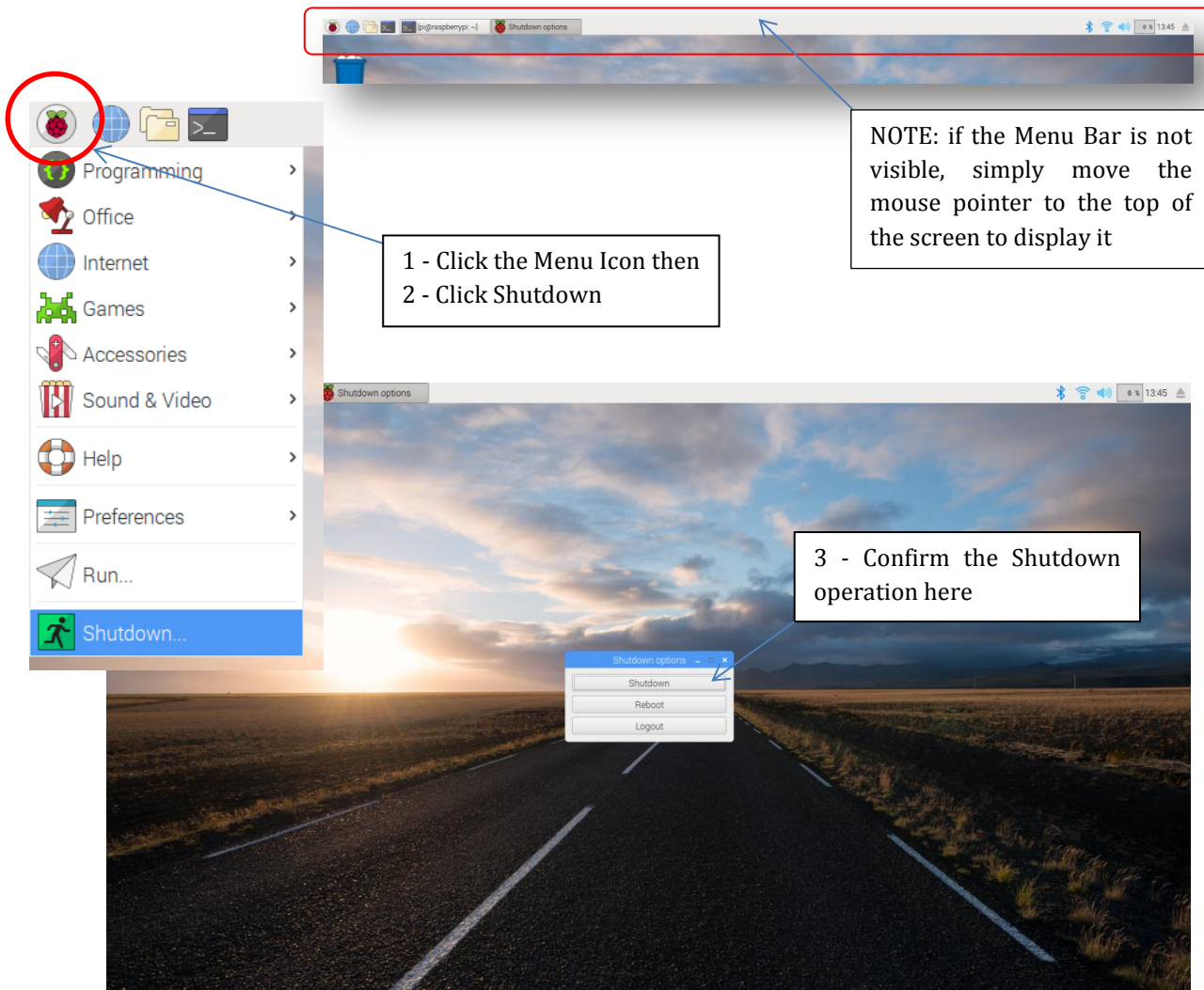


Figure 11 - Shutdown Base Station

- 2) Left mouse click on the **“Menu”** icon at the top left corner of the screen
- 3) Left mouse click on the **“Shutdown...”** option
- 4) The **“Shutdown options”** dialog window will be displayed (see Figure 11 above)
- 5) Left mouse click on the **“Shutdown”** button to turn OFF the Base Station Computer
- 6) After a few moments the desktop will close and the Base Station Computer will power down, remember to also turn OFF the Kinisi device using the slide switch

To turn ON the Base Station Computer, simply remove the micro-USB power connector from the Base Station Computer, wait for five seconds and then re-insert the micro-USB connector. The Base Station Computer will start up and after a few moments will automatically start the Kinisi application software.

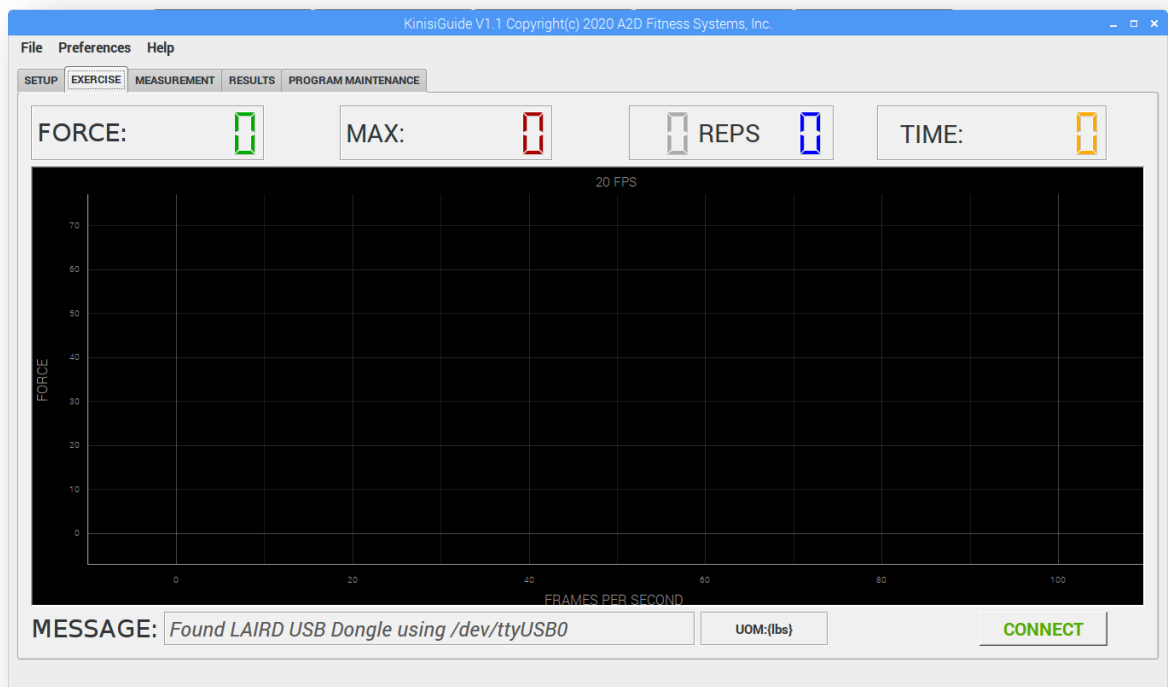


Figure 12 - Kinisi Software & User Interface

Software Controls

In this section we will identify the features and options available within the Kinisi application software and discuss each one in detail:

The Kinisi software has five main tabs located at the top left of the display; these tabs are used to access the various features of the Kinisi software.

Let's look at each tab in detail to see what and how the tabs features are used.

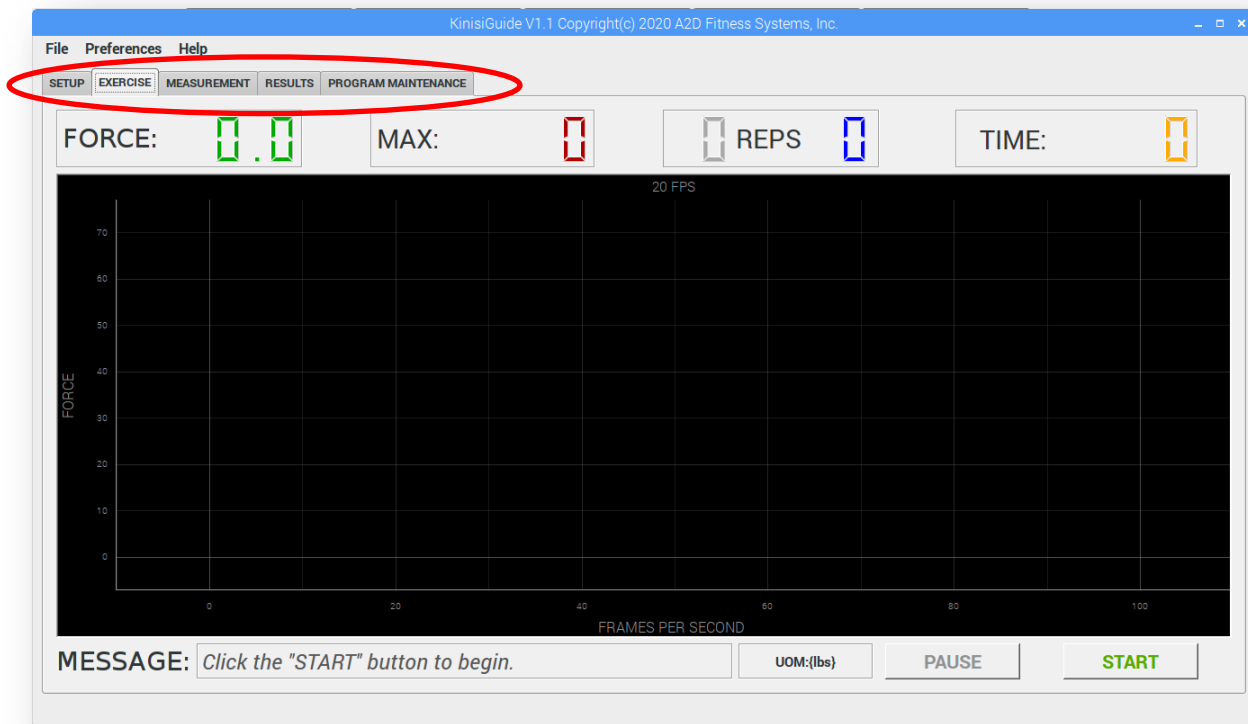


Figure 13 – Kinisi Feature Tabs

SETUP TAB

Below is the SETUP tab with all of its controls

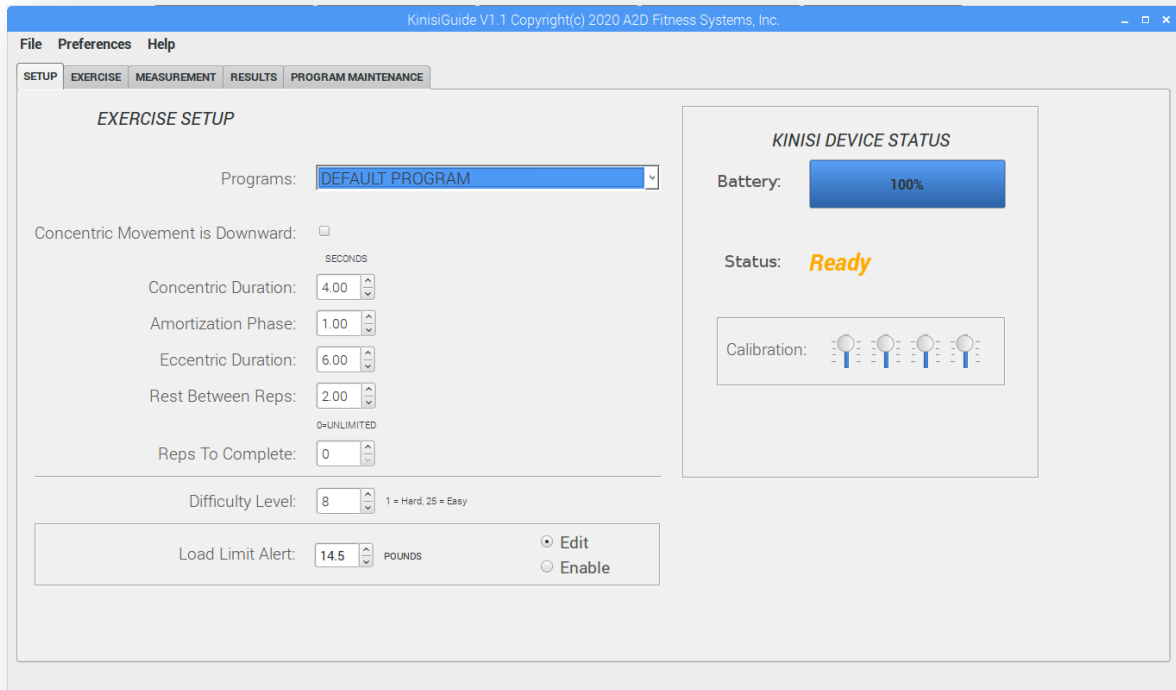


Figure 14 - SETUP Tab

The Exercise Setup tab is used to select a previously configured and saved exercise program or customize any part of the currently selected program. As you can see from the display in Fig 14, you can specify the durations for every part of an exercise movement, Concentric, Amortization and Eccentric phase durations and also the Rest period duration. Also notice at the top of the settings page is the “**Concentric Movement is Downward**” checkbox, this is checked when an exercise like a Lat-Pulldown will be performed, this insures that the real time display is intuitive for the downward concentric movement, more on this later. Next you can specify the target number of repetitions and also the Difficulty Level. We will look at the Difficulty Level and how it’s used later in the “**EXERCISE**” tab section.

At the bottom left of the tab is the “**Load Limit Alert**” section shown in Fig 14; this is used to set an audible and visual alert for the user and is triggered when the set load level is exceeded. This can be very useful for users that should not exceed a recommended resistance level due to therapy/recovery recommendations. To set the audible alert level, first make sure that the “**Edit**” radio button is selected then adjust the alert value up or down using the up/down arrows respectively. To make the alert active, click on the “**Enable**” radio button. Once enabled, the trigger alert value will be displayed next to the “**MAX:**” resistance value on the “**EXERCISE**” tab. See the alert set at 14.5 Pounds in the example below.

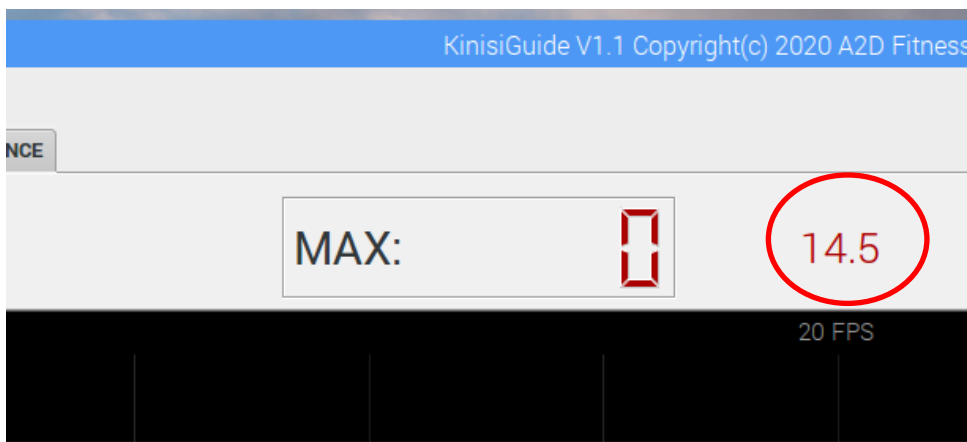


Figure 15 -Enabled Load Alert

Also on the “**SETUP**” tab (Fig 14), on the right side of the display is the “**Kinisi Device Status**” section, here the current battery level and the active device status is displayed. There are three device states that are used, first is “**Ready**”, this indicates the Kinisi is connected and active, second is “**Sleeping**”, after a period of inactivity (Kinisi has been stationary for approximately 3 minutes) Kinisi enters into sleep mode to conserve battery power. Simply moving the Kinisi device will wake it from sleep mode and become “**Ready**” once again. Lastly when Kinisi is connected, active and the battery charger is plugged in, the device status will show “**Charging**” and the battery charge state will indicate the current state of charge.

System Calibration

Located at the bottom of the device status area is the “**Calibration**” section that has four vertical gauges, these reflect the current calibration status of the Kinisi device.

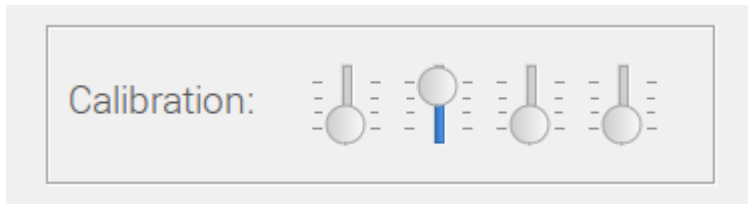


Figure 16 - Calibration Indicators

First it should be noted that Positional Calibration is automatically performed by the Kinisi device while in normal use, however it is recommended that a calibration process be performed at least once and then the Calibration data saved, this helps Kinisi become fully calibrated quickly after being switched on each time.

Placing the mouse pointer over the vertical gauges will cause a “Tool Tip” to display the description of each gauge; in fact this is true for all of the controls on the UI display.

The four calibration gauges each have 4 tick-marks, the bottom mark represents zero with the top tick-mark representing four, meaning fully calibrated. If the gauges are positioned at the topmost position then this indicates that all systems are fully calibrated.

When the Kinisi device and Base Station Computer are setup and turned on for the first time, the calibration as indicated by the four gauges will be at some level that’s less than fully calibrated. It is therefore very important to calibrate the Kinisi device and save the calibration data prior to using the device, this process is called “setup-calibration” again, calibrating and saving the calibration data need only be performed when the Kinisi device and the Base Station Computer are setup for the first time, OR if the system is moved to a new location, and then periodically every few months only if needed.

The following section details the calibration process:

Accelerometer Calibration

- 1) Place the device in 9 different stable positions for a period of few seconds to allow the accelerometer to calibrate.

- a. Hold the Kinisi device parallel (horizontal) to the floor for five seconds
- b. Rotate the device SLOWLY 45 degrees clockwise and hold for five seconds
- c. Rotate the device another 45 degrees clockwise, so it's vertical and hold for five seconds
- d. Rotate the device another 45 degrees clockwise and hold for five seconds
- e. Rotate the device another 45 degrees clockwise until the device is horizontal and hold for five seconds
- f. Rotate the device another 45 degrees clockwise and hold for five seconds
- g. Rotate the device SLOWLY another 45 degrees clockwise so it's again vertical and hold for five seconds
- h. Rotate the device another 45 degrees clockwise and hold for five seconds
- i. Rotate the Kinisi device another 45 degrees until it's back at its starting position parallel (horizontal) to the floor and hold for five seconds

Gyroscope Calibration

- 1) Place the device in a single stable position for five seconds to allow the gyroscope to calibrate

Magnetometer Calibration

Magnetometers in general are susceptible to both hard-iron and soft-iron distortions, with the majority of cases due to the former. The steps below are used to calibrate the magnetometer for hard-iron distortions.

Direction Calibration

- 1) Make some random movements (for example: writing the number '8' in the air while holding the Kinisi device parallel to the floor). Continue for one minute
- 2) Place the Kinisi device in a stable position, on a table for example for ten seconds
- 3) If all vertical sliders indicate the fully calibrated state, the calibration is complete, otherwise repeat the above Direction Calibration steps again.

Once the Kinisi device has been successfully calibrated (all vertical sliders in the topmost position) you can save the calibration data, this data is then used each time the Kinisi device is turned ON which eliminates the need to calibrate the system again. Once the calibration data has been saved, and after switching ON the Kinisi device, typically just a few random movements will place the Kinisi device in a fully calibrated state.

To save the calibration data follow these steps:

- 1) Click on the ***“Preferences”*** menu located at the top left of the Kinisi software
- 2) Left mouse click on the ***“Save Positional Cal Data”***

NOTE: All four of the vertical gauges must be in the fully calibrated position in order to execute step 2, if one or more of the gauges are not in the fully calibrated position the ***“Save Positional Cal Data”*** option will be disabled (greyed out) and consequently will not allow you to execute this option. If this is the case, simply make some additional random movements and then place Kinisi in a stationary position while watching the calibration status. Once all four vertical sliders are in the fully calibrated position the ***“Save Positional Cal Data”*** option will be enabled.

- 3) Upon successfully saving the calibration data, a message dialog will display with the message ***“Calibration data has been saved!”***

After the system has been calibrated for setup and the calibration data saved, it’s still quite normal after turning Kinisi OFF and then ON again, that some of the gauges and particularly the System Calibration gauge indicate a level of calibration that’s less than optimal.

To quickly calibrate Kinisi for use, simply perform some of the movements previously recommended in the setup-calibration process, do a few figure ‘8’s and or rotate the Kinisi device in 45 degree increments while observing the calibration gauges, this process is called “post-calibration”. Post-calibration typically only takes a minute or so before Kinisi becomes fully calibrated again.

After post-calibration and while Kinisi is in use, it’s also very normal to see one or more gauges move up and down a little, this is because Kinisi is continually being calibrated internally but this does NOT indicate that the system needs to be re-calibrated (setup-calibration) again.

To summarize:

- Setup-calibration is required only when the Kinisi device and the Base Station Computer are setup for the first time.
- After post-calibration it’s quite normal that as Kinisi is being used that one or more calibration gauges indicate a level that’s less than fully calibrated. No calibration steps are needed here; simply using Kinisi will quickly place the Kinisi device back into the fully calibrated state again.

EXERCISE TAB

The EXERCISE tab is the main tab used to display the real time information when the user is performing an exercise or movement.

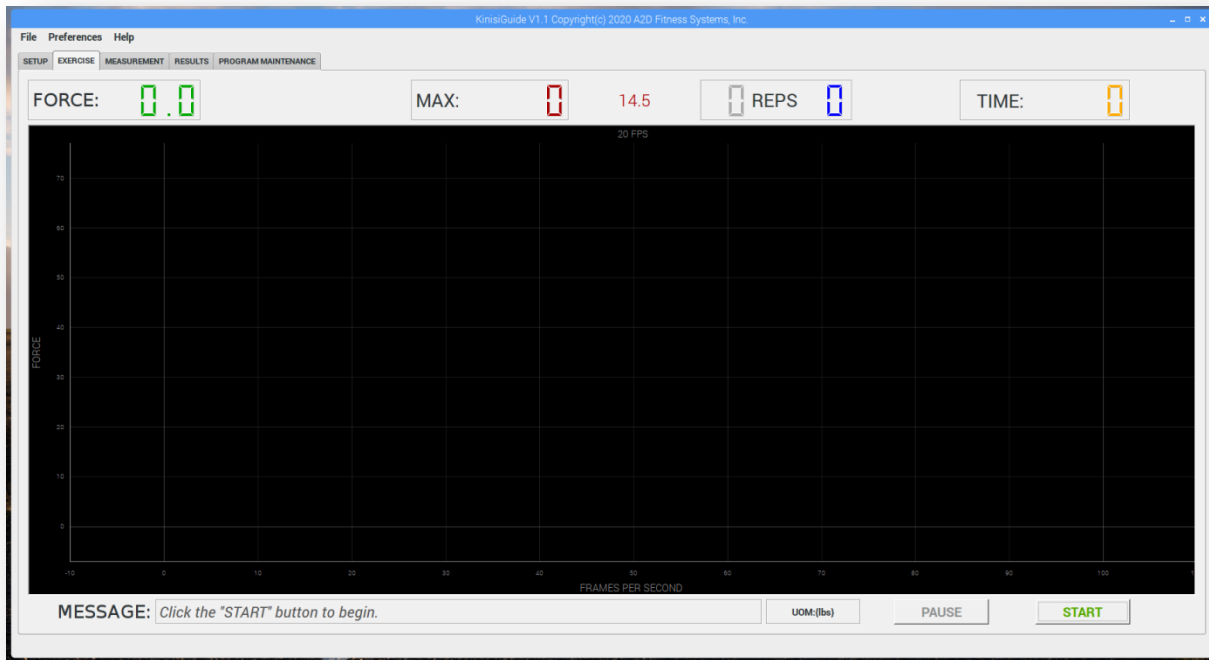


Figure 17 - Exercise Tab

Starting at the top left of the tab is the **“FORCE:”** value, this is where the actual resistance being detected by the Kinisi device is displayed in real-time. Next is the **“MAX:”** value, this is the peak resistance detected during the concentric phase of the exercise. The Kinisi software can report resistance in Pounds, Kilograms and Newton’s depending on the user’s preference. Changing the measurement units is accomplished from the **“Preferences”** Menu; this is discussed in detail later in this section.

The grey **“REPS”** value is the number of repetition cycles completed by the grey pathway, while the blue **“REPS”** value is the number of repetitions that the exerciser has completed. If a target number of reps has been set in the **“SETUP”** tab then a message will be displayed when the target number of reps has been reached, however more reps can be performed if desired.

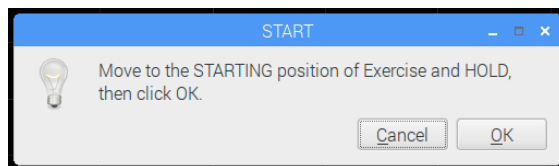
“TIME:” is the total session time that has transpired so far since starting the set.

“MESSAGE:” the message line is used to display useful information about the state of the Kinisi application software while it’s in use.

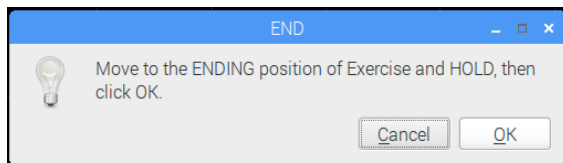
To the right is the **“UOM:”** value, this is used to show the currently selected Unit-Of-Measure for reporting force, Pounds, Kilograms or Newtons.

Assuming that all of the specifications for the exercise and user have been specified in the **“SETUP”** tab then we are now ready to begin an exercise or movement.

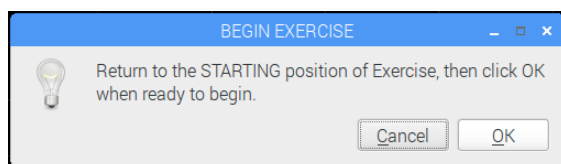
- 1) When the exerciser is in position and ready to begin the exercise, click on the **“START”** button to proceed
- 2) A message dialog will be displayed prompting the user to move to the **“STARTING position”** of the exercise and hold at that position



- 3) You as the Trainer or Clinician will click on the **“OK”** button once the user is in the start position
- 4) Next a message dialog will be displayed prompting the user to move to the **“ENDING position”** of the exercise and hold at that position



- 5) You as the Trainer or Clinician again clicks on the **“OK”** button
- 6) Lastly a message dialog will be displayed prompting the user to **“Return to STARTING position”** of the exercise and hold



7) The Trainer or Clinician clicks on the “**OK**” button to complete the exerciser’s calibration process

Using the specifications from the “**SETUP**” tab and the users’ force calibration information, the pathway trainer is displayed in the graph area; see Fig 18 below showing the grey pathway trainer.

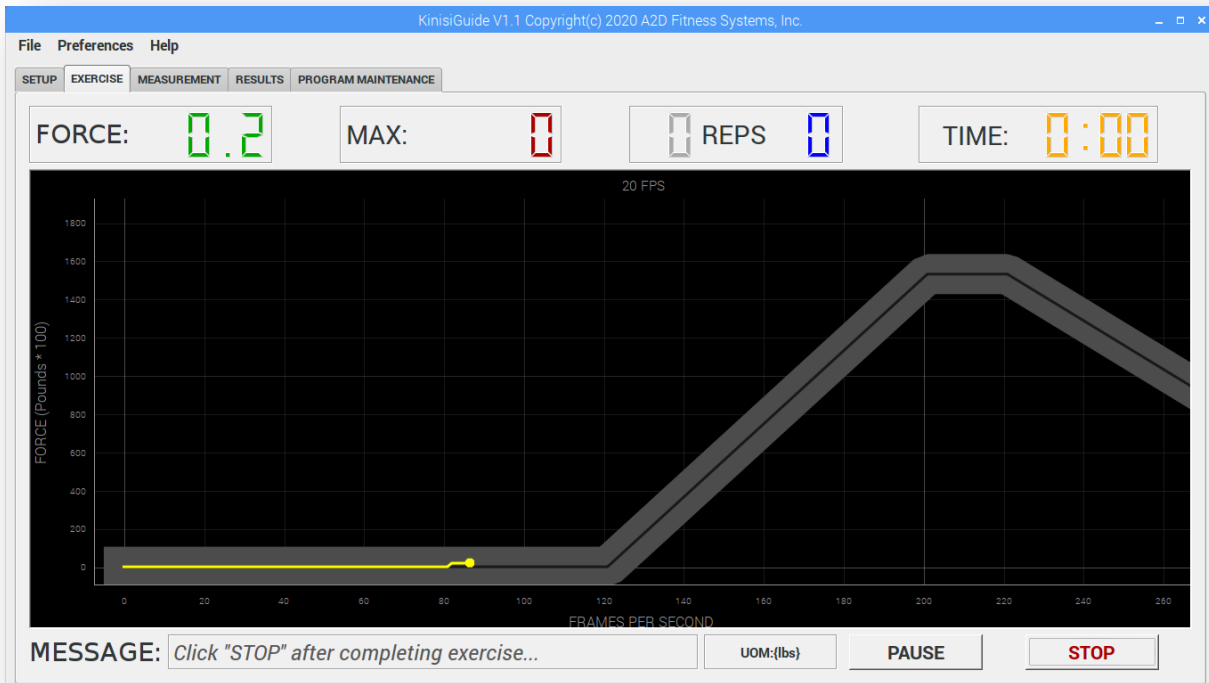


Figure 18 - The Kinisi Pathway Trainer

The yellow dot moves to reflect the exerciser’s real-time exerted force, while the grey pathway represents the target force profile that scrolls from right to left along its time axis.

The width of the pathway is set by the “**Difficulty Level**” value found on the “**SETUP**” tab. The smaller the value for the Difficulty Level, the narrower the pathway will be and consequently more difficult for the exerciser to stay inside of the pathway.

The exerciser watches the yellow cursor while performing the exercise and works to keep the cursor inside of the grey pathway. If the cursor moves outside of the grey pathway then the cursor will change from yellow to red, this indicates that the force or timing is outside of the specified parameters. All information regarding the exerciser’s performance with respect to the target exercise profile is recorded and can be viewed and or printed as needed later.

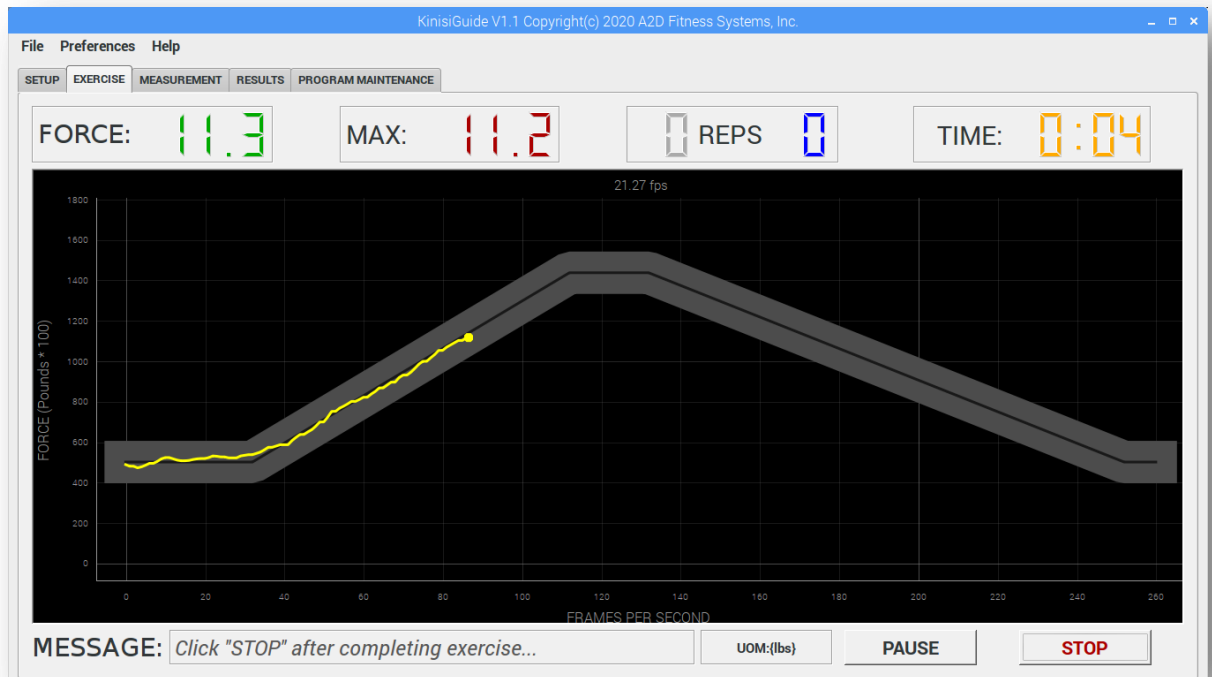


Figure 19 - Performing an Exercise

If the number of reps to complete have been set from the “**SETUP**” tab, and the numbers of reps completed by the user equals the set value then a message will be displayed as shown in Fig 20 on the next page.

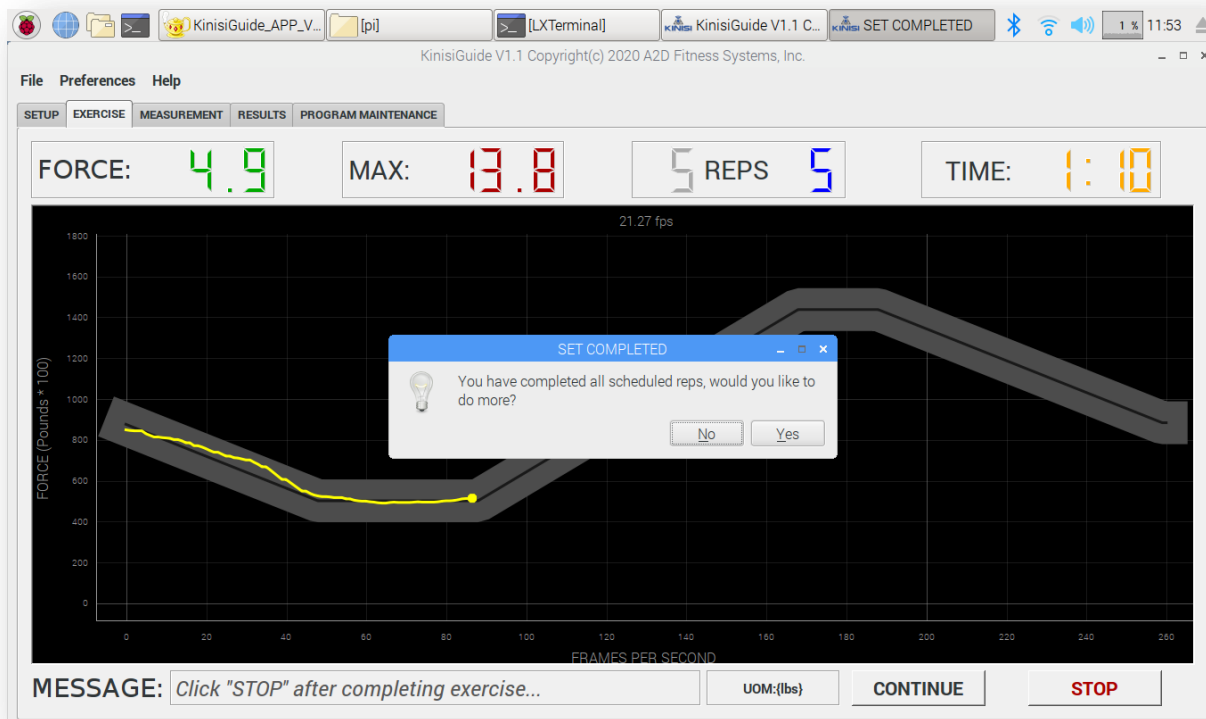


Figure 20 - Completed Set

When the “**SET COMPLETED**” dialog message displays and clicking the “**Yes**” button will allow the user to perform additional reps if required, or clicking “**No**” will allow a new set to be started.

If no maximum repetitions were set on the “**SETUP**” tab then an unlimited numbers of reps can be performed up to a maximum of 99.

MEASUREMENT TAB

The **“MEASUREMENT”** tab is used to measure a joints range of motion using the Kinisi device for extremely accurate and fast digital measurements. Kinisi can be used for Passive, Active and Active Assistive type measurements as needed.

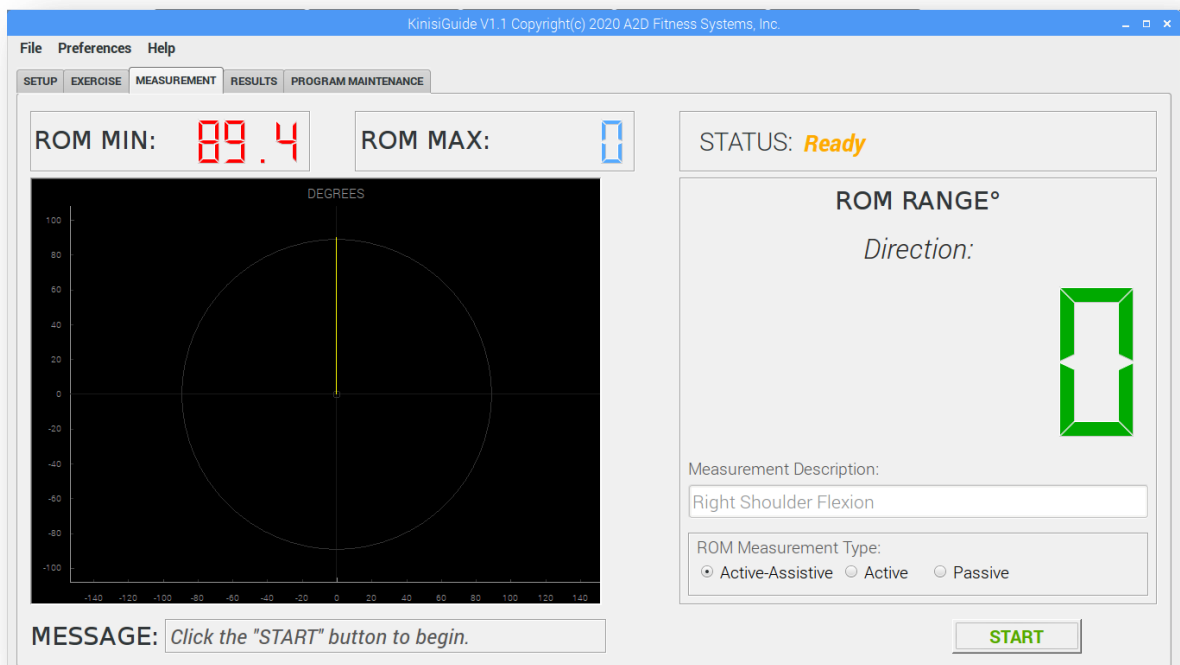


Figure 21 - Measurement Tab

There are a few steps required in order to complete a range-of-motion measurement that is extremely accurate and only takes a few moments to do, here’s how:

- 1) Assuming that the Kinisi device is connected, and with no exercises currently in progress in the **“EXERCISE”** tab, click the **“START”** button to begin, you should see the yellow cursor moving when Kinisi is pointed up to the ceiling or down to the floor, pitch movement direction
- 2) Place Kinisi on the extremity to be measured, an upper arm for example in preparation for measuring the shoulder ROM
- 3) Ensure that the extremity is in the approximate minimal ROM position

- 4) Click on the **"SET MIN ROM"** button to mark the start position of the measurement

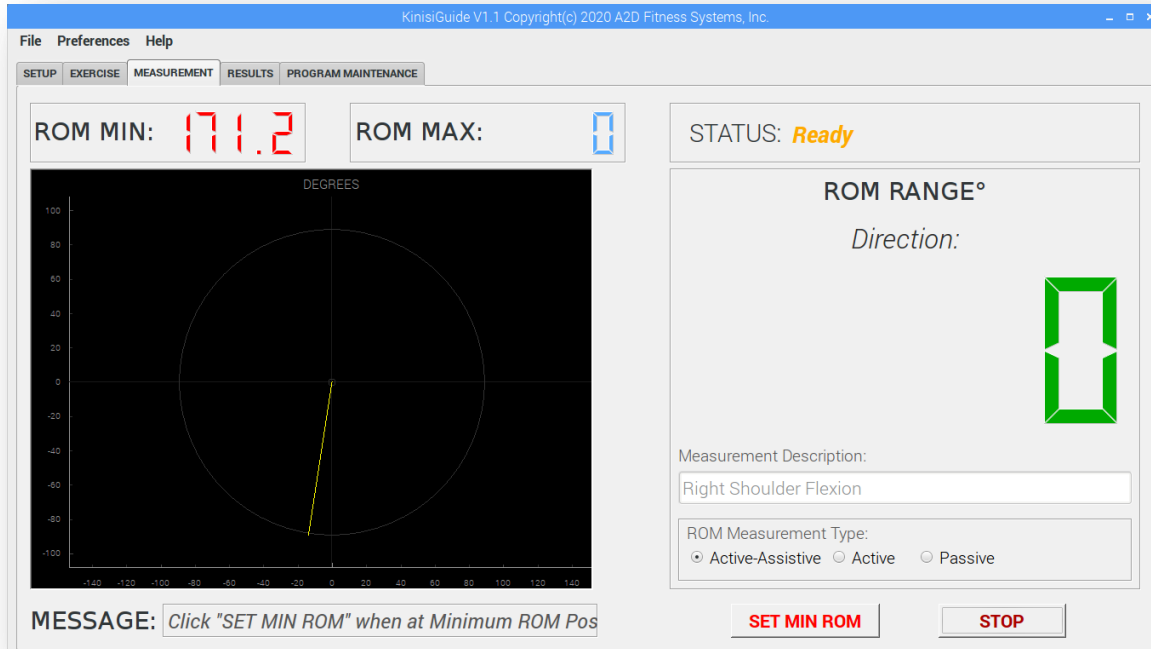


Figure 22 - Set Minimum ROM Position

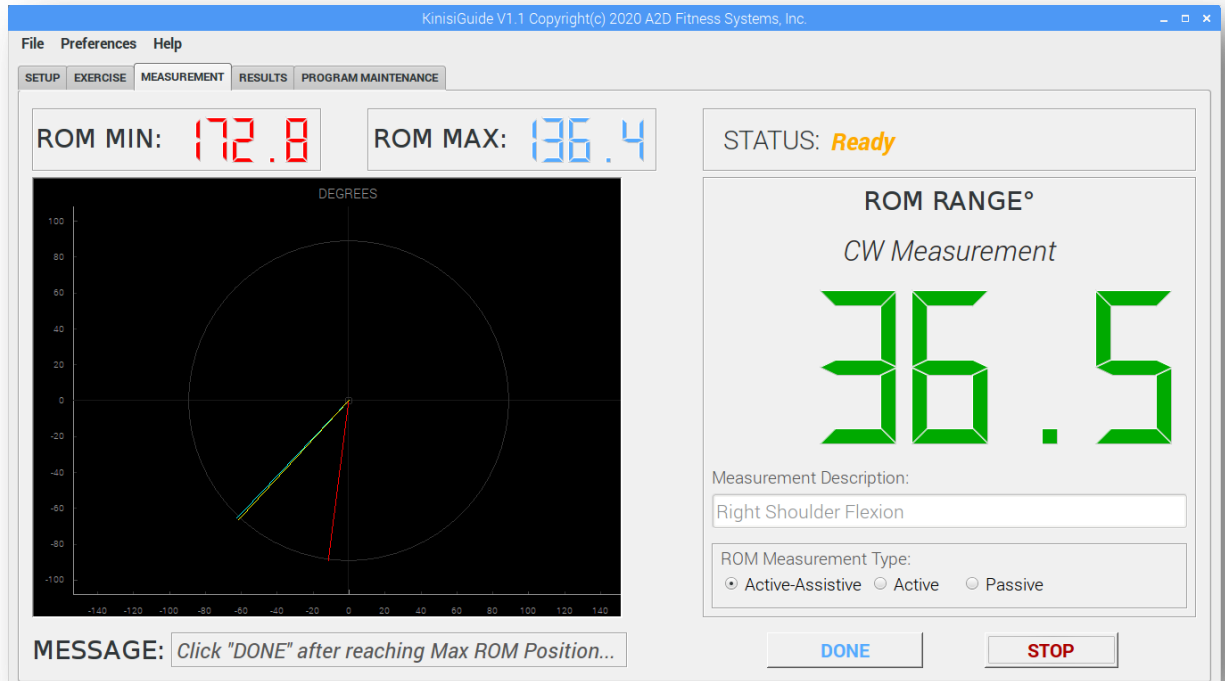


Figure 23 - Set Maximum ROM Position

- 5) A red line will be drawn at the current cursor position to mark the minimum ROM position

NOTE: After moving Kinisi in the direction of the measurement as indicated in the “**ROM RANGE**” panel the minimum ROM position can be adjusted by moving the extremity and Kinisi toward the minimum ROM position and beyond to set a new starting position.

- 6) Now move the extremity and Kinisi slowly toward the maximum ROM position as shown in Fig 24

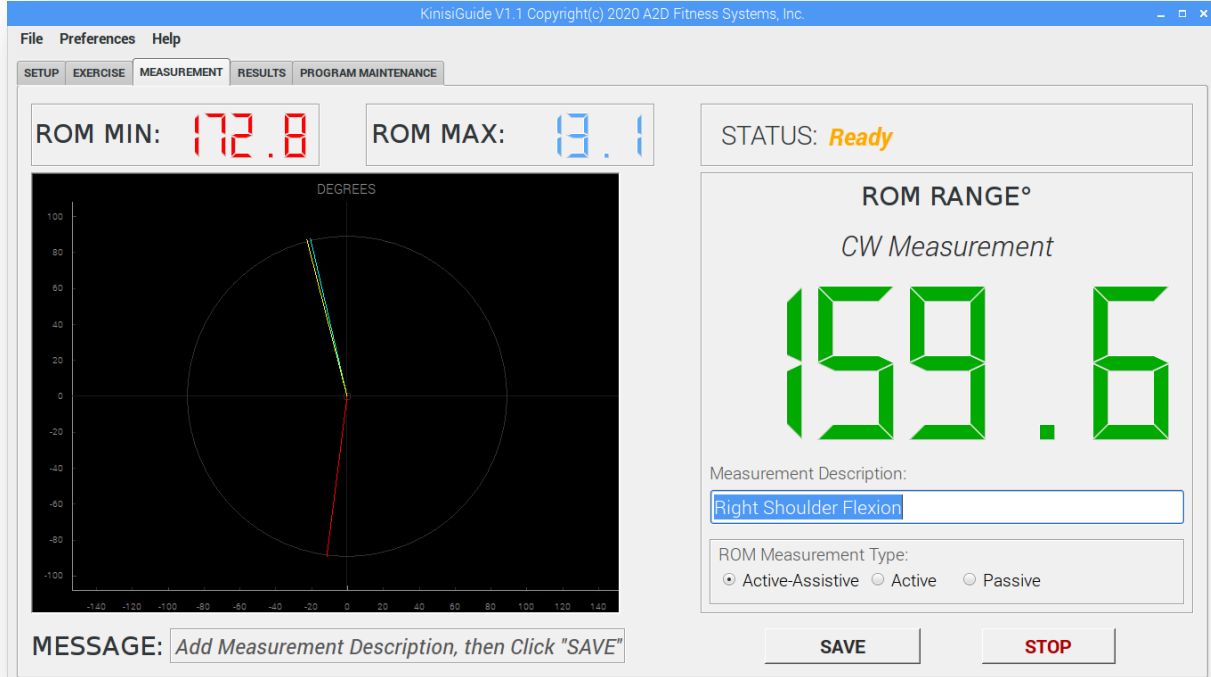


Figure 24 - After the maximum ROM has been marked

- 7) After clicking the **"DONE"** button, a blue line will be drawn indicating the maximum ROM position and the **"ROM RANGE"** now shows the total angle between the ROM minimum and maximum values while the **"ROM MIN"** and the **"ROM MAX"** show the true bubble level angle of each of the measurements
- 8) If the measurement is to be saved or printed for the patent record, add the appropriate measurement description, click on one of the **"ROM Measurement Type:"** radio buttons and then click the **"SAVE"** button. If the measurement does not need to be recorded then click on the **"STOP"** button to reset for the next measurement

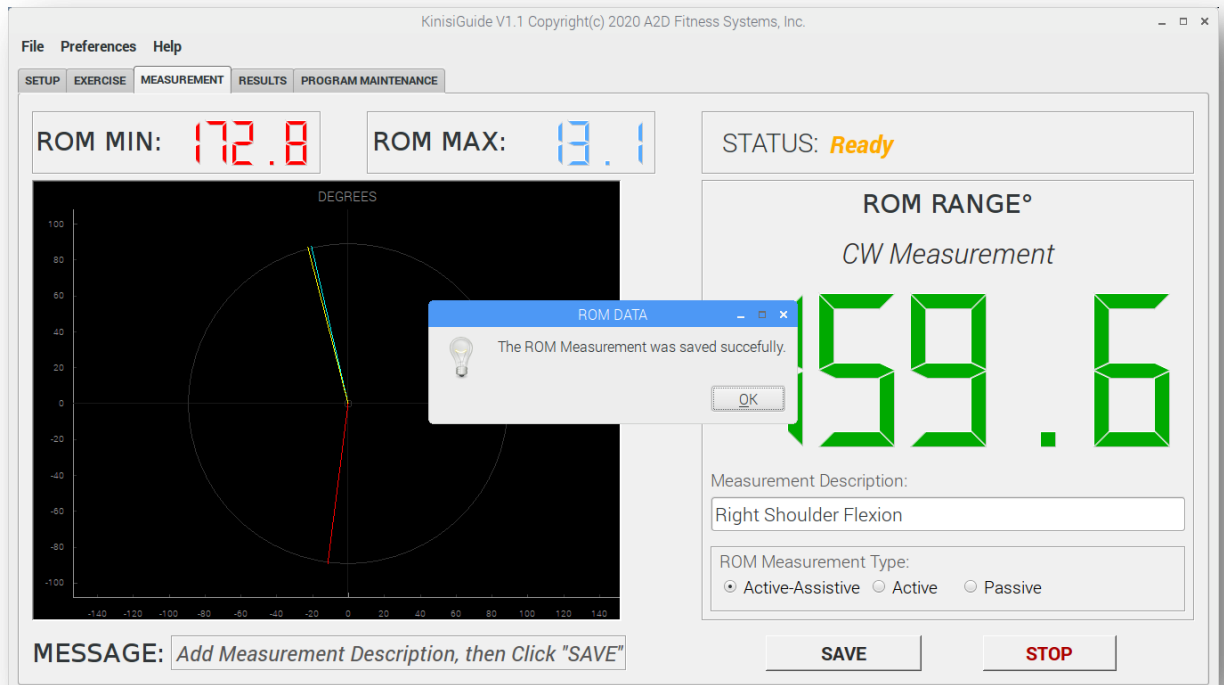


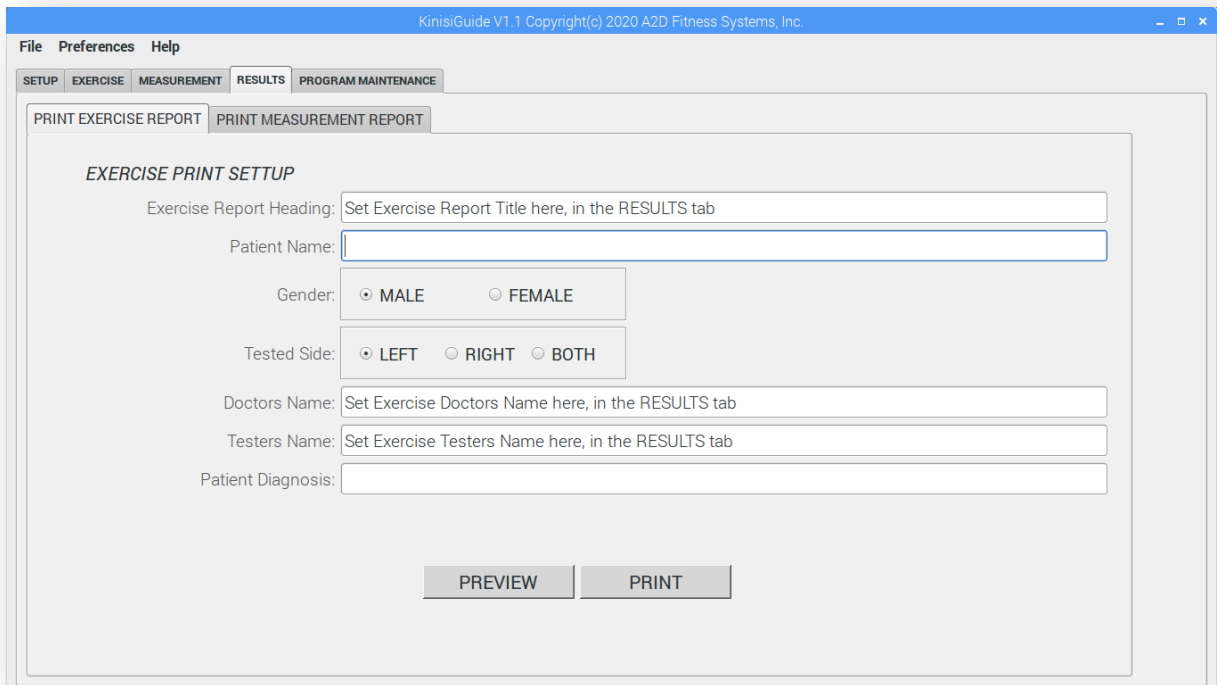
Figure 25 - Measurement Saved

- 9) Clicking "**OK**" will reset ready for the next measurement
- 10) Saved measurements can be printed from the "**RESULTS**" tab

NOTE: Setting the minimum ROM position as shown in Fig 22 can also be accomplished by gently pulling on Kinisi's resistance band connecting ring when Kinisi is in position, this allows the setting to be made without having to return to the computer to click on the "**SET MIN ROM**" button, this is particularly helpful when performing an active-assist or passive measurement. Pulling a second time when Kinisi is in the maximum ROM position will set the maximum ROM position as shown in Fig 24.

RESULTS TAB

The “**RESULTS**” tab is used to view and or print comprehensive data that was captured during all phases or each repetition and all saved ROM measurements. To select an exercise or measurement report, first click on the appropriate sub-tab to begin.



The screenshot shows the KinisiGuide V1.1 software interface. The main window has a menu bar with 'File', 'Preferences', and 'Help'. Below the menu bar are tabs for 'SETUP', 'EXERCISE', 'MEASUREMENT', 'RESULTS', and 'PROGRAM MAINTENANCE'. The 'RESULTS' tab is active, and within it, the 'PRINT EXERCISE REPORT' sub-tab is selected. The 'EXERCISE PRINT SETUP' form contains the following fields and options:

- Exercise Report Heading: Set Exercise Report Title here, in the RESULTS tab
- Patient Name: [Text Input Field]
- Gender: MALE FEMALE
- Tested Side: LEFT RIGHT BOTH
- Doctors Name: Set Exercise Doctors Name here, in the RESULTS tab
- Testers Name: Set Exercise Testers Name here, in the RESULTS tab
- Patient Diagnosis: [Text Input Field]

At the bottom of the form are two buttons: 'PREVIEW' and 'PRINT'.

Figure 26 - Results/Print Exercise Tab

Before viewing or printing, edit the fields as needed:

- 1) “**Report Heading**” this information is shown at the top of the exercise report, it can be set once and forgotten as it is saved and recalled each time you run KinisiGuide so there is no need to keep re-typing it
- 2) “**Patient Name**”, this field however is not retained when KinisiGuide is exited but is retained during the active session until changed
- 3) “**Gender**”, click on the radio button for the patients Gender. This setting is not retained
- 4) “**Tested Side**”, click on the radio button to indicate the side of the patient being tested. Additionally this setting is not retained

5) “**Doctors Name**”, this setting is retained across sessions

6) “**Testers Name**”, this setting is also retained across sessions

7) “**Patient Diagnosis**”, this setting is not retained

Report Preview

Clicking on the “**PREVIEW**” button will generate the results report that can be viewed, printed or saved to file. Fig 27 shows the exercise report.

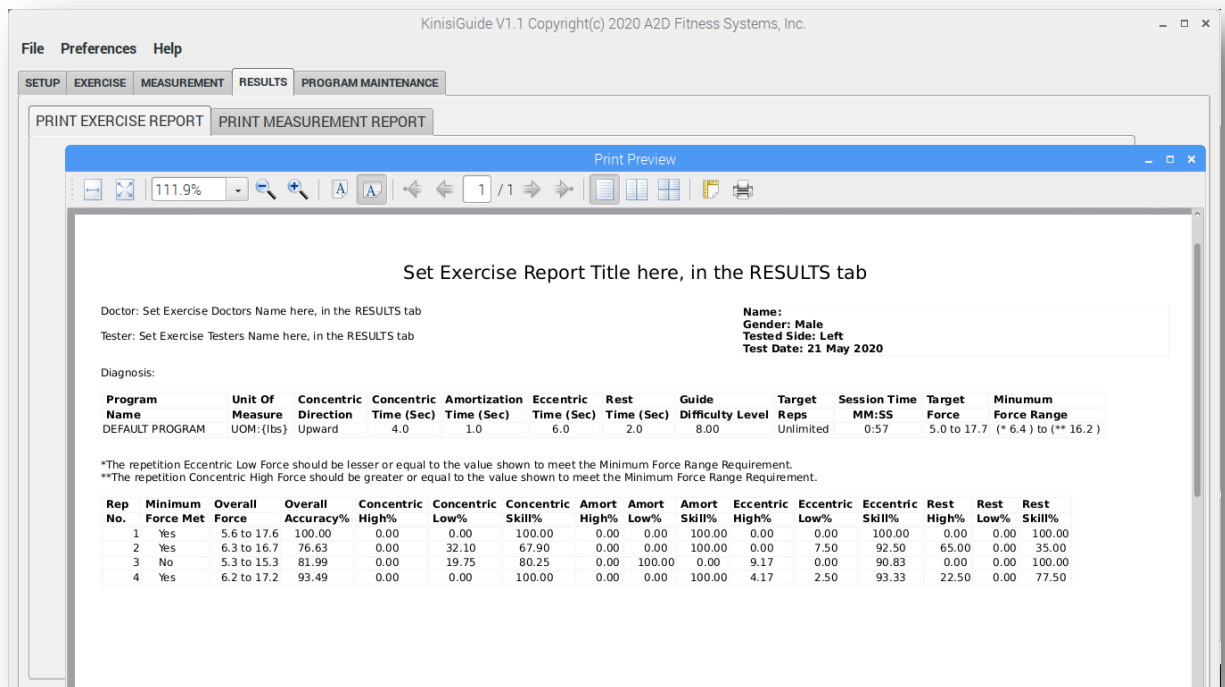


Figure 27 - Exercise Report Preview

To select the measurement report for printing or previewing, click on the “**PRINT MEASUREMENT REPORT**” sub-tab to begin

You have the same report options for the measurement report as discussed for the exercise report previously, “**Report Heading**”, “**Doctors Name**” etc.

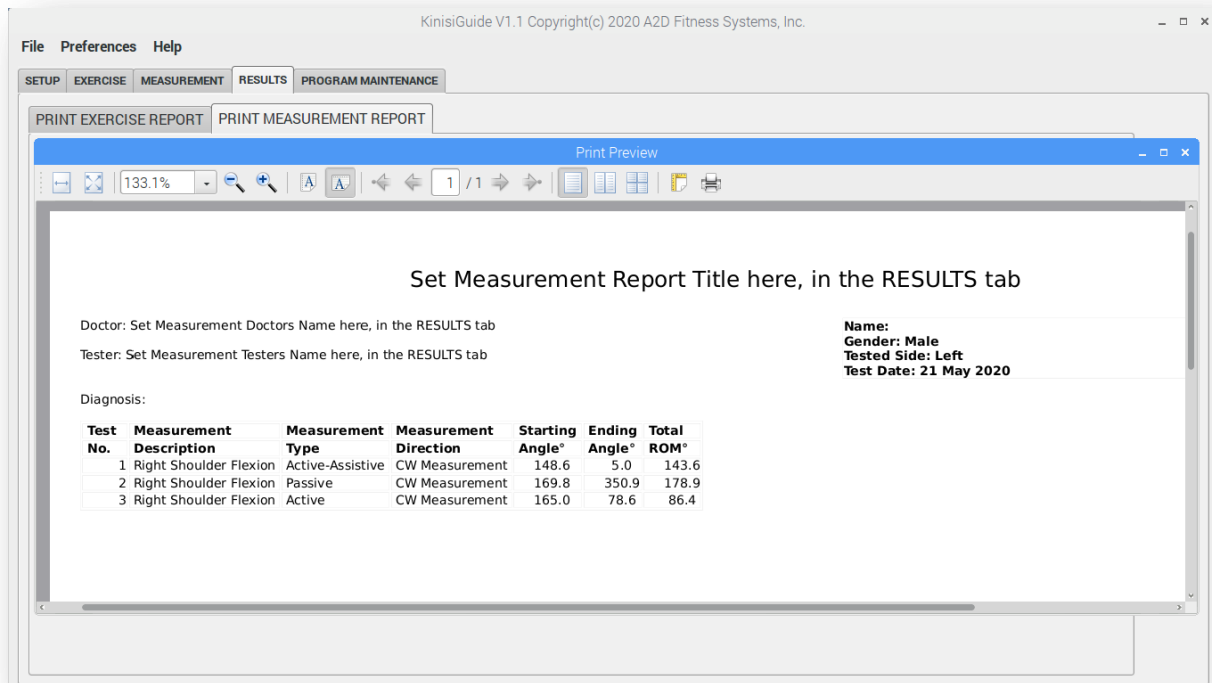


Figure 28 - Measurement Report Preview

Saving Reports as a PDF File

You may want to save reports to file so you can store and recall them at any time for review. For Windows the easiest way to do this is to use “CutePDF Writer”, it’s a virtual printer, once installed all you do is select “CutePDF Writer” from the printer selection dialog in KinisiGuide, and then you will be asked to provide the name and destination folder for the file. CutePDF will then save the Exercise or Measurement report to the chosen folder as a PDF formatted file. A few simple steps to install this free utility are all it takes. Please follow the steps below to install “CutePDF Writer” on your Windows computer, the following steps are NOT required if KinisiGuide is running on the small Base Station Computer as the option to print to a PDF file is already available. See Fig 29 on the next page showing the “**Print to File (PDF)**” option on the Base Station Computer.

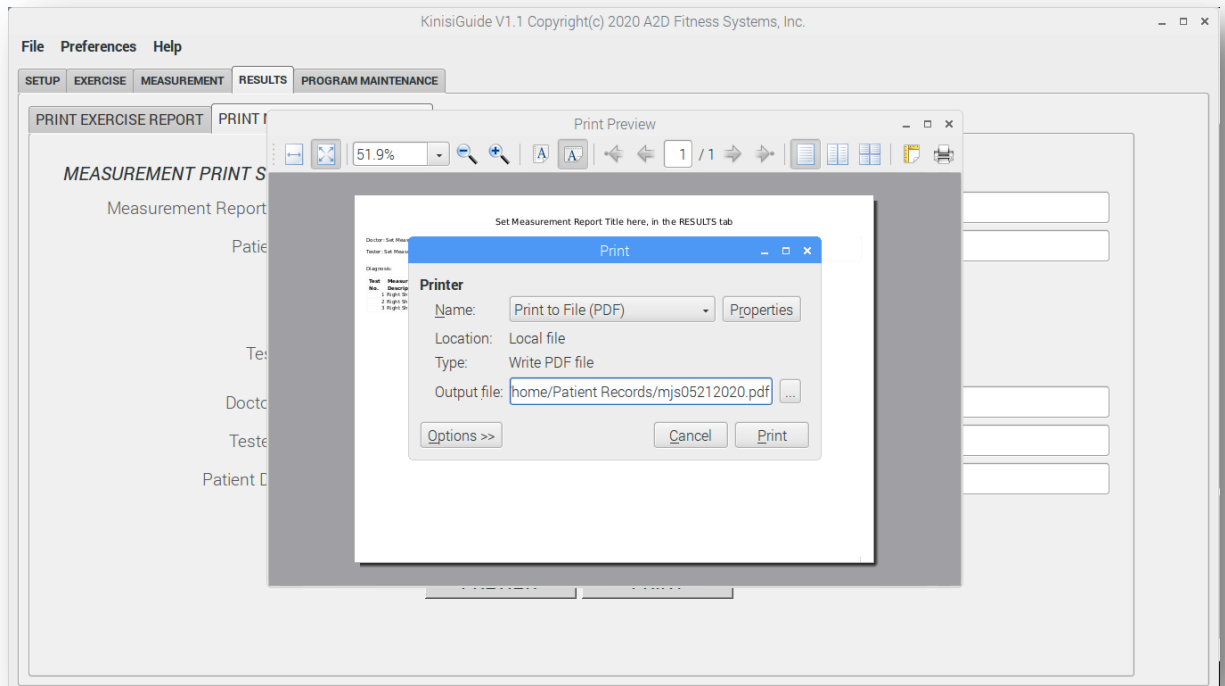
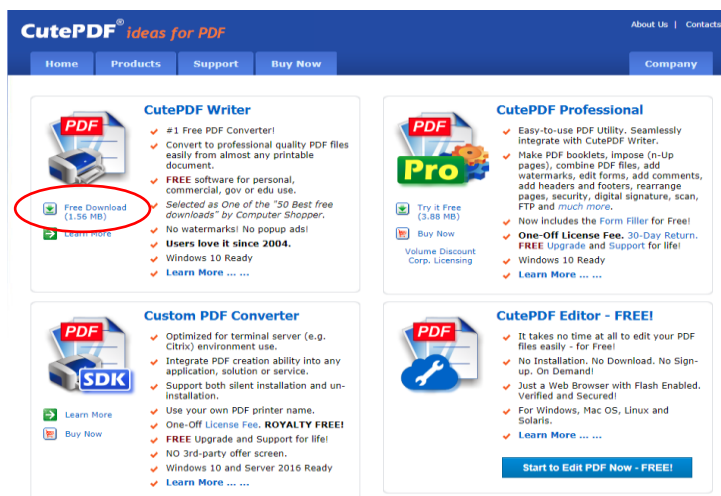


Figure 29 - Print to File Option - Base Station Computer System (Not Windows)

Saving Reports to a File for Windows Computers

- 1) Using your browser, go to www.cutepdf.com



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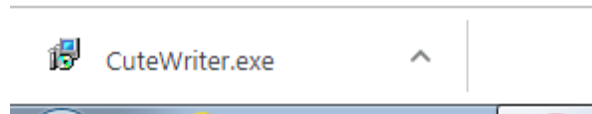
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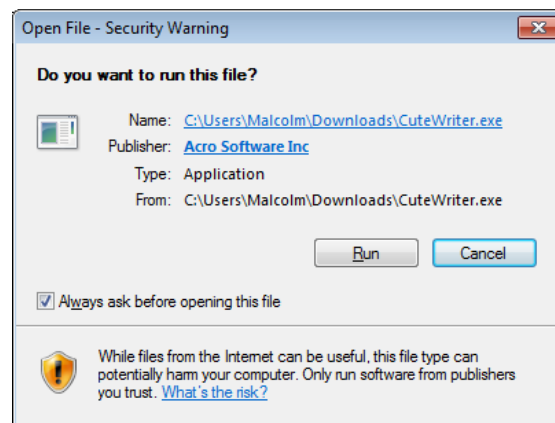
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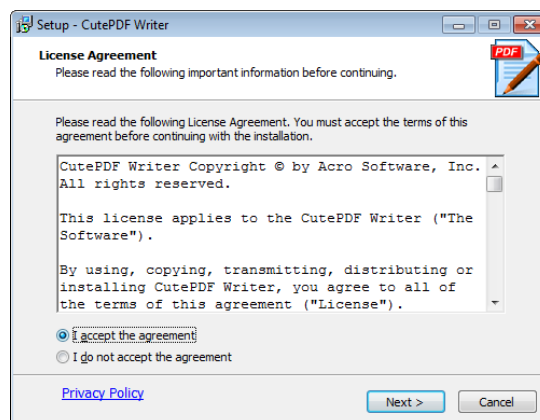
- 2) Click on the **“Free Download”** button in the **“CutePDF Writer”** section to start the download
- 3) After the download has completed, click on the **“CuteWriter.exe”** file icon in the system tray



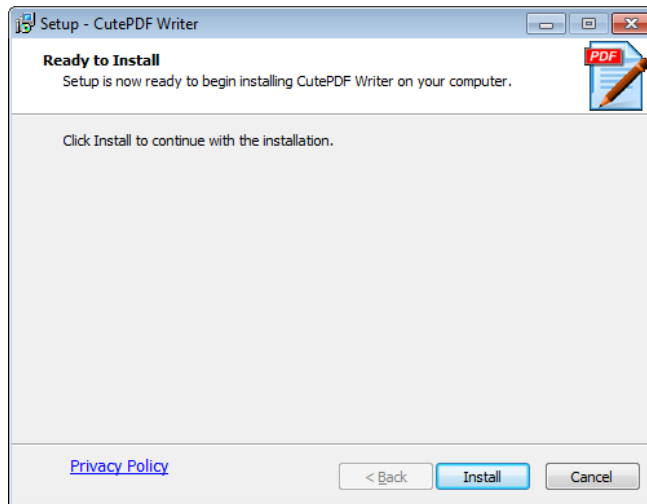
- 4) The install wizard will now start



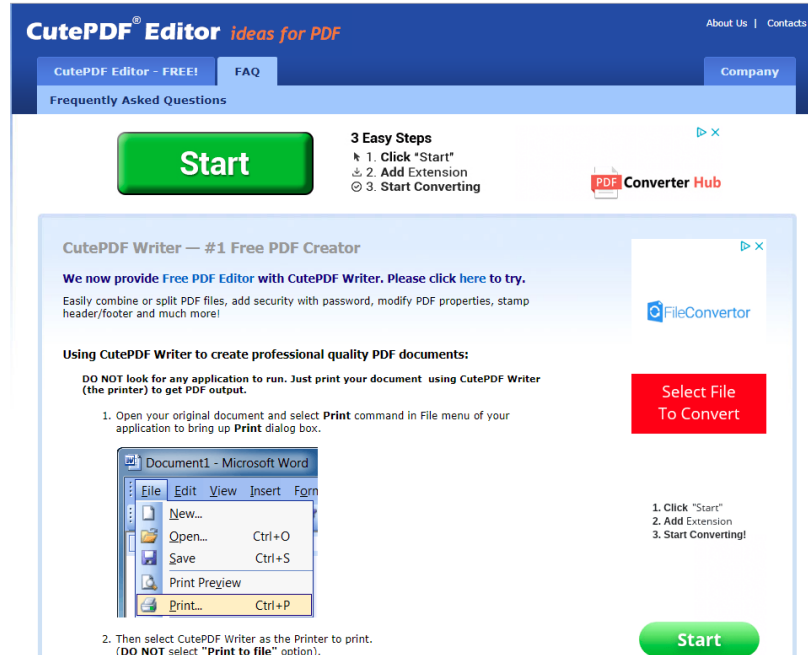
- 5) Click the **“Run”** button to begin the installation process



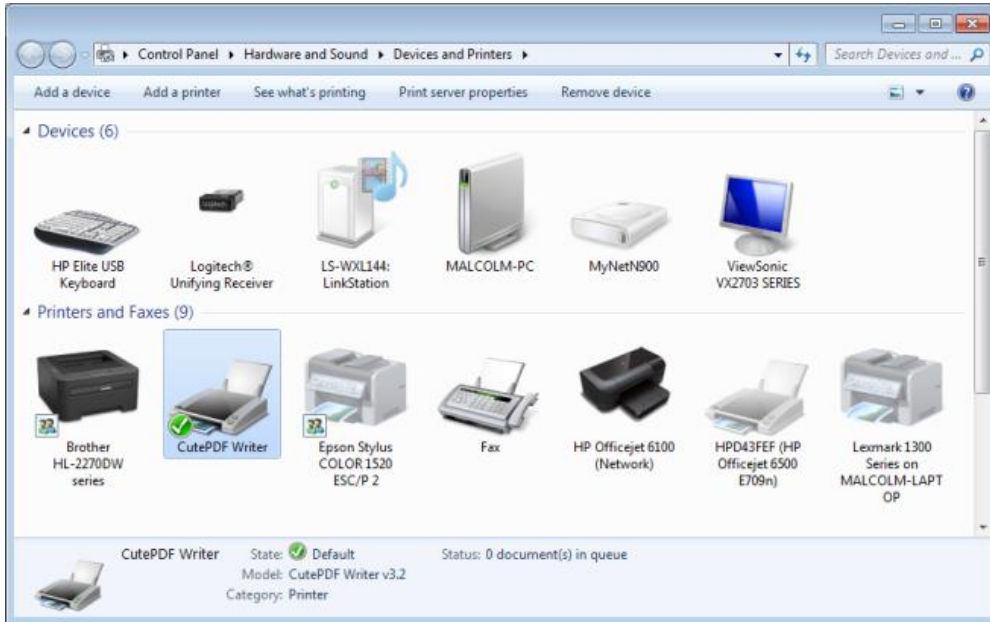
- 6) Click the **“I accept the agreement”** then click the **“Next”** button



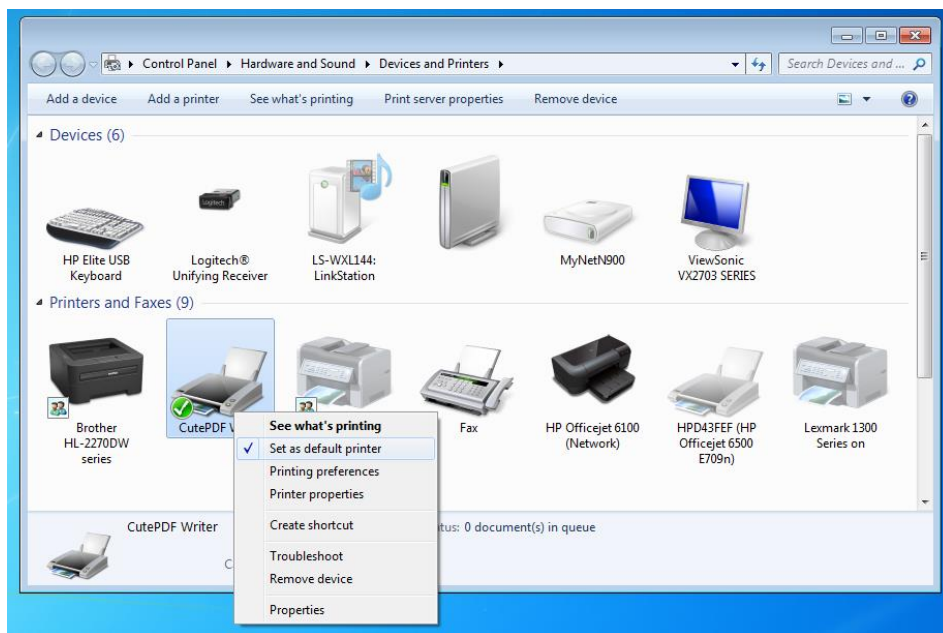
- 7) Click on the **“Install”** button to start the installation process
- 8) The installation only takes a few moments to complete, once finished you will be taken back to the website. At this point you have completed the installation



9) To confirm that everything was installed okay, go to the Windows Start Menu, click on “**Devices & Printers**”, you should now see the CutePDF Writer in the available printers dialog

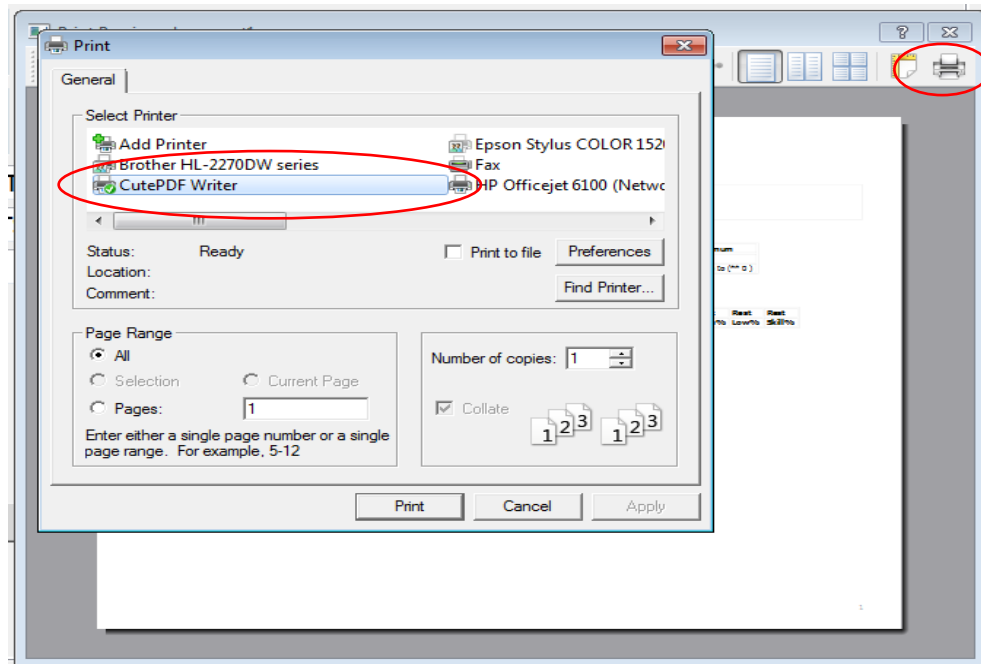


10) To make the CutePDF Writer the default printer, simply right click on the CutePDF Writer printer icon and select the “**Set as default printer**” option



11) To send reports from KinisiGuide to CutePDF Writer, simply select it from the printer selection dialog after clicking the “**PREVIEW**” or “**PRINT**” button on the “**RESULTS**” Tab

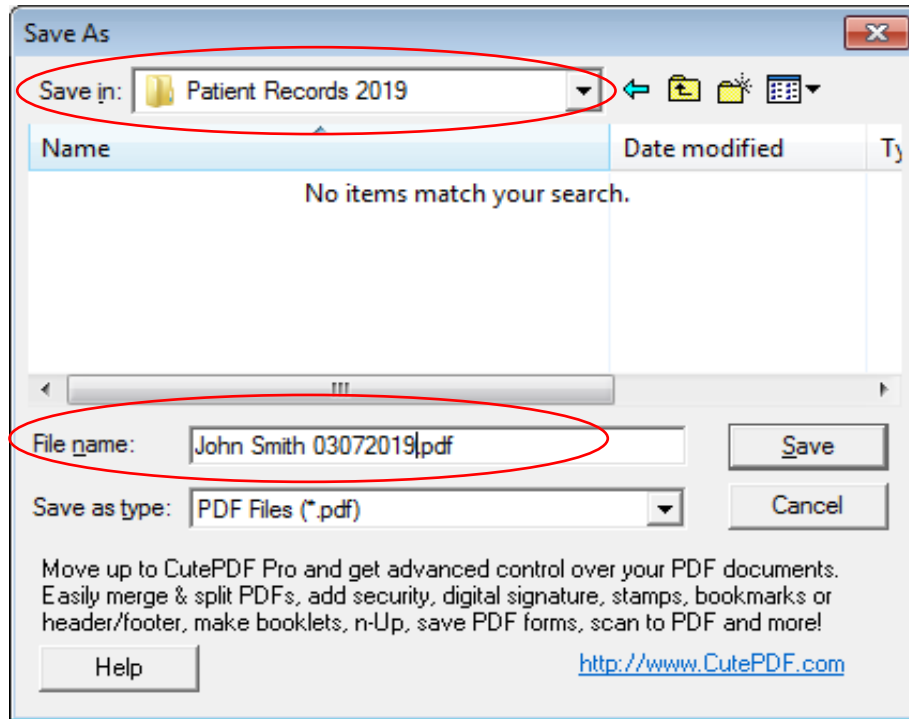
12) Click on the printer icon in the top right corner to show the Print options dialog



13) Select “**CutePDF Writer**” from the Select Printer Dialog

14) Now Click on the “**Print**” button to start the PDF file save process

15) Select the “**Save in**” folder and enter the name for the report in the “**File name**” field as shown on the next page



16) Click on the “**Save**” button to complete the process and save the report as a viewable or printable PDF file recallable at any time

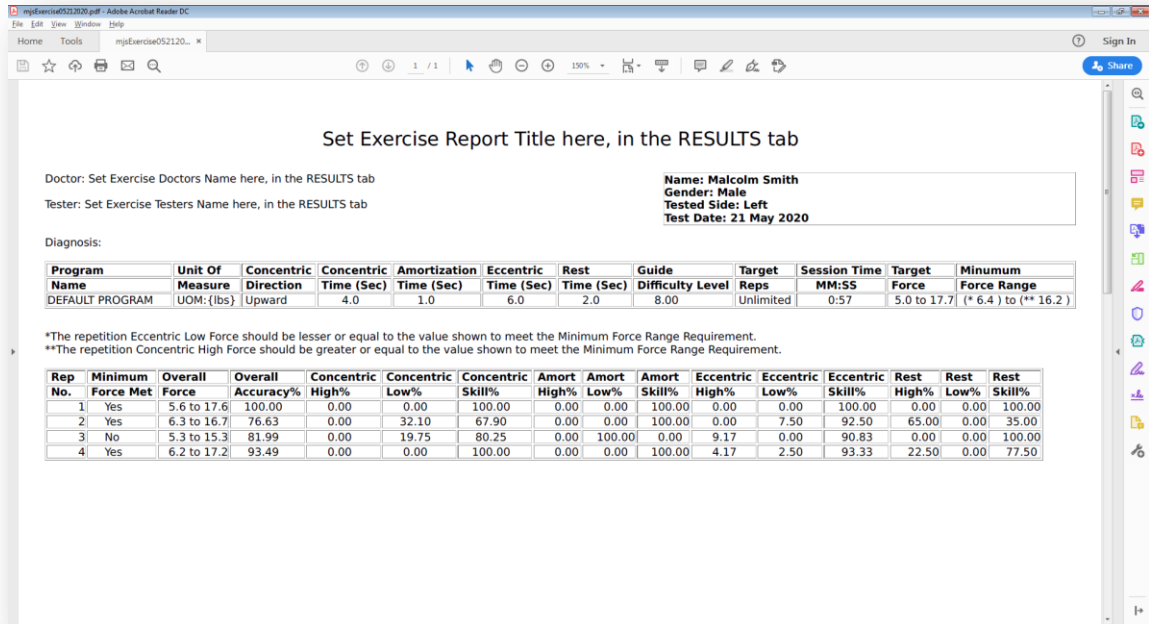


Figure 30 – Exercise Report PDF File

Exercise Report Format

Let's take a look at the comprehensive report information:

- 1) Report title at the top, and as mentioned previously this can be customized to your requirements
- 2) The Doctors and Testers name are on the left side with the patient information and report date are on the right side of the page header
- 3) Patient Diagnosis is under the patient information and to the left of the page
- 4) The next section details the exercise program parameters, first is the Program Name, this is the name given when the exercise program was setup or modified from the **"PROGRAM MAINTENANCE"** Tab
- 5) **"Unit Of Measure"** will be Pounds, Kilograms or Newtons depending on the setting selected from the Preferences Menu
- 6) **"Concentric Direction"**, this reflects the checkbox setting as discussed in the **"SETUP"** Tab section

- 7) **“Concentric Time”**, this is the setting from the **“SETUP”** Tab
- 8) **“Amortization Time”**, this is the setting from the **“SETUP”** Tab
- 9) **“Eccentric Time”**, this is the setting from the **“SETUP”** Tab
- 10) **“Rest Time”**, again, this is a setting from the **“SETUP”** Tab
- 11) **“Difficulty Level”**, this is also a setting from the **“SETUP”** Tab
- 12) **“Target Reps”**, this is the set value from the **“SETUP”** Tab or if set to **“0”** Zero, this indicates unlimited repetitions with a maximum of 99
- 13) **“Session Time”**, is the total duration of time from the start of the set until the **“STOP”** button was pressed
- 14) **“Target Force”**, this is the range of force measured during the calibration process when the exerciser was prompted to move from the start to end position of the exercise
- 15) **“Minimum Force Range”**, this is the minimum force range that must be achieved by the exerciser in order for KinisiGuide to count the repetition. If the exerciser does not meet the minimum force requirement, then the grey rep counter will increment but the blue rep counter will not. This does not mean that the repetition information was discarded, in fact every detail of the rep will be recorded including the users force that did not satisfy the minimum force requirement

The value as set in the **“Difficulty Level”** is used to calculate the **“Minimum Force Range”**. For example, if the **“Target Force”** was (5 to 17.7 pounds) and the Difficulty Level was set to 8 then the **“Minimum Force Range”** would be (6.4 to 16.2 pounds) (rounded up), meaning that the lowest eccentric range must be equal or lesser to 6.4, and the concentric range must be equal or greater than 16.2. If either of the two requirements is not met, then KinisiGuide will not increment the blue **“REP”** counter and the **“Minimum Force Met”** column on the report will indicate **“No”** for that same repetition.

The next section of the report reflects the exercisers actual performance in relationship to the program settings, difficulty level and the exercisers calibrated force range.

- 16) The 1st column, "**Rep No.**", the repetition number
- 17) 2nd column, "**Minimum Force Met**", "**Yes**" or "**No**". This facilitates a quick confirmation of force targets
- 18) 3rd column, "**Overall Force**", this indicates the minimum eccentric and the maximum concentric force range
- 19) 4th column, "**Overall Accuracy%**", this column quickly indicates the accuracy of the exerciser for all of the individual phases of the repetition, concentric, amortization, eccentric and rest phase combined
- 20) 5th column, "**Concentric High%**", indicates the percentage of time that the exerciser was exerting more force than the pathway guide during the concentric movement phase
- 21) 6th column, "**Concentric Low%**", indicates the percentage of time that the exerciser was exerting a lower force than the pathway guide during the concentric movement phase
- 22) 7th column, "**Concentric Skill%**", this column indicates the overall accuracy of the concentric phase
- 23) 8th column, "**Amort High%**", indicates the percentage of time that the exerciser was exerting a higher force than the pathway guide during the amortization phase
- 24) 9th column, "**Amort Low%**", indicates the percentage of time that the exerciser was exerting a lower force than the pathway guide during the amortization phase
- 25) 10th column, "**Amort Skill%**", this column indicates the overall accuracy of the amortization phase
- 26) 11th column, "**Eccentric High%**", indicates the percentage of time that the exerciser was exerting a higher force than the pathway guide during the eccentric movement phase

27)12th column, "***Eccentric Low%***", indicates the percentage of time that the exerciser was exerting a lower force than the pathway guide during the eccentric movement phase

28)13th column, "***Eccentric Skill%***", this column indicates the overall accuracy of the eccentric phase

29)14th column, "***Rest High%***", indicates the percentage of time that the exerciser was exerting a higher force than the pathway guide during the rest phase

30)15th column, "***Rest Low%***", indicates the percentage of time that the exerciser was exerting a lower force than the pathway guide during the rest phase

31)16th and last column, "***Rest Skill%***", this column indicates the overall accuracy of the rest phase

Information for all 16 columns is repeated for each repetition performed with a maximum of 99 repetitions per set.

Measurement Report Format

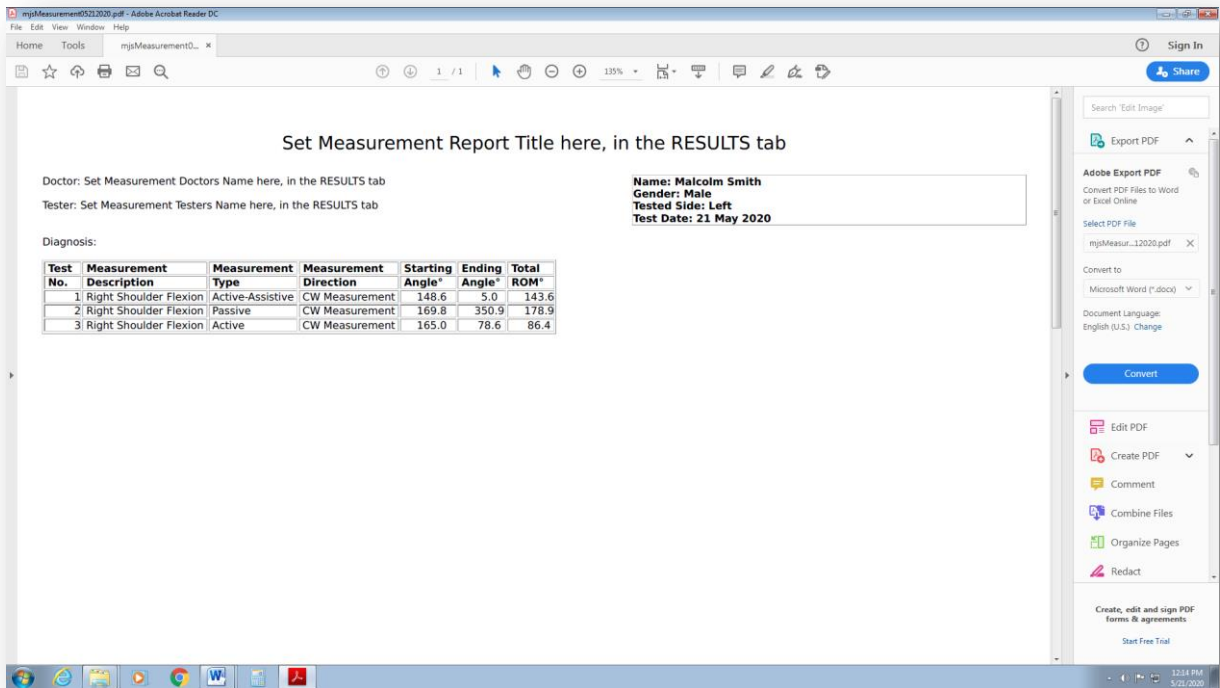


Figure 31 - Measurement Report PDF File

- 1) Report title at the top, and as mentioned previously this can be customized to your specific requirements
- 2) The Doctors and Testers name are on the left side with the patient information and report date are on the right side of the page header
- 3) Patient Diagnosis is under the patient information and to the left of the page
- 4) The next section details the measurement details, in the first column is the “**Test No.**”
- 5) In the second column is the “**Measurement Description**” this is the text that was entered prior to saving the measurement
- 6) Next is the “**Measurement Type**”, this was also selected prior to saving the measurement

- 7) The forth column is the “**Measurement Direction**”, this can be useful to identify how the measurement was performed, in our shoulder ROM example, if the measurement was performed starting with the arm in the down position then moving the arm up, this would be indicated by a Clockwise (CW) direction. Conversely if the measurement was started with the arm in the upward position and then the arm was brought downward for the maximum ROM position then the direction would be Counter Clockwise (CCW).
- 8) Next is the “**Starting Angle**”, this is the actual bubble level angle, for example, if the Kinisi device is placed flat on a table top or floor, the Starting Angle would be 90°
- 9) In the sixth column is the “**Ending Angle**”, this is the actual angle of the Kinisi device when the maximum ROM was set
- 10) Lastly is the “**Total ROM**” column, the value shown here is the total ROM of the measurement

Columns 1 – 7 are repeated for each measurement that has been taken

PROGRAM MAINTENANCE TAB

The last tab on the right is the “**PROGRAM MAINTENANCE**” tab and is used to add, modify or delete custom exercise programs.

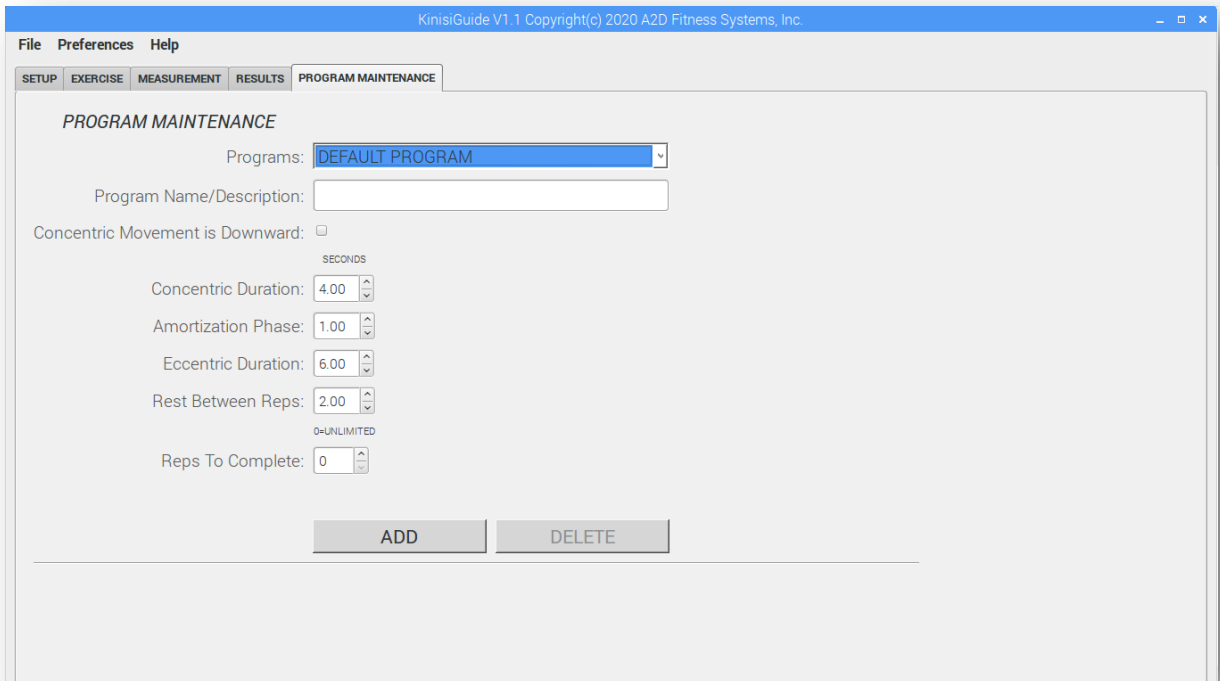
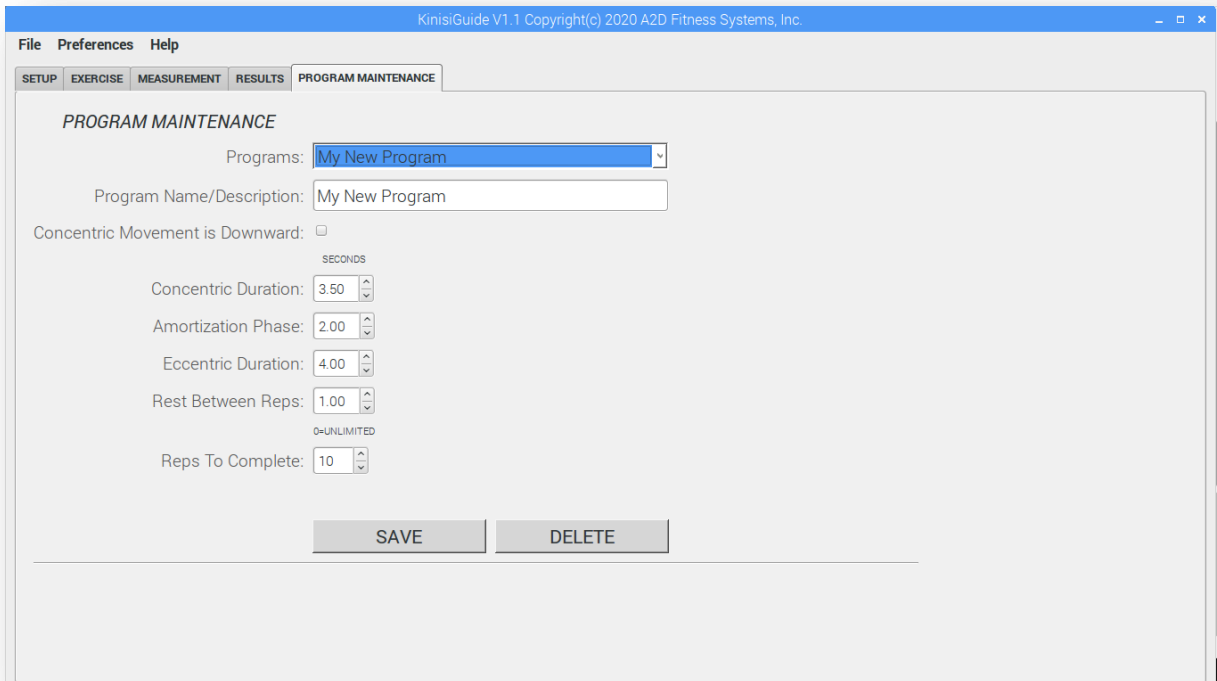


Figure 32 - Program Maintenance Tab

- 1) To add a new user specific program, the first entry in the dropdown list box “**DEFAULT PROGRAM**”, must be selected as seen in Fig 32 above. This will enable the “**ADD**” button. To add your new exercise program enter the name of the program in the “**Program Name/Description**” field, next check the “**Concentric Movement is Downward**” if applicable, if checked this will invert the Y axis of the pathway making it more intuitive for exercises that move in a downward direction for the concentric phase
- 2) Now select the desired time durations for each repetition movement phase, Concentric, Amortization, Eccentric and the Rest time between reps

- 3) You can set a specific number of repetitions to be performed or set the “**Reps To Complete**” to “**0**” zero which indicates that an Unlimited number of reps can be performed
- 4) After setting all of the parameters as needed, click on the “**SAVE**” button



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File Preferences Help

SETUP EXERCISE MEASUREMENT RESULTS PROGRAM MAINTENANCE

PROGRAM MAINTENANCE

Programs: My New Program

Program Name/Description: My New Program

Concentric Movement is Downward:

SECONDS

Concentric Duration: 3.50

Amortization Phase: 2.00

Eccentric Duration: 4.00

Rest Between Reps: 1.00

0=UNLIMITED

Reps To Complete: 10

SAVE DELETE

Figure 33 - Add New Exercise Program

PROGRAM MAINTENANCE

Programs: My New Program

Program Name/Description: 2 Up, 2 Hold, 3 Down
2 Up, 4 Down

Concentric Movement is Downward: 2 Rest, 2 Raise, 0 Hold, 4 Lower
3 Rest, 3 raise, 3 Hold, 3 Lower
0.5 Rest, 3 Up, 2 Hold, 4 Down

Concentric Duration: 0.5 Rest, 3 Up, 4 Down

Amortization Phase: 4 Rest, 3 Raise, 2 Hold, 1 Lower

Eccentric Duration: 0.5 Rest, 4 Up, 2 Hold, 7 Down
0.5 Rest, 4 Up, 7 Down

Rest Between Reps: My New Program

0=UNLIMITED

Reps To Complete: 10

SAVE DELETE

Figure 34 - New Program Added

- 5) The “My New Program” has been added to the end of the available programs list, now you can select it at any time from the “**SETUP**” tab to set the exercise parameters as specified
- 6) To modify a program, simply select the program from the available programs list, make the required changes and then click the “**SAVE**” button

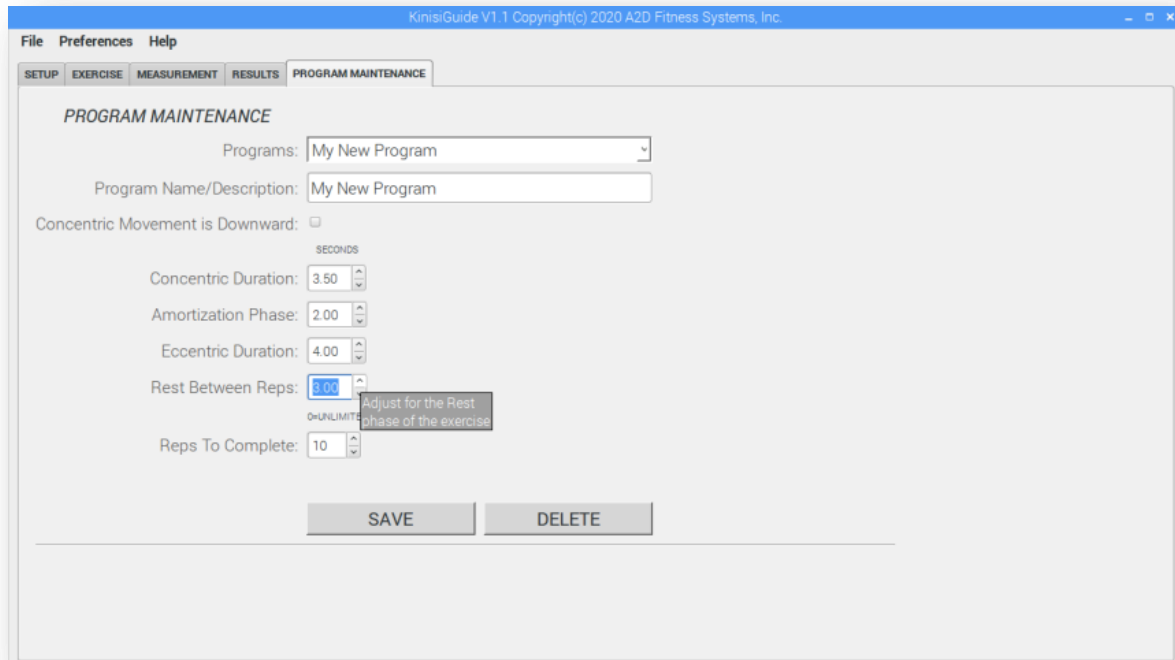


Figure 35 - Modify Program

7) To delete a program, select the program from the available programs list and then click the **“DELETE”** button

NOTE: The **“DEFAULT PROGRAM”** cannot be deleted, but its program settings can be modified and saved if desired.

Exiting the Kinisi Software

To exit the Kinisi Software, simply left mouse click on the ‘X’ located at the top right corner of the display. A message dialog will ask for confirmation, “**Are you sure you want to quit?**” Clicking on the “**Yes**” button will cause the software to close and then return control to the Base Station Computer’s desktop.



File Menu

The “**File**” menu can also be used to exit the Kinisi software by selecting the “**Exit**” option. Additionally you can connect to the Kinisi device using the “**Connect to Kinisi**” option, this is the same as clicking on the “**CONNECT**” button after first starting up the Kinisi software discussed in the section, Kinisi Device Assembly Instructions.

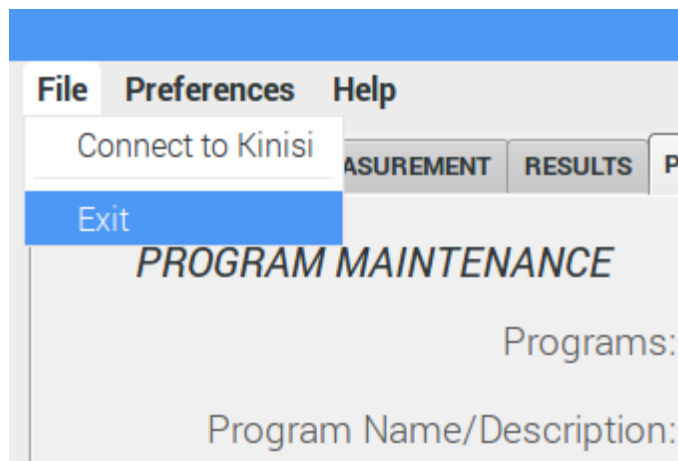


Figure 36 - File Menu

Preferences Menu

Next is the “**Preferences**” menu, this menu has various options used for the calibration, unit of measure settings and other personal preferences. Simply use the left mouse button to click on the “**Preferences**” menu to open it. We will discuss each option in the preferences menu in more detail here:

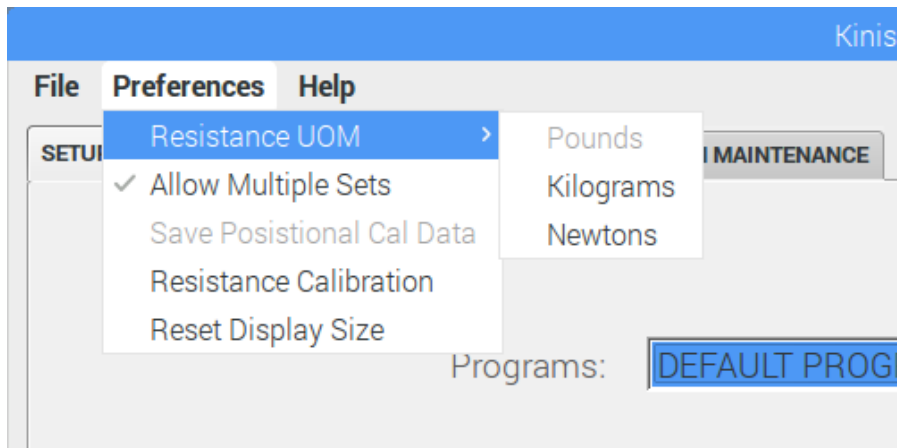


Figure 37 – Preferences Menu

The first menu option is **“Resistance UOM”**; hovering over this menu option will display the three sub-menu options, **“Pounds”**, **“Kilograms”** and **“Newtons”**. The current selection will be saved and used at each startup. At any time you can change the unit of measure for the reported resistance by simply left mouse clicking on any of the three sub-menu options.

Next is the **“Allow Multiple Sets”** option, this can be used to default the force range for the next exercise to be performed using the force range that was determined by the previously completed exercise. This eliminates the need to specify the start and end position for the new exercise about to be performed. Program changes to the concentric and eccentric time parameters can be made before the start of the next set if required just as normal.

If multiple sets are required, first check the option in the **“Preferences”** menu. This option by default from the factory is un-checked.

After checking the **“Allow Multiple Sets”** option the normal calibration process for the exercise must be first completed, moving to the **“Start Position”**, then the **“Ending Position”** and then back to the **“Start Position”**. Now, when the user completes the exercise and the **“STOP”** button is pressed, then clicking the start button to begin the next exercise the **“Begin Next Set using last Calibration Setting?”** message will display.

If the **“Yes”** option is selected, this will start the exercise (set). If **“No”** is selected then it is assumed that you do not want to use the previous calibration settings, you will again be asked for the exercise **“Start Position”**, **“END Position”** as normal for a new exercise. If want to stop completely when there are no further sets or new exercises to be performed, click on the **“Cancel”** button in the **“START”** message dialog.

After each set, reports should be viewed and or printed as reports are reset at the start of each set as they are with exercises.

Please see details starting on page 29 for the “**Save Positional Cal Data**” option.

The fourth entry in the “**Preferences**” menu is the “**Resistance Calibration**” option; this option is used to check and calibrate the reported resistance using a known weight. The Kinisi device is calibrated at the factory and does not usually require resistance calibration, however if the Kinisi device is dropped it may require re-calibration.

After left mouse clicking on the “**Resistance Calibration**” option, a message dialog will display confirming that you would like to continue to perform the calibration, if so just click the “**Yes**” button to continue or click on the “**No**” button to cancel.

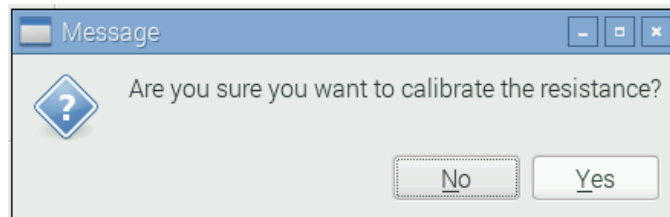


Figure 38 - Resistance Calibration Dialog

After clicking “**Yes**” to continue, you will notice the “**Resistance Calibration**” panel is now shown under the “**Load Limit Panel**”

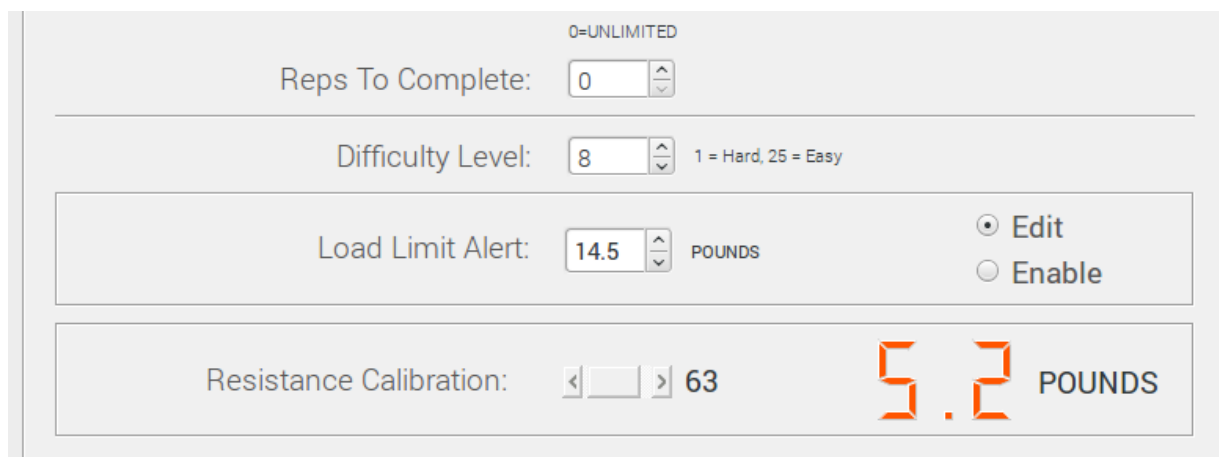


Figure 39 - Resistance Calibration Panel

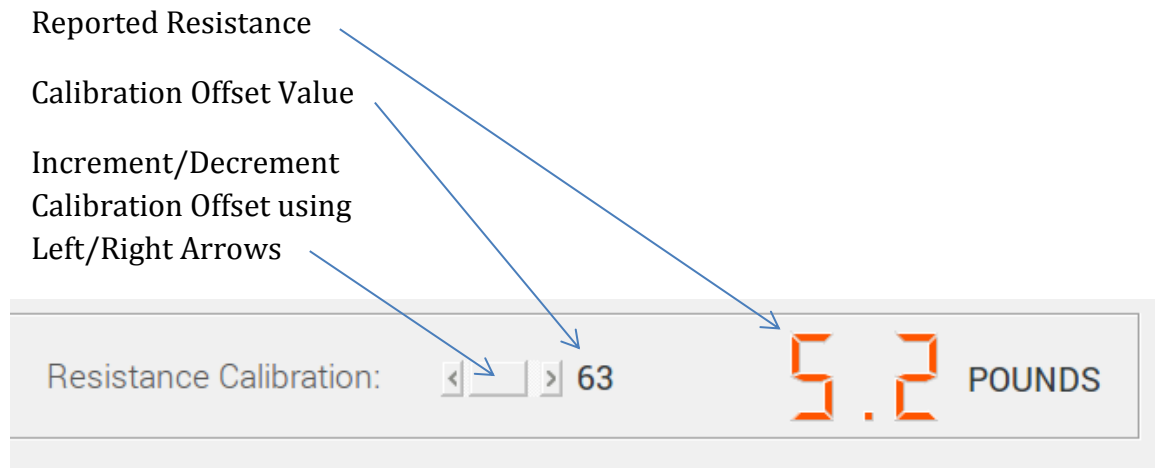


Figure 40 - Resistance Calibration Controls

To begin the resistance calibration process, follow these steps:

- 1) Turn OFF the Kinisi device
- 2) Exit the Kinisi software
- 3) Use a known weight, a one to three Kilogram precision weight works well, however if you use dumbbells please note that they are rarely the exact weight, you can use a dumbbell but you should weigh it first using a postal or similar scale.
- 4) Using the hand grip on the Kinisi device, place the grip over a door knob so the Kinisi device is hanging with the front face pointing down to the floor
- 5) Remove the resistance band if one is currently attached
- 6) Determine how you will attach the known weight using the eyelet on the Kinisi device, string or similar will work as long as it's strong enough to hold the weight being used. Whatever the method used, ensure that it's attached to the Kinisi device BEFORE you switch ON the Kinisi device. This insures that the weight of the tether will NOT be added to the known weight calculation
- 7) Do not attach the known weight yet
- 8) Turn ON the Kinisi device and wait for 30 seconds
- 9) Now attach the known weight using the tether attached to the Kinisi device
- 10) Start the Kinisi software
- 11) Select the appropriate unit of measure option from the Preferences menu if needed
- 12) Click on the "**Resistance Calibration**" option from the Preferences menu

- 13) Click on the **“Yes”** button to confirm you want to continue
- 14) Click on the **“CONNECT”** button
- 15) After successfully connecting to the Kinisi device you should now see the weight displayed that corresponds to the known weight that you have used
- 16) If the reported weight is incorrect, you can adjust the reported weight to equal the known weight by clicking on the horizontal slider left/right arrows as needed. Adjust the resistance calibration slider Up or Down until the displayed weight is equal to the known weight
- 17) Once the weight is reporting correctly, exit the Kinisi software, this will save the calibration correction value so it can be used each time the software is started up
- 18) Congratulations, you’re done!

The last entry in the Preferences menu is the **“Reset Display Size”** option; this option is used when the Kinisi application software is run for the first time using your TV or Monitor. Please see the section **“Setting up Kinisi for your TV”** for detailed information on page 18.

Help Menu

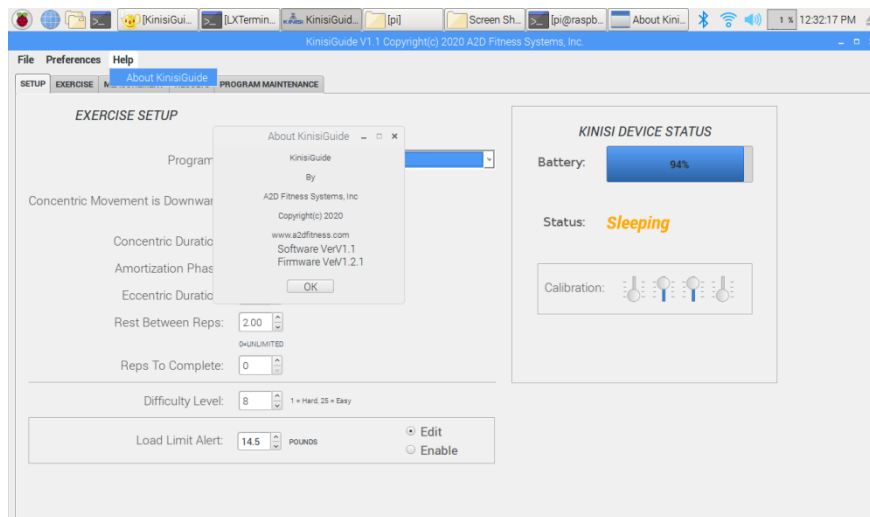


Figure 41 - Help Menu

The **“About Kinisi”** option from the **“Help Menu”** is used to show the software version information.

Tips & Troubleshooting

Q – The Kinisi software displays the message *"Error, please check the Laird™ dongle is plugged in, then restart this app.."* When the software starts up, why?

A – Make sure that the Laird™ USB dongle (looks like a flash-drive) is plugged into any of the four USB ports on the Base Station Computer, start or restart the Kinisi software by first exiting the software if it's already running and then clicking on the "Kinisi-TS" shortcut on the desktop. If the Laird™ USB dongle is detected successfully when the software starts, the message *"Ready"* will be displayed at the message line.

Q – The Kinisi software displays the message *"Please check Kinisi is powered ON and then try again..."* after I click on the **"CONNECT"** button, why?

A – The Kinisi device **MUST** be switched ON before clicking on the **"CONNECT"** button. Turn on the Kinisi device by moving the slide-switch towards the back of the device, watch the orange activity LED turn ON for a few seconds and then turn OFF. Now click on the **"CONNECT"** button to establish the wireless connection.

A – Low battery can also cause this, charge the battery for at least two hours and try again

Q – The Base Station Computer does not boot up or do anything, what's wrong?

A – On the rear of the Base Station Computer's red & white case, check to see if any of the LED's are ON, if not make sure the Micro-USB power connector is plugged into the Base Station Computer all the way and that the wall plug is plugged into a working AC outlet.

A – Check to make sure that it's not just your TV or Monitor that's not turned ON, or that the HDMI cable has come loose from either the TV or the Computer.

A – Check to make sure that the TV is set to use the correct source input, HDMI-1 or HDMI-2 for example.

A – Located in the rear of the Base Station's red & white case, in the opposite end of the case to the USB ports there is a small slot that holds the Micro-SD card, this is the storage device that's used to hold the Operating System and also the Kinisi software. First make sure that the card is in place and seated properly, do this by holding the case upside down, locate the small blue SD card, then use your thumbnail to slide the SD card out, then using your finger slide the SD card back in until it stops. Do this very carefully as the SD card is fragile.

Safety & Handling

Base Station Computer

NEVER remove the Micro-USB power cable from the Base Station Computer while the computer is running, this may cause serious damage to the Operating System or the Kinisi software which will prevent the system from starting again. The only way to recover from this type of corruption is to contact your dealer or A2D Fitness and request a replacement Micro-SD card.

ALWAYS use the “**Shutdown**” option to turn OFF the Base Station Computer, and then remove the Micro-USB power cable if needed.

Kinisi Device



Danger: NEVER replace the rechargeable battery with a different type other than the recommended battery from A2D Fitness Systems, Inc. The use of an incorrect battery can cause serious damage to the device and can cause fire.



Danger: NEVER use a different battery charger other than the charger supplied with your Kinisi Tracking System, the use of an incorrect charger can cause serious damage to the device and can cause fire.

Do not drop the Kinisi device or expose it to vibration or powerful shocks as this could cause damage. The Kinisi device is a precision measuring instrument and should be treated as such. Rule-of-thumb is to treat the Kinisi device like you treat your cell phone.



Patient/User Safety

- Always ensure that the resistance bands and tubing are in good condition and are free from cracks or tears. Also check with the band and tube manufacturer that the bands are suitable for the intended use
- Always follow the specific safety directions issued by the exercise band manufacturer

- Be extremely cautious when performing exercises that require stretching bands or tubing toward the face and head as an unexpected release of the band or tubing could cause injury to the face and eyes. The patient/user should always wear protective eyewear for these types of exercises
- Always ensure that the patient/user has a firm footing while exercising with Kinisi and that an unexpected break or tear in the band or tubing would not result in the patient/user losing balance that may result in a fall
- The Kinisi Tracking System should only be used in the presence of a qualified therapist
- Always ensure that the patient/user is capable of exercising and specifically is able to grasp the Kinisi hand grip securely at all times as releasing the handle with tension on the band or tubing could cause serious injury to the patient/user and or therapist
- Never attempt to use the Kinisi Tracking System while the battery is being charged
- Always ensure that the Kinisi Tracking System is clean and disinfected prior to use

Maintenance

There really isn't much to maintain other than to keep the Kinisi device and the Base Station Computer clean. Dusting the Base Station Computer and mouse is all that's required every so often. For the Kinisi device, use a disinfectant wipe on the device, hand grip and ankle strap before each use.

Technical Data

Kinisi Device

Parameter	Condition	Min	Nom	Max	Unit
Dimension	Length	-	80	-	mm
	Width	-	50	-	mm
	Height	-	40	-	mm
Weight	-	-	240		g
Electronic Rating	Rated Voltage	-	3.3		V
	Rated Input Current	-	21		mA
Battery	Lithium ion-polymer 2600 mA. Approximately 7 days of use at 30% duty cycle atypical.				
Measurement Range	Resistance	0	-	50	kg
	Yaw (Direction) - Accuracy*	0	-	360	Deg
		-180	-	+180	Deg
	Pitch - Accuracy +- 1 Degree	-180	-	+180	Deg
Roll - Accuracy +- 1 Degree	-90	-	+90	Deg	
Relative Humidity	Storage	5	-	95	%
Temperature	Operating	0	-	35	°C
	Storage	-20	-	45	°C
Wireless Type	Bluetooth V4.0	-	-	-	-
Operating Wi-Fi Range		1	5	9	Meters

*Yaw accuracy is adversely affected by the environment, specifically ferrous materials including electrical systems. Always ensure that Kinisi is fully calibrated in order to maintain optimum accuracy. An accuracy or better than +-5 degrees is typical but may vary depending on the environment.

Table 3 - Kinisi Device Specifications

Base Station Receiver

Parameter	Condition	Min	Nom	Max	Unit
Dimension	Length	-	98	-	mm
	Width	-	70	-	mm
	Height	-	30	-	mm
Weight	-	-	85	-	g
Raspberry Pi 3	Broadcom BCM2837 64bit 1.2 GHz ARMv7 Quad Core Processor 1 x GB RAM 4 x USB Ports 1 x HDMI Video Port 1 x 8 GIG Micro SD Card 1 x Ethernet Port				
Electronic Rating	Rated Voltage	-	5		V
	Rated Input Current	-	600		mA
Relative Humidity	Storage	5	-	95	%
Temperature	Operating	0	-	35	°C
	Storage	-20	-	45	°C

Table 4 - Base Station Specifications



Disclaimers

Product Disclaimer

Information has been carefully checked and is believed to be accurate; however, no responsibility is assumed for inaccuracies. A2D Fitness Systems, Inc. shall not be liable for any incidental or consequential damage resulting from the performance or use of Kinisi. A2D Fitness Systems, Inc. reserves the right to make changes without further notice to any products. A2D Fitness Systems, Inc. does not assume any liability arising out of the application or use of any product; neither does it convey any license under its patent rights of others.

Manual Disclaimer

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Service & Support

Warranty Policy

LIMITED WARRANTY

A2D Fitness Systems, Inc. (Company) warrants only to the purchaser (Customer) of the Product that the product will be free from defects in materials and workmanship under the normal use and service for which the Product was designed for a period of **12 months from the date of purchase of the Product by the Customer.**

Customer's exclusive remedy under this Limited Warranty shall be the repair or replacement, at Company's sole option, of the Product, or any part of the Product, determined by A2D Fitness Systems, Inc. to be defective. In order to exercise its warranty rights, Customer must notify Company in accordance with the instructions described under the heading "Obtaining Warranty Service".

This Limited Warranty does not extend to any Product damaged by reason of alteration, accident, abuse, neglect or misuse or improper or inadequate handling; installation, operation or use of the Product not made in strict accordance with the specifications and written instructions provided; use of the Product for any purpose other than those for which it was designed; ordinary wear and tear; disasters or acts of God; unauthorized attachments, alterations or modifications to the Product; or any other reason or event not caused by A2D Fitness Systems, Inc.

A2D FITNESS SYSTEMS INC HEREBY DISCLAIMS ALL OTHER WARRANTIES, WHETHER WRITTEN OR ORAL, EXPRESS OR IMPLIED BY LAW OR OTHERWISE, INCLUDING WITHOUT LIMITATION, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. CUSTOMER'S SOLE REMEDY FOR ANY DEFECTIVE PRODUCT WILL BE AS STATED ABOVE, AND IN NO EVENT WILL A2D FITNESS SYSTEMS INC BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, SPECIAL OR INDIRECT DAMAGES IN CONNECTION WITH THE PRODUCT.

This Limited Warranty shall be void if the Customer fails to comply with all of the terms set forth in this Limited Warranty. This Limited Warranty is the sole warranty offered by A2D Fitness Systems, Inc. with respect to the Product. A2D Fitness Systems, Inc. does not assume any other liability in connection with the sale of the Product. No representative of A2D Fitness Systems, Inc. is authorized to extend this Limited Warranty or to change it in any manner whatsoever. No warranty applies to any party other than the original Customer.



A2D Fitness Systems, Inc. and its directors, officers, employees, subsidiaries and affiliates shall not be liable for any damages arising from any loss of equipment, loss or distortion of data, loss of time, loss or destruction of software or other property, loss of production or profits, overhead costs, claims of third parties, labor or materials, penalties or liquidated damages or punitive damages, whatsoever, whether based upon breach of warranty, breach of contract, negligence, strict liability or any other legal theory, or other losses or expenses incurred by the Customer or any third party.

Obtaining Warranty Service

- All returns must be made to original place of purchase. For direct purchase from A2D Fitness Systems, Inc., warranty is applicable upon production of a valid A2D Fitness Systems, Inc. invoice or receipt.
- If the Product was purchased directly from A2D Fitness Systems, Inc., please contact Customer Service at kiniservice@a2dfitness.com If the Product was purchased from any Third party; please contact them to arrange for a return.

For Technical assistance, please contact us at kinisisupport@a2dfitness.com

A2D Fitness Systems Inc. will provide Customer and Technical assistance for as long as you own your Kinisi Tracking System.



Regulatory Compliance Information

Federal Communications Commission (FCC) Statement

Contains FCC ID: PI4BL600

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Consult the dealer or an experienced radio/TV technician for help.

Industry Canada (IC) Statement

Contains Transmitter Module IC: 1931B-BL600

This device complies with Industry Canada license - exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

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