SPARQ XLR8
Digital Timing System
User Guide

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Safety Precautions

Sport training can result in serious or fatal injury. Protective equipment, safe techniques, and common sense can reduce the incidence and severity of injury but cannot completely eliminate the risk. Consult your physician before starting any new training or exercise program. Read and follow all instructions before training with SPARQ Digital Timing Products.

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Chapter 1

Introduction

1.1 Overview

The SPARQ XLR8 Digital Timing System is a system for automatically timing speed and agility drills. SPARQ Digital Cones generate directional infrared beams and automatically start or stop the timing of a drill when a beam is crossed. A SPARQ Handheld Controller controls the system.

The basic system includes a SPARQ Handheld Controller and two SPARQ Digital Cones. This configuration provides enough power and flexibility to run a wide variety of drills. Additional SPARQ Digital Cones can be added to the system to give you the option of running more sophisticated drills and of timing more than one athlete at once.

1.2 Getting Started

1.2.1 Battery Installation

The Handheld Controller uses two size AA batteries. To install the batteries, lift the tab at the base of the battery compartment door on the back of the Handheld Controller. Insert the batteries as shown in Figure 1.1.

Each Digital Cone uses two size D batteries. To install the batteries, first make a quarter-turn rotation of the cylinder, and remove the base as shown in Figure 1.2. Unscrew the cap at the base of the cylinder, and insert the batteries as shown in Figure 1.3.

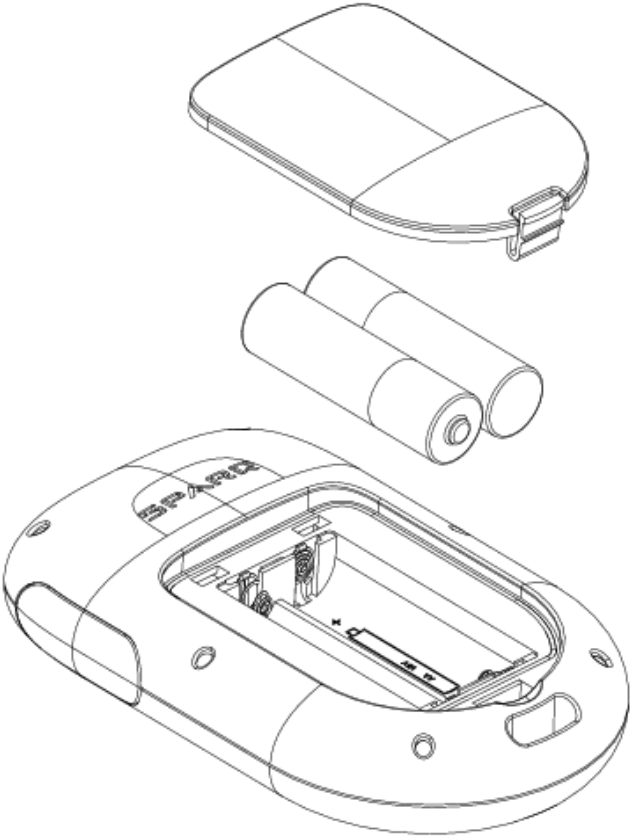


Figure 1.1: Installing batteries in the SPARQ Handheld Controller

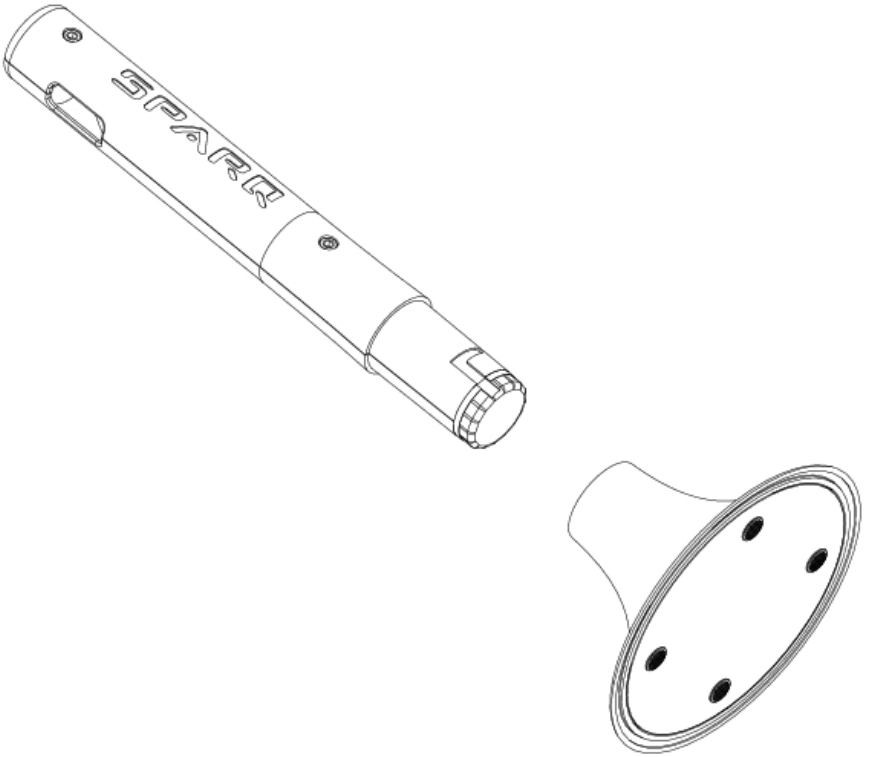


Figure 1.2: Removing the base of the Digital Cone

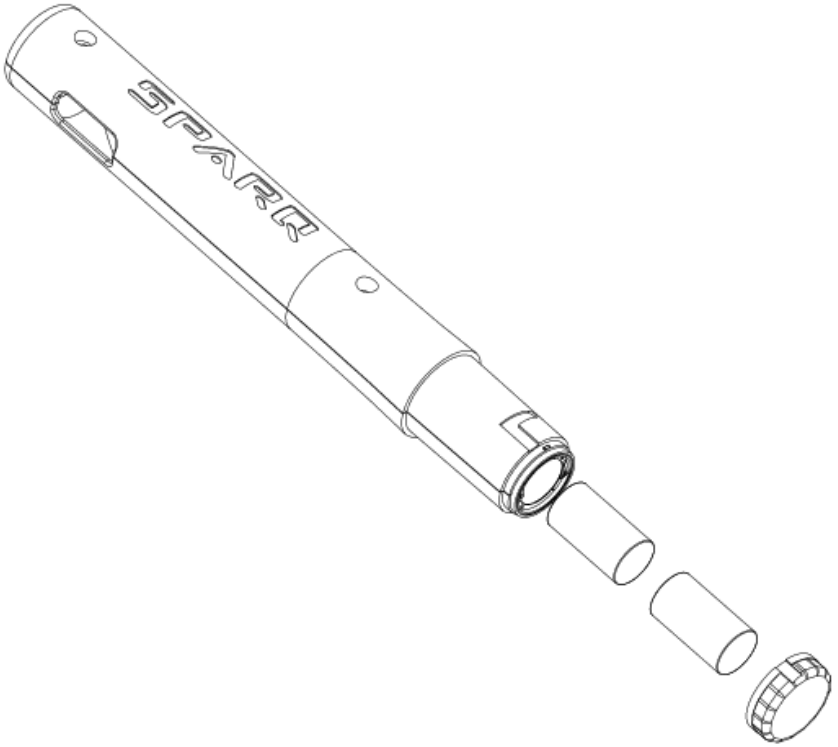


Figure 1.3: Installing batteries in the SPARQ Digital Cone

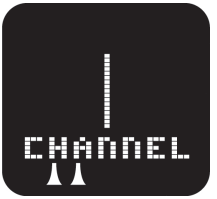
1.2.2 Initial System Setup

The SPARQ XLR8 Digital Timing System requires that the Handheld Controller be able to identify and communicate with the Digital Cones that are to be used in the drills. The first time you use the system, follow these steps to link the Handheld Controller and the Digital Cones.

1. Press the button at the top of each Digital Cone to power on the Digital Cones. The LED at the top of each Digital Cone should flash slowly, indicating that the Digital Cone is ready to link with the Handheld Controller.

2. Press the button centered below the Handheld Controller display to power on the Handheld Controller. The Handheld Controller display should briefly show a *DRILL* splash screen, then show *DASH*:

3. Press the button on the upper left side of the Handheld Controller until *Channel 1* is displayed:



If other Handheld Controllers are in use nearby, use the lower-left and lower-right buttons to select an unused channel.

4. Press the button centered below the Handheld Controller display to accept that selection.

5. Use the lower-left and lower-right buttons to select a Digital Cone to link with the Handheld Controller. The Handheld Controller display shows the Digital Cone to be selected for linking:

   Digital Cone 1 will be used to trigger the start of the drill's timing. Digital Cone 2 will be used to trigger the end of the drill's timing, for drills requiring a second Digital Cone. Additional Digital Cones can be linked for drills that require them, such as drills that record split times.

6. Press the button centered below the Handheld Controller display to accept that selection. The Handheld Controller display should show a message indicating that it is attempting to link with the Digital Cone.

7. Press the button at the top of a Digital Cone to link with the Handheld Controller. The LED of the Digital Cone should flash while the Handheld Controller and the Digital Cone attempt to link. When the Handheld Controller and the Digital Cone have linked, the Digital Cone's LED should flash more slowly, and the Handheld Controller display should show the message *OK*.

8. Repeat Steps 5 - 7 for each Digital Cone.

The Handheld Controller and the Digital Cones remember the links even after being powered off, so these steps are required only for the initial use of the system.

Chapter 2

Features

2.1 Handheld Controller

The locations of the key features of the Handheld Controller–the five buttons and the display screen–are shown in Figure 2.1.

2.1.1 Buttons

The general function of each of the Handheld Controller's five buttons is shown in Table 2.1. The specific functionality of each button depends on the Handheld Controller's current operating mode. See Chapter 3.

The Handheld Controller is powered on by pressing the **Power/Select** button. Pressing and holding the **Power/Select** button powers off the Handheld Controller.

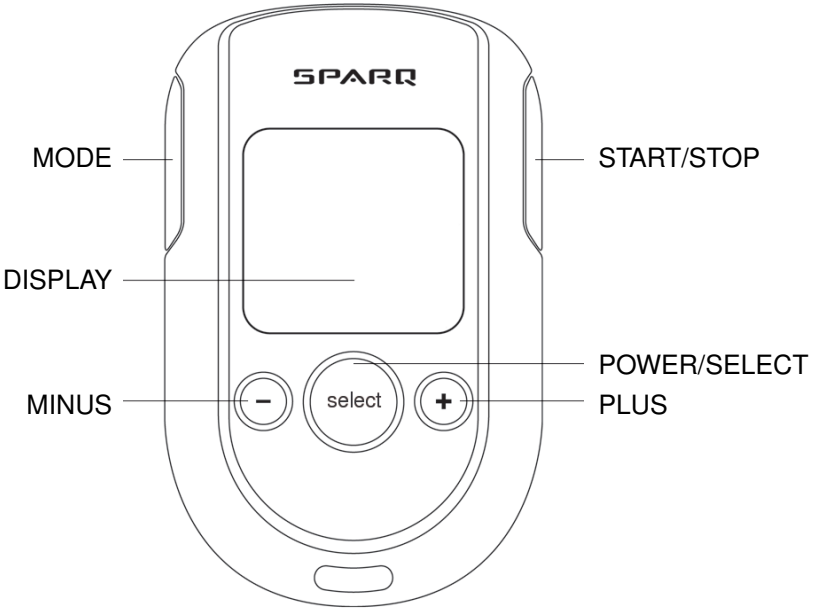


Figure 2.1: SPARQ Handheld Controller features

Power/Select	Power Handheld Controller on/off or make selection.
Start/Stop	Start/stop timing or other operation.
Mode	Change mode.
Plus	Cycle up through choices.
Minus	Cycle down through choices.

Table 2.1: Functions of the SPARQ Handheld Controller buttons

2.1.2 Display

The large center section of the display screen is the primary area for displaying graphical and numerical data. It occupies all but a narrow outer boundary of the screen

Below and to the left of the primary display area is a small area of the screen for displaying status icons. These icons indicate which Digital Cones are linked to the Handheld Controller.

The display represents time with four digits. The digits represent minutes (*M*), seconds (*S*), or decimal digits (*D*). Drill times under 1 minute use format *SS.DD*, drill times over 1 minute use format *M:SS.D*, and drill times over 10 minutes use format *MM:SS*. Timing stops after 60 minutes.

2.2 Digital Cone

The locations of the key features of the Digital Cone–the button/LED and the sensor–are shown in Figure 2.2.

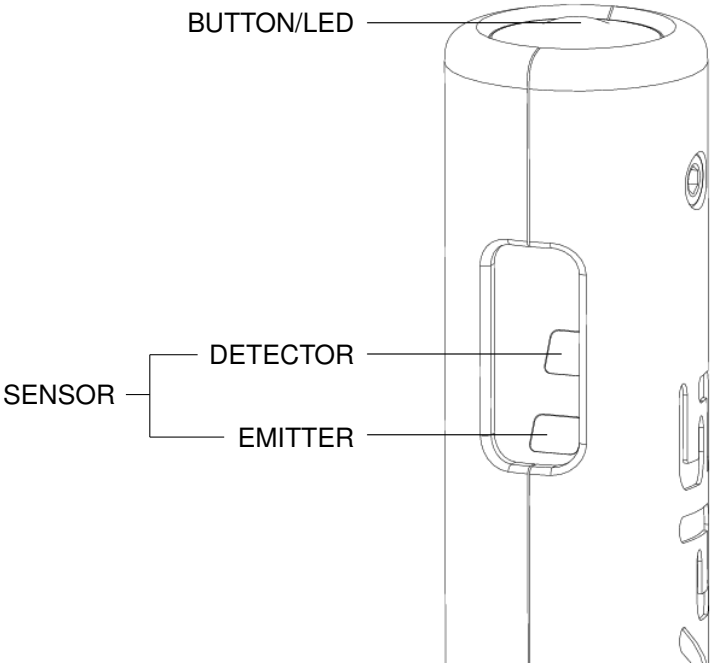


Figure 2.2: SPARQ Digital Cone features

2.2.1 Button/LED

The behavior of the LED on top of the Digital Cone describes the current state of the Digital Cone. Table 2.2 shows the five LED states and the corresponding Digital Cone states.

LED	DIGITAL CONE STATE
Off	Off
Slow Flashing	Not linked to Handheld Controller, waiting for link
Medium Flashing	Linking to Handheld Controller
Fast Flashing	Linked to Handheld Controller, triggered
Continuous	Linked to Handheld Controller, idle

Table 2.2: LED indications of the SPARQ Digital Cone state

The Digital Cone is powered on by pressing the button on top of the Digital Cone. If the LED is on or flashing, the Digital Cone is powered on. Holding the button down until the LED is off powers off the Digital Cone.

The LED displaying continuously or flashing quickly indicates that the cone is linked to the Handheld Controller. The LED flashing slowly indicates that the Digital Cone is unable to find a Handheld Controller to link with.

The Digital Cone powers off automatically if it receives no communication with the Handheld Controller for 5 minutes.

2.2.2 Sensor

The Digital Cone sensor is an infrared emitter-detector pair. Figure 2.2 shows the sensor's location on the Digital Cone. The Digital Cone sensor

sends and detects a directional infrared beam as shown in Figure 2.3. The beam is directed 30 degrees above horizontal to facilitate detection of the athlete and to inhibit detection of objects that are beyond the athlete's position. Crossing the beam triggers drill timing to start or stop.

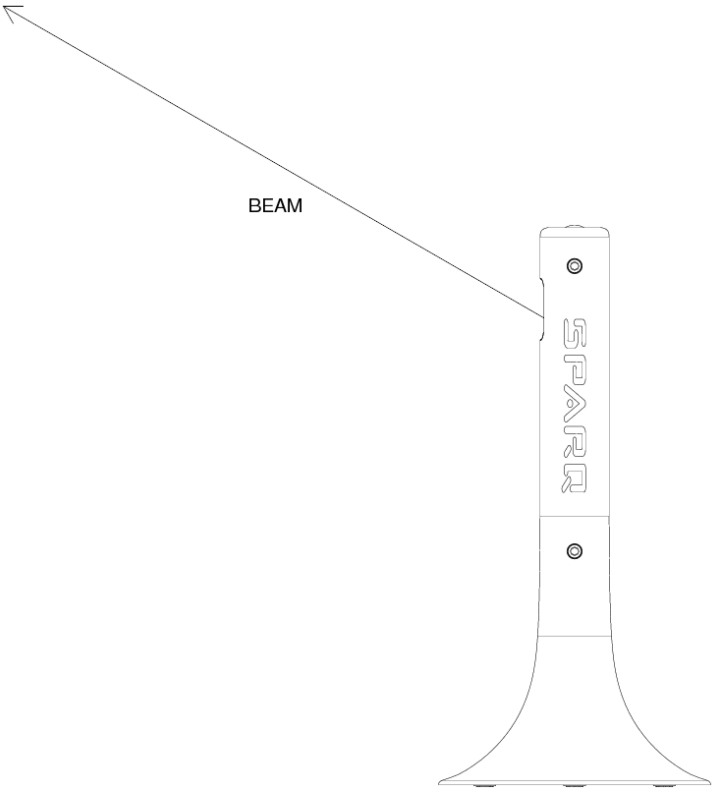


Figure 2.3: Directional infrared beam from the sensor of the SPARQ Digital Cone

Chapter 3

Basic Operations

The Handheld Controller has four major operating modes, shown in Table 3.1.

Drill	Select and run different drills.
Best	Report best times for each drill.
Setup	Set or modify links between Handheld Controller and Digital Cones.
Chrono	Use Handheld Controller as stopwatch.

Table 3.1: Major modes of the SPARQ Handheld Controller

These modes are selected by pressing the **Mode** button on the left side of the Handheld Controller.

Table 3.2 summarizes the Handheld Controller's button operations in the major modes and sub-modes.

MODE	BUTTONS			
	Mode	**Start/Stop**	**Power/Select**	**Plus (Minus)**
Drill				
-Select	Go to mode **Best**		Select drill, go to mode **Drill-Run**	Cycle up (down) through drill list
-Run	Go to mode **Drill-Select**	Add result to history, restart drill (Hold 1 second to clear history)	Discard result, restart drill	Cycle up (down) through result history
Best				
	Go to mode **Setup**	(Hold 3 seconds to clear result)		Cycle up (down) through drill list
Setup				
-Channel	Go to mode **Chrono**		Pick channel, go to mode **Setup-Link**	Cycle up (down) through channels
-Link	Go to mode **Setup-Channel**		Pick cone, start/stop linking process	Cycle up (down) through cones
Chrono				
	Go to mode **Drill-Select**	Reset time	Start/stop time	

Table 3.2: SPARQ Handheld Controller operations in the different modes and sub-modes

3.1 Drill Mode

Drill mode consists of two sub-modes, **Drill - Select** and **Drill - Run**. **Drill - Select** and **Drill - Run** provide the SPARQ XLR8 Digital Timing System with its main functionality for running speed and agility drills.

3.1.1 Drill - Select Mode

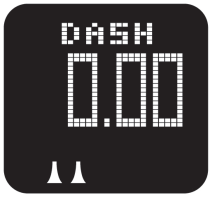
The Handheld Controller enters **Drill - Select** after it is powered on. To enter **Drill - Select** from another mode, press the **Mode** button until the Handheld Controller display briefly shows a *DRILL* splash screen, then shows *DASH*, the default drill selection:

Use the **Plus** and **Minus** buttons to cycle through the list of drills you can select from. Press the **Power**/**Select** button to select the displayed drill and to enter **Drill - Run** mode for that drill.

If the Handheld Controller cannot communicate with the Digital Cones needed to run the selected drill, the Handheld Controller displays a message indicating that the drill is disallowed.

3.1.2 Drill - Run Mode

After a drill has been selected, the Handheld Controller is in **Drill - Run** mode. Before the drill has started, the Handheld Controller display shows *0.00*, indicating that the Start Digital Cone is ready to be triggered to start the timing of the drill:



For most drills, timing is triggered to start by a runner crossing the Start Digital Cone's sensor beam. For other drills, timing is triggered to start by a runner leaving, rather than crossing, the Start Digital Cone's sensor beam. Sections 4.3.1 and 4.3.2 describe the two types of drill starts in more detail.

Timing stops when the Finish Digital Cone's sensor beam is crossed.

If you wish to discard the result, press the **Power**/**Select** button. If you wish to save the result, press the **Start**/**Stop** button. Saved results become part of the drill *history*.

History

The history mechanism remembers the most recent timing results for a drill selection, up to a maximum of 10. Pressing the **Start**/**Stop** button at the end of a drill will save the timing result in the history. Pressing the **Power**/**Select** button at the end of a drill will discard the timing result, preventing it from being added to the history.

The **Plus** and **Minus** buttons scroll through the list of history results, displaying them on the bottom line of the Handheld Controller display screen. Each history entry has an index value and a result value. The indices range from 1 up to a maximum of 10. Index 1 points to the most recent result in the history. Increasing index values correspond to increasingly older results.

To display the *average* of the results in the history for a particular drill selection, use the **Minus** button to scroll back to the index below 1. This index will display as *A*, for average.

To clear the history and the average, press and hold the **Start**/**Stop** button until the history values are cleared from the Handheld Controller display.

3.2 Best Mode

Best mode displays the best result to date for the selected drill:

The best value is remembered even if the Handheld Controller is powered off or its batteries removed.

Cycle through the best result values for each drill type by using the **Plus** and **Minus** buttons. To clear the current best result for a drill, press and hold the **Start**/**Stop** button until the value is cleared to *0.00*.

3.3 Setup Mode

Setup mode consists of two sub-modes, **Select - Channel** and **Select - Link**. **Select - Channel** and **Select - Link** modes provide the SPARQ XLR8 Digital Timing System the capability to link Digital Cones to the Handheld Controller and to coordinate system communication when multiple Handheld Controllers are used in close proximity.

These modes are used for setting the communication links prior to the first use of the SPARQ XLR8 Digital Timing System and for updating

the links when you incorporate additional Handheld Controllers or Digital Cones.

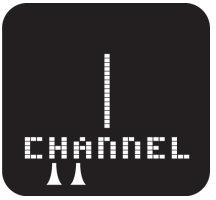
Once the communication links have been set up, the SPARQ XLR8 Digital Timing System should be ready to use whenever the Digital Cones and Handheld Controller are powered on. The communication links are remembered, even if the Handheld Controller and Digital Cones are powered off and the batteries removed.

Setting up the communication links for your system consists of two steps:

1. Selecting the channel the Handheld Controller and the Digital Cones will communicate on.
2. Linking the Digital Cones to the Handheld Controller on the selected channel.

3.3.1 Setup - Channel Mode

When the Handheld Controller first enters **Setup - Channel** mode, the default communication channel, *Channel 1*, will be displayed on the Handheld Controller display screen:



If only one Handheld Controller is in use, or if any Handheld Controllers in use are more than 150 yards away, the default communication channel can be used. Press the **Power**/**Select** button to select Channel 1 as the communication channel and to enter **Setup - Link** mode.

If a Handheld Controller is already being used nearby, any additional Handheld Controllers must use communication channels not already

in use. Use the **Plus** and **Minus** buttons to scroll the list of channels. Choose one of the 52 channels that is not in use, and press the **Power**/**Select** button to select that channel and to enter **Setup - Link** mode.

3.3.2 Setup - Link Mode

The following steps link the Digital Cones to the Handheld Controller on the selected communication channel.

1. Power on the Digital Cones. The LED at the top of each Digital Cone should flash slowly, indicating that the Digital Cone is ready to link with the Handheld Controller.

2. Use the **Plus** and **Minus** buttons to select a Digital Cone to link with the Handheld Controller. The Handheld Controller display shows the Digital Cone to be selected for linking:

   Digital Cone 1 will be the Start Digital Cone, used to trigger the start of the drill's timing. Digital Cone 2 will be the Finish Digital Cone for drills requiring a second Digital Cone, and will be used to trigger the end of the drill's timing. Additional Digital Cones can be linked for drills that require them, such as drills that record split times.

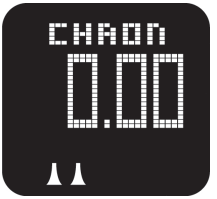
3. Press the **Power**/**Select** button to accept that cone selection. The Handheld Controller display should show a message indicating that it is attempting to link with the Digital Cone.

4. Press the button at the top of a Digital Cone to link with the Handheld Controller. The LED of the Digital Cone should flash while the Handheld Controller and the Digital Cone attempt to link. When the Handheld Controller and the Digital Cone have linked, the Digital Cone's LED should flash more slowly, and the Handheld Controller display should show the message *OK*. If a link cannot be established within 10 seconds, the linking attempt is aborted and an error message is displayed on the Handheld Controller screen.

5. Repeat Steps 2 - 4 for each Digital Cone.

3.4 Chrono Mode

In **Chrono** mode, the Handheld Controller functions as a stopwatch:



There is no history or split time information. The time can be started, stopped, restarted, and reset. The **Start**/**Stop** button is used to start and stop the timer. Pressing the **Power**/**Select** button clears the displayed time.

Chapter 4

Running Drills

This chapter contains information generally applicable to all speed and agility drills you can run with the SPARQ XLR8 Digital Timing System. For more specific information on particular drills, see the Drill Reference section of the SPARQ XLR8 Digital Timing System Instructional DVD.

4.1 Choosing a Drill

Which drills you use in your training program depend on two factors:

1. the drills that are most appropriate for meeting your training goals, and
2. the drills that can be run using the current configuration of your SPARQ XLR8 Digital Timing System.

Check the Drill Reference section of the SPARQ XLR8 Digital Timing System Instructional DVD to gain familiarity with the different drills. Use that as a guide to the selection of the drill to be used in your training program.

Note the number of Digital Cones required by the drill you've chosen. If the drill requires more Digital Cones than you have in your current system, you'll need additional Digital Cones. See Section 5.5 for information on ordering Digital Cones and other accessories. See Sections 3.3.2 and 4.2.1 for instructions on linking the additional Digital Cones.

4.2 Setting Up the Drill

To determine if your system is properly configured to run the drill you've chosen, power on the Digital Cone(s) and the Handheld Controller. The Handheld Controller will automatically display the first (default) drill in its list of drills. Use the **Plus** and **Minus** buttons to move through the drill list until your chosen drill is displayed. The lower left portion of the Handheld Controller's display will show a Digital Cone icon for each Digital Cone that is correctly linked to the Handheld Controller. Press the **Power**/**Select** button. If everything is correctly set up to run the drill, the display will show a time of *0.00*, indicating the timing of the drill is ready to start. Otherwise, the display will show a message that a Digital Cone needed for this drill is missing.

4.2.1 Linking Additional Digital Cones

To link an additional Digital Cone to the SPARQ XLR8 Digital Timing System:

1. Press the button on top of the Digital Cone to power it on.

2. Enter **Setup - Link** mode on the Handheld Controller and press the **Power**/**Select** button.

3. Press the button on top of the Digital Cone.

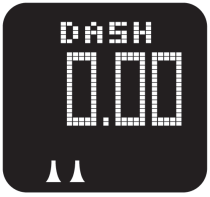
The Handheld Controller display will show the message *OK* when a successful link is made. The display will show the message *No Link* after 10 seconds if the linking attempt was unsuccessful.

SPARQ Digital Cones remember their links even if the batteries are removed, so these steps should only need to be performed once, when the new Digital Cone is added to your system.

See Section 3.3.2 for additional details.

4.3 Starting the Drill

The display showing *0.00* indicates that timing of the selected drill is ready to start:



Timing of the drill will start automatically when the Start Digital Cone is triggered. How the Start Digital Cone is triggered depends on the start method. The two drill start methods for triggering the Start Digital Cone are the *normal start* and the *hold start*.

4.3.1 Normal Start

The normal start is used in the dash drills. When using a normal start, timing begins as soon as the runner crosses the sensor beam of the Start Digital Cone. To ensure accurate timing of the drill, the runner should cross the beam within 4 feet of the sensor eye and should not cross the beam early.

A reset interval of 1 second prevents the Digital Cone from reacting immediately to rapid, spurious events, such as a hand moving back and forth through the beam. Once triggered, the Digital Cone cannot trigger again until this reset interval has passed.

4.3.2 Hold Start

The hold start is used in the shuttle drills. When using a hold start, the runner starts in the line of the Digital Cone sensor beam, not behind it as in a normal start. The runner waits in the sensor beam for a least 1 second before starting. The Digital Cone beeps to indicate its readiness to begin timing. Timing begins when the runner leaves the sensor beam of the Start Digital Cone.

4.4 Using the Drill Results

Once the particular running of a drill is complete, you can discard the result by pressing the **Power**/**Select** button or save it by pressing the **Start**/**Stop** button. A saved result is automatically added to a history of the 10 most recent saved results for this drill and checked against the single best result for this drill.

Use the **Plus** and **Minus** buttons to scroll through the history for this drill. Pressing **Minus** from the history result with index 1 will show the average of all the results in the history list. History results are cleared when the Handheld Controller is powered off.

To see the best result for a drill, enter **Best** mode and use the **Plus** and **Minus** buttons to scroll through the best results for each drill type:

Best results are remembered even when the Handheld Controller is powered off.

Chapter 5

Reference

5.1 Operating Recommendations Summary

This section summarizes the recommendations given earlier in the guide for avoiding the most common problems with the system.

5.1.1 Sunlight on Digital Cone Sensor

Sunlight shining directly on the sensor of the Digital Cone may prevent the cone from operating properly. Orient the Digital Cone to ensure that sunlight is not shining directly on the two lenses of the sensor.

5.1.2 Objects near Digital Cone Sensor

Objects that are near the Digital Cone sensor and in its line of sight may trigger the timer to start/stop prematurely or erratically. Ensure that the beam's line of sight is free of nearby objects.

5.1.3 Starting Positions for Drills

For drills that use a normal start, ensure that the runner is behind the sensor beam before starting the drill. For drills that use a hold start, ensure that the runner is in the sensor beam's line of sight for at least 1 second before starting the drill.

5.1.4 Digital Cone Reset Interval

SPARQ Digital Cones have a 1-second reset interval between successive timing triggers. This feature will normally have no effect on the execution of drills, but being aware of this feature may avoid confusion about Digital Cone triggering behavior in certain situations. See Section 4.3.1.

5.1.5 Digital Cone Hold Time

To ensure correct timing of a drill that uses a hold start, the runner should be in the line of the Digital Cone sensor beam for at least 1 second before starting the drill. The Digital Cone will beep when it is ready for the runner to start. See Section 4.3.2.

5.2 Troubleshooting

5.2.1 Handheld Controller and Digital Cone Fail to Link

If the Handheld Controller and Digital Cone fail to link:

- Check that there is a clear line between the Handheld Controller and the Digital Cone. Objects between the Handheld Controller and the Digital Cone, or the Handheld Controller being too close to the ground, can interfere with the radio signal.

- Check that the Digital Cone is within the Handheld Controller's effective radio transmitting range (approximately 50 yards). Moving the Handheld Controller closer to the Digital Cone may strengthen the signal enough to establish a link.
- Check that there are no nearby electrical devices that could be causing electromagnetic interference.
- Check the batteries in the Handheld Controller and/or the Digital Cone.

5.2.2 Drill Timing Inaccurate

Inaccurate timings may be caused by

- sunlight shining directly on a Digital Cone sensor,
- an object being too close to a Digital Cone sensor,
- a Digital Cone being too far from the Handheld Controller,
- a runner's movements interfering with the beam of the Start Digital Cone, or
- a runner veering from the drill path before crossing the beam of the Finish Digital Cone.

Ensure that the Digital Cones are within 50 yards of the Handheld Controller, that the Digital Cone sensors have appropriate lighting and sufficient operating room, and that the runner triggers the beams of the Start Digital Cone and Finish Digital Cone correctly. Restart the drill.

5.2.3 Start Digital Cone Triggers Early

Timing of a normal-start drill may begin prematurely if the runner's starting position is ahead of the sensor beam or if an object other than the

runner is too close to the sensor. Indoors, the timing could be triggered early by the sensor detecting nearby walls or windows. Before restarting the drill, ensure that the sensor's line of sight is clear. If necessary, reposition the Digital Cone to increase the distance to objects along the sensor's line of sight.

5.2.4 Start Digital Cone Fails to Trigger

Too much light on the Digital Cone's sensor or objects in close proximity to the sensor can affect a Digital Cone's operation and may cause the Start Digital Cone to fail to trigger properly. Before restarting the drill, ensure that the Digital Cone sensors have appropriate lighting and sufficient operating room.

5.2.5 Finish Digital Cone Fails to Trigger

A common cause of the Finish Digital Cone failing to trigger is the runner straying from the line where the sensor can detect him at the end of the drill. Rerun the drill, ensuring that the runner crosses the beam of the Finish Digital Cone's sensor.

5.3 Product Registration

Registering your SPARQ Digital Timing Products helps SPARQ provide you with the best possible assistance. Please mail the product registration card that came with your purchase or register online at **sparqtraining.com/productregistration**.

5.4 Support

For help with SPARQ Digital Timing Products, or to send feedback, send email to **productassistance@sparqtraining.com** or call SPARQ at 1-877-232-9299 between 9 - 5 PST, Monday - Friday.

5.5 Accessories

To purchase additional SPARQ Digital Cones and SPARQ Handheld Controllers, and to see the complete line of SPARQ Digital Products and other SPARQ Training Equipment, visit **sparqstore.com**.

5.6 Specifications

This device complies with Part 15 of the FCC Rules and with Class B Limits of Industry Canada. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This Class B Digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numerique de la classe B respecte les exigences du Reglement sur le material broilleur du Canada.

5.7 Warranty Information

ONE YEAR LIMITED WARRANTY

Your SPARQ Digital Timing Products purchase is warranted to be free of defects in materials and workmanship, under normal use, for a period of 1 year from the date of purchase. This limited warranty excludes damage resulting from improper care or handling, accidents, modification, unauthorized repairs, normal wear or other causes which are not defects in materials and workmanship. If any component of your SPARQ Digital Timing Products is defective, send it and your receipt to the authorized center listed at the bottom of this warranty page or, if you purchased the SPARQ Digital Timing Products at a retail store, you may return it with the store receipt to the place of purchase. If there is a covered defect, we will at our option repair the defective parts or replace the SPARQ Digital Timing Product with the same product or a similar product of equal value. We reserve the right to refuse either repair or replacement (but not both) if the cost of doing so would be disproportionate to the defect. This limited warranty is in place of all other express and implied warranties of any kind, which are hereby excluded. In no event shall SPARQ or National Electronics and Watch Co., LTD be liable for direct, indirect, incidental or consequential damages arising out of the use of this product, and any recovery is limited to the purchase price. No other person or company is authorized to change this limited warranty, and your dealer is solely responsible for any other warranties. For non-warranty service, contact the service center listed at the bottom of this warranty page.

For U.S. purchasers: Some states do not allow limitations on how long an implied warranty lasts, or exclusions of incidental or consequential damages, so the above limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state. The foregoing is without prejudice to other legal rights that may arise under applicable national legislation.

The SPARQ Digital Timing Products are designed to be used only under certain conditions, and the Limited Warranty will be rendered void if the products are used incorrectly or in improper conditions. Specifically they

are not designed to be used in wet or rainy conditions, nor are they to be thrown, dropped or subjected to other use or abuse not contemplated under normal training or testing conditions. Any attempt to modify or repair the hardware or software of the products will also void any existing warranties.

SPARQ Authorized Service Center:

SPARQ Products, Inc.
1860 Executive Drive
Oconomowoc, WI 53066