fusion sport

smartspeed
TM

USER GUIDE

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PART TWO

Software Installation

Setting up Your Pocket PC and ActiveSync Software

To establish a connection between your Pocket PC and your workstation computer, install the MS ActiveSync software as per the manufacturer's instruction guide.

FUNCTIONAL OVERVIEW

SMARTSPEED has been designed to assist you in running a wide range of fitness tests, training and coaching protocols in a wide variety of sports.

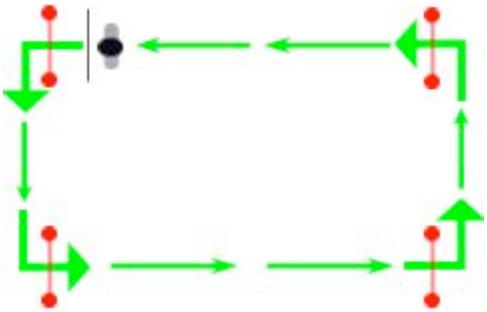
SMARTSPEED's functions can be classified according to 6 types of PROTOCOL –

Protocol Type	Description	Applications	Sports
Lap	The athlete starts and finishes at the same point, with no need to time intermediate splits	Testing lap speed on tracks, interval training, agility testing, and endurance testing.	Athletics, cycling, field sports (soccer, rugby, tennis, hockey, netball etc.)
Lane	The athlete starts at one point and finishes at another. May be a need to test intermediate split times. Athlete follows set course between points.	Speed training & testing, pacing, interval training, race timing & feedback.	Most land, ice, sand or snow based sports where speed of movement is important.
Serpentine	As an athlete moves through a course of gates, they must react to central cues to perform certain changes in direction or movements.	Testing and training reactions to central visual cues during sprinting.	Most field based sports, especially ones involving opposition.
Tree	As an athlete moves through a course of gates, they must react to peripheral cues and change direction or movements.	Testing and training reactions to peripheral cues while sprinting or approaching a target; Reactive/tactical coaching (i.e. defensive offensive coaching)	Most field based sports, especially ones involving opposition.
Grid	Gates are positioned in formation and athletes are required to follow a stimulus from gate to gate.	Testing and training endurance, teamwork, ball skills, decision making.	Most field or court based sports; Cross training.
Pacing	Player is required to follow the cues (lights) of a paced lap(s)	Testing lap speed on tracks, interval training, endurance training,	Athletics, Cycling, Most field and court based sports, Cross

		personal best training, competition training	training, Ice based sports

Applications: Lap Mode

Name:	Defensive Agility Drill
Description:	The 505 Agility Drill is a commonly used test of agility. The drill tests the ability of a player to reverse direction quickly.
Layout:	
Protocol:	The players are required to run forwards, touch the cone with one hand, and run back through the gate.
Variations:	• Player touches with either left or right hand • Player stays facing forward as they run back through the gate • Player must negotiate around the cone with equipment (e.g. dribbling a ball) • Player must go around the gate instead of touching it • Make a tackle

Name:	4 Gate Lap Drill
Description:	The 4 Gate lap drill is a generic protocol allowing training in endurance, speed or combinations of both.
Layout:	
Protocol:	The players are required to run around the lap for the desired time or distance.
Variations:	• Player touches with either left or right hand • Player stays facing forward as they run back through the gate • Player must negotiate around the cone with equipment (e.g. dribbling a ball) • Player must go around the gate instead of touching it • Make a tackle

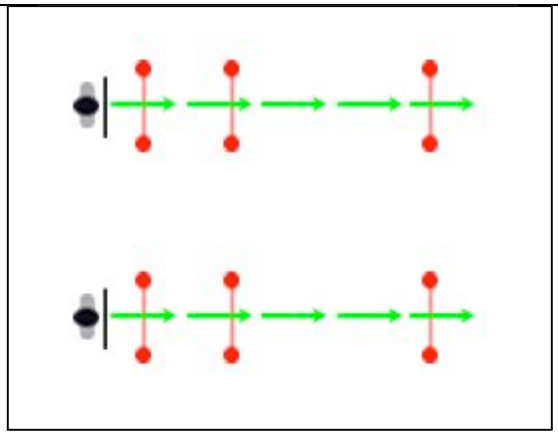
Applications: Straight Lane Mode

Straight Lane Protocols

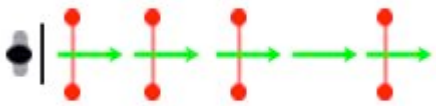
In straight lane configurations each lane is independent of the other. The player runs straight through the lane until they pass through the last gate.

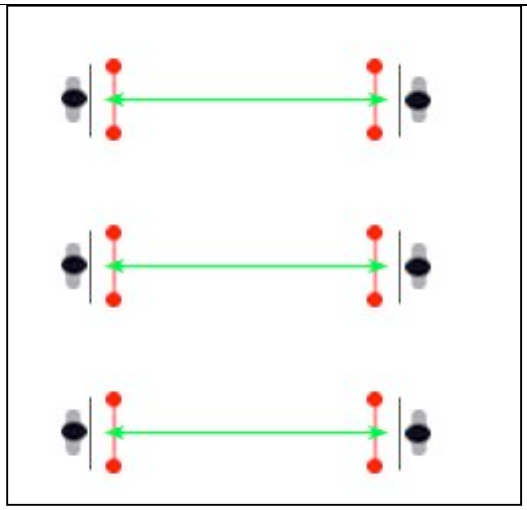
Variables

- Number of lanes
- Number of gates in each lane
- Type of start
- Number of sub-sessions within a session
- Rest between sub sessions

Name:	Standing 40m Sprint Standing 20m Sprint
Description:	The standing 40m sprint is a commonly used test of speed in many sports. An intermediate split time over 10m is used to assess acceleration, while the total time is used to reflect overall speed.
Layout: **NOTE: 2 lane setup shown**	
Protocol:	• The athletes start from a crouched position with the forward-most toe on a line that is 50 cm back from the line of the photo beam • The player starts when ready and sprints maximally the entire 40m distance. • Typically each player would complete 3 trials of this protocol, and the best result would be chosen for data analysis purposes.
Variations:	• Running with a ball or piece of equipment in hand • Running Backwards

	• Running sideways (i.e. can-can style)
Data Analysis	The key data for the standing 40m sprints are – • The standing 10m time • The rolling 30m time • The standing 40m time (total time)

Name:	Standing 20m Sprint
Description:	The standing 20m sprint is a commonly used test acceleration and sport specific speed. An intermediate split time over 5m and also 10m is used to assess acceleration, while the total time is used to reflect overall speed.
Layout: **NB: 1 lane setup shown**	
Protocol:	• The athletes start from a crouched position with the forward-most toe on a line that is 50 cm back from the line of the photo beam • The player starts when ready and sprints maximally the entire 20m distance, aiming to achieve top speed by 15m. • Typically each player would complete 3 trials of this protocol, and the best result would be chosen for data analysis purposes.
Variations:	• Running with a ball or piece of equipment in hand • Running Backwards • Running sideways (i.e. can-can style) • Running in a zig zag format.
Data Analysis	• The key data for the standing 40m sprints are – • The standing 10m time • The rolling 30m time (b minus a) • The standing 40m time (total time)

Name:	Modified Phosphate Decrement Test
Description:	The phosphate decrement test is a commonly used test of speed endurance in team sport players. The original protocol (Jenkins, 1993) involved 8 sprints over a 35m distance. The current protocol, however, has been modified to a 40m distance to allow comparison with standing 40m sprint times.
Layout: NOTE: 3 lane setup shown	
Protocol:	• The test involves 8 x 40m sprints, with one sprint being performed every 30 seconds. • A player is given the command to sprint (this is done using the lights), upon which they sprint from point A to Point B on the diagram above. • The player has the remainder of 30 seconds to rest, before then being commanded to sprint from point A to point B. This cycle is then repeated 4 times for a total of 8 sprints • Eventually we would want to be able to run two players in one lane. To accomplish this, the second player begins the test 15 seconds after the first player.
Variations:	The test could be performed carrying equipment such as a ball.
Data Analysis	For each player, the following data will be displayed: • Fastest sprint time • Slowest sprint time

	• The average of the 8 sprint times

APPLICATIONS: TREE MODE

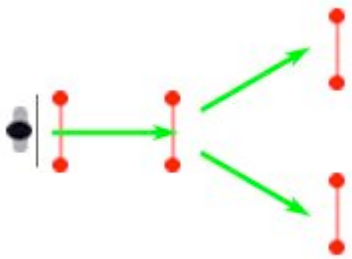
Tree Protocols

Tree protocols utilise the reactive lights to stimulate changes in direction (known as “cutting”).

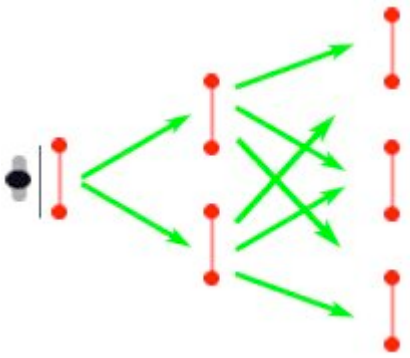
Generic Tree Setup
In tree mode the user should be able to select from 1 to 5 lanes, depending on the size of the system.

Tree drills should be able to start with either an auto start or traffic light start.

The structure of a tree should be configurable in its number of rows and the number of gates in each row. For example, the following tree has 3 rows, and is in 1-3-2 configuration.

Name:	Single Cut Tree Protocol
Description:	The single cut tree protocol is used to assess/train the ability of a player to react during sprinting and make a single decision/direction change.
Layout:	
Protocol:	• The athlete starts from behind the start line • When signalled by the trigger gate, the athlete sprints as quickly as possible through the trigger gate • As the athlete crosses the trigger gate, either the left or right lights flashes to command the athlete to run through that gate (see important note below on Lag time algorithm) • This is a stand-alone protocol, however would usually be used as detailed in the following example below. • Therefore perhaps at the start of the protocol, the coach could enter the number of repetitions to be performed by each player.
Variations:	• The player could be made to carry equipment such as a ball • Defender runs at timed player • Position of end gates moved • Obstacles placed in path of timed player
Data Analysis	For a single sprint, the following data would be generated – • 10-metre pre-trigger sprint time • Mean velocity over 10-metre pre-trigger segment (m/s)

	• 10-metre cutting sprint time • Mean velocity over cutting sprint segment (m/s) • Total time over 20 metres • Mean Velocity over whole sprint (m/s)

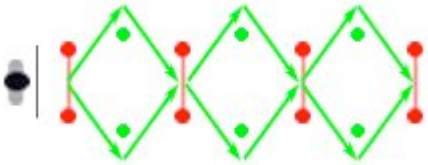
Name:	Double Cut Tree Protocol
Description:	The double cut tree protocol is used to assess/train the ability of a player to react during sprinting and make two decisions/direction changes.
Layout:	
Protocol:	• The athlete starts from behind the start line • When signalled by the trigger gate, the athlete sprints as quickly as possible through the trigger gate • As the athlete crosses the trigger gate, either the left or right lights flashes to command the athlete to run through that gate (see important note below on Lag time algorithm) • This is a stand-alone protocol, however would usually be used as detailed in the following example below. • Therefore perhaps at the start of the protocol, the coach would enter the number of repetitions to be performed by each player.
Variations:	• The player could be made to carry equipment such as a ball • Defender runs at timed player • Position of end gates moved • Obstacles placed in path of timed player
Data Analysis	For a single sprint, the following data would be generated – • 10-metre pre-trigger sprint time • Mean velocity over 10-metre pre-trigger segment (m/s)

	• 10-metre cutting sprint time • Mean velocity over cutting sprint segment (m/s) • Total time over 20 metres • Mean Velocity over whole sprint (m/s)
Graphical Display	• A stacked bar graph showing the two segment times adding to give the total sprint time • The mean velocity for either segment or the whole sprint

APPLICATIONS: SERPENTINE MODE

Serpentine Protocols

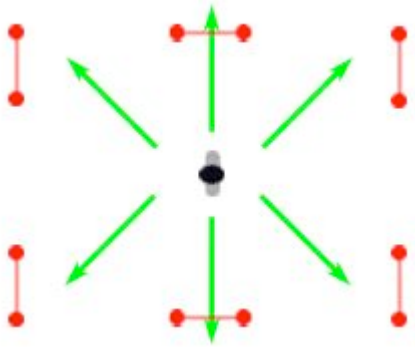
Serpentine protocols use straight lane configurations but use the reactive lights to stimulate athletes to change direction. Unlike the tree protocols, serpentine lanes may be reversible (i.e. the athlete runs in both directions).

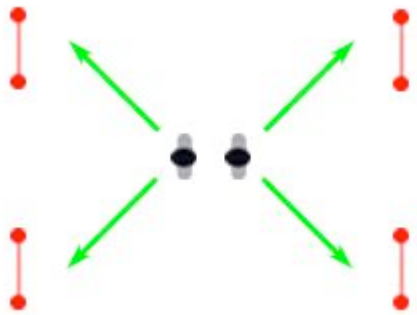
Name:	4 gate Serpentine Protocol
Description:	The 4 gate serpentine protocol requires the athlete to make 3 reactive decisions while sprinting through a lane of 4 gates.
Layout:	
Protocol:	• Traffic light start signals Blue to start the player • Player sprints through first gate, at which time the next gate signals green (left), red (right) or straight ahead (blue) • The player continues to weave through the course until all gates are completed • This protocol may be stand-alone, multiple repetition, or reversible (such as the Phosphate decrement test)
Variations:	• The player could be made to carry equipment such as a ball • Add obstacles for timed player • Distance of cut
Data Analysis	• The progressive time at each gate • The total time for each segment • The total time for the trial

APPLICATIONS: GRID MODE

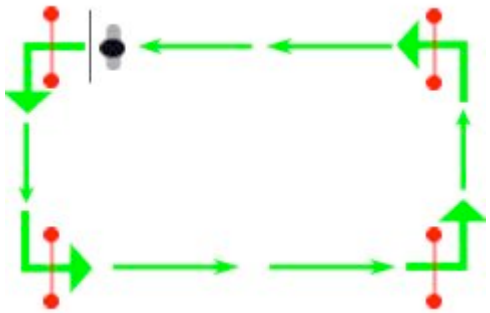
Grid Protocols

Grid protocols can be used for a variety of team and individual drills to train/test endurance or team offence and defensive work. We should say that this one is only available to customers with a 6-gate set and 4-gate set.

Name:	6 Point Grid
Description:	The 6 gate grid protocol requires players to follow their assigned colour around and through the gates.
Layout:	
Protocol:	• In this protocol three players (X, Y, and Z) are each denoted a colour. • The goal is that players must continually “chase” their coloured light • As they run through the gate that was last illuminated, another one is turned on • The protocol could be set to either make them go for a set time or a set distance • In the demo, we will go for a total of 5 minutes, and measure the distance completed
Variations:	• The player could be made to carry equipment such as a ball to pass onto others • Obstacles for players • Defensive and offensive team
Data Analysis	• Total distance covered (m) • Total number of gates • Mean velocity (ms^{-1})

Name:	4 Point Grid
Description:	The 4 gate grid protocol requires players to follow their assigned colour around and through the gates.
Layout:	
Protocol:	• In this protocol two players (X, Y) are each denoted a colour. • The goal is that players must continually “chase” their coloured light • As they run through the gate that was last illuminated, another one is turned on • The protocol could be set to either make them go for a set time or a set distance • Time run is set by coach and measurement of the distance completed occurs
Variations:	• The player could be made to carry equipment such as a ball to pass onto others • Obstacles for players • Defensive and offensive team

Applications: Pacing Protocol

Name:	Pacing Protocol
Description:	The pacing protocol is used to provide athletes with pacing information via visual cues. The pacing data can be based on previous performance or a desired performance.
Layout:	
Protocol:	The players are required follow to reach the particular point be it a cone/marker or gate as the lights flash.
Variations:	• The number of laps (from 1 – 50) • Time between cues (i.e. lights) • Colour of lights when flashing • Spacing of gates • Obstacles on coarse

HEALTH AND SAFETY

Exposure to Radio-Frequency Energy

This System meets Australian Communications Authority (ACA) requirements concerning exposure to radio waves. These requirements are also met in New Zealand, Japan and the United Kingdom.

Precautions When Using Batteries

- Never use any charger or battery that is damaged in any way
- Use the battery only for its intended purpose
- If left unused, a fully charged battery will discharge itself over time
- Always charge in or as close to room temperature (20 degrees Celsius) as extreme temperatures will affect the charging capacity of the batteries
- If Batteries will not recharge (batteries provided have a recharge life of 800 times), DO NOT ATTEMPT to change the batteries yourself. Instead contact your local service provider.

Electronic Devices

Most modern electronic equipment is shielded from radio frequency (RF) signals. However, certain electronic equipment may not be shielded against the RF signals from the units.

Pacemakers

Pacemaker manufacturers recommend that a minimum of 15cm should be maintained between the units and a pacemaker.

Hearing

Some wireless technology can interfere with some hearing aids. In the event of such interference, you may wish to consult your hearing aid manufacturer to discuss alternatives.

Other Medical Devices

If you use other personal medical devices, consult the manufacturer of your device to determine if it is adequately shielded from external RF energy. Your Physician may be able to assist you in obtaining this information.

Vehicles

RF signals may affect improperly installed or inadequately shielded electronic systems in motor vehicles. Check with the manufacturer or its representative regarding your vehicle. You should also consult the manufacturer of any equipment that has been added to your vehicle.

Potentially Explosive Atmospheres

Switch of all units in any area with a potentially explosive atmosphere and obey all signs and instructions. Sparks in such areas could cause an explosion or fire resulting in bodily injury or even death.

Users are advised to switch off all units while at a refueling point (service station). Users are reminded of the need to observe restrictions on the use of radio equipment in fuel depots (fuel storage and distribution areas), chemical plants or where blasting operations are in progress.

Areas with a potentially explosive atmosphere are often but not always clearly marked. They include below deck on boats, chemical transfer or storage facilities, vehicles using liquefied petroleum gas (such as propane or butane), areas where the air contains chemicals or particles, such as grain, dust or metal powders, and any other area where you would normally be advised to turn off your vehicle engine.

APPENDIX

Care and Maintenance

- Keep the system (all its parts and accessories) out of the reach of small children
- Do not store the system in dusty, dirty areas, as its moving parts may be damaged.

- Do not store the system in hot areas. High temperatures can shorten the life of electronic devices, damage batteries, and warp or melt certain plastics.
- Do not use harsh chemicals, cleaning solvents or strong detergents to clean any part of the system or accessories. Wipe with a soft cloth slightly dampened in a mild soap-and-water solution
- Do not paint any part of the system of accessories.
- Do not put the system or any of its accessories in or on heating devices such as microwave ovens, a stove or a radiator.
- If the system or accessories is not working properly contact your local service provider. The personnel there will assist you and if necessary, arrange for service.
- Do not let your system become fully flat. If this does occur charge the units for 3 minutes. Take out the charger points and replace. Repeat this 3 times and then let the system fully recharge.
- To keep your system operating at an optimum level recharge your units and PDA after every session. To recharge your units connect them to the recharge packs. A red LED should flash until they are fully charged. If, however, your system is nearly fully discharged then after approximately 4 hours take out the recharge points and re-insert them. For recharging your PDA see the information booklet in the IPAQ box.
- Do not keep your units charging for more than 36 hours at a time as this can decrease their battery life.

Glossary

a) Gate: A reflector and Reactive Data Unit set up with the photocell of the Reactive Data Unit lined up with the reflector to form a connection
b) LED's: Light Emitting Diodes
c) Reflector: Reactive Data Unit: Cylindrical unit with 3 sets of flashing LEDs and photocell
d) Tripod: Metal pole with extendable head and retracting legs
e) Track: A single "lane" of a protocol (there can be multiple Tracks)
f) Session: One full cycle of players through a protocol
g) Team: Any number of people/players

h) Synchronize: The act of the IPAQ pocket computer communicating with the base unit and the base unit in turn communicating with the reactive data units establishing the number of recognizable reactive data units
i) Test Track: A walk through to break all beams of set-up gates
j) XML: Format of file that your results are kept in when saved (rich text format)
k) CSV: Format of file that your results are kept in when saved
l) ActiveSync: The program that allows you to move files/updates to and from your PDA/computer

TROUBLE SHOOTING

Tripods and units		
Problem	**Possible Reason**	**Solution**
Noise emitting from reactive data unit	Reactive data units do not line up with the reflectors	Rotate the reactive data units until the noise has stopped (and unit and reflector are lined up) Increase or decrease height of reactive data units until the noise has stopped
Extended pole comes out of base	It has been pulled to far	Gently re-insert the extended pole into the base
Tripod falls over	Uneven ground	Move to even ground
		Place the legs of the tripod out to even up the reactive data unit on an even keel
	Legs not fully extended	Fully extend legs
Reactive data unit does not fix onto tripod	Not pressing down on the indented area	Press reactive data unit down in the indented area
	Not rotating in the correct direction	Rotate reactive data unit down and anti-clockwise
Reactive data unit does not come off tripod	Not rotating in the correct direction	Press down and rotate the reactive data unit in a clockwise direction
Reflector does not fix onto tripod	Not pressing down on the indented area	Press reflector down in the indented area
	Not rotating in the correct direction	Rotate reflector down and anti-clockwise
Reflector does not come off tripod	Not rotating in the correct direction	Press down and rotate the reflector in a clockwise direction
Reactive data unit is not upright but tripod is	Ball point on tripod is bent	Straighten tripod
Reflector is not upright but tripod is	Ball point on tripod is bent	Straighten tripod
Tripod(s) do not fit in bag	Legs are not fully straightened	Straighten tripod
	Tripod not fully collapsed	Collapse tripod
Carry case does not shut	Lid on wrong way round	Turn lid around 180 degrees
	Handle on second layer is upright	Push handle on second layer down
	Reactive data units are not lying in box correctly	Lay all the reactive data units in the carry case in the correct manner

Protocol Set-up		
Problem	**Possible Reason**	**Solution**
Lights do no flash when **L** button is pressed	Reactive data unit not on	Turn on reactive data unit

	Base unit is not on	Turn on Base unit and re start Smartspeed
	Batteries in reactive data unit dead	Swap over reactive data unit with another
	Batteries in base unit dead	Run base unit on mains power/add in battery pack?
	Height of base unit to low	Raise height of base unit
	Position of base unit	Move base unit to a more central position
	Not pressing **L** button	Press **L** button
Synchronization Failed	Reactive data unit not on	Turn on reactive data unit, reset and re-synchronize
	Base unit is not on??	Turn on Base unit and re start Smartspeed
	Batteries in reactive data unit dead	Swap over reactive data unit with another and re-synchronize
	Batteries in base unit are flat	Run base unit on mains power/add in battery pack? and re start Smartspeed
	Height of base unit to low	Raise height of base unit and re start Smartspeed
	Position of base unit	Move base unit to a more central position re-synchronize
	To many reactive data units switched on	Turn off extra reactive data units, reset and re-synchronize
	Not enough reactive data units switched on	Turn on extra reactive data units, reset and re-synchronize
	Incorrect number of tracks selected	Return to "Select Protocol" page and choose track number corresponding to the number of reactive data units selected
Bluetooth Failure	Bluetooth not activated on the desktop	Turn Bluetooth "On" located on the desktop
		Manual re-start of PDA then re-activate the Bluetooth connection
	Bluetooth not selected in settings (comms)	Activate Bluetooth in Settings-Comms (see manual)
Test Track Failure	Reactive data unit not on	Turn on reactive data unit, reset and re-synchronize
	Base unit is not on??	Turn on Base unit and re start Smartspeed
	Batteries in reactive data unit are flat	Swap over reactive data unit with another and re-synchronize
	Batteries in base unit dead	Recharge Base Unit
	Reactive data unit beam broken before test track button touched (possible re-alignment needed)	Press the Ok button in top left hand corner twice and then go back and redo synchronization and test track
	Reactive data unit beam not broken before test track button touched (possible re-alignment needed)	Press the Ok button in top left hand corner twice and then go back and redo synchronization and test track

Protocol Running		
Problem	**Possible Reason**	**Solution**
Lights on reactive data unit do not flash when programmed	Base Unit's battery is dead	Put onto mains power and re-start the PDA
		Plug in battery Pack and restart the PDA
	Batteries in reactive data unit dead	Swap over reactive data unit and restart the PDA
No beam break (noise emitting)	Fogged reflector	Wipe reflector with cloth
	Batteries in reactive data unit dead	Swap over reactive data unit and restart the PDA
		Plug in battery Pack and restart the PDA
	Beam broken early	Restart Protocol.
	Reflector and Reactive data unit not aligned	re-align unit with reflector and restart the PDA
	Fogged Photocell	Wipe cover of reactive data unit with cloth
PDA screen goes blank	Sleep Mode button has been pressed	Reset PDA and do not push again.

Results		
Problem	**Possible Reason**	**Solution**
Data not in results page	You have deleted the team	Don't delete teams before you have finished with the data
	You have deleted the player	Don't delete players before you have finished with the data
	Battery has fallen out	Replace battery

NB Always make sure the you are selecting the correct team, protocol and time/date stamp

Edit		
Problem	**Possible Reason**	**Solution**
Error when importing player names	Text document set out incorrectly	Refer to User Manual on correct set up of text document importation

New (Session, Team, Player)

Problem	Possible Reason	Solution
When typing on keyboard no words appear	Have not touched the writing box	Touch the writing box
When using the Letter recognizer, letters come out incorrectly	Precision of writing	Slower writing technique
		Change to Keyboard

Miscellaneous		
Problem	**Possible Reason**	**Solution**
PDA turns off	Low battery	Re-charge battery
		Attach battery pack
Battery charging light turns soon after start	Battery is fully dead	Re-insert charger after the charger light has stopped flashing, 3 times.