Portable Decoder
User Manual

(REVISION 2.1.7)

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Manual rev.	Software rev.	Date (d/m/y)	Amendments
(Revision 1.0)	(Revision 1.0)	17/3/08	This is the first version of this manual
(Revision 1.1)	(Revision 1.1)	15/9/08	Higher accuracy by using Curve Fitting Technology. Graphical representation of NOISE. Improved back-end storage with a maximum 160,000 registrations. Various user interface and back-end improvements.
(Revision 2.0)	(Revision 2.0)	13/3/09	New transponder. Extra menu selections. Changed antenna connection.
(Revision 2.01)	(Revision 2.0)	10/4/09	New error messages added to Troubleshooting section. New caution added to safety section for radio interference.
(Revision 2.1.7)	(Revision 2.1.7)	15/4/10	New template used with ChampionChip references changed to MyLaps in contact details, headings and cover. APEX name changed to Portable Decoder.

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LIST OF FIGURES

1 INTRODUCTION

1.1 Scope of this manual

This manual is intended for operating, maintenance, and supervisory personnel and provides information on installing, operating, and maintaining your unit.

The manual is divided into the following sections:

- ***Introduction*** - (this section)
- ***Safety*** (page 7): describes all safety aspects required when working with MYLAPS equipment
- ***Physical description*** (page 8): physical descriptions of major components in the unit
- ***Functional description*** (page 13): functional descriptions of the unit
- ***Setup and removal*** (page 21): site preparation, installation, and connecting power supply and data cables among the components (also how to remove and store the unit if required)
- ***Operation*** (page 26): how to start up, run, and shut down the unit
- ***Maintenance*** (page 32): instructions on how to maintain and repair the equipment. Contains sub-sections for periodic maintenance schedules and corrective maintenance procedures
- ***Troubleshooting*** (page 40): tables with potential problems, causes and solutions
- ***Appendices*** (page 48): contain unit specifications and CE declaration form

1.2 How to use this manual

This manual is designed to be used in electronic and printed form. Cross references in the online version can be clicked to go directly to the referenced item. Navigation can be done with the bookmarks and/or the table of contents, which contains live links. Page numbers are also provided for ease of use with printed copy.

Before installing, operating or maintaining your Portable Decoder for the first time, always read section *2 Safety* on page 7 to familiarize yourself with the safety aspects of this manual and your system.

To identify individual components, read *3 Physical description* on page 8.

For an explanation of how the unit works, read *4 Functional description* on page 13.

Read both *5 Setup and removal* on page 21 and *6 Operation* on page 26 completely to overview the steps required to setup and run the unit. Refer to *8 Troubleshooting* on page 40 to find solutions to setup/operating problems.

When performing scheduled maintenance on your unit, use *7.1 Periodic maintenance schedules* on page 32 to view the schedules and find the required maintenance procedures. Corrective maintenance is guided from the tables in section *8 Troubleshooting* on page 40.

Refer to the *Appendices* on page 48 for an overview of the technical specifications.

2 SAFETY

This section describes all safety aspects required when working with MYLAPS equipment. The safety aspect can relate to potential equipment damage or to danger to personnel working with this equipment or in the vicinity.

- When installing, operating or maintaining equipment, closely follow the prescribed instructions in this manual, and use common sense at all times
- If ever in doubt about how to do a job or task safely, always ask for assistance

2.1 General safety responsibilities

High voltages, thermal and stored energy hazards are present in MYLAPS systems. Therefore, pay special attention to safety when operating and maintaining each system, including:

- Meet all applicable codes, laws and field regulations
- Read and understand each item in this manual and follow the installation, operator and maintenance procedures exactly
- Always use the correct tools for the job
- Take recommended precautions—never take short cuts

FCC Declaration
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

2.2 Warnings and cautions

The following alerts are used in this manual:

- **WARNINGS** alert users of potentially dangerous situations.
- **CAUTIONS** alert users of potential equipment damage.

Warnings and cautions in this manual, are indicated by:

- an icon
- the text **WARNING** or **CAUTION**
- a textual description, which states the hazard and how to avoid it.

The following icons to highlight and warn of safety aspects are used in this manual, and are attached to the Portable Decoder equipment at appropriate locations:

General Caution or Warning

Dangerous voltage

Grounding required

3 PHYSICAL DESCRIPTION

3.1 Introduction

Portable Decoder is a timing concept for sports where extreme accuracy and simple setup is needed. The Portable Decoder system is portable and is designed for battery operation during outdoor sports events.

The standard Portable Decoder system consists of the following components:

- Controller (housed in a sturdy Pelican case)
- Antenna - 6 m (20 ft)
- Antenna - 9 m (30 ft)
- Power cable (100 to 240 VAC)
- 12 VDC cable with battery terminals
- Coax cable with connection box - 5 m (16 ft)
- Ethernet cable - 10 m (33 ft)
- Torque screwdriver
- Flat screwdriver
- This Portable Decoder User Manual

The following components can be ordered from MYLAPS as options for further expanding the Portable Decoder system:

- Extra antennas - varying lengths: 6 m (20 ft), 9 m (30 ft), 12 m (40 ft)
- ProChips
- Tape for attaching antenna to road surface (recommended Polyken#203 or Tesa 4651)
- Extension coax cables for connection box - 20 m (66 ft) and 100m (328 ft)

Additionally, you can purchase the following component from local suppliers:

- SIM card (this will depend on your country and GSM cellular provider)

See Appendix *1 Specifications* on page 50 for complete specifications.

3.2 Controller

Figure 3.1 Portable Decoder controller (front and rear)

1 Accessory pouches	3 SD and SIM card slots	5 Logo
2 Control panel	4 LED status panel	6 Connectors (behind protective plastic cover)

3.2.1 LED status panel

Figure 3.2 Controller status panel

1 Battery level indicators (E = empty; F = full) - see description below	3 SD and SIM card slots
2 Control panel	4 LED status panel

The battery level indicator LEDs light up from left to right as the controller is charging with the following color definitions:

- red = 0-20% full
- yellow = 20-40% full
- 1st green = 40-60% full
- 2nd green = 60-80% full
- 3rd green = 80-100% full

3.2.2 Connectors

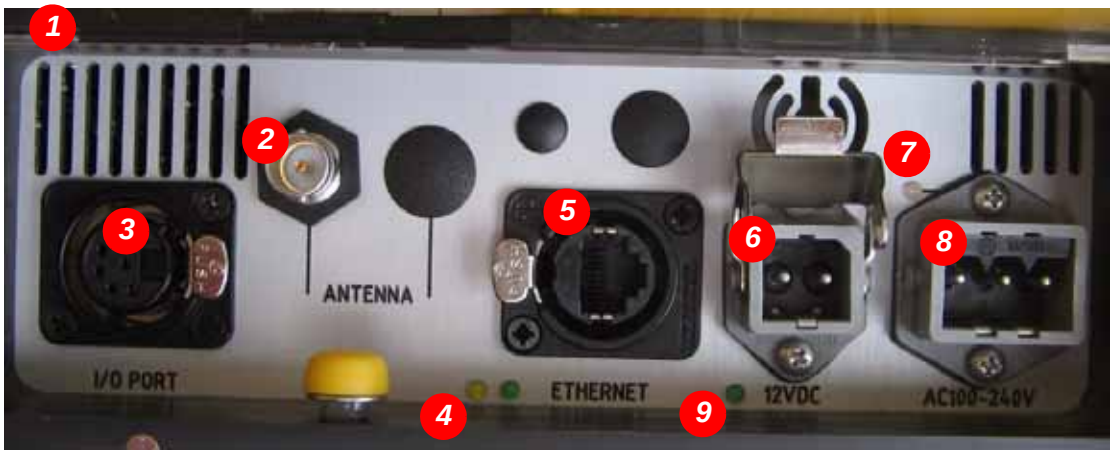


Figure 3.3 Controller connectors

1	Protective transparent cover	4	LED indicators network connect/ activity	7	LED indicator 100/240 VAC connected (red: <50% charged; orange: >50% charged; green: battery charged)
2	Antenna connector	5	Ethernet connector port	8	100/240 VAC connector port
3	IO port (for start gun, etc.)	6	12 VDC connector port (external battery)	9	LED indicator external battery status

3.3 Antenna

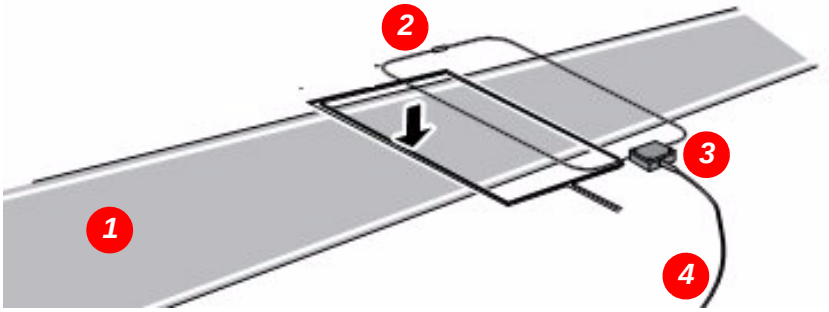


Figure 3.4 Antenna

1	Race track	3	Antenna connector box
2	Antenna (with balance resistor)	4	Coax cable

Lay the loop antenna wires across the width of the course in parallel to form a rectangle. The loop length should not be less than 2 m (6.6 ft) or greater than 12 m (36 ft). The antennas are plugged into a connector box with a coax cable attachment. The antenna must be laid to suit ground surfaces as follows:

- Asphalt/concrete - use adhesive tape to affix the loop wires. We recommend Polyken #203, Tesa 4651 or similar, 10 cm (4 inch) wide.
- Ice - cut slots 2 cm (1 inch) deep in the ice. Place the loop wires in the slots and fill them with snow/water at least 12 hours prior to the start of the event to allow the slot to re-freeze
- Snow - cut horizontal slots in the snow, approximately 20 cm (8 inch) deep. Place the loop wires in the slots and fill them with snow.

3.4 ProChip

Figure 3.5 ProChip

1 Transponder (enclosed in plastic mold)	2 Attachment strip

The ProChip has the following features:

- Waterproof with attachment strip for fitting onto ankle band, running shoe, bike
- The chip is normally in 'sleep' mode until activated by the antenna. The chip will then send a signal to the Portable Decoder controller - see *4.1 Basic principle* on page 13 for more on this.
- After a first detection, a chip is only detected again by the controller after it is removed from the antenna field for at least 2 seconds, even if the 'Time between same chip' setting is lower than the time between two subsequent chip detections.

When worn in a race, the chip must be vertically aligned for best reception. See *Figure 3.6* for an example of how to align the chip in an ankle band and attach to a bicycle with a tie wrap.

Figure 3.6 ProChip in ankle band and attached to bicycle

Before use, each chip can be checked and registered as follows:

1. Pass each chip over a connected antenna and check it is detected by Portable Decoder (detection light, beep) - reject all defect chips.
2. Record each chip number - the registered chips can be later assigned to individual runners in a race.

4 FUNCTIONAL DESCRIPTION

4.1 Basic principle

Every participant in a MYLAPS timed event carries a registered Portable Decoder ProChip. When this chip passes a Portable Decoder timing system antenna, the chip will emit a unique code to identify itself and register the time it passed. The Portable Decoder controller reads the data collected from the antenna and assigns the code of the chip with the registered time. See following overview.

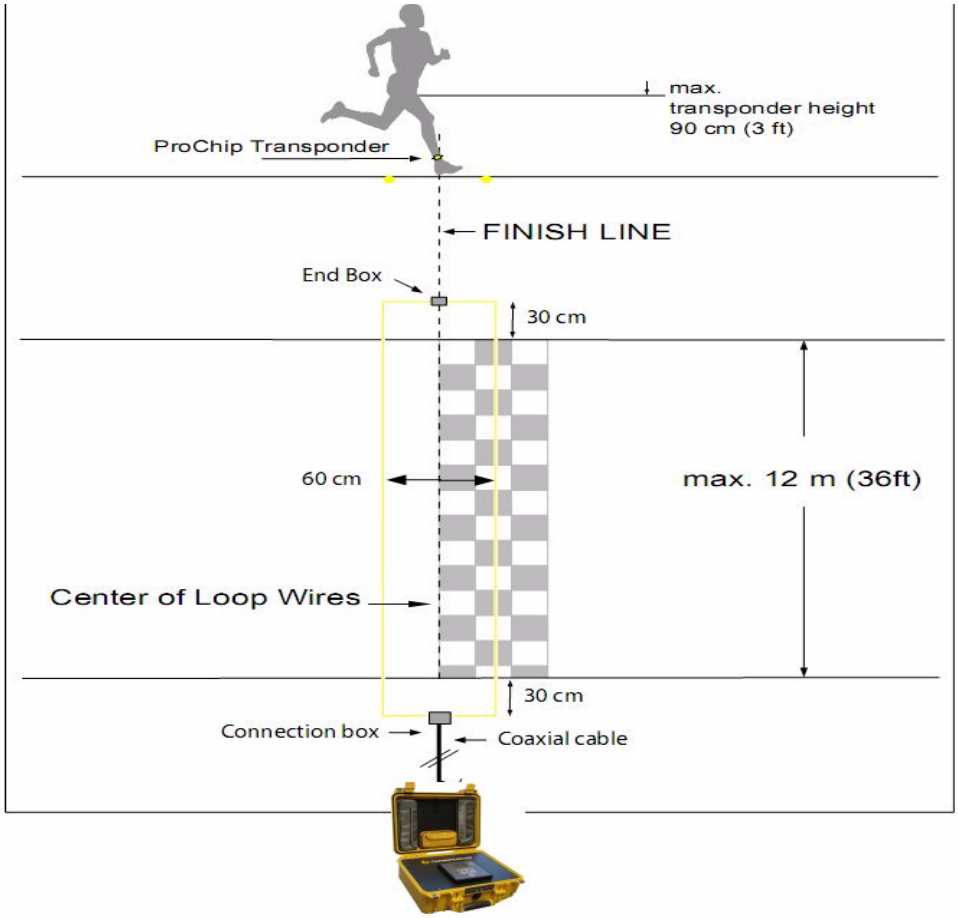


Figure 4.1 ProChip passing antenna

Detection heights depend on antenna width, ProChip orientation and road surface (reinforced concrete under the road surface may reduce detection height). See following table for guidelines for antenna widths and ProChip detection placement:

Race type	Antenna width cm (ft.)	ProChip placement
Ice skating	50 (1.7)	Strap around ankle
Inline skating	60 (2.0)	Strap around ankle
Cycling	60 (2.0)	Vertically mounted (low on bike)
Other	60 (2.0)	As applicable

NOTE: *Always check detection height after installing an antenna.*

4.2 Date and time

The Portable Decoder internal clock is extremely accurate when recording timing data. It can be synchronized using time signals from GPS satellites. This guarantees precise time synchronization between multiple Portable Decoder systems, and gives extreme accuracy over a long period.

All date and time parameters are set via the menu selections on the control panel. See *4.3.1 Operator control panel* on page 14 for more information.

NOTE: *Never change the time during a race. When Portable Decoder is powered down, the clock will no longer be accurate.*

4.3 System controls

4.3.1 Operator control panel

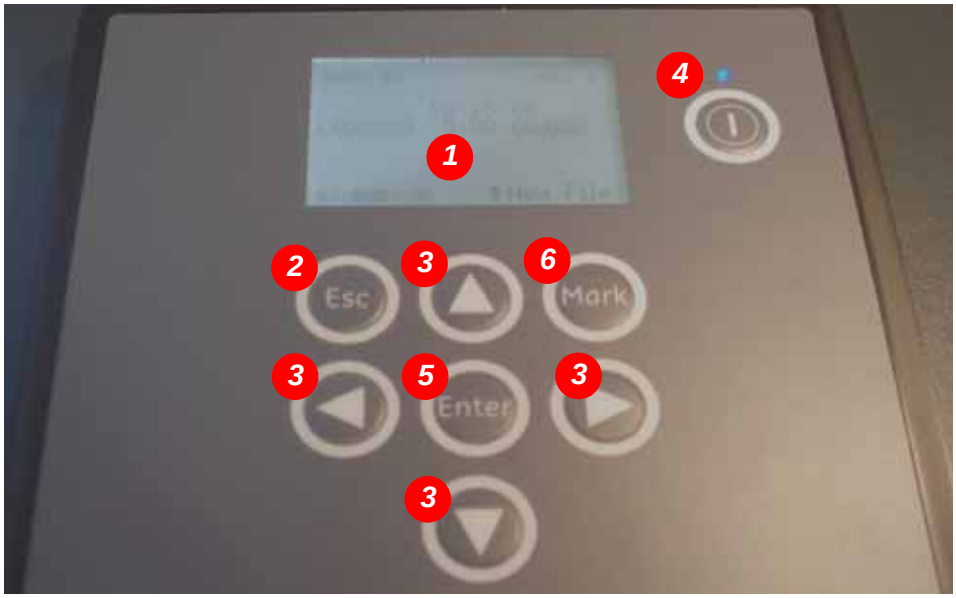


Figure 4.2 Operator control panel

	Control	Function
1	Display (showing Main screen)	See *4.3.2 Main Screen* on page 15
2	Esc button	For acknowledging errors and returning to Main screen from menus
3	Navigation arrow buttons	For moving between menu selections (see *4.3.3 Menu tree* on page 16); can also be used to change a screen value
4	Power button	On/off switch for activating controller (with LED to show on/off status)
5	Mark button	See *6.1.3 Marker* on page 27
6	Enter button	To access menu selections or to confirm a setting

Table 4.1 Controls and their functions

4.3.1.1 Quick keys

The navigation arrow buttons (**< >**) have a 'quick key' function in certain menu selections to access 'extra' screens (see *4.3.3 Menu tree* on page 16 for the menu tree with all normal selections).

Press **<** and **>** to move to and from menus and the following 'extra' screens:

MAIN MENU	< >	CHIP FILES	< >	CHIPS
SYNC USING GPS	< >	SYNC NOW	< >	GPS STATUS
SOFTWARE VERSION	< >	VERSION NUMBERS	< >	SERIAL NUMBERS

Table 4.2

4.3.2 Main Screen

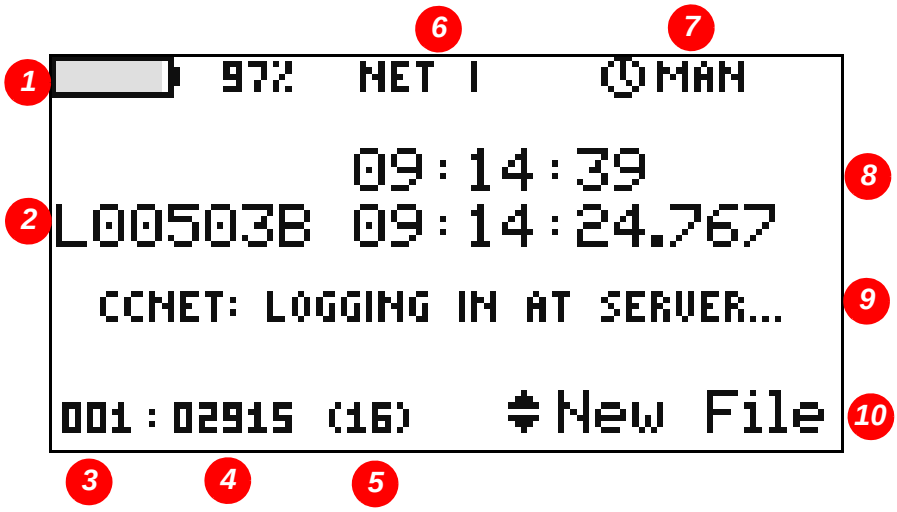


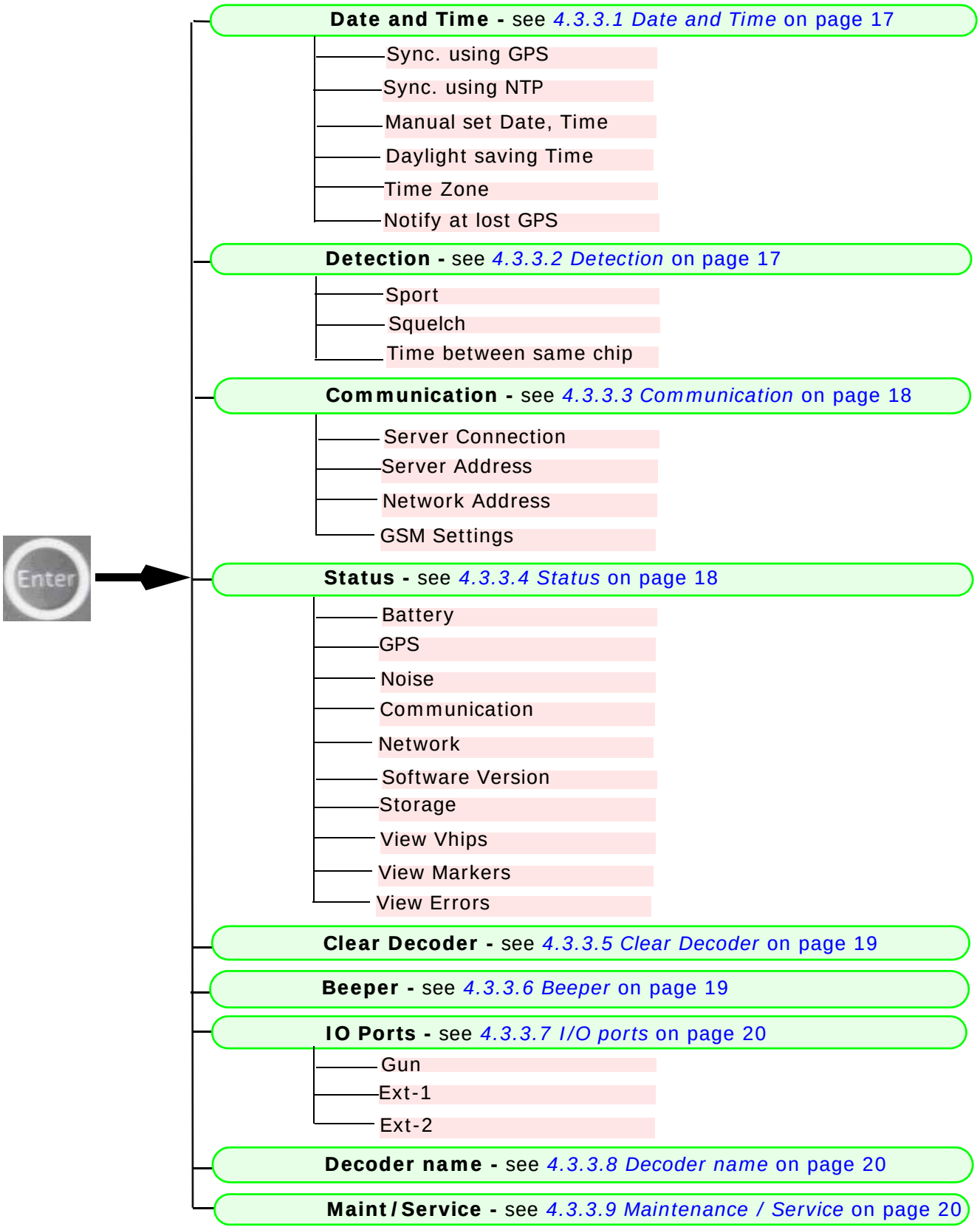
Figure 4.3 Main screen

1	Power status - internal or external battery, or AC power (and battery full percentage) - see *4.3.3.4 Status* on page 18	5	Number of detections for last chip (during its most recent antenna detect)	9	Status messages
2	Last detected chip code	6	Communication status (none, 'Net' or 'GSM') - see *4.3.3.3 Communication* on page 18	10	Marker type - choose here either 'New file', 'Gun' or 'Marker' (set with 'Mark' button) - see *6.1 Marker types* on page 26
3	File number	7	Manually set Portable Decoder time (MAN) or GPS time (GPS) with number of GPS satellites in view - see *4.3.3.1 Date and Time* on page 17		
4	Number of detected chips in file	8	Current time, and time of last chip		

NOTE: *The backlighting for the screen dims after 2 minutes of inactivity; press the navigation buttons or 'Esc' to fully illuminate screen.*

4.3.3 Menu tree

The following figure shows the menu structure for the Portable Decoder control system (accessed by pressing 'ENTER' on the control panel). You can navigate through the menu selections with 'Esc', 'Enter' and the navigation buttons (**< >**).



4.3.3.1 Date and Time

NOTE: *Never change time parameters after the system is setup for a race.*

Sync using GPS

Synchronize the date and time in the Portable Decoder to the date and time received from GPS satellites. If multiple Portable Decoderes are synchronized to GPS, precise time synchronization (to the msec) is assured. The time required for the Portable Decoder GPS module to correctly synchronize with GPS satellites can vary (up to 20 minutes for first-time startup).

Sync using NTP

Synchronize the date and time in the Portable Decoder to the date and time received via the Network Time Protocol. This protocol synchronizes the decoder clock over packet-switched, variable-latency data networks.

Manual set Date, Time

Manually set the date and time in the Portable Decoder.

Daylight Saving Time

Switch on or off the daylight saving time (summer time); the Portable Decoder clock is synchronized to summer time.

Time Zone

Change the time zone to configure the GPS time to local time.

Notify at lost GPS

Here you can set Portable Decoder to display a warning if it temporarily 'loses' its GPS connection - the default setting is not to warn for a lost GPS signal. Normally, once the Portable Decoder time has been synchronized to a GPS signal, the time is sufficiently accurate and further synchronization with GPS should not be necessary.

4.3.3.2 Detection

Sport

- Other - Choose here for running, carting, etc.
- Cycling - Choose here for cycling events
- Skating - Choose here for normal skating events
- Ice Skating - Choose here for ice skating events

Squelch

The squelch setting lets you suppress weak ProChip signals. This is useful if participants are walking near the antenna loop or the coaxial cable and are accidentally detected. For example, if the squelch setting is 60 (instead of the default 30), all ProChips with a received strength below 60 will be ignored.

Time Betw. Same Chip

If a chip is detected more then once within this interval, each new registration will be neglected until the interval is over, or until a gunshot or marker is received.

4.3.3.3 Communication

Server Connection

- Off - Portable Decoder makes no connection to the CCNetServer
- CCNet GSM - Portable Decoder will try to connect to the CCNetServer via a GSM internet connection
- CCNet Ethernet - Portable Decoder will try to connect to the CCNetServer via a cabled internet connection

Server address

Configure here your own servers instead of the default 'CCNetServers'.

Network Settings

- IP Config Mode
  - Automatic (DHCP) - Correct network setting will be automatically obtained from DHCP server on local network, if available
  - Manual - No automatic configuration; network settings as set in "Manual IP Settings" menu will be used
- Manual IP Settings - Enter the following standard IP settings when "IP Config Mode" is "Manual" or when no DHCP server is available:
  - IP Address
  - Netmask
  - Gateway
  - DNS

GSM Settings

Configures the GPRS connection of the GSM module. Settings must be obtained from your GSM provider and entered in the following fields:

- APN (Access Point Name)
- Username
- Password

4.3.3.4 Status

Battery

- Maximum battery capacity (see *7.5 Calibrate battery indicators* on page 36 for how to calibrate)
- Current battery charge in mAh and as a percentage of capacity
- Current power source:


– internal battery


– external battery


– AC mains power is connected and charging battery

- Internal battery temperature
- Internal case temperature
- Current used (in mA)

GPS

Graphical display showing the number of satellites received and their signal strength. Resetting the GPS will restart a search for satellites. See *Appendix 1: Preliminary installation instructions* on page 49 for more on this option.

Noise

Portable Decoder determines the average background noise. The noise (and signal strength) has a range of 0 to 255 points. Noise level, as shown on this status screen, should not exceed 40 points. If the noise level is higher, the received ProChip signal strength should be 60 points above noise level to ensure proper functioning. So if the ProChip received signal strength is 120 points, the noise should not exceed 60 points. See *8.3 Noise* on page 42 for more on this option.

Communication

Shows the current communication method being used (shows if a server is connected or not).

Network

Shows MAC address and IP address, if available.

Software version

Shows the current software version and the build date. Also gives access to the software update interface to upload new software version. See *7.4 Check/Update software* on page 35 for more on this option

View Chips

View the chips stored in the current and previous files (since last "Clear Portable Decoder").

Storage

View the memory remaining on the SD card.

View Markers

View the markers registered by Portable Decoder with the time the marker was made, and the type of marker.

View Errors

View the errors encountered by Portable Decoder with the time an error occurred.

4.3.3.5 Clear Decoder

Clear all chip registrations in the Portable Decoder. To be used before a new event.

4.3.3.6 Beeper

The following options are available for the beeper:

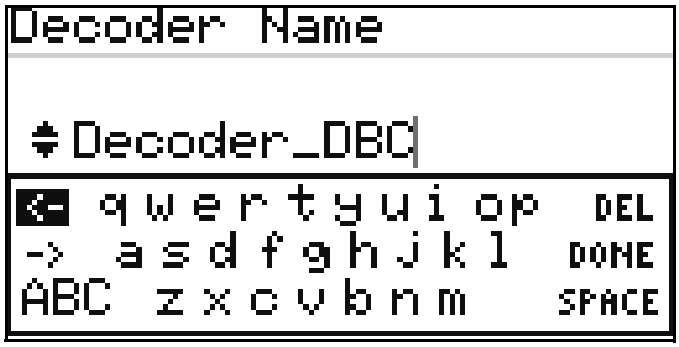
- Key Volume (volume heard when entering values on the control panel, or if an error occurs)
- Chip Detect Volume (the volume heard when a chip is detected by the antenna - this volume can be amplified by connecting an external beeper to the IO port at the back of the case)

4.3.3.7 I/O ports

Here you can change the software interface to the I/O ports for an external connection for a starter pistol (Gun) or other external devices. The default setting for these ports is 'normally closed'.

4.3.3.8 Decoder name

Here you can assign a personalized name for easy identification when the Portable Decoder is connected to a network. This name will be displayed next to the MAC/IP address in the MYLAPS software.



Use the QWERTY keyboard in combination with the navigation buttons and Enter to assign the name.

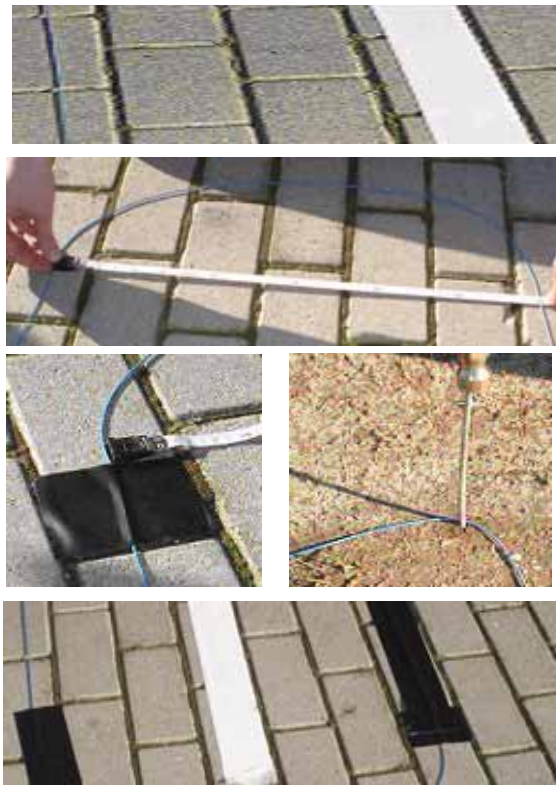
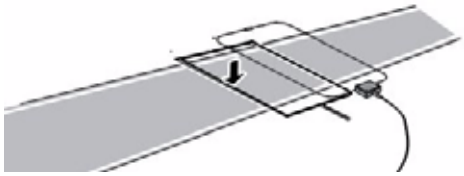
4.3.3.9 Maintenance / Service

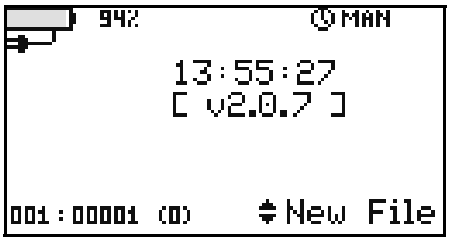
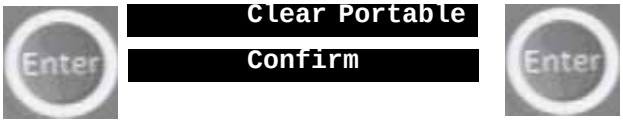
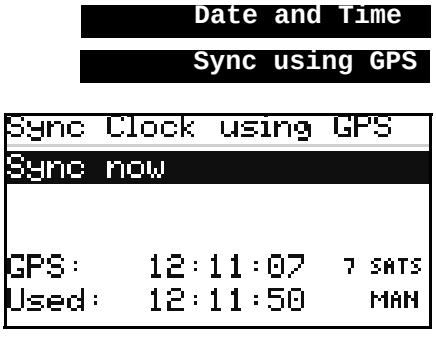
Only for MYLAPS service engineer use, or after contact with MYLAPS. See *8.6 Reset to factory defaults* on page 46 for more on this option.

5 SETUP AND REMOVAL

This section describes how to setup the Portable Decoder equipment for a race, and then to remove it after a race. Also described here is how to retrieve race data from the Portable Decoder controller (see *5.2 Removal and storage* on page 24).

5.1 Setting up Portable Decoder

1	Choose suitable antenna • Measure total width of timing location through which competitors will cross • Select correct length antenna from supplied antennas	
2	Lay out antenna • Lay out antenna in a rectangular shape, equally spaced on either side of the start/ finish line and extending 30 cm (1 ft) more than the track width on each side • Measure the parallel distance between the antenna leads and adjust the width to suit the race; i.e. 60 cm (2 ft) for running, 50 cm (1.6 ft) for ice skating • Attach the four corners of the antenna leads with tape (for hard surfaces) or pegs (for soft surfaces) • Use tape or mats to cover the antenna leads to ensure the leads will not cause a hindrance to competitors crossing the line	
3	Connect antenna • Insert the antenna connectors into the coax cable connector box • Optionally, attach a multimeter to the antenna ends to test the antenna resistance (should be ±220 Ω)	
4	Position the Portable Decoder controller so it is easily accessible but not where it will hinder competing athletes	

5	Lift the protective cover at the back of the Portable Decoder case and plug the coax cable into the coax antenna connector	
6	Click open both front latches on the case and carefully open lid	
7	Switch on Power • Press the main Power button • Wait until the Main screen appears (this screen is described in *4.3.2 Main Screen* on page 15)	
8	Check Main screen • Check that no errors are displayed on the screen - if so, refer to *8 Troubleshooting* on page 40 for how to solve them • Check the battery level (shown as a % on the top left of the main screen) • If battery level is low, supply external power by connecting a 12 VDC supply to the connector at the back of Portable Decoder case	
9	Clear data in Portable Decoder memory • Access the menu by pressing 'Enter' • Choose 'Clear Portable Decoder' • Select 'Confirm' and press 'Enter'	
10	Synchronize time with GPS • Select menu entry 'Date and Time' • Select 'Sync using GPS' • Verify if GPS is available (may take several minutes) - eventually 'GPS' and 'no. of satellites' is displayed in bottom right corner of screen • If no GPS is available, reposition Portable Decoder for better satellite reception • Press 'Sync now' and wait until time is synchronized	

11	Configure 'Detection' parameters by using the menu selections to configure: • Sport • Squelch • Time Betw. Same Chip	Detection Sport Squelch Time Betw. Same
12	Configure 'Beeper' • Use the menu selections to configure the Chip detect volume	Beeper Chip detect
13	Test Portable Decoder by carrying a chip (held vertically) across the antenna area and check • The chip is registered by the Portable Decoder system at expected height • No intermittent or irregular beep • Reception height at both ends of the antenna area is the same	
14	Check Noise • Select menu 'Status' • Select 'Noise' • Check the Noise level - if the display shows consistent readings above 40, refer to *8 Troubleshooting* on page 40 for how to solve	Status Noise
15	Set up communication • Select menu 'Communication' • Choose appropriate communication method for your situation - see *4.3.3.3 Communication* on page 18 for more on communication **Important: For GSM communication, make sure your provider settings are entered - see *Appendix 1: Preliminary installation instructions* on page 49**	Communication
16	Attach starter pistol (optional) • If required, attach a starting pistol (and/or other triggers) to the I/O port at the rear of the Portable Decoder case	

5.2 Removal and storage

1	Retrieve race data (if not already done): • Refer to *6.3 Retrieve data* on page 29 to see how to retrieve data (race results) from the Portable Decoder • Verify data has been retrieved before proceeding. If no data connection to a results computer is immediately available, data can be retrieved later	
2	Switch off power • Press 'Power' button • Choose "Confirm''	
3	Disconnect all cables • Remove coax cable • Remove power cable (if connected) • Remove Ethernet cable (if connected) • Remove starter pistol cable from I/O port (if connected)	
4	Disassemble antenna(s) and other equipment • Remove the antenna cables from the coax cable connector box • Carefully remove antenna(s) from measuring points and load them into their carry bags in the Portable Decoder case • Load all other accessories into their carry bags • Make sure all pegs, tape and other attaching materials are removed from antenna location	
5	Close case and remove equipment • Carefully close lid (making sure that nothing is trapped between cover) • Click closed both front latches • Remove the Portable Decoder equipment to a storage area (see step 6) or to an area where race data can be retrieved (see *6.3 Retrieve data* on page 29).	
6	Store case in a dry area at storage temp of 0 to +40 °C (32 to +104 °F), and close to a mains power socket	

CAUTION

HIGH VOLTAGE:
Danger of electrocution. Before connecting power to the Portable Decoder, make sure that all electrical connections are secure.

7 Charge Portable Decoder

- Attach 100 - 240 VAC power cable into AC connector at rear of case
- Connect the power cable into the mains power socket
- Leave power connected until Portable Decoder is next required (the battery will be automatically charged so it stays fully charged)

6 OPERATION

Once correctly setup, the Portable Decoder system is ready to automatically record the chips as they pass the measuring point.

The following operation steps may be required:

- Set up a new file for the race - see *6.1.1 New file* on page 26 for more details
- If an electronic starting pistol is connected to the I/O port at the rear of the Portable Decoder case, the start signal can be automatically recorded by the Portable Decoder system when the pistol is fired - see *6.1.2 Gun* on page 27 for more details.
- Once the race is started, occasionally check the front panel LEDs for errors, and that the battery indicators show sufficient battery power (if required, you can connect a 12 VDC external battery to the 12 VDC connection at the back of the Portable Decoder case - see *6.2 Connect external battery* on page 28).
- At the race finish line, check status as competitors pass the antenna by making sure that they are detected (flashing LED and beep). If required, you can mark an individual time using the 'Mark' button - see *6.1.3 Marker* on page 27. You can also retrieve the race data as described in *6.3 Retrieve data* on page 29.

When ready you can remove the Portable Decoder equipment as described in *5.2 Removal and storage* on page 24.

6.1 Marker types

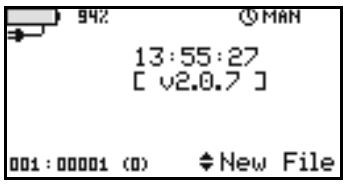
The following operating functions are built under the special 'Mark' button selectable with the up/down navigation buttons on the main screen:

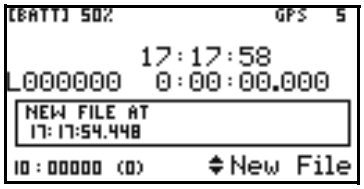
- Start a new file - see *6.1.1 New file* on page 26
- Manually register a starting pistol (gun) signal - see *6.1.2 Gun* on page 27
- Marker - mark individual times - see *6.1.3 Marker* on page 27

Note: The 'Mark' button is always operational regardless of the current screen; the type of marker is only selectable on the main screen.

6.1.1 New file

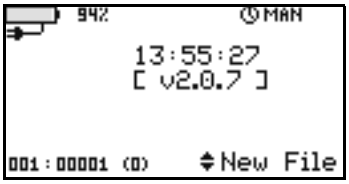
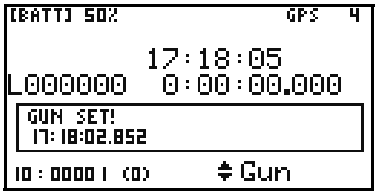
This function is useful for separating the detected chips times into individual files (e.g. it can be used to record multiple races after each other). Use this function as follows:

1	Check the selection in the bottom right corner of the main screen -this will display either 'New file', 'Gun', or 'Marker'	
2	Use the up/down navigation buttons to select 'New file'	

3	Start 'New file' • Press the 'Mark' button every time you wish to start a new file (maximum 999 files) • A message appears showing the time the new file is started	 

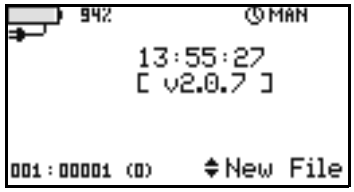
6.1.2 Gun

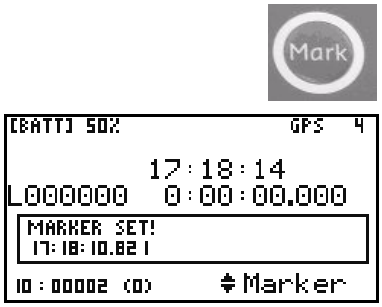
This function is useful for manually registering a start gun time at the beginning of a race. Use this function as follows:

1	Check the selection in the bottom right corner of the main screen -this will display either 'New file', 'Gun', or 'Marker'	
2	Use the up/down navigation buttons to select 'Gun'	
3	At the start of the race, press the 'Mark' button to register a start gun time	 

6.1.3 Marker

This function is useful to manually register a time during a race (e.g. recording the time for a competitor without a chip). Use this function as follows:

1	Check the selection in the bottom right corner of the main screen -this will display either 'New file', 'Gun', or 'Marker'	

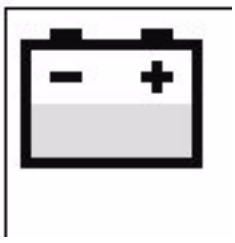
2	Use the up/down navigation buttons to select 'Marker'	
3	Press 'Mark' button to mark a time	

6.2 Connect external battery

CAUTION

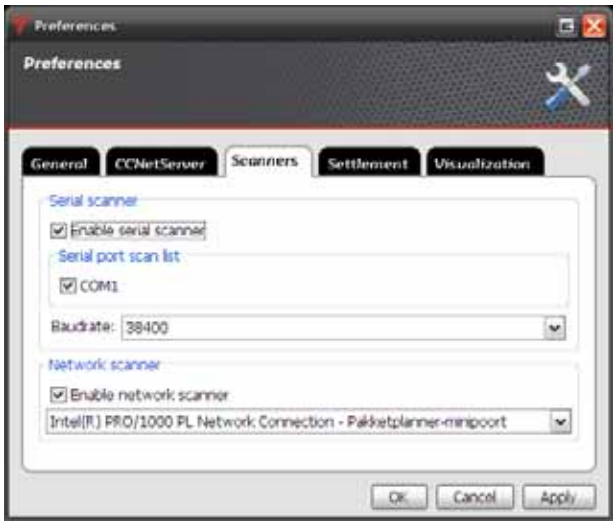
EQUIPMENT DAMAGE
The Portable Decoder will be seriously damaged if connected to an incompatible power supply.
Only connect the Portable Decoder to a 12 VDC external battery.

Normally the internal battery (when fully charged) is sufficient for a race duration, however a 12 VDC external battery can be connected as follows:

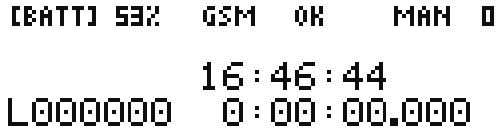
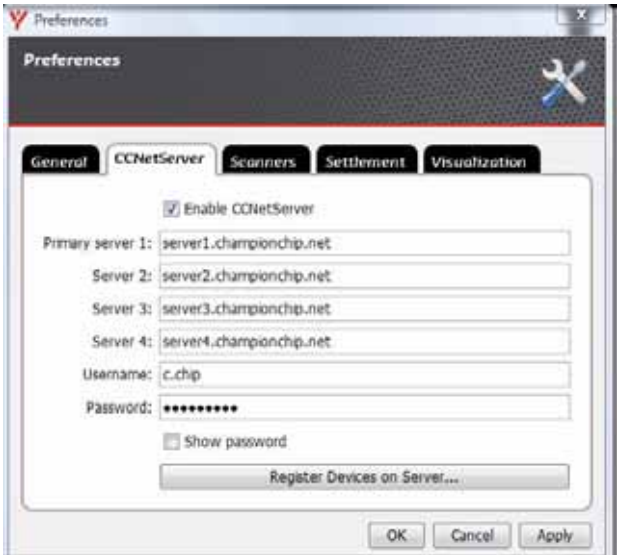
1	Connect battery: • Attach leads to battery terminals (red to +; black to -) • Press the battery connector into the socket at the back of the Portable Decoder case and check the LED is lit	
2	Check the top left of the main screen to ensure that the external battery symbol is showing, and the battery has sufficient charge	

6.3 Retrieve data

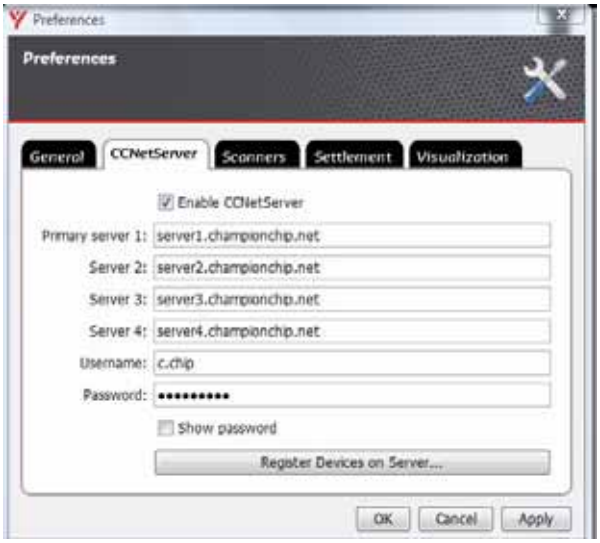
6.3.1 Retrieving data (local network via Ethernet cable)

1	Connect an Ethernet cable by firmly clicking it into the connector (always use the supplied Ethernet cable, or standard Ethernet UTP cable up to a max. 100 m (300 ft) long). Check the green LED (under Ethernet connector) is lit to show the connection is made.	
2	Choose menu 'Communication', then 'Network settings'. From the settings screen, select one of the following: • Choose 'IP Config Mode' and 'Automatic (DHCP)' to assign IP address automatically • Choose 'Manual IP settings' to manually assign IP address - use the navigation buttons to enter 'IP address', 'Netmask', 'Gateway' and 'DNS' (Gateway and DNS are optional if internet connection is not required or available)	
3	When the decoder is connected to the local network, use the MYLAPS software Toolkit to retrieve recorded data. Refer to the Toolkit User Manual for the instructions on how to startup Toolkit and assign the correct scan settings for Toolkit. See here an example Toolkit screen for scanner settings.	

6.3.2 Retrieving data (GSM)

1	Select internet mode: • Choose menu 'Communication', then 'Internet connection' • Choose 'CCNET GSM' to connect to the internet via a GSM connection	
2	Check GSM connection • Return to the Main screen • Check that the top line is showing 'GSM xx OK' • If this does not appear within a minute, refer to *8 Troubleshooting* on page 40	
3	When connected to CCNet, use the MYLAPS software Toolkit to retrieve recorded data. Refer to the Toolkit User Manual for the instructions on how to startup Toolkit and assign the correct CCNet settings. See here an example Toolkit screen for CCNet settings.	

6.3.3 Retrieving data via internet (CCNET Ethernet)

1	Select internet mode: • Choose menu 'Communication', then 'Internet connection' • Choose 'CCNET Ethernet' to connect to the internet via your local server	
2	Check CCNET connection • Return to the Main screen • Check that the top line is showing 'NET OK' • If this does not appear within a minute, refer to *8 Troubleshooting* on page 40	
3	When connected to CCNet, use the MYLAPS software Toolkit to retrieve recorded data. Refer to the Toolkit User Manual for the instructions on how to startup Toolkit and assign the correct CCNet settings. See here an example Toolkit screen for CCNet settings.	

7 MAINTENANCE

Only qualified and trained personnel should perform maintenance on MYLAPS equipment.

Maintenance can be described as, but not limited to:

- Checking and testing components
- Cleaning the unit and individual components - accumulated dirt can hamper unit operations
- Installing and removing parts from the unit
- Troubleshooting any malfunctions that may occur on the unit before, during and after operations
- Calibrating and adjusting settings on the unit

7.1 Periodic maintenance schedules

Use the following table to plan routine maintenance for your unit. If you are using the electronic version of this document, click the text or the page number to jump to the procedure.

Maintenance activity	Page	Service interval			
		daily	monthly	6-monthly	as required
Clean	33				●
Charge battery	34	●			
Check/Update software	35		●		
Calibrate battery indicators	36			●	
Remove/replace SD card	37				●
Remove/replace SIM card	38				●
Replace battery	38				●
Emergency startup	39				●

NOTE: *The 'Emergency startup' procedure is mostly required during troubleshooting to solve system errors.*

7.2 Clean

1	Take a clean soft cloth and moisten it with clean water (do not use an abrasive cleaning liquid).	
2	Using gentle strokes, clean the inside of the case, including the screen. Dry off any excess moisture. Use a newly moistened cloth to clean the outside of the case, including under protective cover and around connectors.	
3	Use a moist cloth to clean the antenna cables, paying particular attention to remove any dirt in the connectors.	

CAUTION

ENVIRONMENTAL HAZARD
Plastic and other waste products are harmful to the environment. Dispose of waste items in a responsible, environment-friendly manner. Separate recyclable products from other, non-recyclable waste. Heed site regulations and obey local environmental by-laws

4	Dispose of the cleaning materials (check you local environmental regulations).	

Charge battery

1	Check that temperature of the charging location is within range 0 to +40 °C (+32 to +104 °F)	

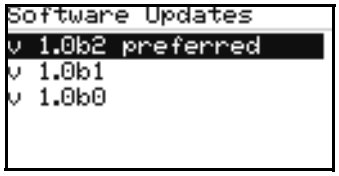
CAUTION

HIGH VOLTAGE:
Before connecting power to the Portable Decoder, make sure that all electrical connections are secure..

2	Connect cable: • Switch off the decoder at main switch • Attach 100 - 240 VAC cable into AC connector at rear of case • Connect the power cable into the mains power socket	
3	Check the battery status at the front of the case: • The LEDs will gradually light from left to right as charging is in progress (last LED will blink) • Wait until battery is fully charged and all 5 LEDs remain lit (takes 5 to 10 hours from empty to full)	
4	Remove power (optional): • MYLAPS recommends leaving power connected to retain battery life and ensure the decoder is fully charged and ready for its next use	

7.3

7.4 Check/Update software

1	Connect to a local internet provider via a cable connection or via GSM (select CCNet GSM)	
2	Access menu 'Status': • Select 'Software version' • Wait until your current software version is displayed, together with its build date	
3	Update version (if required): • Select 'Check update' • Use the navigation buttons to scroll through the displayed software versions and use 'Enter' to choose the version you wish to load as your current version (the download may take several minutes)	
4	Check update: • Confirm reboot to new version • Verify that new version works correctly (if problems occur, refer to section Troubleshooting)	

7.5 Calibrate battery indicators

1	Check that temperature of the charging location is within range 0 to +40 °C (+32 to +104 °F)	

CAUTION

HIGH VOLTAGE:
Before connecting power to the Portable Decoder, make sure that all electrical connections are secure..

2	Fully charge the battery until the green 'F' lamp stays constantly lit (takes 5 to 10 hours from empty to fully charged)	
3	Deplete battery: • Disconnect power from the Decoder • Switch on the Decoder • Leave the Decoder running until the internal battery is completely empty (can take 24 hours from full to empty) • The Decoder will switch off automatically to prevent battery damage	
4	Fully charge the battery until the green 'F' lamp stays constantly lit (takes 5 to 10 hours from empty to fully charged)	

7.6 Remove/replace SD card

CAUTION

Equipment damage:
To prevent damage to the SD card and possible data loss, always switch off the Portable Decoder before removing/replacing the card.

1	Switch off power: • Press 'Power' button • Choose "Confirm''	
2	Remove card flap: • Unscrew the card flap with the supplied flat screwdriver • Remove the flap and store it and the screw and washer in a safe place	
3	Remove/replace card: • Press the card gently, and then release it so it ejects from its slot • Slide new card into SD slot, taking care that it is correctly oriented	
4	Check the card flap and surrounds are clean before screwing the flap back into place (remember to replace the small washer on the screw).	

7.7 Remove/replace SIM card

CAUTION

Equipment damage:
To prevent damage to the SIM card and possible data loss, always switch off the Portable Decoder before removing/replacing the card..

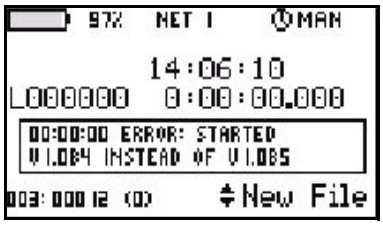
1	Switch off power: • Press 'Power' button • Choose "Confirm''	
2	Remove card flap: • Unscrew the card flap with the supplied flat screwdriver • Remove the flap and store it and the screw and washer in a safe place	
3	Remove/replace card: • Press the card gently, and then release it so it ejects from its slot • When replacing the SIM card in its slot, make sure the cut-out corner is on the bottom left	
4	Check the card flap and surrounds are clean before screwing the flap back into place (remember to replace the small washer on the screw).	

7.8 Replace battery

Please contact MYLAPS for the procedure for replacing the battery.

7.9 Emergency startup

This procedure is normally required after a problem has caused Portable Decoder to generate an error.

1	Press and hold the 'Power' button for 7 seconds until Portable Decoder powers down	
2	Switch on power: • Wait 5 seconds before starting up the decoder again • If the problem is solved, continue with normal decoder use • If the problem is not solved, power down Portable Decoder again (by holding in the 'Power' button for 7 seconds) and restarting. Do this twice to force a software version switch - see next step	
3	Switch to previous software version: • On the third restart, check that the Main screen shows the message 'Started V xxx instead of V.yyy'. This confirms that the decoder is now running a previous software version • Press 'Esc' to acknowledge the message	
4	Check the Portable Decoder system operates correctly (after the next reboot, the normal software version will be restarted again). If problems persist, contact MYLAPS at support@mylaps.com	

8 TROUBLESHOOTING

8.1 Troubleshooting principles

Troubleshooting for the Portable Decoder can be divided into 4 distinct categories:

- Start up problems - see *8.2 Start up problems* on page 41
- Electromagnetic interference (NOISE) causing problems with antenna reception and chip detection - see *8.3 Noise* on page 42
- Operating errors and warnings (signalled by screen messages) - see *8.4 Errors during operation* on page 43
- Problems with updating software - see *8.5 Problems with updating software* on page 46

If troubleshooting does not solve a problem, contact MYLAPS at support@mylaps.com. Alternatively, check the MYLAPS forum site for similar problems and solutions - see http://partner.mylaps.com

8.2 Start up problems

Normally when starting up the Portable Decoder, the main screen will appear after the power button is pressed on the control panel. However, the following problems may be encountered during startup.

No power is available (no LEDs lit)

Connect power to the Portable Decoder and check if the 'E' battery indicator is lit:

- If lit, charge the Portable Decoder (see *Charge battery* on page 34) until the internal battery is sufficiently full (the second charge LED starts to blink)
- If battery indicator is not lit, contact MYLAPS

'Detect' and 'Error' LEDs blink simultaneously

Perform Emergency startup - see *7.9 Emergency startup* on page 39.

Start screen freezes

Perform Emergency startup - see *7.9 Emergency startup* on page 39 (startup can take 40 seconds longer after a software update).

Startup errors

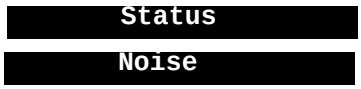
The following table alphabetically lists the errors that may be displayed immediately after power up. The suggested solutions are shown with procedure number (as listed in the Maintenance section of this manual).

PROBLEM	POSSIBLE CAUSE	SUGGESTED REMEDY
Clock stopped	Software error	Restart (see *7.9*)
Failed to access file on A	Software error in storage management	Contact MYLAPS
Failed to access file on SD	Software error in storage management	Replace SD card (see *7.6*). Contact MYLAPS if problem persist
Failed to open file on A	Software error in storage management	Contact MYLAPS
Failed to open file on SD	Software error in storage management	Replace SD card (see *7.6*). Contact MYLAPS if problem persist
Storage capacity low on A	Software error in storage management	Contact MYLAPS
Storage capacity low on SD	SD card almost full	Check storage status page, eventually replace SD card (see *7.6*)
Failed to start PPP module	Software error	Restart (see *7.9*)
Failed to start ReadLite server	Software error	Restart (see *7.9*)

Failed to start TCP/IP server	Software error	Restart (see *7.9*)
Failed to start TCP/IP client	Software error	Restart (see *7.9*)
Failed to start Toolkit server	Software error	Restart (see *7.9*)
Memory fault	Software error	Contact MYLAPS
Maintenance required (EEProm)	Software error	Restart (see *7.9*)
Reader stopped	Software error	Restart (see *7.9*)
SD card missing	No SD card is loaded	Load card (see *7.6*)
SD card write protected	SD card is locked for writing	Remove card (see *7.6*) Unlock card Reload card (see *7.6*)

8.3 Noise

Chip detection problems are sometimes caused by external magnetic interference (called Noise or EMI). This is often the situation if the Portable Decoder antennas pick up other wireless signals. Mostly, rearranging or relocating the antennas solves the problem. Check if Noise interference is too high as follows:

1	Select menu 'Status'. Select 'Noise'.	
2	Check noise level - the display readings should not exceed 40 points. If the noise level is higher, the received ProChip signal strength should be 60 points above noise level to ensure proper system functioning. So if the transponder received signal strength is 120 points, the noise should not exceed 60 points. If this is not the case: • Check antenna connections are secure • Check that the antenna cables are not damaged - if so, replace • Remove all Portable Decoder connected cables (except antenna) and check if NOISE problem is solved • Check that no other cables are in the vicinity of the Portable Decoder • Adjust the location of the Portable Decoder to eliminate the noise level	

8.4 Errors during operation

If errors occur during operation, an error message is displayed on the Portable Decoder control screen. See example in following figure.

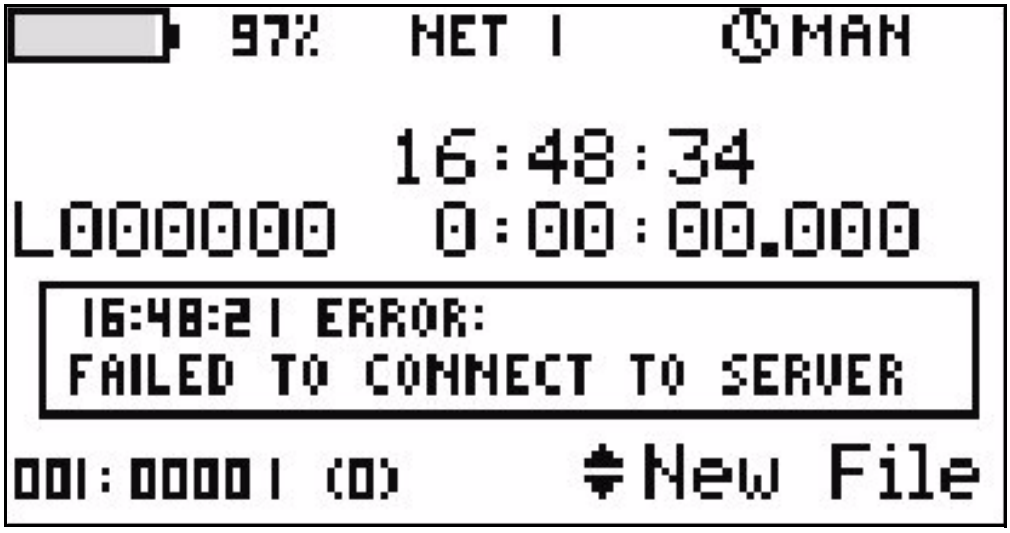


Figure 8.1 Error message on control screen

The red 'error' LED on the panel on the front of the case will glow continuously for an error - see location of red 'error' LED in following figure:

Figure 8.2 Error lamp

To acknowledge the error and clear the message, press the 'Esc' button. In an extreme emergency situation, hold in the main power switch for 7 seconds to completely shut down the Portable Decoder.

Errors can be caused by human, software, mechanical or electrical faults - read the message carefully, and decide upon the best course of action. The following table alphabetically lists the various operating errors as follows:

- Error text
- Possible Causes (in order of likelihood)
- Solutions to the listed causes (also in order of likelihood) with suggested procedure number (as listed in the Maintenance section of this manual)

Error	Problem(s)	Solution(s)
Ambient temperature too high to charge	Surrounding temperature too high to charge battery	Charge battery in correct temp. range - (see)
Ambient temperature too low to charge	Surrounding temperature too low to charge battery	Charge battery in correct temp. range - (see)
Battery fuse broken	Fuse is broken/tripped	Contact MYLAPS

Error	Problem(s)	Solution(s)
Battery low	Warning that the battery charge level is becoming low	Connect to an external battery, or connect to AC power (if no other option)
Battery status read failed	Software error	Restart (see *7.9*)
Battery temperature too high to charge	Battery temperature too high	Charge battery in correct temp. range - (see)
Battery temperature too low to charge	Battery temperature too low	Charge battery in correct temp. range - (see *7.6*)
Charge error (high current)	The measured charge current is too high	Connect alternative (110 - 240 VAC) supply. Contact MYLAPS if error repeats
Charge error (low current)	The measured charge current is too low	Connect alternative (110 - 240 VAC) supply. Contact MYLAPS if error repeats
Connection lost	Connection to the CCNet server is lost	Wait for Portable Decoder to reconnect. If error occurs frequently, check GSM status or network connections
Decoder Connection Failed	Internal communication failed	Contact MYLAPS
Decoder Re-read	Internal communication resync was required	Contact MYLAPS
External battery low	Warning that external battery charge level is low and Portable Decoder will switch to internal battery supply	Connect to an extra external battery, or connect to AC power (if no other option)
Failed SIM card	SIM card removed/faulty	Replace SIM (*7.7*)
Failed to connect to modem		Contact MYLAPS
Failed to get GSM status		Contact MYLAPS
Failed to get modem status		Contact MYLAPS
Failed to store chip codes	No permanent data storage is possible for later retrieval	Do not power down the Portable Decoder before retrieving race data via network. Contact MYLAPS for eventual solution
Failed to connect to server	Waiting for modem	Wait for modem connection
	Logging in at server problem	Contact network provider
Failed to find GSM network	Logging in at provider	No GSM provider - check connection (see *Appendix 1: Preliminary installation instructions* on page 49); contact provider if problem persists
Failed to get GSM signal	GSM signal is unavailable	Check that a GSM signal is available Contact GSM provider

Error	Problem(s)	Solution(s)
Failed to get GSM status		Contact MYLAPS
Failed to get a PPP connection via GSM	Internet unavailable	Check APN, User name and password. Contact network provider
GPS antenna short circuit	Short circuit in the GPS antenna - no sync is possible with GPS	Contact MYLAPS
GPS antenna not connected	No connection to GPS antenna - no sync is possible with GPS	Contact MYLAPS
GPS module failed	No communication is possible via GPS - no sync with GPS time.	Restart (see *7.9*)
GPS signal lost	Portable Decoder out of range of GPS satellite(s)	Wait until signal is restored, or relocate Portable Decoder for a better GPS reception (see *8.7*)
GPS timeout	Portable Decoder out of range of GPS satellite(s)	Wait until signal is restored, or relocate Portable Decoder for a better GPS reception (see *8.7*)
GPS unknown leap seconds	Warning to signal that the GPS is not yet corrected for annual leap 'time' adjustment	Wait until synchronization is completed (max. 12 minutes)
Internal battery disconnected	Battery is not connected or has been shut down by temperature protection	Contact MYLAPS
Maintenance required (battery voltage high)	Battery has been charged at too high a current	Replace battery if message repeats (see *7.8*)
Maintenance required (battery capacity)	Battery has been loaded for too long	Replace battery if message repeats (see *7.8*)
Maintenance required (EEPROM)		Contact MYLAPS
Memory fault	Software problem	Contact MYLAPS
Moderate Noise detected	Noise level above 40	See *8.3*
NTP Sync failed	Error during NTP server communication	Check internet connection, contact MYLAPS
OS Error (file descriptor)	Software problem	Do not power down the Portable Decoder before retrieving race data via network. Contact MYLAPS for eventual solution
OS Error (file pointer)	Software problem	Do not power down the Portable Decoder before retrieving race data via network. Contact MYLAPS for eventual solution

Error	Problem(s)	Solution(s)
Severe Noise detected	Noise level above 50, detection likely to suffer from interference	See *8.3*
Stand-by clock failed	System has been powered down for too long	Set the clock again
Started V1 instead of V2	Started wrong software version	Reload correct software (see *7.4*)
Version changed to Version x.x	Confirmation of a software update	Press 'Esc' to acknowledge message

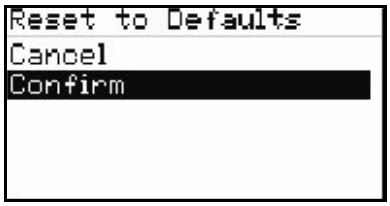
8.5 Problems with updating software

If a problem occurs with an updated software version, Portable Decoder can revert to a working software version as follows.

1	Check Portable Decoder is started: • If Portable Decoder does not start correctly, refer to *7.9 Emergency startup* on page 39 to force a reboot with a working software version	
2	Refer to *7.4 Check/Update software* on page 35 for how to update software and make sure you select a software version that previously ran correctly on your Portable Decoder.	
3	Report software problem to MYLAPS.	

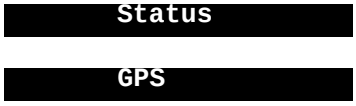
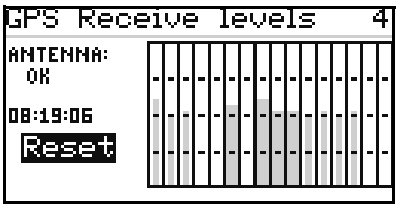
8.6 Reset to factory defaults

If required, Portable Decoder can be reset to the original factory settings.

1	Access Maintenance/Service menu	
2	Use the arrow buttons on the keypad to enter code '6789' and press 'Enter'	
3	Confirm • Wait for 'Reset to defaults' screen • Select 'Confirm' and press 'Enter' - the controller will automatically reboot with the factory defaults	

8.7 GPS reception is weak or lost

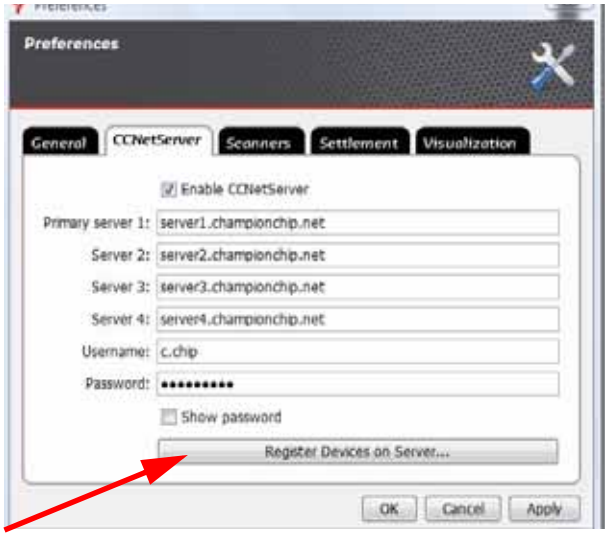
Solve problems with a weak or lost GPS signal as follows.

1	Reposition the Portable Decoder controller so that it has a clear view of any possible satellites (not obstructed by buildings, trees, etc.)	
2	Access GPS status • Select menu 'Status' • Select 'GPS'	
3	Check signal strength • Press 'Reset' to start a new search for available satellites • Wait until the reception strength screen appears (showing at least 3 'Receive levels')	

APPENDICES

This section contains the following appendices:

Appendix 1: Preliminary installation instructions

1	Power up Portable Decoder	
2	Choose menu 'Communication' Choose 'GSM settings'	Communication GSM settings
3	Enter setting: • Use the up/down navigation buttons to choose respectively APN, Username, or Password • Use the left/right navigation buttons to enter the correct value for the chosen setting • Confirm the setting with 'Enter'	
4	When all settings are correct and confirmed, exit menu with 'Esc'	
5	Use the MYLAPS software Toolkit to register the Portable Decoder at the CCNet server. Refer to the Toolkit User Manual for the instructions on how to startup Toolkit and choose for CCNet settings. See here an example Toolkit screen showing the button for registering a device at the CCNet server.	
6	Test the connections	

Appendix 1: Specifications

Portable Decoder Controller

Material	**Modified Pelican 1450 case**
Dimensions (B x D x H)	371 x 258 x 152 mm (14.61 x 10.16 x 5.98 in)
Weight (including accessories)	10 kg (22 lb)
AC input voltage	100 to 240 VAC at 50/60 Hz
Power consumption (charging)	60 W
Power consumption (charged)	2.5 W
Typical power consumption (operation)	7.2 W
Max. power consumption (operation)	12 W
Internal battery current	12 V / 13 Ah NiMH
Charge time (device switched off)	<5 hours
Charge time (device switched on)	<10 hours
Operating time	>15 hours (with fully charged battery)
Operating temperature (charging)	0 to +40 °C (+32 to +104 °F)
Operating temperature (not charging)	-20 to +50 °C (-4 to +122 °F)
Storage temperature	-20 to +40 °C (-4 to +104 °F)
Relative humidity	Max. 90%, non-condensing
Pollution degree	III
Protection class (rear lid closed)	IP54
Protection class (rear lid open)	IP33
Safety norm	EN60950
Maximum chip passing speed	90 km/h (56 mph)
Maximum laid antenna dimension (W x L)	0.6 x 24 m (2 x 72 ft)
Antenna wire	Diameter =3 mm (1/8 in), tinned copper, 0.75 mm² (18 AWg)
Max. unique chip detects	50/sec
Timing Resolution	0.004 sec
Clock tolerance	1 ppm
Maximum detection buffer size	160,000 chips
SD card	Max 133X, 2 Gb, -20 to +50 °C (-4 to +122 °F)
GSM unit	Triband, GPRS, EDGE

ProChip

Operating Frequency	3155 to 3400 kHz
Dimensions (Diameter x Height)	37 mm x 13 mm (1.45 x 0.51 in)
Weight	16 g (0.035 lb)
Max. speed	75 km/h (47 mph)
Life span	approx. 120,000 antenna detections or 5 years
Max. detection height	approx. 90 cm (3 ft)
Operating temperature	-20 to +50 °C (-4 to +122 °F)
Storage temperature	-20 to +40 °C (-4 to +104 °F)
IP Protection Class / max immersion depth	IP 68 / 4 m (13.12 ft)

IO port pin settings

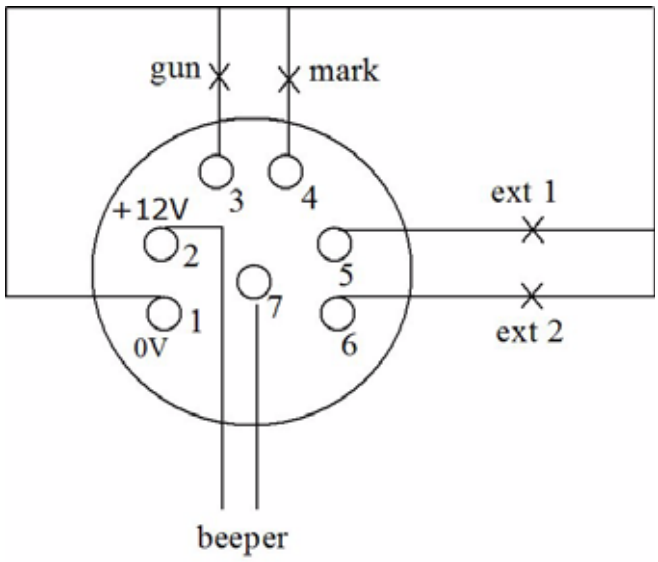


Figure 8.3 Pin settings

1 = -0 V

2 = +12 VDC_OUT (500 mA)

3 = in GPIO1 - reserved for GUN (gun between GPI01 and -0V)

4 = in GPIO2 - reserved for Marker (same as marker button on control panel)

5 = in GPIO3 - reserved (e.g. for light curtain 1)

6 = in GPIO4 - reserved (e.g. for light curtain 2)

7 = out GPIO5 - reserved for Beeper (beeper between 12V_out and GPI05)

(GPIOs are open collectors, max. 24 VDC and max 500 mA)

Appendix 2: CE Declaration

CE Declaration of Conformity

We,

ChampionChip B.V.
Havenweg 15
6541 AD Nijmegen, The Netherlands

declare that the RFID controller

Apex V2

in accordance with the following Directives:

2006 / 95 / EC	**The Low Voltage Directive;**
2004 / 108/ EC	**The Electromagnetic Compatibility Directive;**

has been designed and manufactured to the following specifications:

EN 300 330-2 (2006)
EN 301 489-1 (2005)
EN 301 489-3 (2002)
EN 61000-3-2 (1995), with A1 (1998) and A2 (1998)
EN 61000-3-3 (1995)

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications. The unit complies with all essential requirements of the Directives.

Name and signature of authorized person	Bas van Rens
Function of authorized person	Managing Director
Place	Haarlem NL
Date	March 10, 2009

INDEX

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