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Contact Information

AMB i.t. Europe

Amsterdam
The Netherlands
Tel: +31 23 529 1893
E-mail:
support-eur@amb-it.com

AMB i.t. Asia

Tokyo
Japan
Tel: +81 352754600
Email:
support-asia@amb-it.com

AMB i.t. America

Atlanta
USA
Tel: +1 678 816 4000
E-mail:
support-us@amb-it.com

AMB i.t. Australia

Sydney
Australia
Tel: +61 2 9546 2606
Email:
support-aus@amb-it.com

www.amb-it.com



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This publication is to be used for the standard model of the product of the type given on the cover page.

1: Decoder Installation/Operation

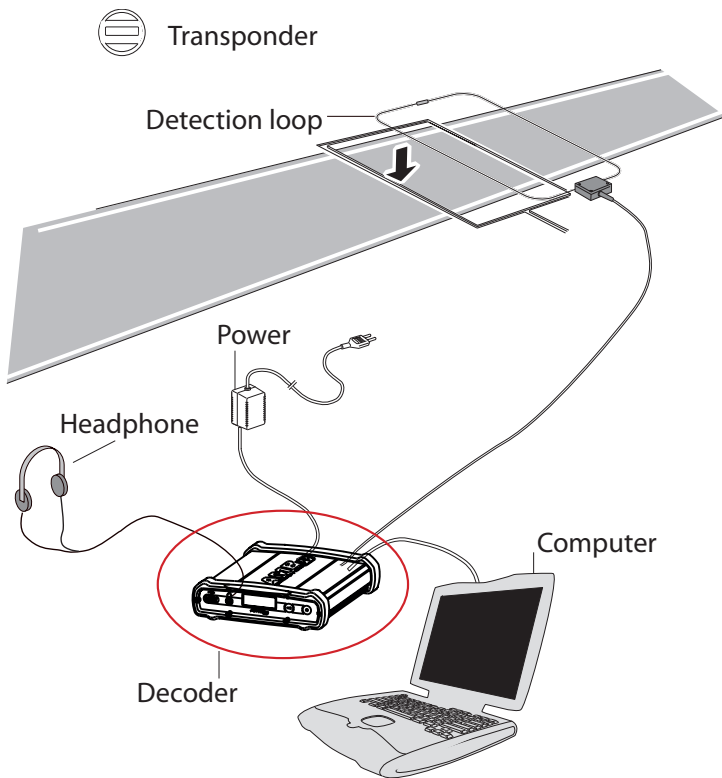


Figure 1.1 System overview

1.1 Installation of the decoder

The decoder is a precision instrument. Therefore please handle it with care and keep the decoder out of direct sunlight and avoid high humidity. Take special precautions in case of thunderstorms by disconnecting all cables (coax, Ethernet and mains) from the decoder. Nearby lightning strikes can damage the decoder when these cables are connected.

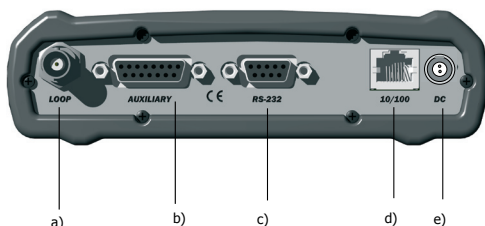


Figure 1.2 Connections of the decoder

How to connect

- a) The detection loop: Connect the supplied 75 Ohm double-shielded coax cable to the decoder.
- b) The auxiliary port: This port can be used to connect a photocell, external start pulse or a sync pulse. For more information on how to connect these devices, contact your nearest AMB i.t. office.
- c) The serial port: This port can be used to connect the decoder with the computer with a RS232 cable.
- d) The network: Connect the network cable between the decoder and the network connection port of the computer.
- e) Power: Connect the 12 VDC adapter to the decoder and mains. Since a power interruption will result in a failure of the timing and scoring system, connecting the 12 VDC adapter to mains through a UPS (Uninterruptible Power Supply) is recommended.
- f) The headphone: Connect it on the **front side** of the decoder. A beep will sound for every passing transponder, which provides an easy check for proper operation of the decoder and the transponders on the track.

1.2 Operating the decoder

The decoder is not equipped with an on/off switch, therefore connecting the decoder to the mains will switch it on and will enable timing of transponder passings after approximately 15 seconds. With each detection of a transponder, a beep will sound in the headphone and received transponder information is shown on the decoder display.

1.2.1 Noise level

The decoder determines the average background noise. The noise (and signal strength) has a range of 0 to 255 points. Noise level, as shown by the AMB i.t. timing software and also on the decoder screen, should best not exceed 40 points. If the noise level is higher, the received transponder signal strength should be 60 points above noise level to ensure proper functioning of the system. So if the transponder received signal strength is 120 points, the noise should not exceed 60 points.

1.2.2 Signal strength

Transponder signal strength, as shown by the AMB i.t. timing software, should preferably be above 100 points and should at least be 60 points higher than the indicated background noise. The closer a transponder is to the track the higher the signal strength. A higher transponder signal strength gives a higher immunity against outside interference.

1.2.3 Number of hits

The number of hits, as shown by the AMB i.t. timing software, is an indication of the number of repeated transponder signal receipts during a passing. Hit-rate varies with the speed of a passing transponder. Slower passings yield higher hit counts. The minimum number of hits should not be below 10 points.

1.2.4 Firmware update

Our products are in continuous evolution, for new functionalities and small changes you can check our website for a decoder firmware update. Please go to <http://support.amb-it.com> and follow the instructions.

1.3 Menu options explained

On the front of the decoder, you will find an information display, designed to show and change the decoder settings.

The status screen will show the following information:

- a: Decoder date/time, UTC when synchronized to GPS
- b: Timeline name
- c: Blinks when connecting to Mylaps Live, steady when connected to Mylaps Live
- d: Background noise indication
- e: Indication that hits are received, remains black when a transponder is being received by the loop.
- f: Strength of last received transponder
- g: Number of received GPS satellites
- h: Blinks when GPS receiver attached, steady when decoder is locked to UTC time
- i: Message line

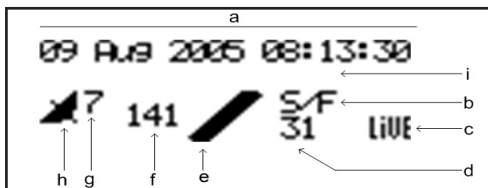


Figure 1.3: Status display.

By clicking on the Acknowledge button once, you will find the IP address of the decoder. By clicking this button twice, you will find the Ethernet Address/Serial number (see 1.3.2.), by clicking it three times, it will show the version and type of the decoder, and by clicking it 4 times it will show the number of passings stored in the flash memory.

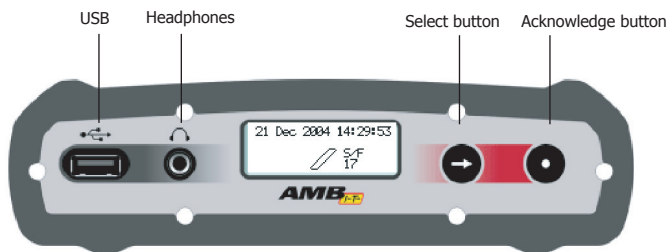


Figure 1.4: Decoder with status display.

By clicking on the Select and Acknowledge buttons you can choose which information you want to see on the display. Detailed information of the menu options will be given on the following pages.

By clicking on the select button you will find a main menu with different subjects :

General	Clear passings
	Timeline
	Beep
	Loop trigger
	First contact
	Protocol RS232
	Contrast
	Factory defaults
	Firmware

Net	Automatic
	IP address
	Subnet mask
	Gateway
	DNS

Timing	Sport
	Photo holdoff
	ext. start holdoff
	Sync holdoff

Clock	Date
	Time

Mylaps live	Active
	Activation code



Figure 1.5: Menu

You can navigate between the menu items with the Select button and you can choose a menu with the Acknowledge button. Please note that you can go one step back by selecting << and clicking the Acknowledge button.

1.3.1 MENU: General

Within the general menu you can choose/see:

- **Clear passings:** clears the passings in the flash memory.
- **Timeline:** description of the loop name. Occasionally needed for the timing software.
- **Beep:** to choose the tone of the beep.
- **Loop trigger:** optional for future developments.
- **First contact:** when switched on the decoder will send a record without a time stamp as soon as the transponder is detected. This is intended to allow TV graphics applications to already display a name, while the passing time is not known yet (works with P3 protocol only).
- **Protocol RS232:** This is used to select the protocol on the RS232 interface. There are 3 options:
 - Enhanced:
This protocol is here only for compatibility reasons. Not all features are available via this protocol.
 - P3:
If you are a software developer this is the preferred protocol to use. This protocol is also used for software like 'Racewave' and 'Orbits'.
 - Remote:
Allows the host computer to select the protocol by using a command.
- **Contrast:** contrast of the display. Here you can adjust the contrast settings.
- **Factory defaults:** reset to the factory defaults. You can reset the settings of the decoder to the initial settings.
- **Firmware:** software running inside the decoder. When you update the firmware in your decoder, the decoder will retain the current version of the firmware. With the switch firmware option you are always able to revert back to the previous version.

1.3.2 MENU: Net

Please leave the decoder in the automatic menu if you are not familiar with network basics.

Within the Net menu you can choose/see:

- **Automatic:** to automatically determine the IP address of the decoder.
If your decoder is placed in a network and you select automatic "on" the decoder will first try via the DHCP server (DHCP = Dynamic Host Configuration Protocol) to get an IP address which is in the range of the network. Please note that it can take around 60 sec. to obtain the settings via DHCP. If a DHCP server is not found, the decoder will use an IP address via APIPA (Automatic Private IP Addressing)
- **IP address:** IP address of your decoder
An identifier for a computer or device on a TCP/IP network.
- **Subnet mask:** A mask used to determine what subnet an IP address belongs to.
- **Gateway:** A node on a network that serves as an entrance to another network.
- **DNS:** Short for Domain Name System (or Service or Server), an Internet service that translates domain names into IP addresses.
Gateway and DNS are both used to set up the decoder for Mylaps live.

1.3.3 MENU: Timing

Within the timing menu you can choose/see:

- **Sports:**
There are many parameters which may influence timing performance. With the sport setting the decoder uses some pre-defined parameters optimized for a certain type of sport / transponder placement.

Sport	Loopwidth	Transponder placement
Ice skating	50cm / 1.7ft	Strap around ankle
Inline skating	60cm / 2ft	Strap around ankle
Cycling	60cm / 2ft	Vertically mounted to the bike
Other	60cm / 2ft	

Note : Use 'other' if there is no **exact** match for sport and transponder placement.

- **Photo holdoff,**
External start holdoff
Sync holdoff

This is the time in milliseconds the decoder will wait before accepting a new pulse via one of those inputs.

1.3.4 MENU: Clock

Within the Clock menu you can see/change:

- **Date:** date settings
Here you can change the date
- **Time:** time settings
Here you can change the time of day

1.3.5 MENU: Mylaps live

MyLaps Live provides AMB transponder users and race fans with live race information from circuits that use AMB i.t. hardware around the world. It is your live global score board, bringing you up-to-date real time results whenever and wherever the action is.

Within the Mylaps live menu you can see/change:

- **Active:** to put all passings directly on the live results website or not.
- **Activation code:** a unique code which should be used for registering on MyLaps Practice website **www.mylaps.com/practice**. Please visit www.mylaps.com for more information about finding all your race results online.

Note : For using mylaps live you need a functioning internet connection. Also the DNS server and gateway setting have to be correctly configured (see menu `network`).

A1: Transponder is not being detected

A few of the transponders are not being detected.

If this is the case, the problem is most likely related to the individual transponder or the positioning of the transponder.

- Check the mounting position of the transponder, for more information check your transponder manual.

None of the transponders are being detected.

If this is the case, the problem is most likely related to the detection loop, decoder, timing computer or cabling. Please take the following steps:

- Check if a beep is heard in the headphone, or of the loop in the display changes to black during a transponder passing. If this is working, but nothing appears on the computer screen, check the cabling between the decoder and the computer.
- Check the coax cable by measuring the resistance (with multimeter) between the centre pin and the outside of the BNC connector. The reading should be approximately 150 kOhm after 30 seconds. If not, the coax has to be replaced.
- Check the loop wire by cutting the loop wires from the connection box and measuring the resistance between the loop wires in the track. The reading should be approximately 220 Ohm. If this is not the case, the loop has to be replaced. When (re)connecting the loopwires to the connection box please solder with proper connections (for more information please check your system installation manual).

A2: Noise level

What if my background noise is higher than 40 points?

An increased background noise is an indication of a higher interference level picked up by the system. Every five seconds a background noise measurement is performed by the decoder and sent to the computer. The noise level should be as low as possible, but as long as the received signal from the transponders is 60 points higher than the noise level detection will be reliable. If the noise level is higher than 70 there is most likely something wrong with the installation.

Possible causes of high background noise levels:

- When the detection loop is damaged, a fluctuation in noise level will be noticeable, especially in wet conditions. If this is the case, please check the loop wire and coax for cuts or breakage.
- Electrical equipment too close (<3 m) to the loop or coax cable.
- Using a generator with a poor ground connection
- Use of DC/AC converter for AC power.
- Poor connections between the detection loop and the coax cable.
- BNC connector incorrectly fitted to the coax cable.
- Poor ground connection of the AC power. If this is the case, ground the decoder by connecting the outside the BNC connectors on the decoder to a piece of metal (copper rod or tube) that goes into the ground.

A3: Signal strength

What if the received signal strength is below 100 points?

- If the signal strength is lower than 100 points, please check the position of the transponder.
- If the signal strength is fluctuating heavily in combination with high noise levels, check the quality of the loop installation and coax cables.

Appendix B: EC and FCC Regulations



CE information:

This device complies with the EMC directive 89/336/EEC. A copy of the declaration of conformity can be obtained at:

AMB i.t. BV
Zuiderhoutlaan 4
2012 PJ Haarlem
The Netherlands



FCC information:

This equipment complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This equipment may not cause harmful interference, and (2) this equipment must accept any interference received, including interference that may cause undesired operation.

Appendix C: Technical Specifications

Dimensions	180 x 160 x 45 mm / 7 x 6.3 x 1.8 inch
Weight	720 g / 1.6 lb
Decoder Clock stability	0.5 ppm
Decoder Timing Resolution	0.001 s
Time of day clock stability (decoder off)	+/- 25 ppm
Time of day clock stability (decoder on)	+/- 0.5 ppm
Time of day clock resolution	1 sec.
Time of day clock synchronisation	via GPS receiver to UTC (AMB part nr. 00017)
Max. track width	max. 20 m / 66 ft
Operating temperature range	0 - 50 C / 32 - 122 F
Humidity range	10 % to 90 % relative
Operating voltage range	10 to 14.4 V, typical 12V
Power consumption	max. 600 mA @ 12V, typical 250 mA
Interfaces	RS232, 9600 baud, 8 bits, 1 stopbit 10/100 BaseT USB A
Network connection	DHCP client, APIPA, Static IP
Aux. Power	5 VDC, max 150 mA
Aux. Output	Opto coupled closing contact max 50 mA switched
Aux. Inputs	3x Opto coupled 5-12 VDC / 5-15 mA

Specifications are subject to change without notice.

Guarantees & Warranties

AMB i.t. guarantees that, for a period of twelve months from the date of dispatch, decoders manufactured or sold by AMB i.t. with defects caused by faulty materials and/or workmanship and/or design, will be repaired. If repair is not possible or economical for AMB i.t., AMB i.t. has the choice to refund the purchase price of these goods or to deliver new goods. AMB i.t.'s liability shall be strictly limited to replacing, repairing or issuing credits at its option for any goods returned within twelve months from the date of dispatch. AMB i.t. shall not be liable for incidental or consequential damages including, but not limited to costs of removal and reinstallation of goods, loss of goodwill, loss of profits or use. If the requirements set forth above and described below are not complied with, the AMB i.t. warranty/guarantee shall not apply and AMB i.t. shall be discharged from all liability arising from the supply of defective goods.

EXCEPT AS EXPRESSLY PROVIDED IN THIS SECTION, AMB i.t. MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, NATURE OR DESCRIPTION, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OR MERCHANTABILITY, FITNESS OF THE GOODS FOR ANY PARTICULAR PURPOSE, OR NONINFRINGEMENT, AND AMB i.t. HEREBY DISCLAIMS THE SAME.

Remedies and damages

AMB i.t. shall not incur any liability under the above warranty unless:

- a) AMB i.t. is promptly notified in writing upon discovery by the customer that such goods do not conform to the warranty and the appropriate invoice number and date of purchase information is supplied;
- b) The alleged defective goods are returned to AMB i.t. carriage pre-paid;
- c) Examination by AMB i.t. of goods shall confirm the alleged defect exists and has not been caused by misuse, neglect, method of storage, faulty installation, handling, or by alteration or accident.