LogIT

Laptimer, Revmeter and Data Logger

MANUAL

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at

OWS GERMANY

Introduction

Congratulations on your purchase of **LogIT**, the time and engine rev logging system from OWS Germany. This tool is essential for every race driver to evaluate the lap performance and thus to improve the driving style as well as the setup.

The features of **LogIT** are :

- Measuring lap times (up to 3 split times)
- Measuring engine revs for both 2-cycle and 4-cycle engines
- Logging the measured lap times and engine rev values for over 110 minutes
- Professional data evaluation software

The upcoming chapter describes the one-time installation of all **LogIT** components. The use of the logger during data acquisition is explained in chapter 2. The data transfer to the PC is detailed in chapter 3.

Although we have spent an enormous amount of time to design the data logger for easy use and simultaneously strived to maximize the amount of information transfered to the driver and the engineer we recognize that improvements may still be possible. Thus we encourage you to forward any suggestions to us so that we can look into the possibilities to incorporate them into the product.

Meanwhile we wish you many quick laps and hope that **LogIT** can serve you to appreciate our common interest in racing even more.

Your team at OWS Germany

Contents

Chapter 1

Installation

1.1 Hardware installation

The **LogIT** logging system is composed of

1. the main unit which displays and logs the data
2. a timing sensor to pick up the lap signal
3. a cable with a clip to be attached to the spark plug cable in order to sense the engine rev

To install **LogIT** on your vehicle follow these steps :

1. Insert a 9V battery
2. Place the adhesive anti-slip tape
3. Fasten **LogIT** to the steering wheel
4. Mount the timing sensor
5. Attach the RPM clip to the spark plug cable

Step 1 : Inserting the battery

To insert the battery open the battery compartment on the back of the **LogIT** unit. Attach the new battery to the clip which is failsafe in respect to polarity mismatches. Finally close the battery compartment.

Step 2 : Place the adhesive anti-slip tape

The adhesive strips are to be placed on the back of the **LogIT** unit in order to avoid any slip of the case on the steering wheel. Cut the adhesive strip to the desired size and place it at the location where the steering wheel will come into contact with the **LogIT** unit.

Step 3 : Fastening LogIT to the steering wheel

Naturally **LogIT** has to be placed on the steering wheel with the display and keypad oriented to the driver. For good operability of the keys the device has to be secured tightly taking into account that while running the kart a considerable amount of vibration may be encountered.

Step 4 : Mounting the timing sensor

For use with karts the timing sensor is intended to be mounted under the front fairing. Place the sensor with its axis along the driving direction onto the floor plate and secure it with an adhesive tape (not supplied). For use with other vehicles place the timing sensor as close to the ground as possible.

Step 5 : Attaching the RPM clip to the spark plug cable

The cable with the clip is intended for picking up the ignition spikes. Hence the clip has to be attached to any part of the spark plug cable. **Do not route it close to any other electrical cable to avoid interference. Make sure that no loops are formed.** These would allow crosstalk which invalidates the measurements.

1.2 Software installation

The requirements for running the data evaluation software of **LogIT** are :

- Operating System : Windows 95/98/2000 or Windows NT/ME/XP
- Processor : Pentium 350 MHz or higher
- Free Memory : 8 MB
- Free Diskspace : 2 MB
- Free Parallel Port

To install the software insert the CD-ROM into your CD-ROM-Drive, select this drive and start the program install.exe. If your CD-ROM-Drive is for example assigned to the drive letter D then click on the start button, select execute, type ”d:\install.exe” and press return.

Follow the instructions. You will be asked to select a destination directory which will be filled with the program files. This directory will be the default destination directory for the imported data files.

After having finished the installation procedure you may start the software directly by selecting **LogIT** from the program group of the start button menu.

Chapter 2

Data Acquisition

2.1 Automatic Displays

Pressing the **ON** button powers up **LogIT**. The display will turn on as seen in figure B.8. **LogIT** instantly assumes displaying and logging both engine revs and lap times. The lap times are shown on the upper left of the display, whereas the engine revs can be seen on the upper right hand side (see figure 2.2 b).

Passing a timing line will stop the time count. If **LogIT** is set up in 1 sector mode the lap counter will be advanced. If **LogIT** is set up in 3 sector mode the symbol for the just finished section (1, 2 or F for Final) is shown in the middle of the upper line. Additionally the lap counter is advanced if the final section has been completed (see figure 2.2 a).

Below the lap time the time difference to the best split time is displayed. After eight seconds the display is switched to the new time count. The time difference to the best lap on the second line will then be replaced by the time of the last section as seen in

Figure 2.1: Layout of the keypad.

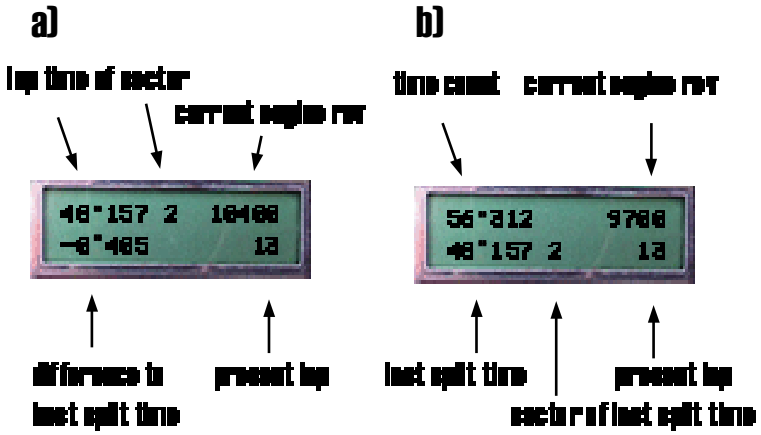


Figure 2.2: a) View of the display shortly after having passed a timing line (a) and 8 seconds later after **LogIT** has resumed the time count (b).

figure 2.2 b.

All of the times displayed have the format of seconds and thousands. The display of minutes is omitted intentionally in order for the lap times to be read as quickly as possible.

2.2 Function Overview

LogIT is operated using the **MENU** and the **SELECT** button. The **MENU** key is used to enter the menu and to scroll through the available options (thin arrows in figure 2.3). Pressing the **SELECT** button (bold arrows in figure 2.3) selects the present item if a menu is already active.

The display always reverts to normal operation (i.e. time count) if no button is pressed for eight seconds.

2.3 Menu

2.3.1 Menu Command : TRANSMIT

The logged data can be transferred to a Personal Computer (PC) using the supplied transfer cable. Plug it into the connector on the left side of the **LogIT** unit and into the parallel port of your PC. Select the menu command "Import" of the software and initiate the data transfer by selecting the menu command **"TRANSMIT"** on the **LogIT** unit. During the transmission **LogIT** will display **"TRANSMITTING..."**. At the end of the transmission **LogIT** reverts to the normal time count.

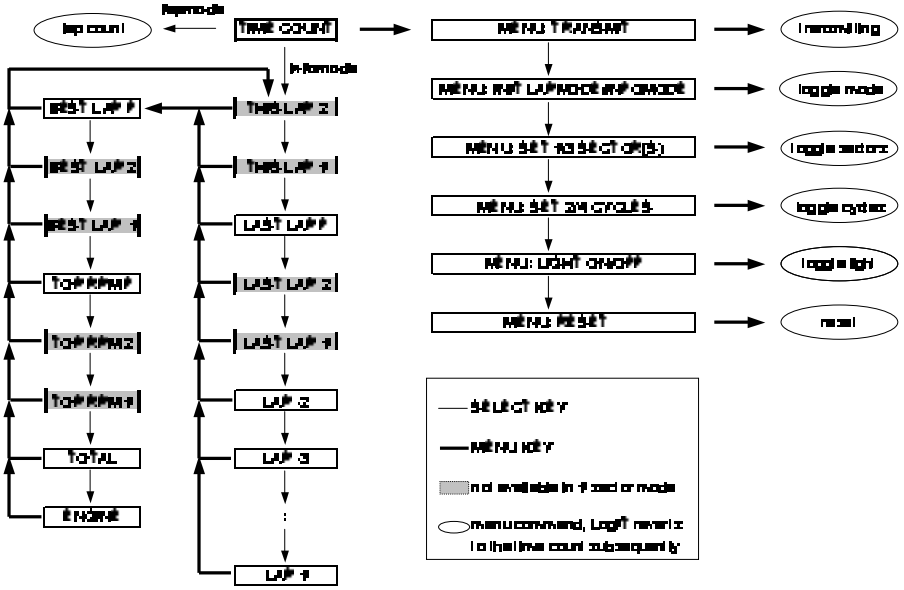


Figure 2.3: Display and menu structure. The screens "**THIS LAP 1**" and "**THIS LAP 2**" are only shown if the respective sectors have already been finished in the present lap. If a command (circled) is selected **LogIT** reverts to the time count after having executed the command.

2.3.2 Menu Command : INIT LAPMODE

If no magnetic strip for the lap timing is available or if timing on an open circuit is needed the timing has to be performed manually. This can be done by initiating the *lapmode*. In this mode pressing the **SELECT** button has the same effect as passing a timing line. Press the **MENU** button until the command "**INIT LAPMODE**" is displayed and enter the lapmode by pressing the **SELECT** button. **The lapmode is indicated by a star on the upper left side of the display.** Note that the external timing sensor is disabled during lapmode. To quit lapmode enter the menu again and select the command "**INIT INFOMODE**".

2.3.3 Menu Command : INIT INFOMODE

When not in lapmode the infomode is active. In infomode the **SELECT** button can be used to scroll through a variety of information. The order of the information displayed can be seen in figure 2.3.

All screens accessible in infomode contain an rpm value which is shown on the upper right. It is the top engine rev of the specific section displayed. The only exception is the screen named "**TOTAL**" which shows the total running time since powering on **LogIT**. The associated rpm value is the top engine rev of the whole session.

The screens "**THIS LAP 1**" and "**THIS LAP 2**" show the information for the first and second sector of the present lap if these sectors have already been finished. In "**LAST LAP F/2/1**" the time and engine revs for all sectors of the last lap can be viewed.

Pushing the **SELECT** button again will bring up the "**BEST LAP F/2/1**" screens. They display the best times recorded at these sectors. Subseqently the top engine revs for each sector are shown ("**TOP RPM F/2/1**").

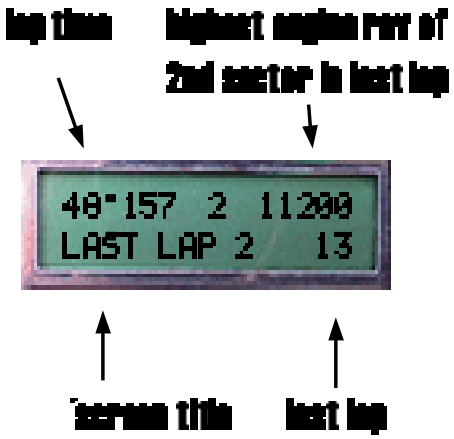


Figure 2.4: Example infomode screen. In "**LAST LAP 2**" the time and the highest engine rev of the second sector of the last lap is shown.

2.3.4 Menu Command : SET 1 SECTOR

LogIT can be used on tracks with either one or three timing lines. The currently used number of sectors (3) is shown on the upper line of the display. Select this command if you want to change the state of the **LogIT** unit in order to use it on tracks with only one timing line. By selecting the menu command SET 1 SECTOR **LogIT** assumes that the track is equipped with only one magnetic strip. Every time this timing line is crossed **LogIT** counts one lap.

2.3.5 Menu Command : SET 3 SECTORS

LogIT can be used on tracks with either one or three timing lines. The currently used number of sectors (1) is shown on the upper line of the display. Select this command if you want to change the state of the **LogIT** unit in order to use it with 3 sectors per lap. By selecting the menu command SET 3 SECTORS **LogIT** assumes that the track is equipped with three magnetic strips. When the first timing line is crossed **LogIT** registers the first split, passing the second timing line provides the second split time. After crossing the third timing line the lap time is recorded and the lap counter is increased by one.

2.3.6 Menu Command : SET 2 CYCLES

LogIT can be used with both 2 and 4 cycle engines. The currently used number of cycles (4) is shown on the upper line of the display. Select this command if you want to change the state of the **LogIT** unit in order to use it with a 2 cycle engine. **LogIT** will then acknowledge every ignition spike with one engine rev.

2.3.7 Menu Command : SET 4 CYCLES

LogIT can be used with both 2 and 4 cycle engines. The currently used number of cycles (2) is shown on the upper line of the display. Select this command if you want to change the state of the **LogIT** unit in order to use it with a 4 cycle engine. **LogIT** will then count two engine revs for every ignition spike.

2.3.8 Menu Command : TURN LIGHT ON/OFF

Selecting this command to turn the background light on or off. Keep in mind that the light consumes about 10 times the power of the rest of the unit resulting in a much shorter battery lifetime.

2.3.9 Menu Command : RESET

Selecting this command erases the previously recorded engine revs and lap times (cf. section 2.4). Recording data is resumed with the beginning of the next lap.

The lapcounter, present sector, top engine revs and total time are unchanged. If you want to reset these registers turn off **LogIT** and turn it on again.

Note : Be careful turning on LogIT in 3-sector mode while driving : If you are not in the first sector of the lap and turn on LogIT, then it will wrongly assume the next timing line to be the first split.

2.4 Logging Data

LogIT automatically logs the engine rev and the lap times. **LogIT** samples the engine rev more than 3 times per second. The recorded values are written to the non-volatile memory at the end of each lap. This means that all data recorded until the end of the last lap may be transmitted to a PC even after **LogIT** has been powered off and switched on again. If you do not want to keep the previously recorded data in the memory you can erased it by selecting the menu option "RESET".

2.5 Limits

The *lap times* may not be in excess of 99.9s. If the time count reaches this limit it will be stopped and ^^" ^^^ will be displayed to indicate the overflow. When finishing the lap by passing the final timing line an overflow indicator is written to the memory. For nearly all tracks the maximum lap time of 99.9s will not be a limiting factor.

The maximum *number of laps* that can be counted is 254. Reaching this value will disable any further lap count. Completing any more laps still results in the lap times being written to the memory but they are all labeled as number 254.

The maximum *engine rev* that is displayed is 25000 RPM. This value is written to the memory if the engine rev exceedes this limit. The accuracy of the engine rev values is limited to +/- 50 RPM as a consequence of the discrete nature of the measurement.

The maximum *running time* that can be shown on the display is 99.99 minutes. For any longer runs this limit will be displayed.

2.6 Shutdown

LogIT is turned off by pressing the **OFF** key. Do not turn off **LogIT** while passing the final timing line since this may corrupt the data of the non-volatile memory.

Chapter 3

Data Evaluation

3.1 Data Transfer to the PC

In order to transmit the logged data to your PC the following procedure has to be executed :

Step1

Plug the data transfer cable into the parallel port of your PC and into the connector on the left side of the **LogIT** unit.

Step2

Start the evaluation software and select the command **Import** from the File menu or hit the F1-key.

Step3

Select the menu command "**TRANSMIT**" on the **LogIT** unit. This initiates the transfer mode indicated by the message "**TRANSMITTING ...**". The PC software will show the number of transferred laps. At the end of the transmission the file lap.dat will be placed in the program directory.

The data may now be analyzed using the data evaluation software. See the integrated help documentation for a description of the usage of the data evaluation software.

3.2 Using Excel

The data file "lap.dat" can also conveniantly be viewed in EXCEL by just picking the file and dropping it into an EXCEL window. Open the file example.xls from the **LogIT** directoy to see an example analysis of the data in EXCEL.

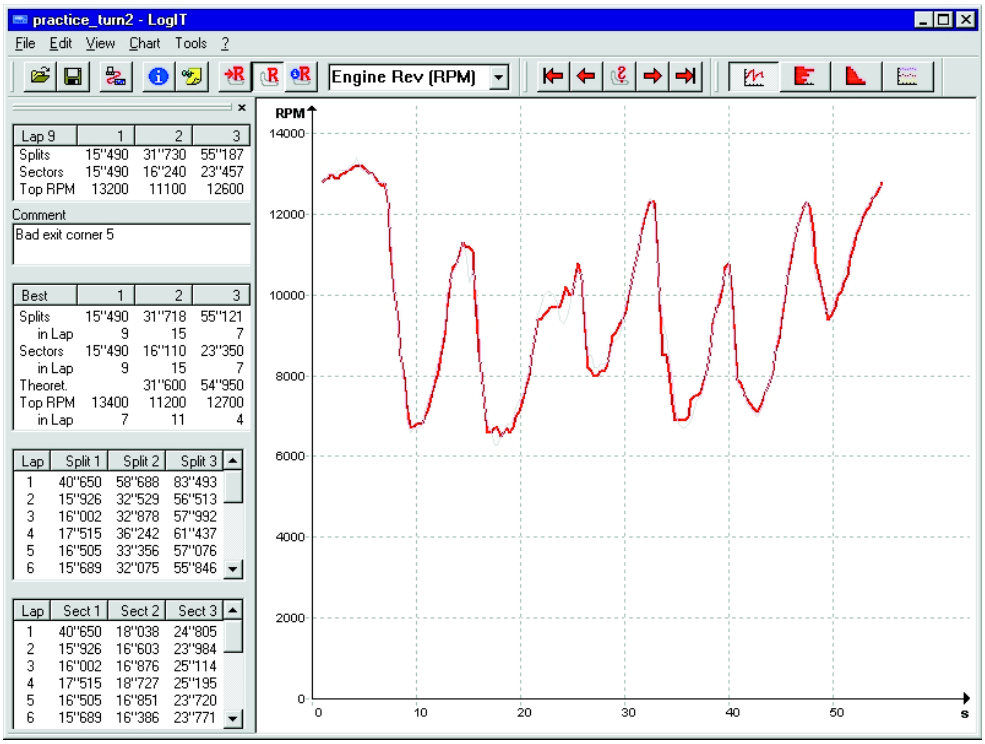


Figure 3.1: Screenshot of the **LogIT** data evaluation software package.

Appendix A

Troubleshooting

LogIT does not power up - Check that the battery has sufficient charge (minimum voltage 9V) and that it is well connected to the battery clip.

After pressing the ON button LogIT only shows black squares on the upper display line - The battery does not have sufficient charge any more to power up the **LogIT** unit. Replace the battery. Check that the PC data transfer cable is unplugged from the **LogIT** unit since the power supply of the PC might interfere with the startup procedure of the **LogIT** unit.

No Intro Screen. The display immediately after power on looks as if a timing line would have been passed - Make sure that the cable to pick up the engine rev is not routed closer than 5cm to the cable which picks up the timing signal.

No Lap Count - Make sure that the timing sensor is mounted properly (see section 1.1). Check especially that its height above ground does not exceed 5cm. Also verify that the track is equipped with magnetic strips which are essential for using the timing sensor. Make sure that the cable to pick up the engine rev is not routed closer than 5cm to the cable which picks up the timing signal.

No data is transmitted to the PC - Check that the data transfer cable is connected safely to both the parallel port of the PC and to the **LogIT** unit. Ensure that you have selected the menu command **Import** of the PC software and within 10 seconds the menu command "**TRANSMIT**" of the **LogIT** unit.

LogIT does not power down - Unplug the PC transfer cable from the **LogIT** unit before powering down.

New information that was not available while going to press might be found on the **LogIT** homepage at www.logit-online.de. If you encounter any other problems please contact OWS Germany for further assistance (support@logit-online.de).

Appendix B

Specifications

B.1 thermal characteristics

Parameter	**Min**	**Max**	**Unit**
Storage temperature	-15	70	C
Operating temperature†	0	50	C
Storage relative humidity	10	90	%
Operating relative humidity	15	85	%

† Allow the LogIT unit to acclimate to the ambient temperature prior to operation in order to avoid condensation which might cause short-circuits.

B.2 electrical characteristics

Parameter	**Min**	**Max**	**Unit**
Supply voltage	9.0	12.0	V
Current consumption (on)	14	20	mA
Current consumption (off)		0.1	μA
Battery type	9V block		
Battery lifetime (on)†	22	32	h

† assuming a typical battery capacity of 450mAh

B.3 sensor characteristics

Parameter	Min	Max	Unit
Mounting height above ground of timing sensor		2	cm
Internal timebase (nom. 4 MHz)	3.9996	4.0004	MHz
Duration between time aquisitions	2.6		s
Engine rev sampling rate	3.32	3.34	1/s
Measurable engine rev	100	25000	RPM
Resolution of engine rev measurement	100		RPM
Length cable engine rev sensor	160	180	cm
Length cable timing sensor	95	100	cm

B.4 recording characteristics

Parameter	Min	Max	Unit
Lap or sector time		99.999	s
Number of times per lap	1 or 3		
Maximum recording length of engine revs per lap	335	345	s
Recording capacity	110	113	Min

B.5 memory characteristics

Parameter	Min	Typ	Unit
Number of Reset cycles[†]	10k	100k	
Number of recorded laps[†]	100k	1M	
Characteristic Retention	40		Year

[†] whichever is reached first

B.6 display characteristics

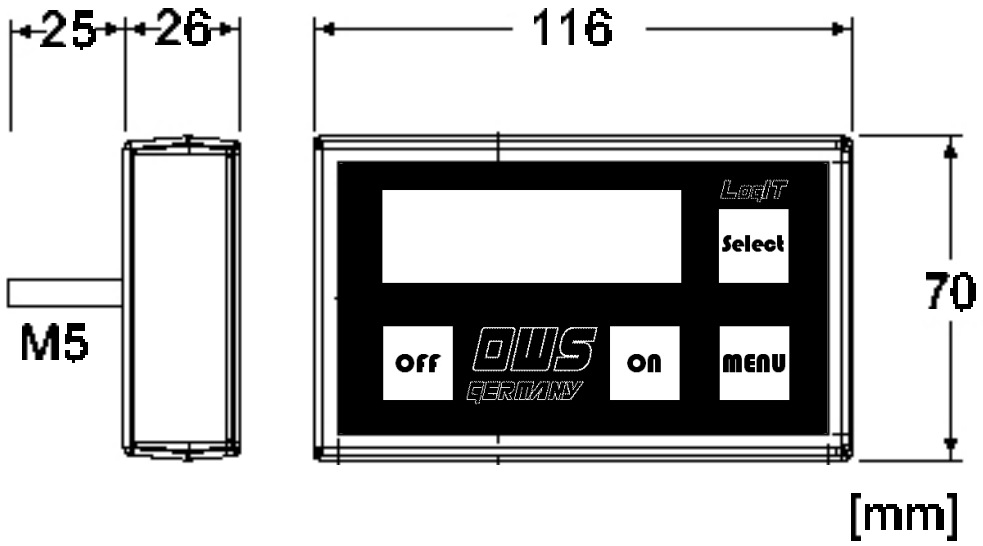
Parameter	Min	Max	Unit
Lap/sector time		99.999	s
Total running time†		99.98	min
Engine rev	100	25000	RPM
Number of laps		254	

† The maximum displayable running time is 99”59.

B.7 mechanical characteristics

Parameter	Typ	Unit
Case, length	116	mm
Case, width	70	mm
Case, depth	26	mm
Mounting Screw, length	25	mm
Mounting Screw, diameter	5 (M5)	mm
Weight without cables	180	g

B.8 mechanical dimensions



B.9 hardware requirements

Parameter	Value
Operating System	Windows 95/98/2000 ME/NT/XP
Memory	32 MB
Space on Hard Disk Drive	10 MB
CD-ROM Drive	minimum 2-speed
Interface	Parallel Port

B.10 Transmission characteristics

A proprietary protocol is used for transmission between the LogIT unit and the analysis software. The timing is performed by handshaking. Hence the transmission rate depends on the clock frequency of the processor. For a 1.5 GHz PC-system a typical value is 1s transmission time for 20s recording time.

B.11 PC link cable

Parameter	Value
Connector (LogIT)	stereo jack 3.5 mm
Connector (PC)	D-Sub jack 25 pins
Length	2.4 m