Mobile Timing MT1

Manual

Important Information

General

Before using your ALGE·TIMING device read the complete manual carefully. It is part of the device and contains important information about installation, safety and its intended use. This manual cannot cover all conceivable applications. For further information or in case of problems that are mentioned not at all or not sufficiently detailed, please contact your ALGE·TIMING representative. You can find contact details on our homepage https://www.alge-timing.com/

Safety

Apart from the information of this manual all general safety and accident prevention regulations of the legislator must be taken into account.
The device must only be used by trained persons. The setting-up and installation must only be executed according to the manufacturer's data.

Intended Use

The device must only be used for its intended applications. Technical modifications and any misuse are prohibited because of the risks involved! ALGE·TIMING is not liable for damages that are caused by improper use or incorrect operation.

Power supply

The stated voltage on the type plate must correspond to voltage of the power source. Check all connections and plugs before usage. Damaged connection wires must be replaced immediately by an authorized electrician. The device must only be connected to an electric supply that has been installed by an electrician according to IEC 60364-1. Never touch the mains plug with wet hands! Never touch live parts!

Cleaning

Please clean the outside of the device only with a smooth cloth. Detergents can cause damage. Never submerge in water or open. The cleaning must not be carried out by hose or high-pressure (risk of short circuits or other damage).

Liability Limitations

All technical information, data and information for installation and operation correspond to the latest status at time of printing and are made in all conscience considering our past experience and knowledge. Information, pictures and description do not entitle to base any claims. The manufacturer is not liable for damage due to failure to observe the manual, improper use, incorrect repairs, technical modifications, use of unauthorized spare parts. Translations are made in all conscience. We assume no liability for translation mistakes, even if the translation is carried out by us or on our behalf.

Disposal

If a label is placed on the device showing a crossed out dustbin on wheels (see drawing), the European directive 2002/96/EG applies for this device.
Please get informed about the applicable regulations for separate collection of electrical and electronical waste in your country and do not dispose of the old devices as household waste. Correct disposal of old equipment protects the environment and humans against negative consequences!

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- 3 -

Declaration of Conformity

We hereby declare that the following product complies with the below stated standards. All components used by us are CE certified by their producer and are not modified by ALGE-TIMING GmbH.

We,   ALGE-TIMING **GmbH**
Rotkreuzstraße 39
6890 Lustenau

declare in sole responsibility that the radio receiver

Mobile Timing MT1

complies with the following standards/normative documents and in case of intended use complies with the basic requirements of Radio Equipment Directive 2014/53/EU

Telecommunication (TC)terminal device

Applied harmonized standards:
EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013
EN 62311:2008

EMC: EN301 489-17 v2.1.1. (2009-05) EN 301 489-52 V1.1.0

Radio Spectrum Efficiency:
EN 301 511 VI2.5.I
EN 301908-1 VII.1.1
EN 301 908-2 VII.1.2

Additional information:
The product complies with the low voltage directive 73/23/EEC and EMC directive 2004/108EG and carries the CE sign.

Lustenau, 2019-09-26   ALGE-TIMING GmbH
Albert Vetter
(CEO)

Table of Contents

1   Introduction

The MT1 is a high-precision timing device. Using the built-in GPS, it is automatically synchronized to the time of day. It has two timing channels with 1/100,000 seconds precision. The timing pulses are automatically sent to the internet, so the results can be seen live there. As a result, impulse cables are no longer necessary, which is particularly advantageous for long distances. Automatic backup to the internet makes a log paper printer obsolete. If necessary, the start number can be entered in backup or memo mode. The MT1 has a built-in Li-ion battery and is charged via a USB C socket.

2   Device description

Power on:
Press the ON button, then confirm with the ⏎ button. This is to prevent from switching on the device unintentionally. If you only press ON, the device shows its name (ID).

Power off:
Press the OFF button for 3 seconds. The MT1 asks for confirmation. Release the OFF button and press it again to confirm. You can abort this with the ESC or any other button.

2.1 Display

The OLED display of the MT1 has a resolution of 128 x 64. The display is switched off after 5 minutes without activity. The display is reactivated by any button or a timing pulse.

2.1.1 Status Bar

When the device is switched on, the main menu appears. This main menu has a status bar at the top with some icons on it. The left icon is the GPS status. Next icon from the left is the UMTS signal strength. After power on, this icon is blinking. That means the MT1 is searching for a mobile network operator. If the MT1 finds a mobile network operator, it stops blinking and shows the signal strength of the mobile network. A small "o" at the icon shows that the MT1 is online. After a short time is changes to "s", which means that the MT1 has connection to the www.alge-results.com server. If the MT1 receives a timing pulse, it is transmitted to the server, which is displayed with a small arrow. The icon is crossed out if no network is available. A blinking circle with an arrow means that there is an active network search in progress.

The third icon is the USB icon. It is striked through if there is no USB data connection. Note: A power supply or power bank has no data connection. In this case, the icon stays striked through.

The fourth icon from the left is the battery icon which shows the power state and state of charge. The fifth icon shows the synchronization state. At the beginning, there is no synchronization. After synchronization, it shows the type of synchronization. Possible state is GPS, GSM and EXT. The device must be synchronized for timing. You will not receive any timestamp without synchronization. Standard setting is GPS synchronization, which has the highest possible accuracy. GSM (Server) synchronization has only an accuracy of approx. 0.05s and should be used for testing only.

At the right end you can find the name of the device for identification. This can be set from server configuration.

2.1.2 Bib

On the main screen, a bib is blinking. To confirm the next bib press ENTER. To change the bib enter the number and confirm with ENTER.
Note:
If you want to suppress a wrong pulse, you can enter "0"+ENTER. This disables upcoming pulses. You can identify the disabled state with a blinking circle.

2.1.3 Time

On the bottom part of the screen you can see the running time.
On the very bottom of the screen, you can find the latest timing pulse (channel, bib and time).

2.2 Keypad

The MT1 has a splash-proof foil keyboard with 12 buttons.

2.3 Connections

2.3.1 Timing channels

The MT1 is equipped with two timing channels on banana plugs. One green and black(C0), and one red and black (C1) with a precision of 1/100,000 seconds.

2.3.2 USB

The MT1 device has a USB-C interface which can be used for charging and data transmission to a PC. This USB interface simulates a virtual COM port. For Windows 7 OS and older you need a driver to use this COM port. For newer OS you can install the MT1 driver to show the correct name in the device manager, but it is not necessary. This virtual COM port uses the same data protocol as the Timy series and TDC 800x series.

No data connection to the PC is shown with a crossed out USB symbol.

Valid data connection to the PC and charging:

The flash symbol shows an existing external power supply. When the battery is charging the battery symbol shows an animation. The MT1 does not have to be switched on for charging.
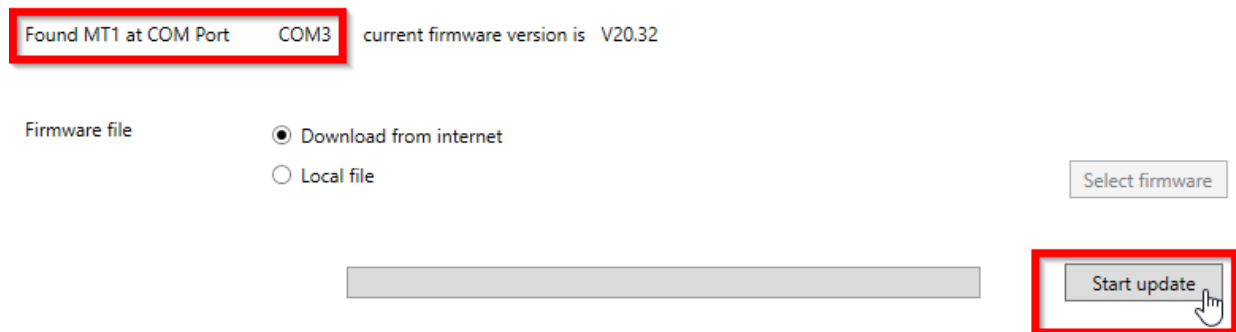
Note:
From firmware version V23.43, a "D" (device) is shown when connected to a PC or charger. When connecting to a printer "H" (host) will be displayed.

2.3.2.1 Firmware Update

You need the MT1 Firmware Update software for a firmware update.
Start with installing this software; then connect the MT1 to the PC. Otherwise, it could be necessary to re-attach the MT1 device. You can choose if you want to update the latest firmware version from the internet or from a local file, which can be useful for offline installation.
As soon as the MT1 is found in the firmware update software, you can press "Start update" to start the updating process.

Found MT1 at COM Port   COM3   current firmware version is   V20.32

Firmware file   ⦿ Download from internet
                       ◯ Local file   Select firmware

                                                                       Start update

Firmware update
Write memory...

After finishing the download, press the ON/ESC button to restart the device.

3   Operation

In the main menu you can enter the next bib and confirm with ⏎.

3.1   Menu

Open the selection menu with the ESC button. Press ESC once again for returning to the main screen. Use the arrow buttons ('2' for scroll up, '8' for scroll down) to choose the menu item. Press ⏎ to confirm the selection.

3.1.1   Channel blocking

First menu item is the channel menu. In this menu, you can set the timing channels "Active", "Disabled" and "Blocked". If a timing channel is "Disabled", no time is stored. That is used during breaks to avoid unnecessary data transmission. Use "Blocked" during the event when you are not sure if the next pulse is valid or not. Use "Active" for normal operation. You can navigate with the arrow buttons. To react very fast, this setting is immediately active. You do not have to confirm. You can return to the main menu with the ESC or ⏎ button.

At the main screen, you can see the current state in the left lower corner. A blinking circle around the C is shown if channels are blocked. It is crossed out if the channels are disabled, and it does not blink during normal operation.

3.1.2   Permanent trigger

If a timing channel is permanently triggered, the channel display starts to flash after 5 seconds (standard). That would be the case, for example, if the photocell is misaligned. You can change this time on the alge-results.com website under devices -> channels.

Pulse Hold Time
5   Seconds   SAVE 🖬

3.1.3 Memo

With the "memo" menu you can switch to memo-mode. This mode is used if it is not clear which competitor is next, e.g. at the finish area when you cannot see the competitor come closer.

The bib number at the first time blinks. You can confirm the given bib with ← or you can enter a new bib and confirm with ←.

If you want to delete an pulse, enter bib '0' or press ESC and confirm with ←.

If you want to edit another pulse, you can exit the edit mode with 2 x ESC. Then scroll to the desired time. Press ← to edit. You can enter the bib and confirm it with ←.

Exit the memo mode with ESC.

It can happen, that 2 competitors pass at the same time. You will get only one impulse then. You can double the time by press+hold the ESC button for at least 3 seconds. Confirm time doubling with the Enter button. Repeat this step for more than two competitors.

3.1.4 Scroll

At the "scroll" menu, you can check the timing pulses and edit the bib information. Scroll with the arrow buttons (2 for scroll up, 8 for scroll down) to the time you want to change. With ← you can edit the bib number. Enter the new bib and confirm with ←. If you enter the bib '0', the time is be deleted.

Exit the scroll mode with ESC.

3.1.5 General

This is the menu for general information and settings.

3.1.5.1 Information

General information about the MT1 device like serial number, sync setting, used memory, software version and current accuracy of the device (only available with GPS 3D-fix and minimum 10 minutes of operation and external power). Newer MT1 devices from serial number 230499xxx will show "Design2".
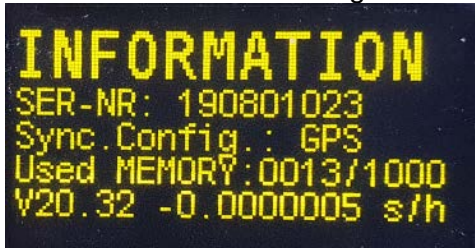
When you press the arrow down (8) button in the info menu you can change the following special settings:

3.1.5.1.1 Setup delay time

Usually the timekeeper will set the delay time on the alge-results.com website.
If it is necessary to change the delay time on the MT1 device, you can do this by pressing the down arrow key in the info menu. The desired channel can be selected with the arrow keys. The setting can be changed by pressing the Enter key.

If the setting on the device is changed, this is not reflected by the server.

3.1.5.1.2 Show pulse hold

The pulse hold time of a channel is only set by the timer on the alge-results.com website. The set values can be displayed by pressing the arrow key down three times in the info menu. You can't change this setting on the device.

3.1.5.1.3 Time zone setting

The time zone is normally set by the timer on the alge-results.com website. This setting is only available if no mobile network is available. This is only intended for offline use. The setting is therefore not sent to the server.

To change the setting, press the Enter key. You can use the arrow buttons to change the value in 0.5 hour increments. Confirm the new setting with the Enter key. Exit the menu with the ESC key.

3.1.5.1.4   0.1s Correction

If you connect a device which has 0.1s delay like a WTN or TED(2), you can setup the 0.1 correction here for each channel. Use the arrow keys to select the channel, then press Enter to confirm. Use the arrow buttons to select the desired setting and press Enter to confirm. This setting is available from firmware version V23.43. You can change this setting on the MT1 device only.

3.1.5.2   Clr mem

The MT1 automatically stores all of the timing pulses. On power off procedure the times are saved to the Flash memory. On restart of the device these times are automatically restored. If the memory is full, the eldest timing pulse is overwritten.
Here you can delete stored times. Confirm with ⏎ if you want to proceed. Otherwise press ESC to exit.

3.1.5.3   Sync out

You can synchronize other devices with a timing pulse on C0. A confirmation is displayed at the full minute.

Note:
This function is only available if the MT1 device itself is in synchronized state.

3.1.5.4   Mobile Network

3.1.5.4.1   Technologies and Providers

Mobile networks are constantly being improved and equipped with new functions. The evolutionary steps are divided into generations, which coexist in parallel. The oldest active and slowest generation is 2G. The difference between 2G, 3G and 4G is mainly the speed of data transmission, but also the power consumption. Since the 4G, there have been the LTE-M and NB-IoT sub-standards, which were specially developed for low power consumption.

TECHNOLOGY COMPARISON

	LTE (e.g. Cat-1)	LPWA TECHNOLOGIES	
		LTE-M	NB-IoT
Mobility	Full (seamless cell handover)	Full (seamless cell handover)	Limited (cell reselection)
Data rates	10/5 Mbps (DL/UL peak)	1/1 Mbps (DL/UL peak)	250/230 kbps (DL/UL peak)
Latency[1]	Very low (<50ms) (interactive use cases possible)	Low (<1s) (some interactive UCs possible)	High (<10s) (no interactive UCs possible)
Indoor penetration	Similar to GSM	Good indoor coverage	Maximum indoor coverage
Voice/SMS	Supported	Possible, with (expected) quality degradation	No voice/no SMS
Expected max. battery life time	Longer than regular LTE (power saving functions)	Very long	Maximum
Radio module target cost	> €10	€5–10	< €5

1) When device is not in PSM/eDRX

T · · ·   LIFE IS FOR SHARING.   27.11.2019   10

The MT1 application transfers very little data. LTE-M and NB-IoT are ideally suited for this and have a very long range. In contrast to the current 5G standard, which is unfortunately not very well suited for our application. In order for the transmission to work, the interaction between the modem used and the mobile phone provider must work. The original MT1 therefore uses the 2G and 3G standards, which are very well developed worldwide and also work very well in remote areas. However, more and more providers are now switching off either 2G or 3G in favour of 5G technology. The newer MT1 Design2 uses LTE-M transmission as standard. If this technology is not available, the modem tries to work with 2G. If 2G is not available either, the system will switch to the slowest technology, NB-IoT. This one has the highest range. But a network search can take 45 minutes in extreme cases.

General:

The MT1 connects to the very best cellular network. If the connection to the cellular network is disrupted, the MT1 automatically searches for a network. In this case, the impulses do not get lost. As soon as the MT1 has a cellular network again, the timing impulses that have not yet been transmitted are resent. The impulses that have not yet been sent are also transmitted after restarting the device. If it is not possible to send a timing impulse, you will get the message:

You can still work with the MT1:
With the ESC button, the message will disappear.
With the ENTER button, the message will disappear permanently.
A "!" is shown on the display until the outstanding triggers have been transferred.

Mobile state:
This gives information about the current mobile network operator and signal quality. A value between 0 (poor) and 31 (best) is displayed for "Signal Power". 99 means no network reception.

Search operator:
You can execute a manual search for an operator. After the search is finished, you have to choose the one of the listed operators by pressing the number which is shown on the left. Confirm with the ENTER button. If no operator listed, there is no mobile network available. This disables the automatic search function and is therefore not recommended.

Server:
Here we can change to our developer server for testing. Please use the main results server which is www.alge-results.com. Do not change this setting.

Reconnect mobile network:
In case of a malfunction of the mobile network it can be necessary to execute a manual reconnect to re-establish mobile connection. This re-enables the automatic search.
In case you selected a fix operator network with the function "Search operator" you can reactivate with this function the automatic search function.

Note:
If a device is switched off for a long time and it is not assigned to a competition, the internal SIM card is automatically deactivated. This saves costs when the device is not used.
As soon as you edit the device or assign it to a competition, the SIM card will be reactivated.
It can then take up to 10 minutes before the device can transfer data again. This can be accelerated if you select "Reconnect mobile network" or restart the device.

3.1.5.5 GPS reception

If there is no GPS available:

Below picture shows the normal operation with more than 3 satellites in view. In this example there are 7 satellites in use and 26 satellites in view. You also can see the altitude and GPS signal strength of the 7 best satellites which are used.
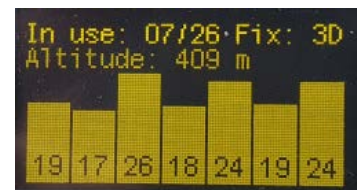
The GPS receiver uses GPS, GLONASS and GALILEO satellites.

4   GPS

The internal GPS receiver is always activated. You can see the status of the GPS receiver in the upper left corner of the status bar.
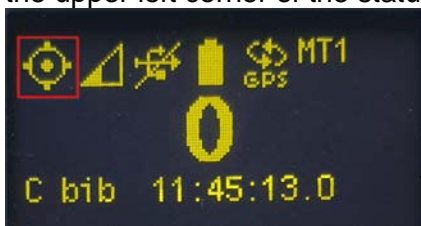
No GPS reception:

Good GPS reception with 3D-fix:

3D-Fix is displayed with four dots around the circle. The blinking dot in the middle shows the correct reception of the highly precise second pulse.

After the device has been successfully synchronized, the GPS will be put into standby mode to save power.

Note:
The distance between two or more MT1 devices must be at least 30 cm as otherwise the GPS reception can be disturbed.

4.1   Auto trim function

Every clock (quartz) has a deviation. This deviation depends on temperature and aging. That means that the clock sometimes runs faster or slower.
As soon as the MT1 receives a 3D-fix, it is able to auto trim the internal quartz. The longer the MT1 receives a GPS signal the more accurate it gets. That eliminates influences from temperature and aging. With this technique, no re-synchronization is necessary, which would cause a time jump. Current accuracy is displayed in the info menu (see 3.1.5.1).

Note:
In battery operation, the GPS is deactivated after synchronization to save energy (from firmware V21.C1). The quartz adjustment only works with an external power supply.

5   Software

5.1   alge-results.com platform

The MT1 system is maintained over the www.alge-results.com website. Open your web browser and navigate to www.alge-results.com. Then login:

If you do not have an account, you have to create one.
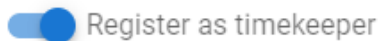
Note:
IE11 and older browsers are not supported.

5.2   Create account

Then please fill in the sign up form.
At the bottom choose "register as timekeeper". Otherwise you cannot manage devices and events.

5.3   Add device

To manage your device, you have to add the device to your account. Switch on your MT1 device and click "REGISTER DEVICE" in your web browser.
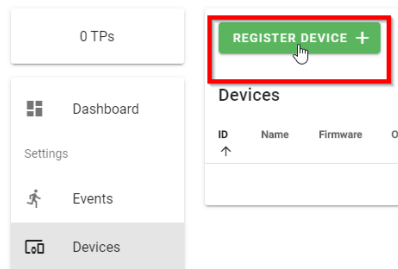
Fill in the serial number of your device and click "CONTINUE"

Then enter the PIN code, which is displayed on the MT1 to proof that it is your device. With each new MT1 device you receive 2000 timing points (TP). You need these TPs for event creation (150TP) and data transmission. If you want to transfer these TPs to your account, you have to select this here. Then click "CONTINUE". Now you can use your MT1 device on the alge-results.com platform.

There are three possible actions for a device:

Actions

First action is edit, where you can set the device name, time zone and synchronization configuration and delay time. Under "trigger" you can see the received pulses.
Second action is re-read. That action reads the current status of the MT1 device.
Third action removes the device from your account.

Note:
If you want to pass your device to another person, you have to remove it from your account first. A device can only belong to one account at the same time.

To get some more information about the alge-results.com platform we provide an extra manual at the alge-timing.com website.
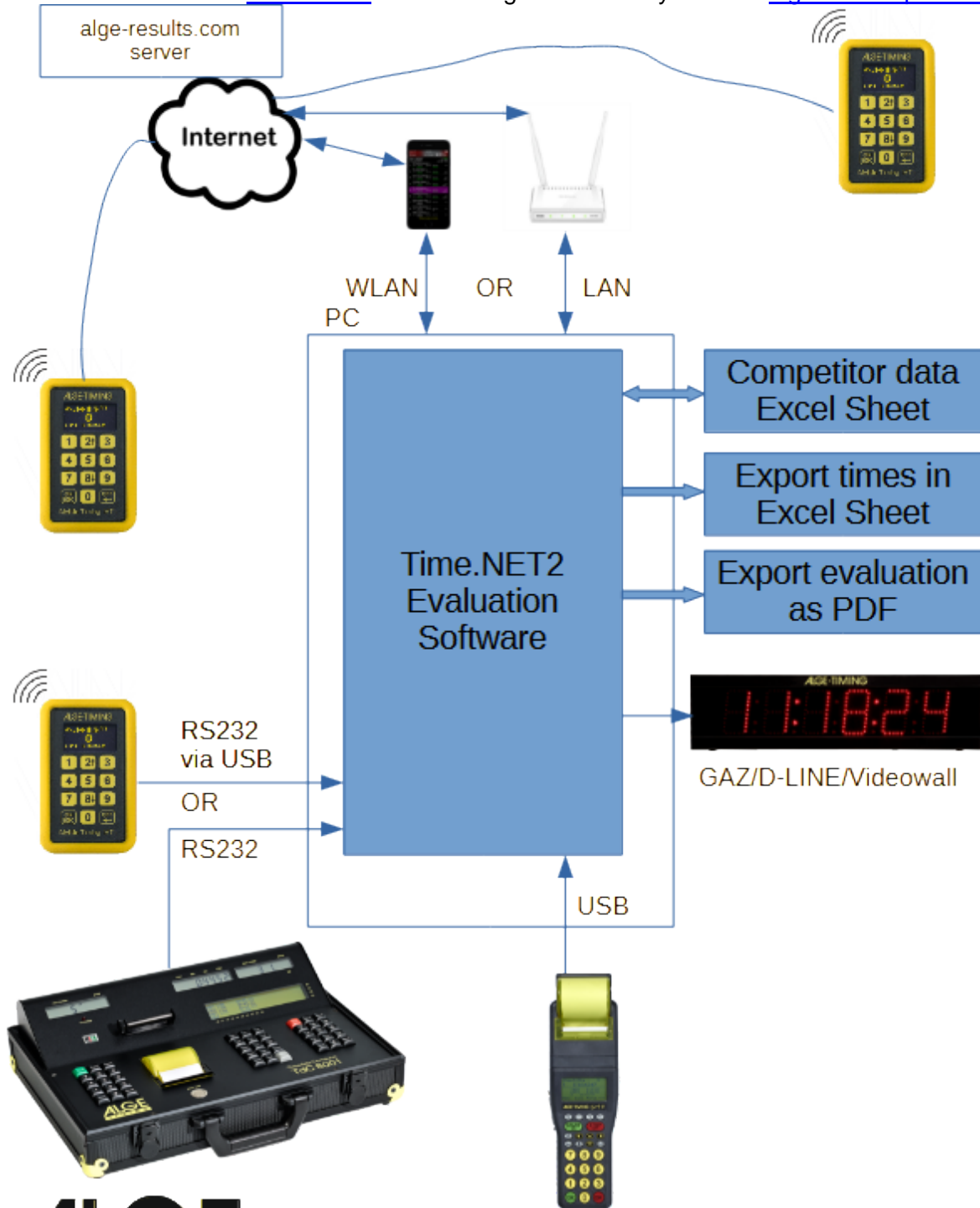
5.3.1 Evaluation software

If your evaluation software can work with serial data and supports the communication protocol, (Timy series or TDC 800x series, time of day format) it can be used to read the timestamps directly via USB interface.
Since firmware V21.51, a distinction has been made in the protocol as to whether it is a sequential start number or a manually entered start number. If a start number is entered explicitly, this time is marked as "correct" with an "*". This corresponds to the functionality of the Timy Backup with STN* feature.

5.3.1.1 Evaluation with Time.NET2

The evaluation software Time.NET2 can exchange data directly with the alge-results-plattform.

5.3.1.2 Time.NET Connector

With the Time.NET Connector software you can connect your 3rd party evaluation software with the alge-results platform. There are several different possibilities for connections:

Connections MT1 with Time.NET Connector
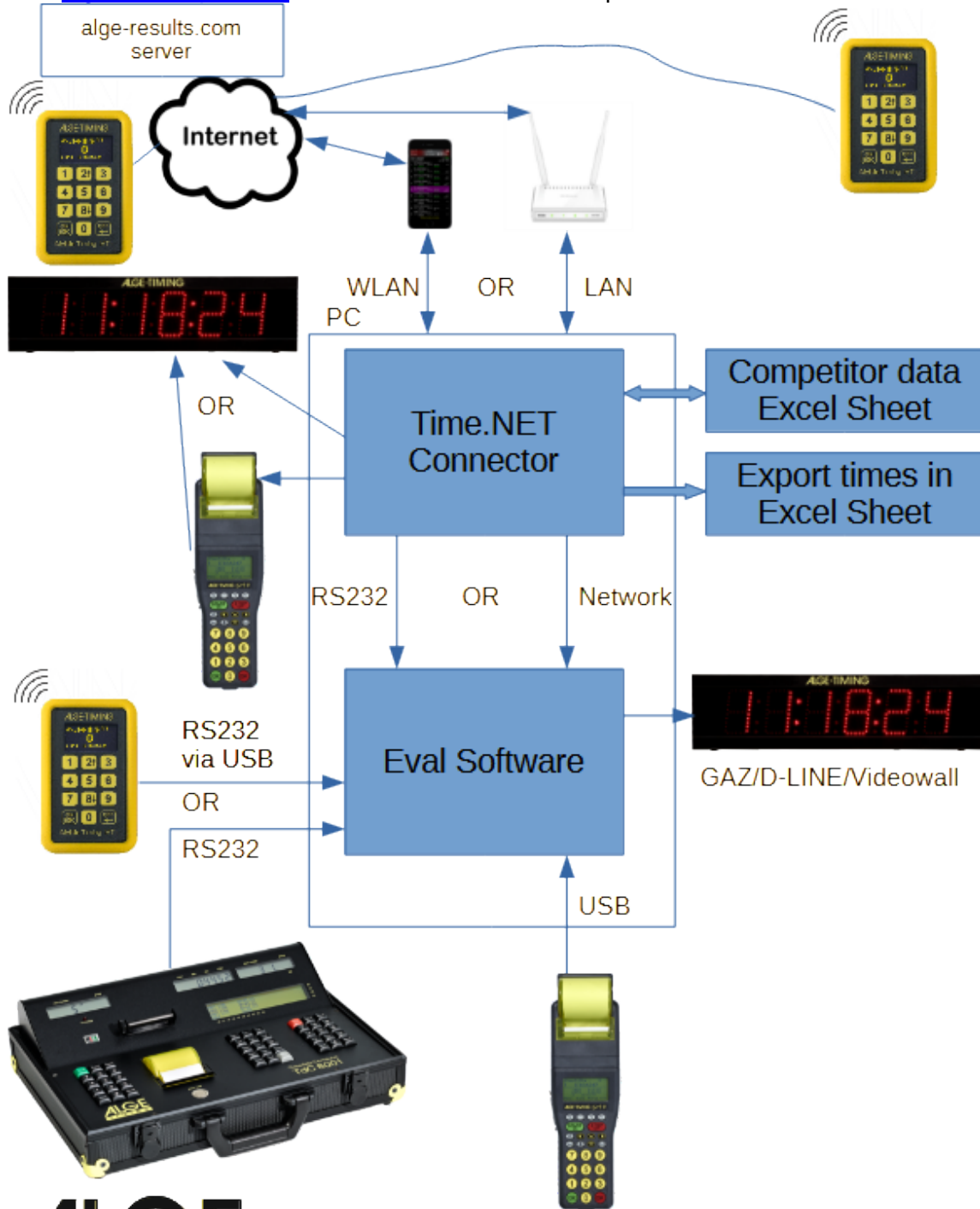
Note:
If the Time.NET Connector and the evaluation software run on the same PC you need a null modem cable (from one COM port to the other) or driver software which simulates and connects two COM ports. This COM port simulator (Com0Com) can be downloaded on our website. A manual how to setup this Com0Com comes with the installation.

Note:
A TCP server runs on port 4448 on the Time.NET connector. The same data is transmitted here as via the COM port. Other programs (OPTIc3, Time.NET, IDCam, ..) that can connect to it also receive the time stamp.

Note:
Timing pulses of non-MT1 devices are not reflected to the online platform alge-results.com

6   Technical data

Timing channel precision:	1/100,000 s
Number of timing channels:	2 channels with banana connectors
Operating temperature:	-20 to +65 °C
Time-base:	self-calibrating TCXO quartz
Synchronization:	external, via internal GPS or GSM
Operating time:	24 h at +25 °C with one impulse per minute
	14 h at -20 °C with one impulse per minute
Charging time:	app. 2.5 h at +25 °C
Time memory	6,700 times
Battery:	Li-Ion rechargeable battery 3.6 V / 10.4 Wh (integrated)
Measurements:	22 x 74 x 34 mm
Weight:	235 g (0.5 lb)
Data connection:	2G & 3G (GSM/EGPRS/UMTS/HSDPA) (Design1)
	4G/LTE-M & 2G & 4G/NB-IoT (Design2)
Roaming:	worldwide
Display:	OLED display with 128 x 64 pixels

Subject to changes and misprints

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