

QUICK GUIDE: MPD

By reading this guide in its entirety, it will be possible to acquire the necessary knowledge to perform the basic initial setup, the first startup, and the daily use of the MPD product.

Attention! First of all, it is necessary to connect the supplied antenna with the device turned off and only after that proceed to turn it on.

Attention! Do not perform the Factory Reset available in some options as it would delete the system certificates, making the product unusable. For the same reason, it is recommended to run only manufacturer-certified applications loaded onto the SD card.

Topics covered in the guide:

- FEATURES LIST
- GENERAL PRINCIPLE OF MPD OPERATION
- SD CARD MANAGEMENT
- APP QUAKE:
 - general information
 - initial setup
 - startup and use
 - visual inspections
- APP LoRa MESHTASTIC:
 - general information
 - configuration management
 - startup and use

Features list	
MCU ESP32-S3FN16R8 Dual-core LX7 microprocessor	■
Wireless Connectivity 2.4 GHz Wi-Fi & Bluetooth 5 (LE)	■
GPS module	■
3,7v 2000 mA LiPo BATT	■
SD SLOT with 32GB micro SD card	■
Keyboard, trackball, speaker	■
2.8 inch LCD Resolution: 320 x 240 Full viewing angle	■
SX1262 LoRa Transceiver	■
External antenna, transmit power +22dBm	■
Band plan: one from 868 MHz, 915 MHz, 433 MHz	■

General principle of MPD operation

This handheld device allows the execution of multiple applications, including those dedicated to real-time earthquake monitoring, called QUAKE, and communications on the ISM band LoRa network, called Meshtastic.

The MPD - Premium version is ready to use, equipped with a micro SD card inserted in the side slot containing various application programs like those mentioned above, as well as service files.

Additional programs can be loaded onto the SD card as available and needed, offering high flexibility of use. The lithium battery and built-in GPS module allow for field use. WiFi, Bluetooth, and LoRa connectivity are present, enabling a wide range of communication.

SD card management

There are two main controls located on the sides of the device: on the right, an **ON/OFF** slider switch, and on the left, a **REBOOT** button.

After attaching the supplied antenna and charging the battery, you can proceed to turn on the device and the screen shown in fig. 1 will appear.

Within the first 5 seconds, by pressing the word LAUNCHER, it is possible to access the SD CARD management menu shown in fig. 2 and obtain a list of the contained files, such as those in fig. 3.

By pressing the words PREV or NEXT, you can select the desired application, then install it and launch it for execution.

Tip It is always possible to cancel any operation by pressing the side REBOOT button.

Tip It is recommended to avoid using different submenus.



Fig. 1



Fig. 2



Fig. 3

APP QUAKE general information and startup

This application program is tasked with periodically displaying data related to seismic events that have occurred in a specific geographic area, having automatically downloaded them from the relevant Service Provider via a Wi-Fi connection.

It will process this data to select the most significant information, having appropriately filtered it based on geographic location, magnitude intensity, etc., using both configurable criteria and automatic mode, adapting to the current seismic scenario.

Subsequently, it will present the data on the display in chronological order or organized by proximity alert and descending magnitude (via a mode change command).

Attention! It is necessary, first of all, to configure both the data related to the WiFi network to which the device will connect and to locate the device itself (Home position), otherwise the device may fail to start or provide unreliable data.

Furthermore, it has the task of effectively alerting the user through a summarized visual and auditory communication (thanks to a seismic trend indicator, a general alarm, and classifying seismic events according to the proximity alarm criterion), regarding the existence of a critical condition for the specific observed area.

The **device alarm condition** is triggered under one of the following circumstances:

- a seismic event of a certain intensity and proximity relative to the location of the device
- an increasing area seismic trend indicator

The **proximity alarm condition** for a single seismic event is triggered within a certain (configurable) distance from the device's location.

Disclaimer: this device does not replace the normal procedures for acquiring information about seismic events provided by institutional portals. Furthermore, its operation is strictly dependent on the availability of online data provided by the relevant Service Provider.

Tip: For a complete understanding of the features and for any remaining doubts, please refer to the resources available in the repository (video tutorials, FAQs, etc.) and, as a last resort, send an email to the support address indicated in the repository.

It is possible to start the Quake application using the procedure indicated in the previous paragraph **SD card management** and select one of the following files if present on the SD card:

- TDECK_QUAKE_EMSC_xxxx: EMSC database access program
- TDECK_QUAKE_INGV_xxxx: INGV database access program

Tip: by default, only one file is provided for database access; optionally, it is possible to install both.

APP QUAKE: initial setup



ACCESS TO THE SYSTEM MENU:

connect the power supply via cable and proceed as follows:

- start the reboot: CLICK the side REBOOT button
- during the REBOOTING... phase in the first 5 seconds press the <space> button to access the SYSTEM MENU



PARAMETER CONFIGURATION (Param Config):

The parameters to be configured will appear in sequence in the green field, with the current value of each shown in parentheses; 3 buttons:

INS: if pressed, it turns blue indicating the possibility of modification

SKIP: moves to the next field without making changes

EXIT: exits the system menu

WIFI NETWORK

set the Wifi network data to which the device will connect:

Wifi name: name of the Wifi network to connect to (case sensitive)

Wifi password: password of the Wifi network to connect to (case sensitive)

Warning! In case of error, **LED1 turns red “1”**

HOME POSITION

Home Lat: Latitude of the Home point (! reference to the North):

0-90° N: just enter the number without a preceding sign (e.g., 40.12 = 40.12N)

0-90° S: enter the number with a preceding minus sign (e.g., -20.17 = 20.17S)

Home Long: Longitude of the Home point (! reference to East):

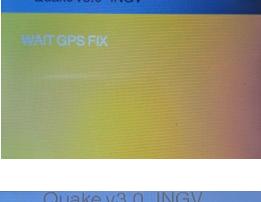
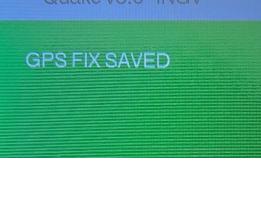
0-180° E: just enter the number without a preceding sign (e.g., 14.12 = 14.12E)

0-180° W: enter the number with a preceding negative sign (e.g., -40.17 = 40.17W)

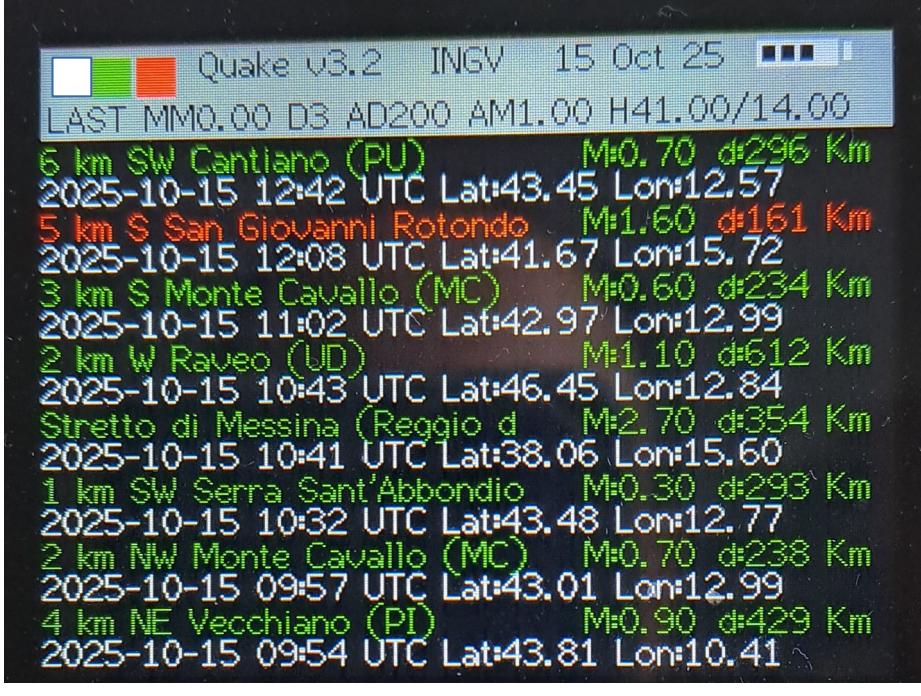
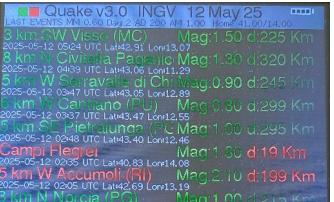
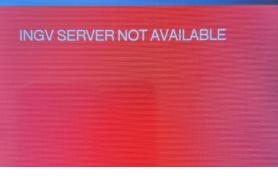
Tip: This data is mandatory and determines the correct operation of the device. Set your Home location or a virtual location.

Tip: Given the presence of the GPS module, use the appropriate menu to

	start the automatic procedure to define the current Home location.
CYCLE PAUSE	Indicates the duration (in minutes from 5 to 30) of the cycle break, that is, the waiting time between each individual automatic data download from the server.
ALARM DISTANCE	indicates the length (in Km from 0 to 999) of the alarm radius. All events that are within the alarm radius from the Home position are colored red and considered alarmed events .
ALARM MAGNITUDE	indicates the intensity magnitude threshold (Mag from 0.0 to 10.0) used for triggering the alarm state of the device that will be activated (red LED 3 + acoustic siren if enabled in the Sound configuration menu)

	<p>PARAMETER CONFIGURATION RESET (Reset Config):</p> <p>This procedure resets the parameters to the standard settings:</p> <p>Wifi: SSID "DEMO", password "12345678" HOME LAT: 45.00 N, HOME LON: 12.00 E Cycle Pause: 15 minutes Alarm Distance: 200 Km, Alarm Magnitude: Mag 4.00</p>
 	<p>GPS CONFIGURATION (GPS Config):</p> <p>This procedure activates the GPS module and locates the device:</p> <ul style="list-style-type: none"> - access the GPS menu in an outdoor location without obstacles in the sky - yellow screen indicates waiting for positioning (wait a few minutes) - green screen indicates that positioning is complete, the device stores the new position and restarts automatically <p>Tip: in the second line of the Main Screen under Home, the new GPS coordinates will be displayed</p>
	<p>EXIT/REBOOT:</p> <p>button to exit the SYSTEM MENU and force a device reboot</p>
	<p>SOUND:</p> <p>Here you can enable sound functions:</p> <ul style="list-style-type: none"> - ALL SOUND OFF: all sound effects disabled - ALL SOUND ON: all sound effects enabled - BEEP ONLY: only keyboard feedback sounds enabled - ALARM ONLY: only the device alarm siren enabled
	<p>BRIGHT:</p> <p>here you enable the display brightness level L1...L6</p>
	<p>KEYBOARD BACKLIGHT:</p> <p>ALT-B: turns the keyboard backlight on/off</p>

APP QUAKE: startup and use

<p>First row:</p> <p>LED1: Connection status LED2: Seismic trend LED3: General alarm / data download in progress</p> <p>SW release name, Service provider, date, battery status</p> <p>Second row: active data mode name: - alarmed first (default) - last events MM: minimum magnitude filter D: # max days observed AD: Alarm Distance (km) AM: Alarm Magnitude H: Home coordinates Seismic events field: up to 8 events arranged according to the active mode</p>	<p>MAIN SCREEN: Connect the power supply via cable and proceed as follows</p> 
<p>MODE SWITCH</p>	<p>DATA DISPLAY MODE CHANGE: quick access to functions using the following commands: Q key activates Last Events data mode P key activates Alarmed First data mode (default at reboot) <space> activates SYSTEM MENU</p>
	<p>LAST EVENTS: The events will appear in sequence in chronological order, with the most recent at the top, up to a maximum of 8 events, each with its own details:</p> <ul style="list-style-type: none"> - name of the epicenter location, magnitude (various colors), distance from Home (km) - date and time (UTC) of the event, epicenter coordinates
	<p>ALARMED FIRST: The alarmed events (in red) will appear first at the top and are then sorted in decreasing magnitude. Other events (in green) follow, sorted in decreasing magnitude. Each with its own details:</p> <ul style="list-style-type: none"> - epicenter location name, magnitude (various colors), distance from Home (km) - event date and time (UTC), epicenter coordinates
	<p>SERVER OFFLINE: This screen indicates the temporary unavailability of the Service Provider and/or the related data service; the device will repeatedly attempt to download the data until the service resumes. Check the WiFi connection.</p>

APP QUAKE: visual inspections

<p>LED:</p> <p>1 - 2 - 3</p> 	<p>LED 1:Wifi / Internet / Service Provider CONNECTION STATUS Red 1: Wifi error/unavailability Red 2,3: Internet connection retry Red 4,5: Service Provider connection retry/parameter tuning White/Green: procedure in progress</p> <p>LED 2: SEISMICITY TREND INDICATOR: Green: stable trend Orange: increasing trend Blue: decreasing trend Tip: Data valid from the second download cycle</p> <p>LED 3: Red: GENERAL DEVICE ALARM ACTIVATED Black: data download in progress</p>
	<p>MAGNITUDE FIELD COLOR:</p> <p>Orange: Mag ≥ 7.0 Yellow: $5.0 \leq \text{Mag} < 7.0$ Blue: $3.5 \leq \text{Mag} < 5.0$ Green: $\text{Mag} < 3.5$</p>
	<p>TYPE OF EVENTS:</p> <p>Red: alarm events, occurred within the alarm distance threshold from Home</p> <p>Green: non-alarm events</p>

APP LoRa MESHTASTIC general information and start-up

This application program is designed to allow access to and use of group messaging and location services through the use of the LoRa protocol network.

Two or more terminals using MPD or LoRa technology can communicate with each other without the use of other technologies (WiFi, cellular networks, etc.), as long as they are within direct range of each other (a few kilometers) or by using the principle of a "Meshed" network.

The Meshed network is implemented by each powered-on terminal, which automatically acts as an active repeater for messages from those within its range. It goes without saying that through this mechanism called "store & forward," the Meshed network allows a theoretical extension of the range up to several tens of kilometers.

A key factor in achieving this coverage expansion is both the antenna system used by each terminal (internal or external) and the possible presence of fixed repeater terminals located in strategic positions for this purpose (typically at a height), as well as terminals already active in a given area.

The services available in this context are:

- Short messaging with encryption: the ability to exchange brief messages among participants of a specific group or directly between two terminals; the messages are decrypted only by them as they possess the appropriate encryption key.
- Real-time group location: it is possible to automatically share the positions of group members and display them on a map.

Tip: by default, national maps are provided, while regional and provincial maps can be installed as options.

It is possible to launch the LoRa/Meshtastic application using the procedure indicated in the previous paragraph '**SD card management**' and select the following file present on the SD card:

- LoRa-t-deck-xxxx: LoRa Meshtastic network access program

Attention! First of all, it is necessary to connect the supplied antenna while the device is turned off, and only afterwards proceed to turn it on.

APP LoRa MESHTASTIC configuration management

The LoRa Meshtastic program included in MPD comes with a standard configuration based on the bandplan used (shown below).

Tip: through the MPD user interface, it will be easy to consult the existing configuration. For a complete modification, it is necessary to use a smartphone with the Meshtastic APP installed, which can be found in the app store, and connected to the MPD via Bluetooth:

1) install and launch the Meshtastic app  on the smartphone having activated Bluetooth

2) Activate the Bluetooth connection in MPD:

- From the main menu, select Settings & Tool - Reboot / Shutdown
- Select the Bluetooth icon and wait for the reboot

Tip: To restore the native interface, simply select the Bluetooth icon and wait for the reboot

3) In the smartphone, in the Meshtastic app, proceed with the Bluetooth pairing of MPD

4) Proceed to access the configuration menus, as per the available manuals at:

- <https://meshtastic.org/>
- <https://www.loraitalia.it/>

Standard LoRa Meshtastic network configuration - bandplan 868 MHz		
userconfig	Longname	Editable default value
	Shortname	Default value, editable up to 4 characters
	Licensed	NO
channels	Channel name	MediumFast
	PSK	AQ==
	position	YES
device	role	CLIENT
position	Smart enabled	YES
	GPS mode	ENABLED
LoRa	Use modem preset	YES
	Modem preset	MEDIUM_FAST
	hop	3
	TX enabled	YES
	TX power	27 dBm
	RX boosted gain	YES
	slot	1
	region	EU868 MHz

Standard LoRa Meshtastic network configuration - bandplan 433 MHz

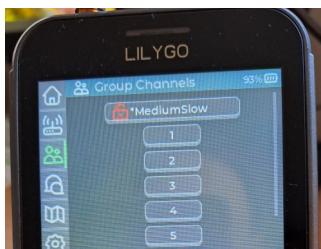
userconfig	Longname	HAM ID
	Shortname	HAM ID shorted (4 chars)
	Licensed	YES
channels	Channel name	MediumSlow
	PSK	As per https://www.loraitalia.it/ FVNtESlvjcper4TmMzt4BuL9u8hWj41rTvCskQqOoHk
	position	YES
device	role	CLIENT
position	Smart enabled	YES
	GPS mode	ENABLED
LoRa	Use modem preset	YES
	Modem preset	MEDIUM_SLOW
	hop	3
	TX enabled	YES
	TX power	12 dBm
	RX boosted gain	YES
	slot	4
	region	EU433 MHz

APP MESHTASTIC: startup and use



ACCESS TO THE SYSTEM MENU:

- HOME icon takes you back to the system menu indicating:
 - presence of new incoming messages
 - number of online users
 - operating frequency
 - strength of the received signal
 - type of sound (enable with a TAP)
 - GPS coordinates (enabled with a TAP)
- Online users icon: list of users online or recently contacted
- Group channels icon: access to the channel in use for group chat
- Chats icon: group chats or direct chats; you can read and send messages from here
- Maps icon: it is possible to view the location of the group and all online users who have enabled their location
- Settings & Tools icon: it is possible to check the configuration and activate diagnostic functions



ACCESS TO GROUP CHATS:

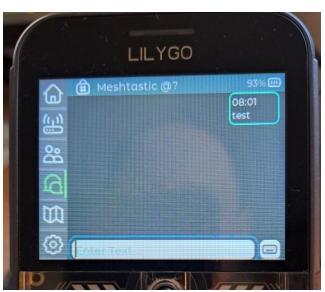
- from the system menu, access the group channels icon or the chats icon
- press the button related to the channel with the lock or to the group chats
- send messages to the group; the green box indicates correct forwarding to the network, red indicates forwarding problems, yellow means waiting for feedback.





ACCESS TO INDIVIDUAL CHATS:

- from the system menu, access the online users icon or the chats icon
- press the button corresponding to the user you want to contact
- send messages to the individual user; the green box indicates successful delivery to the network, red indicates delivery issues, yellow indicates waiting for a response.



ACCESS TO LOCATION MAPS:

- From the system menu, access the location map icon
- The red pointer indicates device position, while the colored ones represent users belonging to our group or who is online
- Use the Zoom/Pan commands to navigate the map
- Selecting a pointer icon will take you to the specific user's information in the online users menu
- The default maps are national, and it will be necessary to ZOOM OUT before locating users

