



deeptack

DBOARD R3

Technical Operation Manual

**Intelligent
automation uses
every ray of sun**

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1. Introduction

The purpose of this manual is to describe the main characteristics, installation and operation procedures for the DBOARD R3 Tracker Controller. It is required that the Installer adheres to these instructions to ensure correct installation. For an in depth understanding detailed manuals for each of the main components are available.

1.1. Glossary

Term	Description
Tracker (or Solar Tracker)	Tracking system considering the structure, photovoltaic modules, motor and the controller.
DBOARD	Electronic board which includes the NFC antenna, EEPROM memory and microcontroller which manages the tracker controller algorithms.
Emergency Stop	Pushing button for emergencies situated in the case of the DBox.

2. Safety information

2.1. Warnings, cautions and notes



A Warning contains information which is essential for avoiding a safety hazard.



A Caution contains information which is necessary for avoiding a risk of damage to the product or other

NOTE:

A NOTE contains information which helps to ensure correct operation of the product.

2.2 Electrical Safety

The voltages used in the Solar Tracking Control System cannot cause electrical shock or burns but anyway, the user has to extreme care at all times when working with or adjacent to the control system equipment. Specific warnings are given at the relevant places in this User Manual.

2.3 System Assembly and General Warning

The Control System is intended as an ensemble of components for professional incorporation into a complete Solar tracking installation.

Close attention is required to the electrical installation and the system design to avoid hazards either in normal operation or in the event of equipment malfunction. Installation, commissioning/start-up and maintenance must be carried out by personnel who have the necessary training and experience. They must read this safety information and this User Manual carefully.

2.4 Installation Risks

Concerning errors during the installation of the equipment:

- If the DBOARD is supplied with inverse polarity: The device integrates input reverse polarity protection, but a continued exposure to reverse polarity may break the input protection. The cables should be differenced by two colors to help minimize the chances of error (red and black).

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2.5 Radio Frequency (RF)

Safety Due to the possibility of radio frequency (RF) interference, it is important that you follow all the special regulations that may apply regarding the use of radio equipment. Follow the safety advice given below.

Operating your device close to other electronic equipment may cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturer's recommendations.

2.6 Interference with Pacemakers and Other Medical Devices

Potential interference

Radio frequency energy (RF) from cellular devices can interact with some electronic devices. This is electromagnetic interference (EMI). The FDA helped develop a detailed test method to measure EMI of implanted cardiac pacemakers and defibrillators from cellular devices. This test method is part of the Association for the Advancement of Medical Instrumentation (AAMI) standard. This standard allows manufacturers to ensure that cardiac pacemakers and defibrillators are safe from cellular device EMI.

The FDA continues to monitor cellular devices for interactions with other medical devices. If harmful interference occurs, the FDA will assess the interference and work to resolve the problem.

Precautions for pacemaker wearers

Based on current research, devices do not pose a significant health problem for most pacemaker wearers. However, people with pacemakers may want to take simple precautions to be sure that their device does not cause a problem. If EMI occurs, it could affect a pacemaker in one of three ways:

- Stop the pacemaker from delivering the stimulating pulses that regulate the heart rhythm.
- Cause the pacemaker to deliver the pulses irregularly.
- Cause the pacemaker to ignore the heart own rhythm and deliver pulses at a fixed rate.
- Keep the device on the opposite side of the body from the pacemaker to add extra distance between the pacemaker and the device.
- Avoid placing a turned-on device next to the pacemaker.

Device Maintenance

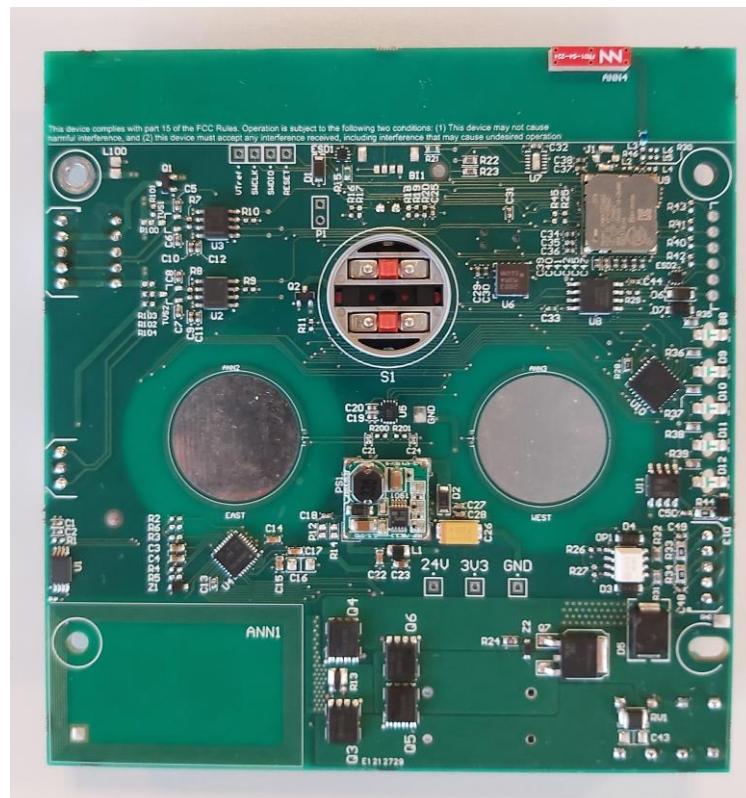
When maintaining your device:

- Do not attempt to disassemble the device. There are no user serviceable parts inside.
- Do not expose the DBOARD directly to any extreme environment where the temperature or humidity is high.
- Do not expose the DBOARD directly to water, rain, or spilled beverages. It is not waterproof.
- Do not place the DBOARD alongside computer discs, credit or travel cards, or other magnetic media. The information contained on discs or cards may be affected by the device.

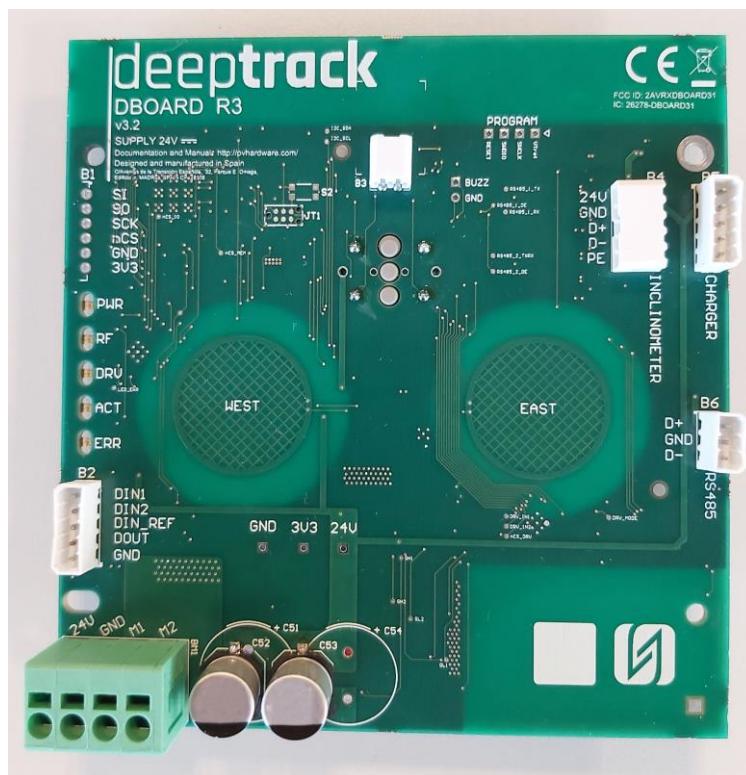
Using accessories, such as antennas, that DEEPTRACK has not authorized may invalidate the warranty. If the device is not working properly, contact DEEPTRACK Technical Support.

3. DBOARD overview

FRONT VIEW

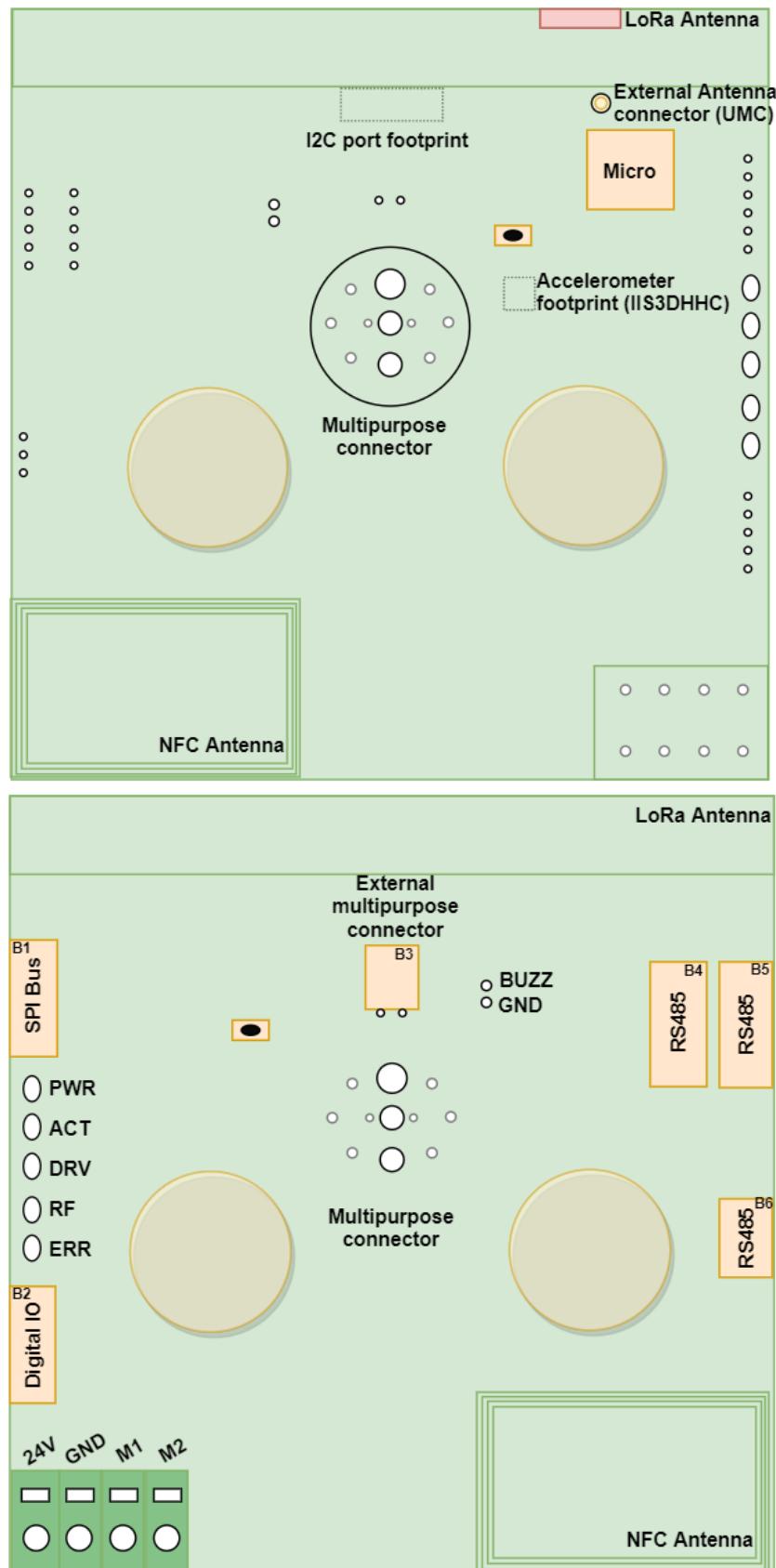


BACK VIEW



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3.1. Connectors and signals - Interfaces

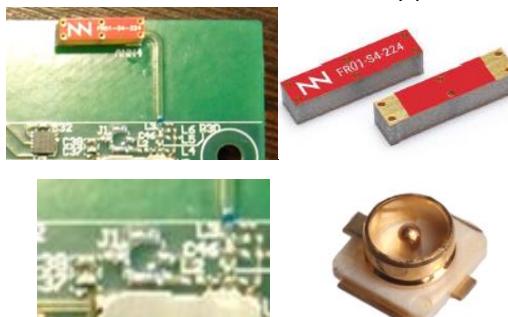


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1. LoRa interface: LoRa embedded Antenna and footprint for external antenna connector (UMC)

Through the LoRa antenna interface, the user can communicate LoRa devices. The board includes an optional connector for install an external antenna.

The current and certified antenna is omnidirectional and lineally polarized.

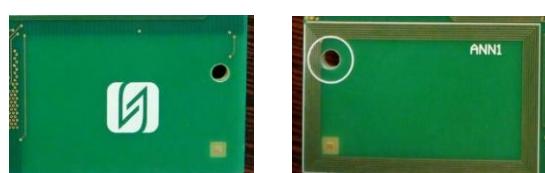


2. NFC interface

The board includes a 64-Kbit EEPROM for the NFC memory allowing faster data transfer between the NFC (I^2C communication) and the RF interface (NFC tag writer is recommended).

Write time:

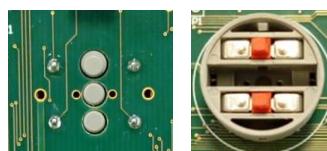
- From I^2C : typical 5ms for 1 byte
- From RF: typical 5ms for 1 block



3. Multipurpose connector footprint (GPIO):

The multipurpose connector is integrated as a discrete component and connected to the isolated interface, 24VDC.

For this footprint use FRVKOOP (in the image) or equivalent switch.



4. External multipurpose connector (B3):

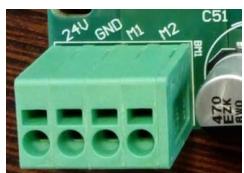
Designed to connect external devices powered at 24V, this multipurpose connector without a specific footprint exposes a galvanically isolated connection to one of the switches of the contact.

<p>Signals:</p> <ul style="list-style-type: none"> <input type="radio"/> STO A <input type="radio"/> STO B 	
--	--

5. Power and motor drive connector:

Power supply input and SSR outputs. Connector SPT 2.5/4-V-5.0.

The board must be 24VDC powered. Located in the same connector are the outputs for motor driver (M1 and M2), 24VDC, up to 15A.

<p>Signals:</p> <ul style="list-style-type: none"> <input type="radio"/> 24V <input type="radio"/> GND <input type="radio"/> M1 <input type="radio"/> M2 	
--	--

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6. **RS485 connector (B6)**: RS485 interface. Connector PTSM 0,5/ 3-HV-2,5.

For devices which does not need power from the board and are powered from another voltage source.

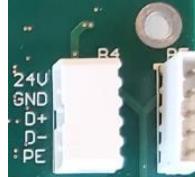
Signals:

- P
- GND
- N

7. **RS485 connector (B4/B5):** RS485 interfaces. Connectors PTSM 0,5/ 5-HV-2,5. For devices which can be 24VDC powered from the board.

Signals:

- 24V
- GND
- P (D+)
- N (D-)
- PE



8. **Digital IO connector:** Digital IO, 2 inputs, 1 SSR output. Connector PTSM 0,5/ 5-HV-2,5.

Signals:

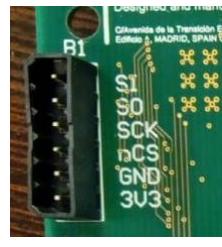
- IN1
- IN2
- Input ref
- OUT SSR
- GND



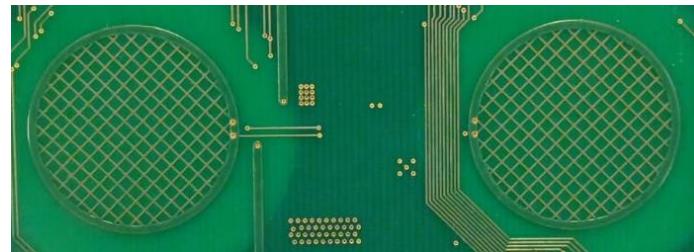
9. **Led interface:** Several LEDs used to indicate the status of the board.

All the LEDs are programmable, except LED "PWR" which is directly connected to the power supply.

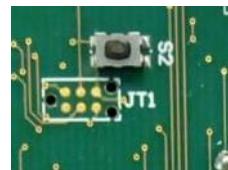
10. **SPI Bus connector:** Serial Peripheral Interface. Connector PTSM 0,5/ 6-HV-2,5

<p>Signals:</p> <ul style="list-style-type: none"> • S1 • S0 • SCK • nCS • GND • 3V3 	
--	--

11. Capacitive buttons: are used to interact with a human user



12. Reset button (S2): Directly connected to the reset pin of the microcontroller, it is not programmable.



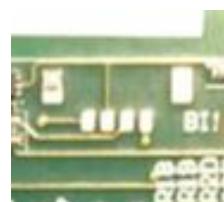
13. Optional buzzer (GPIO)



14. Accelerometer IIS3DHHC



15. Footprint for I²C port



4. Installation instructions

4.1. Power the DBOARD

WARNING

The board should not be connected while the power supply is on.

The DBOARD is powered through one SPT 2.5/4-V-5.0 connector in the left lower part of the board. 24VDC powered, this power supply may come from an AC/DC converter, battery, DC/DC converter, etc.

Mostly of the power supply will work with the DBOARD, but the condensers in the input may be considered.

Regulated source between 5 - 30V on 24V with current limiting and short circuit protection.

When the DBOARD is powered, the PWR LED must be ON.

4.2. Program the DBOARD

Through the JT1 connector the firmware of the DBOARD should be loaded in the microcontroller memory. The micro can access to the NFC EEPROM memory, where, as example, the user could write the configurable parameters for commissioning the board.



Microcontroller MuRata model is CMWX1ZZABZ-078.

5. Commissioning procedure

The commissioning procedure may be carried out by writing in the NFC memory of the board. Then the firmware may use this data stored in the memory to control and interact with the devices attached to the board.

To facilitate the commissioning, it is based on a smartphone application developed by DEEPTACK. This application runs in any android smartphone with NFC implemented. In case of a bad NFC implementation of the phone there can be some difficulties to connect, so we recommend using one of the following devices that have been validated by the application developers:

- Huawei Y8 2018
- Motorola G6

The commissioning consists on set the parameters in every DBOARD by writing them in its NFC memory. The application also writes the radio and unique ID data automatically in the NFC memory.

6. DATA

6.1 Manufacturer data

deeptack

DEEPTACK, S.L.U.

C/ Avenida de la Transición Española, 32, Edificio A, Planta 4

28108 - ALCOBENDAS (Madrid) - ESPAÑA

CIF: B-85693224

Telephone: +34 91 831 00 13

6.2 Equipment data

Type of equipment	Single axis tracker controller.
Equipment name	DBOARD R3
Models	DBOARD R3

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7. Markings

Commercial brand and manufacturer info.

Commercial brand of manufacturer (DEEPTACK) is included, along as official address of the company. The name of the equipment (DBOARD R3) is also included along with input power supply. Additional information regarding documentation can be found in this part of the marking



CE Marking

The device also complies CE regulation son CE marking is also included



FCC & IC IDs



Regulatory Notice

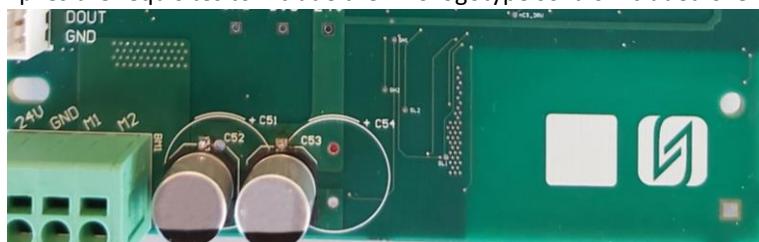
"This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation".

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

Mass production serial number reserved space + NFC compliant label

A white square has been included to include a QR code with the unique serial number included during mass production. The QR code would be laser engraved or stack using industrial grade stickers.

DBOARD R3 fully complies the requisites to include the NFC logotype so it is included over the NFC patch.



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8. FCC/ISED Regulatory notices

Modification statement

DEEPTACK S.L.U. has not approved any changes or modifications to this device by the user. Any changes or modifications could void the user's authority to operate the equipment.

DEEPTACK S.L.U. n'approuve aucune modification apportée à l'appareil par l'utilisateur, quelle qu'en soit la nature. Tout changement ou modification peuvent annuler le droit d'utilisation de l'appareil par l'utilisateur.

Interference statement

This device complies with Part 15 of the FCC Rules and Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Wireless notice

This equipment complies with FCC and ISED radiation exposure limits set forth for an uncontrolled environment. The antenna should be installed and operated with minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet appareil est conforme aux limites d'exposition aux rayonnements de l'ISDE pour un environnement non contrôlé. L'antenne doit être installée de façon à garder une distance minimale de 20 centimètres entre la source de rayonnements et votre corps. L'émetteur ne doit pas être colocalisé ni fonctionner conjointement avec à autre antenne ou autre émetteur.

FCC Class B digital device notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAN ICES-3 (B) / NMB-3 (B)

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de classe B est conforme à la norme canadienne NMB-003.