



GLOBAL DISPLAY SOLUTIONS

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Description	User Manual - NFC 5V RS232 board
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This technical literature is subject to change without notice.

Please contact GDS or its representative before designing your product based on this specification



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1. FCC Notice (U.S. Only)

FCC Class B

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instruction manual, may cause interference with radio and television reception. 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.

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.
- 2 This device must accept any interference received, including interference that may cause undesired operation.

NOTICE: The FCC regulations provide that changes or modifications not expressly approved by Global Display Solutions SpA could void your authority to operate this equipment.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference with radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the system with respect to the receiver.
- Move the system away from the receiver.
- Plug the system into a different outlet so that the system and the receiver are on different branch circuits.

If necessary, consult a representative of Technogym SpA or an experienced radio/television technician for additional suggestions.

The following information is provided on the device or devices covered in this document in compliance with the FCC regulations:

- Product name: NFC 5V RS232
- Model number: BRD02822 - 0WR01147AA
- Company name: Global Display Solutions SpA

End product labelling:

Using a permanently affixed label, the modular transmitter is labelled with its own FCC identification number, and,

if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module.

The final end product must be labelled in a visible area with the following:

“Contains Transmitter Module FCC ID: XZR0WR01147AA or contains FCC ID: XZR0WR01147AA”.

2. Safety Instructions

The NFC 5V RS232 board is a Mifare/NFC reader module of the Technogym Devices (Equipment Cardio, Trainer point or Class Reader).

Read the Safety Instruction carefully and keep it for use later.

Beware of all warning and instruction signs marked on the NFC 5V RS232 board.

Ensure that the ambient temperature around the module is between +5°C and +50 °C (with relative humidity between 5% and 85%).

3. NFC compatibility

The NFC module will be compatible with the following handsets with respect to the development phases:

Phase 1:

- Samsung GALAXY NEXUS GT-i9250
- Samsung MINI 2 S6500 NFC

Phase 2:

- Google NEXUS S
- Blackberry CURVE 9360
- Blackberry BOLD 9900
- Samsung GALAXY SII I9100 NFC
- Nokia 700

This list may be subject to future changes according to new devices released on the market in the coming months. For a complete list of devices which integrate NFC please refer to:

<http://www.nfcworld.com/nfc-phones-list/>

<http://www.paywithisis.com/>

<http://www.nfc.cc/nfc-phones/>

4. Mechanical dimensions

The NFC 5V RS232 board shows the following mechanical dimensions:

Quote	MAX Dimension
PBC_W	86mm
PCB_L	51mm
PCB_H	1.6mm
Ant_W	56 mm
Ant_L	40mm

The electronic board has all components on one side only and the connectors must be of type SMT.

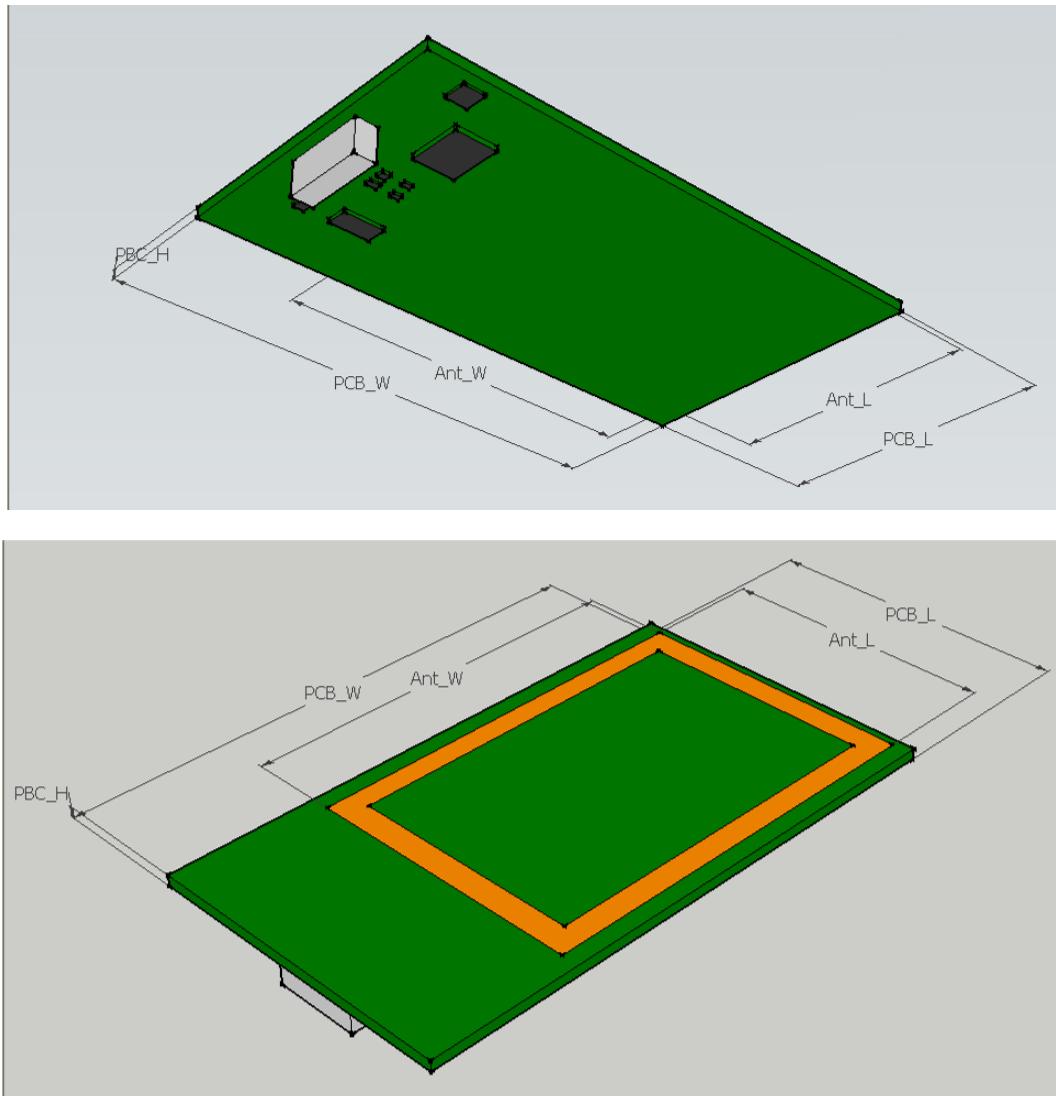


Figure 1 NFC 5V board mechanical dimensions

5. Connections

The NFC 5V RS232 board has the main connector (Picoblade Molex SMT - 53398-087) with reference J1.

Pin	Function	Description
1	+5Vdc	Power Supply
2	RS232_TX	Serial Data Out
3	RS232_RX	Serial Data In
4	NC	RTS out
5	NC	CTS in
6	NC	Relè out
7	NC	NC
8	GND	Ground

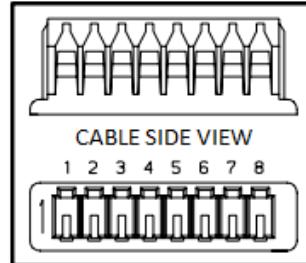


Figure 2 J1 connector details

6. Operating mode

The NFC 5V RS232 board operate with both user keys based on Mifare protocol (TGS Mifare and MyWellness key) and NFC smartphones. The minimum reading distance with NFC devices must be at least 15 mm.

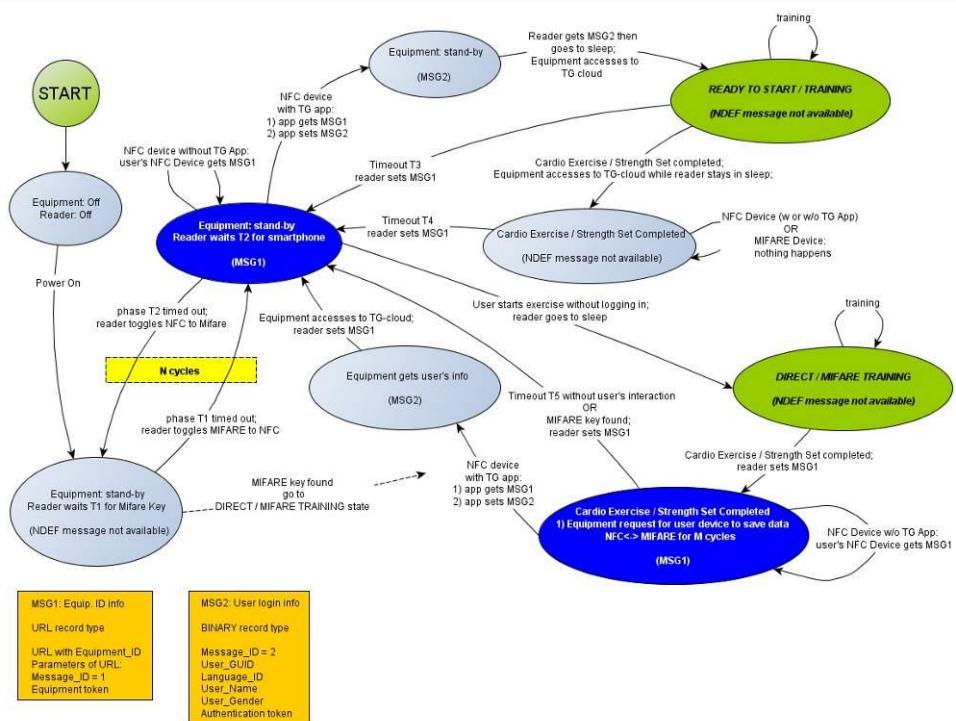
In the case of interaction with user key based on Mifare protocol, the board traces its operating states, based on the use of fitness equipment by the athlete (eg, running a year) and through some parameters collected from the user keys.

When the board reads a smartphone NFC, the data exchange between them is minimized, thanks to a NFC application, installed in the smartphone (installed as prerequisite), which supports most of the data management.

The NFC 5V RS232 board operates with the following transmitter specifications:

- Work Frequency : 13,56 MHz
- Frequency Range: 13.553-13.567MHz
- Electric Field @ 30m: < 0.5 mV/m

Equipment connected: reader state machine



Equipment not connected: reader state machine

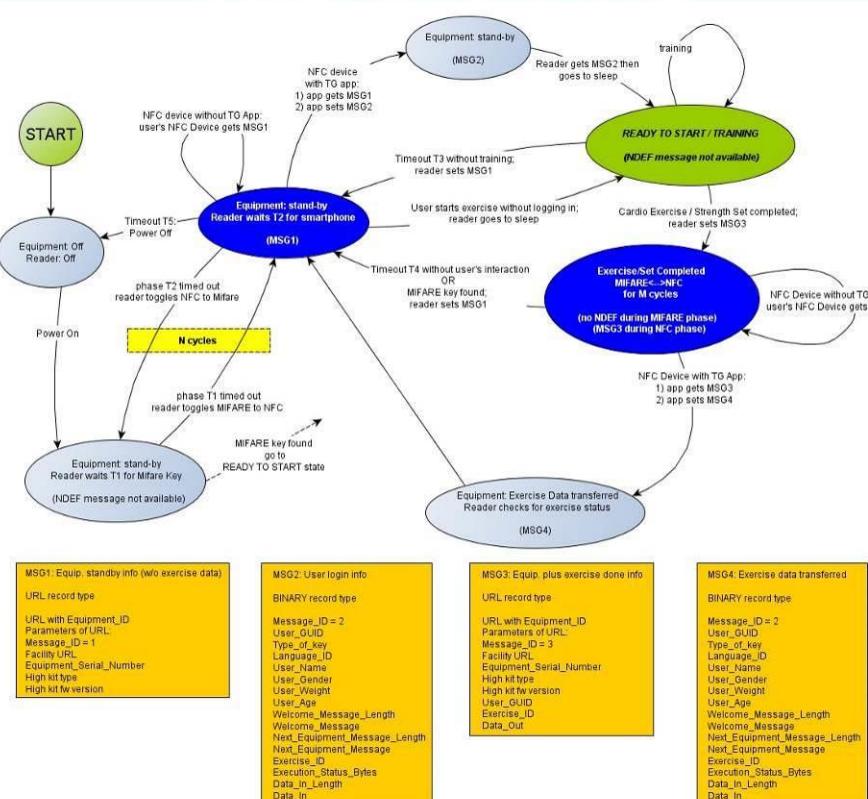


Figure 3 NFC 5V RS232 board state diagram with and without equipment connected

7. Labelling

The NFC 5V RS232 board has labeling showing FCC ID code, GDS SpA board code and Technogym SpA codes.



Figure 4 NFC 5V RS232 board labelling (option 1)



Figure 5 NFC 5V RS232 board labelling (option2)