

# NBDUINO

## NARROWBAND SHIELD ARDUINO COMPLIANT

### DESCRIPTION

NBduino is the new shield that allows you to send data from your Arduino board directly to the cloud via the NB-IoT network.

You can plug the shield on the "Arduino" boards or it can be standalone with a self own LiPo battery.

With simple codes and libraries (check the [link](#)), it's possible to develop fastly your application and view your data directly on the Cloud.



**PLUG AND PLAY**  
(ARDUINO COMPATIBLE)

**POWER MODES**  
(USB or LiPo  
battery)

**LOW  
POWER**  
(5 $\mu$ A)

**LONG  
RANGE**  
(7 Km)

**CLOUD  
STORAGE**  
(MQTT BROKER READY)

### TOPVIEW SRL

Via Pertini 25d  
81020, San Nicola la  
Strada (CE), Italy  
+39 0823424244

[www.topview.it](http://www.topview.it)

Mon- Fri  
09-18

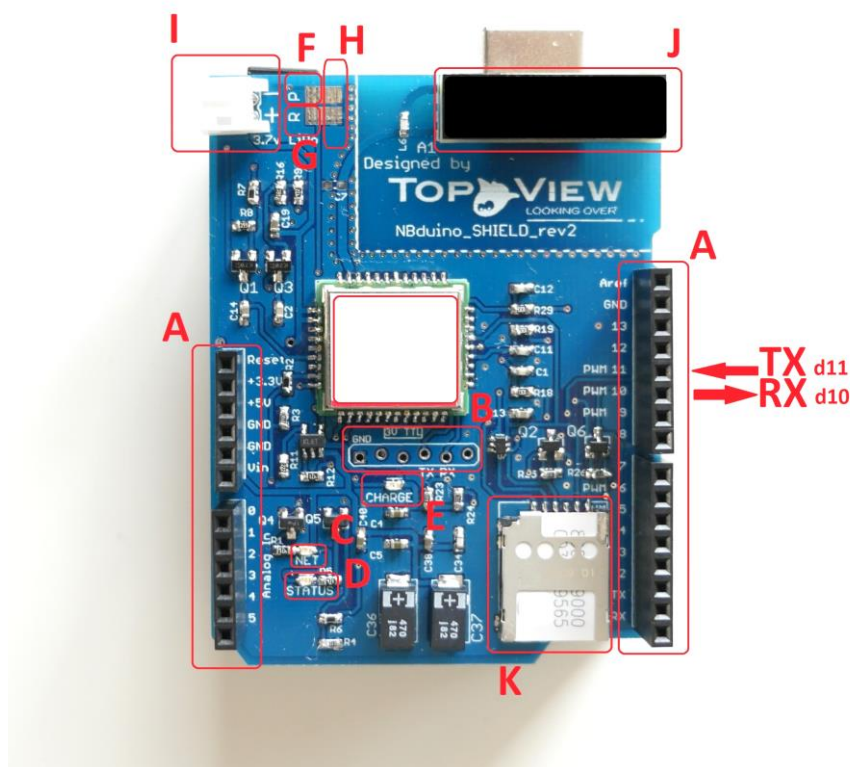


# NARROWBAND SHIELD ARDUINO COMPLIANT

## INDEX

|  |                        |
|--|------------------------|
| <a href="#">SHIELD PINOUT DIAGRAM</a>                  | <a href="#">pag. 3</a> |
| <a href="#">PLUG AND PLAY (ARDUINO COMPATIBLE)</a>     | <a href="#">pag. 4</a> |
| <a href="#">POWER MODES<br/>(USB or LiPo battery)</a>  | <a href="#">pag. 5</a> |
| <a href="#">LOW<br/>POWER<br/>(5<math>\mu</math>A)</a> | <a href="#">pag. 6</a> |
| <a href="#">LONG<br/>RANGE<br/>(7 Km)</a>              | <a href="#">pag. 7</a> |
| <a href="#">CLOUD STORAGE<br/>(MQTT BROKER READY)</a>  | <a href="#">pag. 8</a> |
| <a href="#">REFERENCE</a>                              | <a href="#">pag. 9</a> |

## SHIELD PINOUT DIAGRAM



**Figura 1:** NBduino Shield Pinout

- A. ARDUINO PINOUT, a voltage greater than 3.0V is present at the pin (5V boards) a voltage greater than 2.0V volts is present at the pin (3.3V boards)
- B. FTDI PORT
- C. NET LED (fast blink = wait to attach, slow blink = attached);
- D. STATUS LED (Fixed = module ON)
- E. CHARGE LED (ON = charging, OFF = charged)
- F. PowerKey PAD (to wake up the module – without arduino)
- G. Reset PAD (resets the module)
- H. GND PAD
- I. LiPo 3.7V slot
- J. EMBEDDED ANTENNA
- K. MICRO SIM SLOT

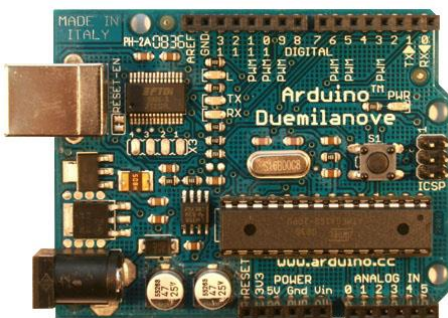
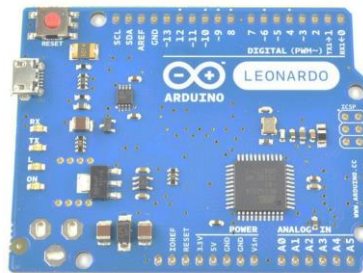
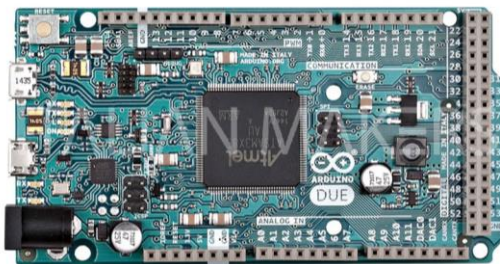
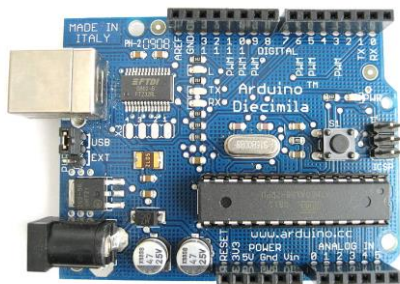
# NBDUINO

## NARROWBAND SHIELD ARDUINO COMPLIANT

### PLUG & PLAY

You can plug this SHIELD on the follow Arduino boards:

- Diecimila
- Due
- Duemilanove
- Uno
- Leonardo
- Mega2560
- Yun



# NB<sub>DUINO</sub>

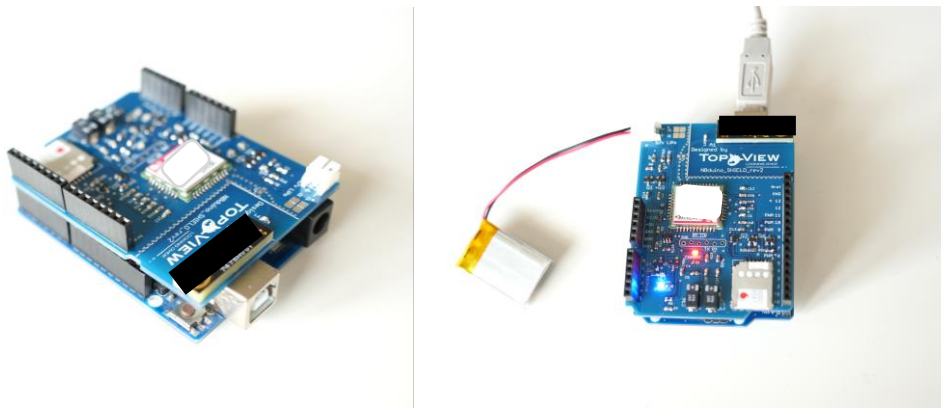
## NARROWBAND SHIELD ARDUINO COMPLIANT

### POWER MODES

#### 1. – USB –

Plug the SHIELD on the Arduino Board, connect USB cable and run the sketch

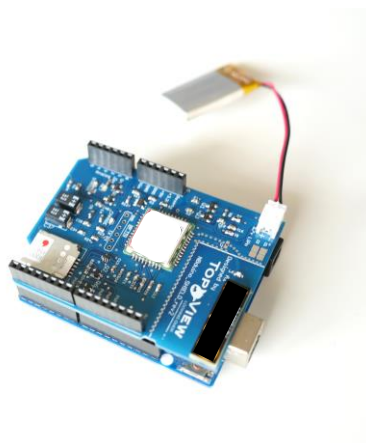
The module is powered by Arduino's 5v pin and the LiPo battery charger starts to charge (you can see the fixed CHARGE LED, it will turn off when charging is complete)



**Figure 2:** a) the NBduino SHIELD plugged on Arduino UNO, b) The System powered by USB cable and LiPo battery charging

#### 2. - STANDALONE with Arduino -

Plug the SHIELD on the Arduino Board, connect 3.7V LiPo battery and run the sketch

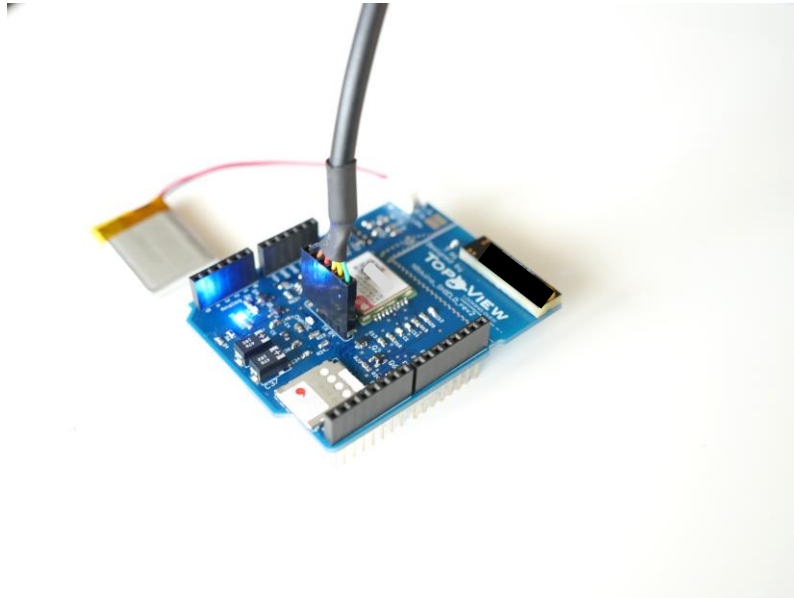


**Figure 3:** the NBduino SHIELD plugged on Arduino UNO, both powered by 3.7v LiPo battery

### 3. - STANDALONE without Arduino –

Connect 3.7V LiPo battery, wake-up the SHIELD pushing “P” pad and GND pad together for 500 ms (it also sleep the SHIELD ).

You can directly control the module with a FTDI cable by your personal computer.



**Figure 4:** the NBduino SHIELD “standalone” powered by 3.7v liPo battery

# NB

## DUINO

# NARROWBAND SHIELD

# ARDUINO COMPLIANT

## LOW POWER

The NB chip on board is the “SIM7020E” by SIMCOM;

it has an ultra low power consumption (5  $\mu$ A in “Power Save Mode”).

You can find every specification about SIMCOM product inside “SIM7020 Hardware Design\_V1.00” and “SIM7020 Series MQTT Application Note”.



# NB<sub>DUINO</sub>

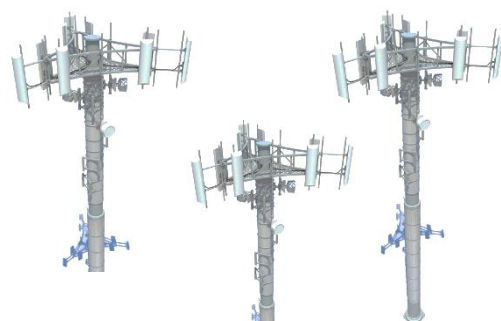
## NARROWBAND SHIELD ARDUINO COMPLIANT

### LONG RANGE

It can be used directly in the cloud using the mobile vendors infrastructure and it's possible to develop its own application to MQTT broker that manages all data.

TOPVIEW provides to his clients the SIM card with some traffic available and space on cloud to manage the data.

Here is the network structure for NB-iot communications:



cellular LTE Towers



User application

☰ NB-IOT

**NB-IOT Test page**

Payload:      Topic: 868333030018895/H%  
                    Payload: 48

| Index | Timestamp                | Topic                | Value |
|-------|--------------------------|----------------------|-------|
| 0     | 2018-11-08T17:35:26.000Z | 868333030018895/T_2  |       |
| 1     | 2018-11-08T17:35:23.000Z | 868333030018895/T    | 22    |
| 2     | 2018-11-08T17:35:23.000Z | 868333030018895/H_2% |       |
| 3     | 2018-11-08T17:35:22.000Z | 868333030018895/H%   | 48    |
| 4     | 2018-11-08T17:35:04.000Z | 868333030018895/T_2  |       |
| 5     | 2018-11-08T17:35:03.000Z | 868333030018895/T    | 22    |
| 6     | 2018-11-08T17:35:00.000Z | 868333030018895/H_2% |       |
| 7     | 2018-11-08T17:35:00.000Z | 868333030018895/H%   | 48    |
| 8     | 2018-11-08T17:34:42.000Z | 868333030018895/T_2  |       |
| 9     | 2018-11-08T17:34:42.000Z | 868333030018895/T    | 22    |
| 10    | 2018-11-08T17:34:38.000Z | 868333030018895/H_2% |       |
| 11    | 2018-11-08T17:34:38.000Z | 868333030018895/H%   | 48    |
| 12    | 2018-11-08T17:33:36.000Z | 868333030018895/T_2  |       |
| 13    | 2018-11-08T17:33:35.000Z | 868333030018895/T    | 22    |

**Cloud Storage powered by**

**TOPVIEW**

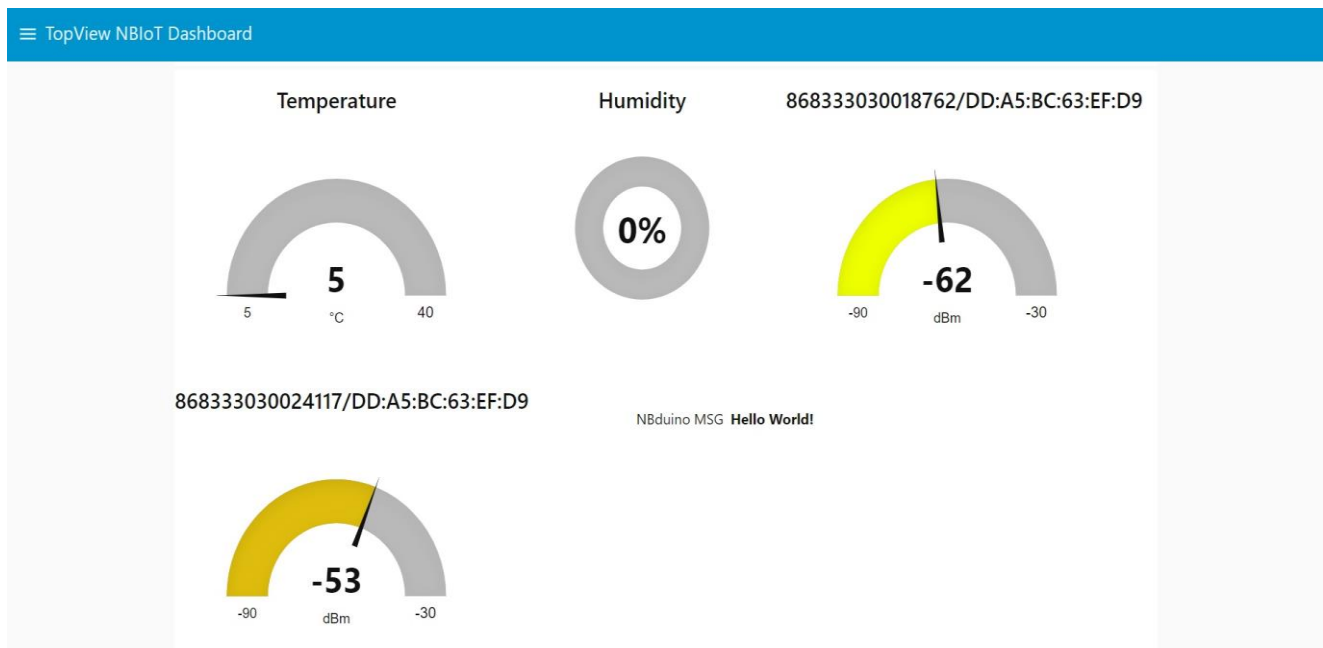
LOOKING OVER

# NBduino

## NARROWBAND SHIELD ARDUINO COMPLIANT CLOUD STORAGE

TopView provides a cloud service (optional) if it is required, you can see your data on cloud and store it on our database.

We also provide APIs to interface the personal user service with our own.



**Figura 5:** data storage and management by TopView Dashboard



**NB**DUINO

# **NARROWBAND SHIELD ARDUINO COMPLIANT**

Reference

<https://github.com/TopViewsrl/NBduinoShield>