

## OVERVIEW



### Characteristics:

Power supply: ..... 12 VDC (12 min – 15 max)  
Consumption: ..... 350 to 700mA depending on calibration  
Communication: ..... RS232.  
Pin out: ..... 4 points connector (located on the RS232 interface)

### Reading distance:

Credit card tags (CCT type): max. 70 cm / 2.3 ft (\*)  
High distance tags (TVL type): max. 100 cm / 3.28 ft (\*)  
(\* ) Performance for a non-perturbed environment.

### Mechanic:

**Antenna:** Inox tube. Dimension 83 x 53 cm  
**Mast:** Inox – square section 40 x 40 mm – height : 150 cm  
**Base:** 20 x 20 cm, 4 oblong holes  $\varnothing 9$  x 18 mm for fixation.  
**Electronic case:** IP67 waterproof aluminum case. 171 x 121 x 55 mm.

## Features

- Manual calibration to get the best performances according to the reader environment.
- Possibility to add an extra LED and buzzer to give a detection/reading information.

## Recommendations / Limits

- If 2 (or more) readers are installed too close, it can cause a coupling. The readers will not be able to read tags or a tag will be read by each reader at the same time.
- Do not install the reader near to a closed conductor circuit.
- Do not install the reader on a metallic support
- Do not install the reader close to a metallic ground. In this case, respect the minimum distance, between the antenna and the ground, which are 20 cm with the side of the antenna and 50 cm with the back of the antenna.
- Do not forget to connect the 0V to a clean ground.  
(See the installation examples at the end of this document)

## Unfavorable cases

Avoid installing the reader close to perturbing electromagnetic field like:

- Informatics data transmission cables
- Energy transmission cables
- Screen display
- Equipment with no EMC conformity

## Wiring / Calibration

### Wiring

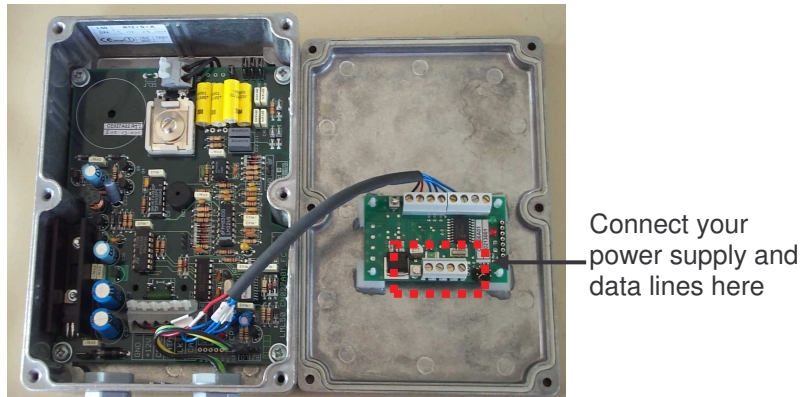
Connect the power supply (0V, +12V) and the bus data lines (Tx, Rx) to the interface.  
The maximum distance between the host and the reader is 15m.

#### Recommended cables (for remote power supply):

1 pair 6/10° of 98.43 ft max (30 m)	OR	1 pair 9/10° of 165.05 ft max (50 m)
2 pairs 6/10° of 196.86 ft max (60 m)		2 pairs 9/10° of 328.10 ft max (100 m)
3 pairs 6/10° of 328.10 ft max (100 m)		

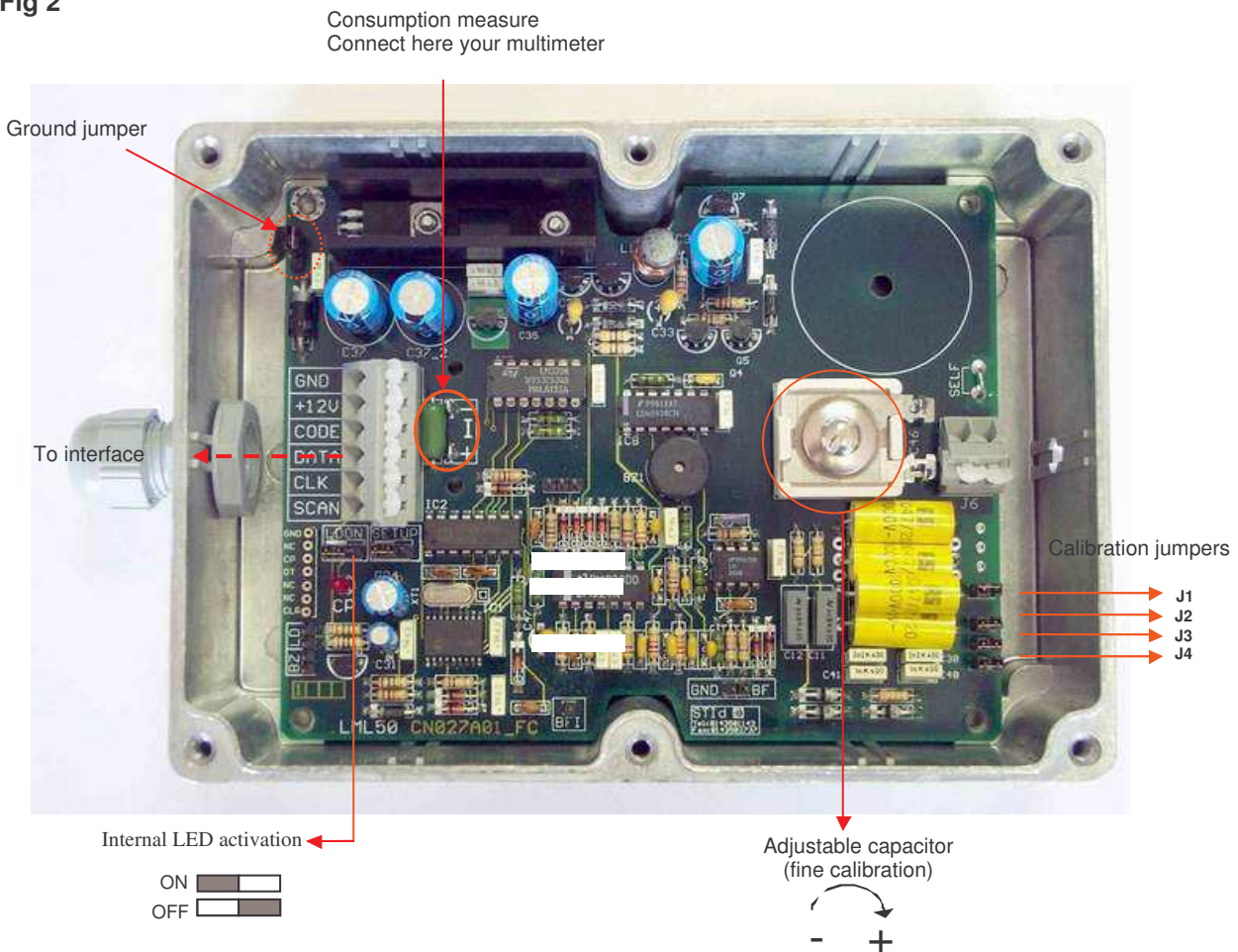
### Electronic equipment view

Fig 1



### Main board view

Fig 2



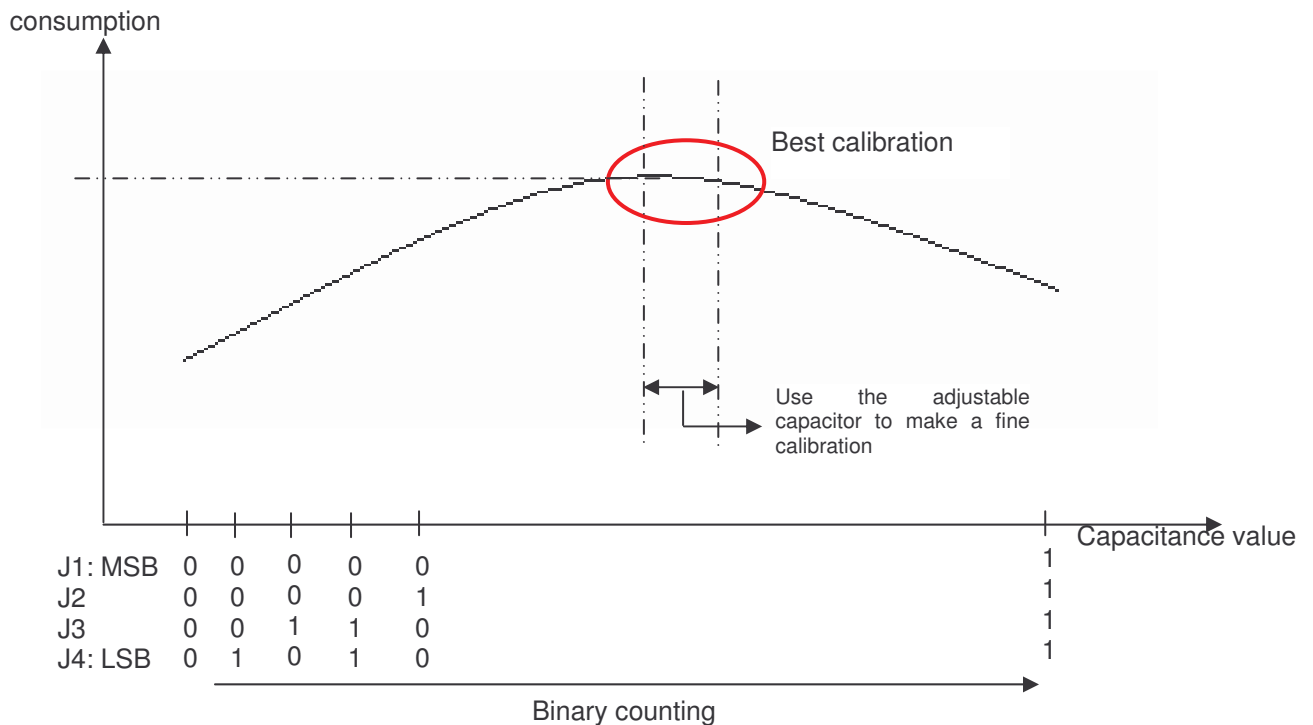
## First use

- Fit the reader at the desired place
- First connect only the power supply
- Present a tag to the reader
- Check the good detection (if the distance is not correct, modify the calibration)  
*To control the detection, use the LED on the main board. You can verify that data are sent from the main board to the interface with the LED on the interface.*
- Connect the data lines (Rx / Tx / GND)

## Calibration

The reader is calibrated before delivering, but it is possible that the reader need to be re-calibrated to adjust to its environment.

- Connect a voltmeter (DC) to check the consumption (see the main board view for the voltmeter connection). Consumption = measure x 10
- Usually, you get the best possible performances when the reader's consumption is maximum (usually maximum is around 550 mA (measure 55mV)).
- To correctly calibrate the reader you need to find the right capacitance value (jumper J1, J2, J3, J4 and adjustable capacitor). For more details, check the scheme and the algorithm above.
- The ground jumper can be used to reduce perturbations.

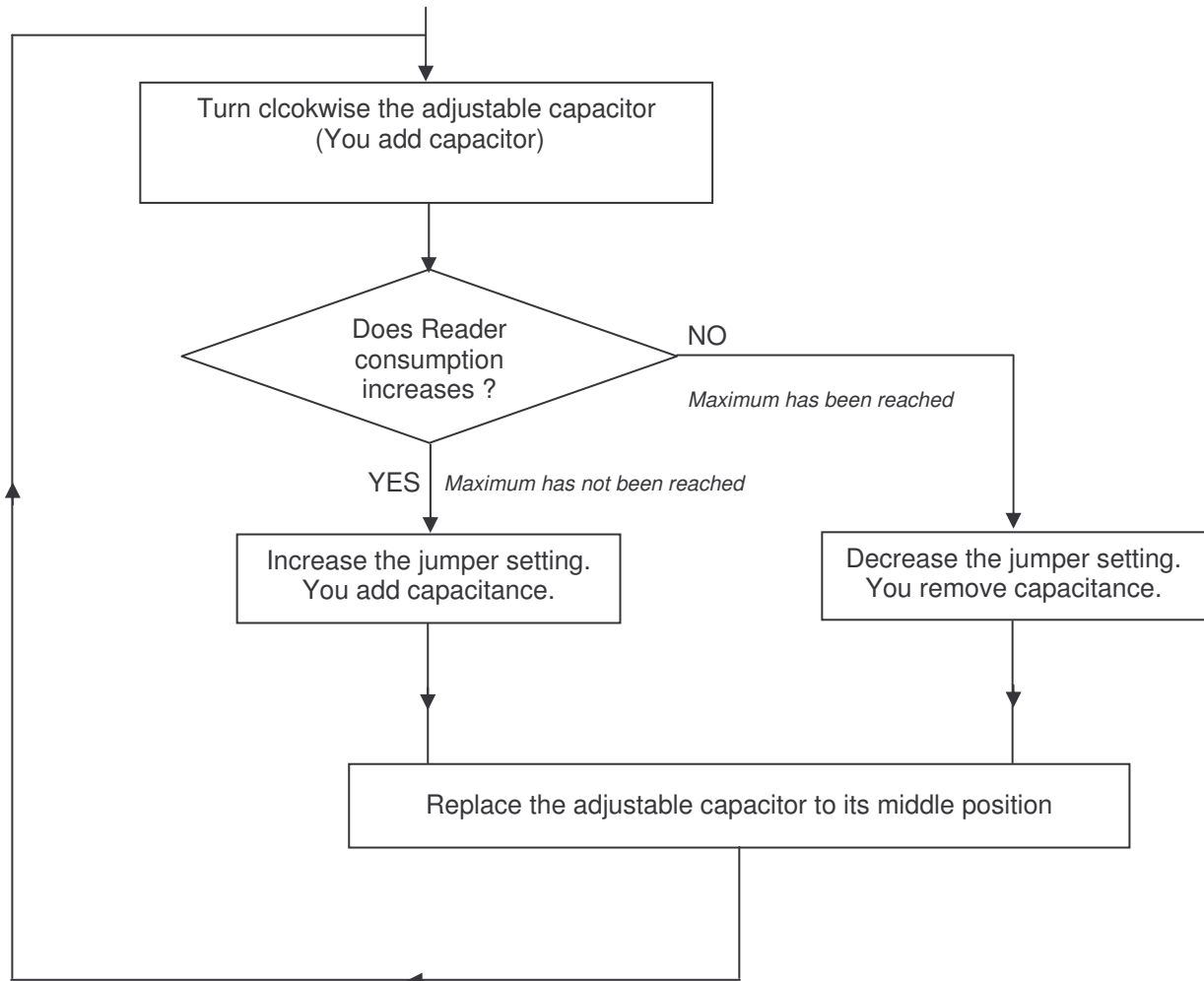


J1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	
J2	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	
J3	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	
J4	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	
Decimal value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

## Calibration algorithm

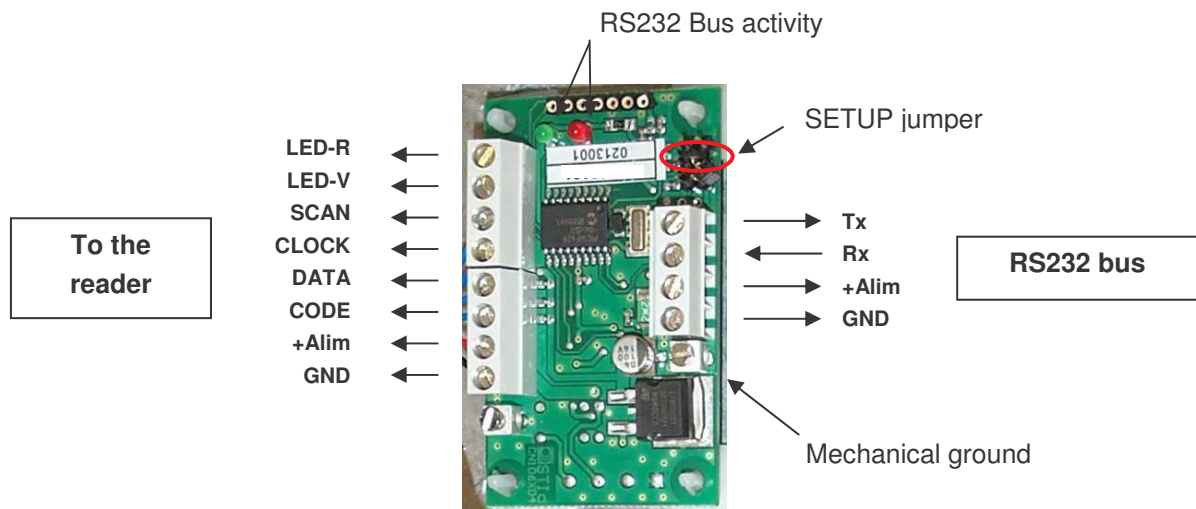
The goal of this algorithm is to find the best jumper setting by a dichotomy method.

- If the consumption increase when capacitance value is increased, the maximum consumption value has been already reached. So you have to decrease the total capacitance value by modifying the jumper setting.
- If the consumption decrease when capacitance value is increased, the maximum consumption value has not been already reached. So you have to increase the total capacitance value by modifying the jumper setting



During the algorithm process, if you go back to the last jumper setting, it is because you are near the best calibration jumper setting. Try, with the adjustable capacitor, to find the maximum consumption (try it with the 2 different jumper setting).

## Interface



### Option available: Interface with relay

When a tag is detected by the reader, it automatically sends the ID through the RS232 bus. If the host does not answer by an acknowledge (ACK, 06h, 06d) when it receives the ID number, the reader will re-emit it (3 times max).

**If you cannot dialogue with the MLT, you should configure the communication parameters**  
(see next page)

## Reader configuration (SETUP mode)

To configure the reader (communication characteristics), you need to go into SETUP mode.

- Switch off the reader
- Fit the SETUP jumper
- Switch on the reader (the reader will automatically send a message on the bus "ENQ", 05h)

You are now into SETUP mode, you can configure the reader to your needs by sending configuration commands

- Main configuration: "3" (33h, 51d)  
STX ; "3" ; Parameters (6 bytes) ; CR ; ETX

### *Parameters:*

Byte 0: communication speed

- "0" (30h, 48d): 9600 bauds
- "1" (31h, 49d): 4800 bauds
- "2" (32h, 50d): 2400 bauds
- "3" (33h, 51d): 1200 bauds

Byte 1: Parity

- "0" (30h, 48d): no parity
- "1" (31h, 49d): even
- "2" (32h, 50d): odd

Byte 2: Carriage return

- "0" (30h, 48d): carriage return not used
- "1" (31h, 49d): carriage return used

Byte 3: Filtering time

*This option fixes the time between 2 emissions of a same ID*

- "0" (30h, 48d): No delay between 2 emissions
- "1" to "9": delay (in seconds) between 2 emissions of a same ID

Byte 4: Not implemented on the MLT (must be "0", 30h, 48d)

Byte 5: Not implemented on the MLT (must be "0", 30h, 48d)

The reader will answer ACK ASCII character (06h), if it accepts the new configuration.

If the reader answers NACK (15h), the command can be considered as lost.

- Extended configuration: "f" (66h, 102d)  
STX ; "f" ; Parameters (2 bytes) ; (CR if selected) ; ETX

### *Parameters:*

Byte 0: LRC (checksum)

- "0" (30h, 48d): LRC not used
- "1" (31h, 49d): LRC used

Byte 1: Compatibility

- "0": default
- "1": Only if you need compatibility with old 5C protocol

The reader will answer ACK ASCII character (06h), if it accepts the new configuration.

If the reader answers NACK (15h), the command can be considered as lost.

When you have finished configuring the reader, return into normal mode:

- Switch off the reader
- Remove the SETUP jumper
- Switch on the reader

## Optimization

If you do not have the best performances, some simple tips could help you to get them.

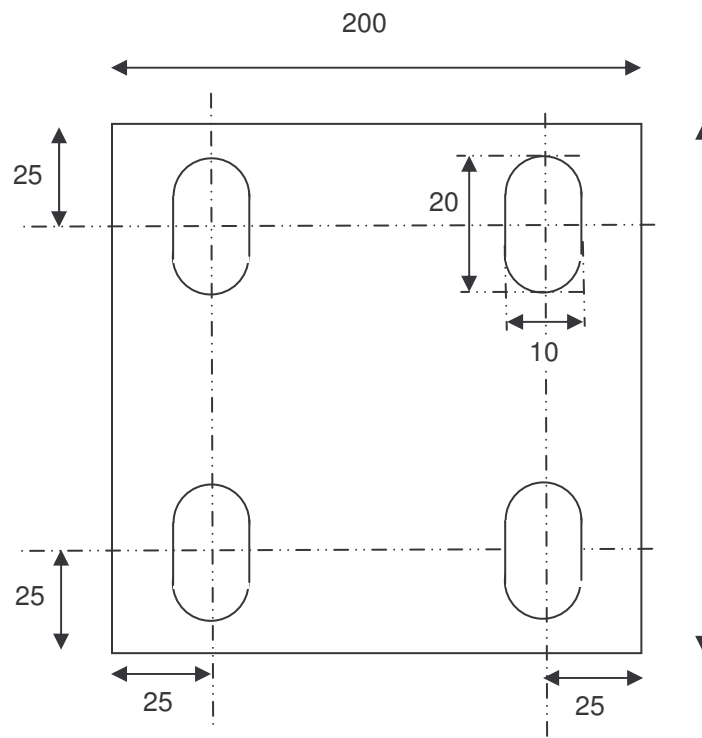
- Analyze the environment to find possible causes of perturbation
- Verify the wiring. Check that all contacts are corrects.
- Verify that the 0V is connected to a **clean** ground
- Measure the power supply. In some cases, the power supply doesn't succeed to drive enough current and its voltage drop. If you have less than 12V, the performance can be reduced a lot
- Measure the consumption. If you don't have around 550 mA, you need to calibrate the reader to its environment (see the calibration section).
- Try to move the reader and/or change its orientation.

**TIPS:** You can use a 12V battery to power the reader and it will be easier to move it.

**CAUTION:** All detection tests need to be done with the embedded 'CP' LED.

If you move the reader and get better performance on a new place, it means the initial place was not compliant for long range 125 kHz readers.

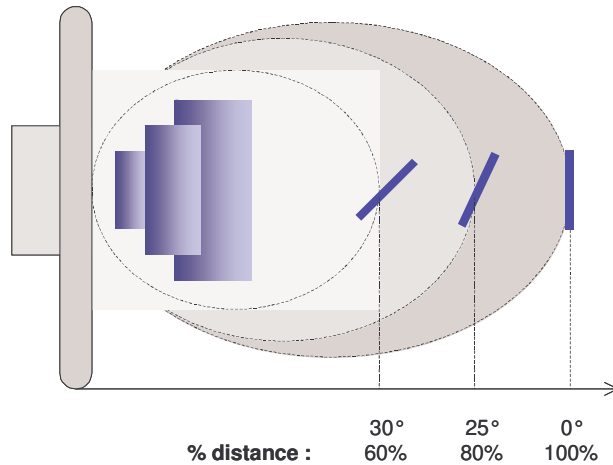
## Ground fixation



## Tag using

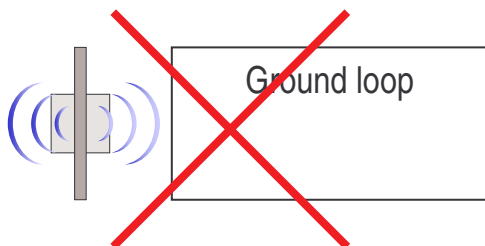
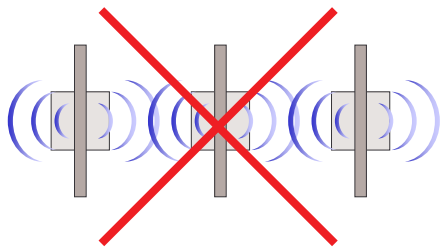
Present the tag in front of the reader, perpendicularly, and approach it slowly until the tag is detected. It is not necessary to agitate the tag.

**Caution:** If the tag is inclined, the reading distance will be reduced.



## Readers installation examples

**NO**



**YES**

