IPICO STK Elite reader

User Manual

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Version 1.2 draft

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HISTORY:

Version	Date	Person	Reason
Draft 1.0	15/09/2006	Hubert	Create
Draft 1.1	27/10/2006	Hubert	Edit and enhance
Draft 1.2	22/11/2006	Hubert	Edit and enhance with comments from Aus, add mats config
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Draft 1.1	Dd/mm/yyyy	Name	Reason
Draft 1.2	Dd/mm/yyyy	Name	Reason
Issued Version 2.00	Dd/mm/yyyy	Name	Issued

GLOSSARY

STK	Sport Time Keeping
TX	Transmit antenna
RX	Receiver antenna

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1 INTRODUCTION

This manual is intended to make a description of the STK Elite reader and to explain the procedure to setup and use the reader. It must be understood that setup environment can influence the performance of the system. This manual will help you to setup the reader to have an optimum tag read performance under most conditions.

2 SUMMARY OF FACILITIES

- Capability to drive 4 reading mats (2mx1m each), equivalent to an 8 meters timing line for one reader, or 4 meters with a second 4 meter line for backup. With 2 readers a 16 meters timing line is possible.
- Data can be stored on an internal flash drive (with battery backup)
- Ethernet port (RJ45) to communicate between a computer and the reader (Optional WIFI or RS485).
- Internal power supply by battery for mobile application
- External power supply: 12VDC or 220VAC (must be specified when ordering)
- External connectors for supplementary power supply battery
- Battery management card: beeps on low voltage or incorrect input polarity, voltage indicator
- Only one On/Off switch for the whole system
- Input (RS485) for the storage of data from a single STK Lite reader
- Leds and buzzer for tag detection.
- Optional Plug-in DSP(s) for better detection of tags in electromagnetic noisy environment
- Automatic tuning of the system
- Aluminium skin/plywood Road Case
- Venting on bottom and top of reader for hot climates (like Australia and Africa).

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3 READER

Figure 1: STK Elite reader

3.1 Front panel

All the cable connections on the reader are done on the front panel. All the visual indicators are also on the front panel. Figure 1 shows the front panel layout. A description of each part of the front panel is done in the followings chapters.

The face plate of each unit is powder coated Zinc annealed Steel.

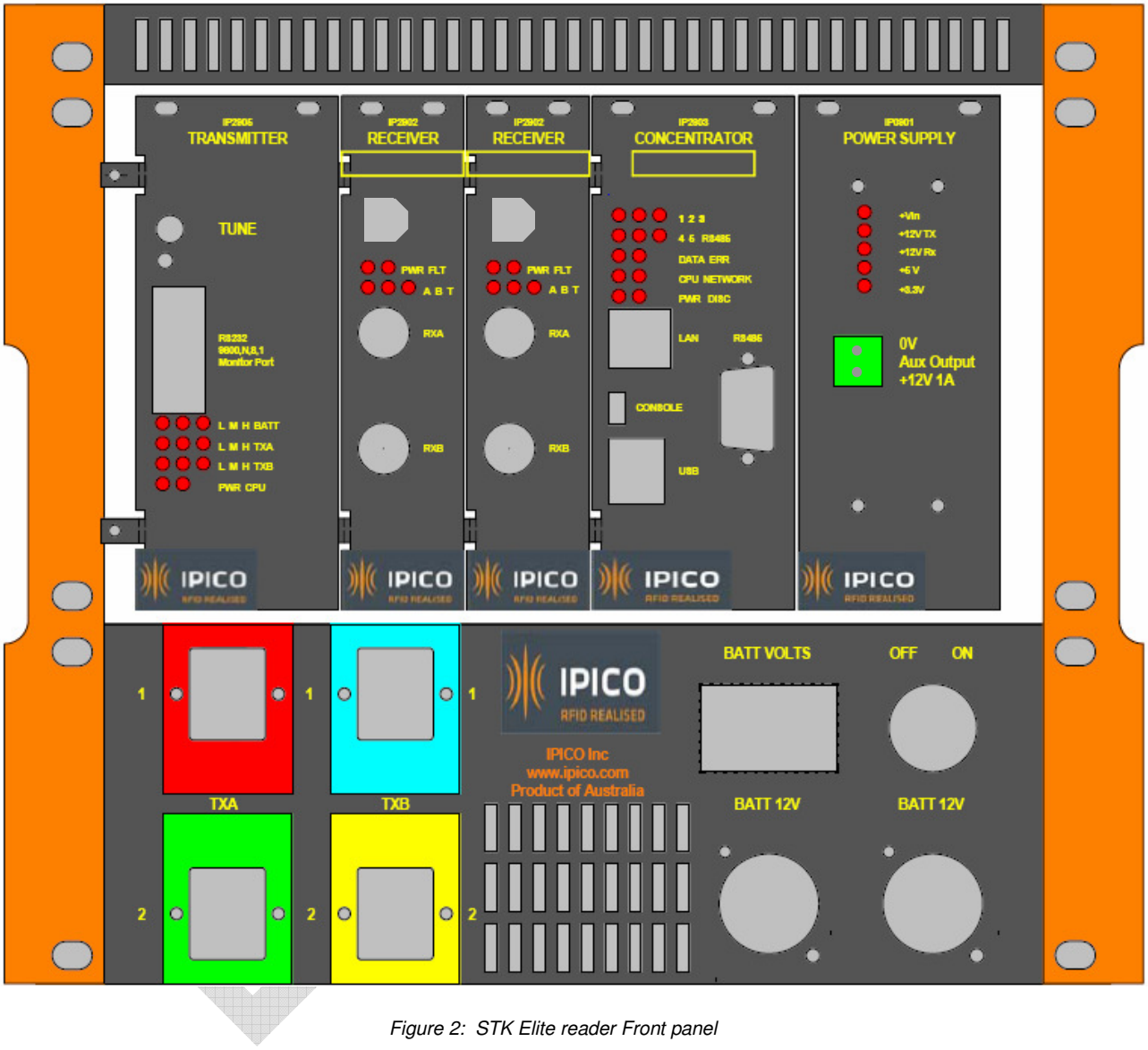

Figure 2: STK Elite reader Front panel

3.1.1 Transmitter unit

This unit manages the TX loops to provide energy to tags.

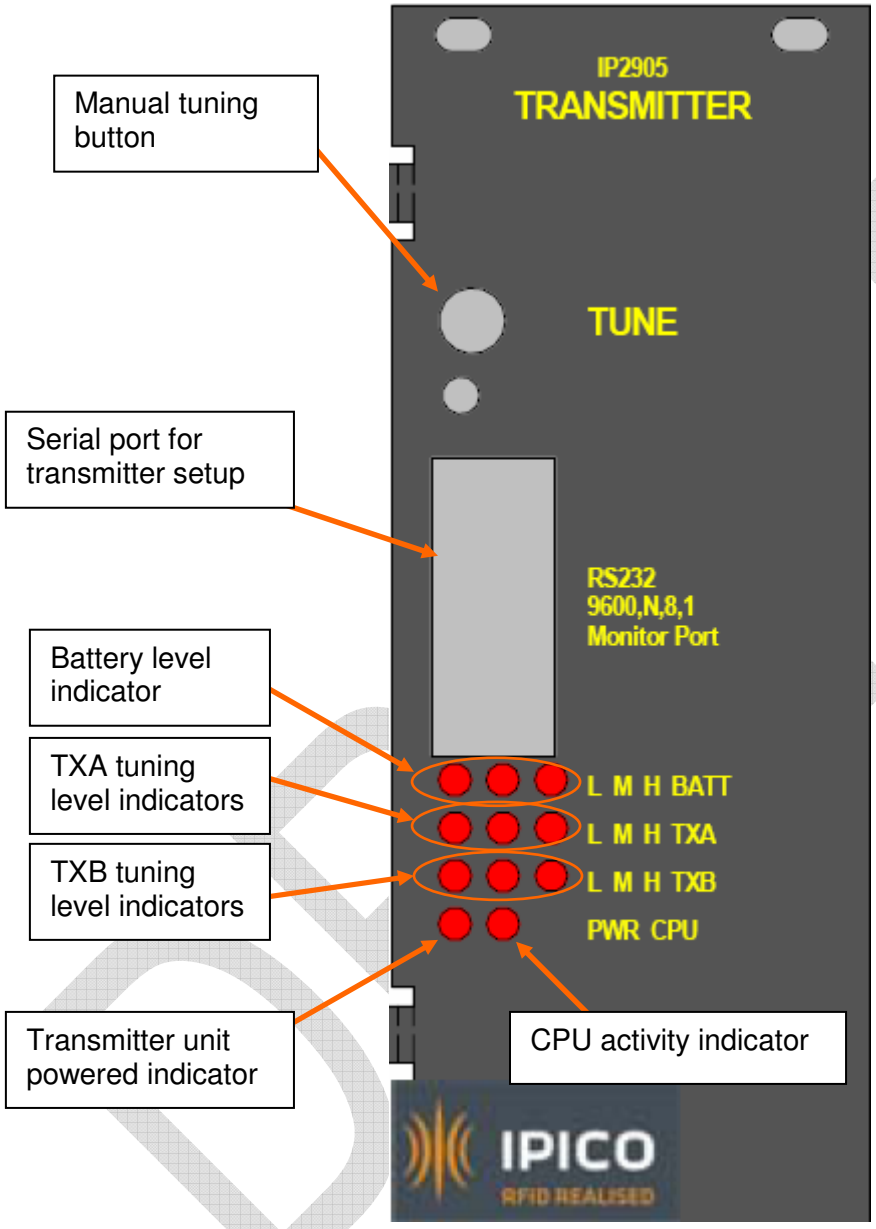

Figure 3: Transmitter unit

Battery level indicator:

Three indicators show Low (L), Medium (M) and High (H) voltage levels. As the power supply is managed by the Power Supply unit, the light should always show H.

Transmitter unit powered indicator:

This indicator should be lit when the reader is switched on to show that the transmitter unit is powered.

Manual tuning button:

This button is used to start a manual tuning of the mats antennas. After the reader and mats are installed and the reader is switched on, the reader will automatically tune the loops. The result of this tuning will be displayed on the TX tuning levels indicators. This manual tuning may be done during an event when there is no traffic on the mats, if it seems like the mats have detuned slightly due to temperature changes. In most of the cases, the automatic tuning done when the reader is switched on is sufficient.

TXA Tuning Level indicators:

TXA drives 2 mats (with red and green plugs). Three indicators show Low, Medium and High tuning level. This level indicates the performance of the reading distance of the 2 mats TXA. Under normal operation the indicators should be in the M or H region. However, good results can still be obtained when it is showing L. If flashing then something is not correct. Turn the power off and restart the system.

TXB Tuning Level indicators:

TXB drives 2 mats (with blue and yellow plugs). Three indicators show Low, Medium and High tuning level. This level indicates the performance of the reading distance of the 2 mats TXB. However, good results can still be obtained when it is showing L. If flashing then something is not correct. Turn the power off and restart the system.

CPU activity indicator:

This indicator shows that the microprocessor is operating. When operating correctly the CPU indicator will flash at approximately half second intervals.

Serial port for transmitter setup:

This serial port must not be used by the user. It is only used by Ipico qualified staff to setup the transmitter unit at the manufacturing level.

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3.1.2 Receiver unit

There are 2 Dual channels receiver units per STK Elite. They collect tag data from the RX loops in the mats.

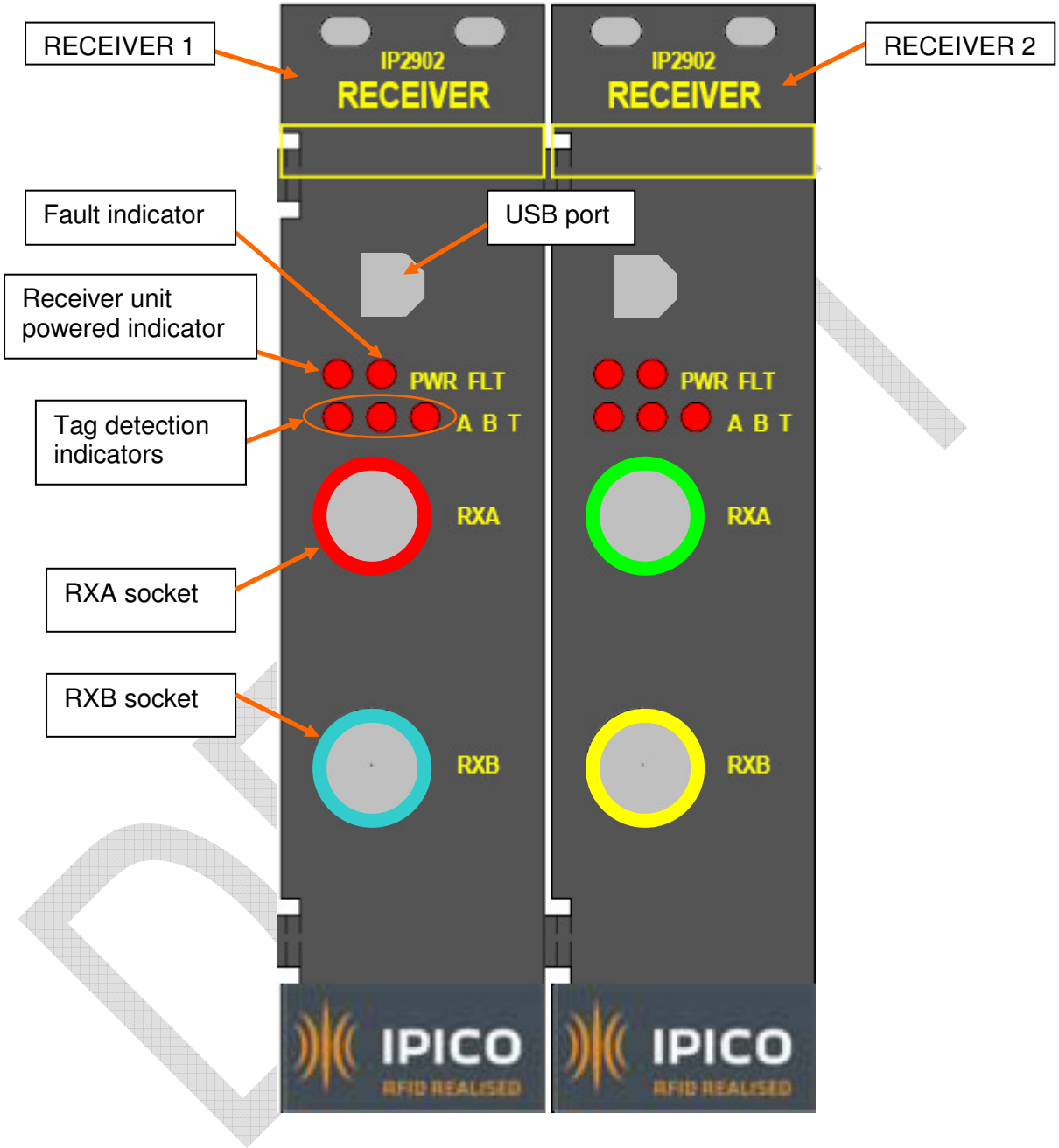

Figure 4: Receiver unit

Receiver unit powered indicator:

This indicator should be lit when the reader is switched on to show that the receiver unit is powered.

Fault indicator:

This indicator will be lit if there is a communication problem in the receiver.

Tag detection indicators:

The receiver has 3 data activity indicators. These are labelled A, B and T. The A and B indicator show which section of the receiver RXA or RXB is detecting a tag. If a tag is detected the indicator is lit or

flashes. The T indicator shows that the decoder in the receiver is sending data to the Concentrator unit. A buzzer can also be setup to emit sound when a tag is detected.

RXA socket:

BNC sockets are colour coded with the mats plugs.

RXB socket:

BNC sockets are colour coded with the mats plugs.

USB port:

This USB port must not be used by the user. It is only used by Ipico qualified staff to setup the receiver unit at the manufacturing level.

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3.1.3 Concentrator unit

The concentrator unit gets data from the receiver units and stores them on a flash drive. The streaming data is also available during the race from the Ethernet port, and after the race the complete data file can be copied from the concentrator to the computer by the Ethernet port.

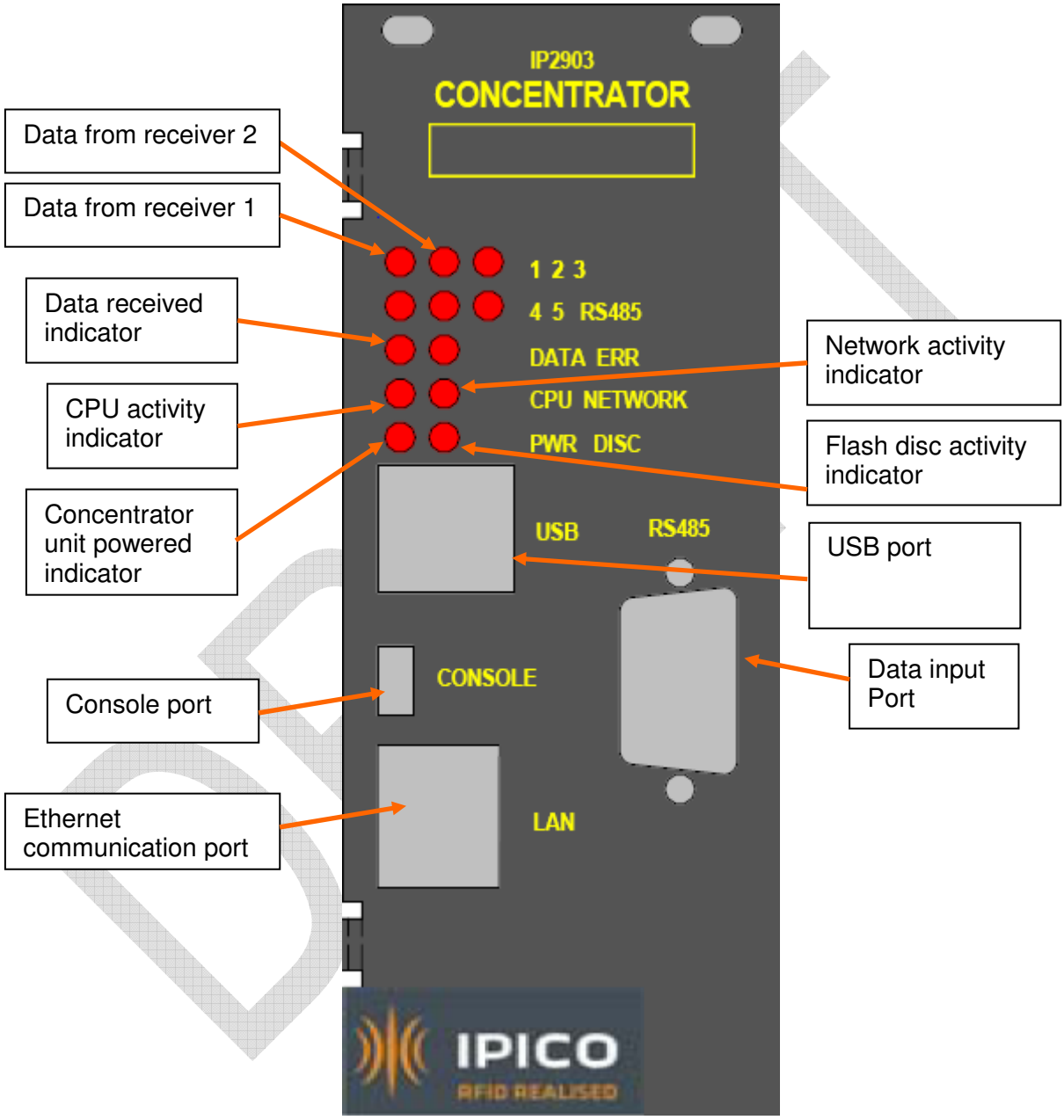

Figure 5: Concentrator unit

Data from receiver 1:

This indicator shows when data is received from the receiver 1 unit to the concentrator unit.

Data from receiver 2:

This indicator shows when data is received from the receiver 2 unit to the concentrator unit.

Data received indicator:

This indicator shows the activity of data received from the receiver unit.

CPU activity indicator:

This indicator shows that the microprocessor is operating. When operating correctly the CPU indicator will flash at approximately one second intervals.

Concentrator unit powered indicator:

This indicator should be lit when the reader is switched on to show that the concentrator unit is powered.

Network activity indicator:

This indicator shows data exchanges between the network and the reader.

Flash disc activity indicator:

This indicator flashes when data are stored on the flash disc.

Ethernet communication port:

This communication port permits to plug a computer or a network to get data from the reader and to setup the reader.

Data input port:

This port is used to store data from a STK Lite reader by the RS485 line.

Console port:

This console port must not be used by the user. It is only used by Ipico qualified staff.

USB port:

This USB port must not be used by the user. It is not used for the moment and is there for future development (for memory key…).

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3.1.4 Power supply unit

This unit manages the power supply of the whole reader.

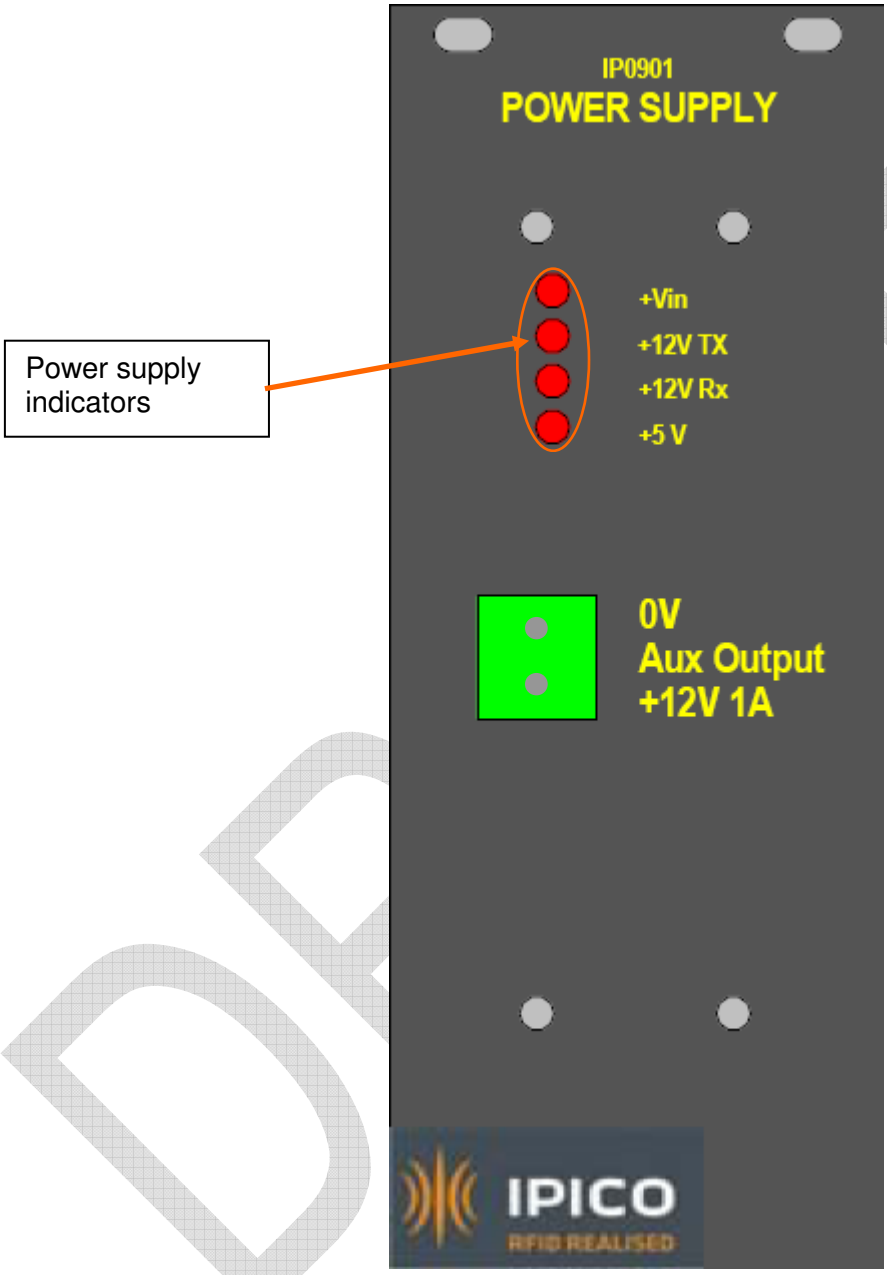

Figure 6: Power supply unit

Battery specifications/buzzer:

The battery will give approx 5 hours of run time. When the battery reaches a preset discharge voltage (approx 11.5v) the reader will sound an alarm alerting the operator that a second battery is needed. This will happen only for Long events over 5 hours. The operator has approximately 15minutes to add a second battery before the reader shutdown to save damage to its internal battery.

If external batteries are plugged in with incorrect polarity, beeps will be emitted by the reader and the external battery will not connect.

Power supply indicators:

These indicators correspond to each voltages used in the reader. When the reader is turned on, all should be lit.

Auxiliary output:

There is a two pins power supply output (+12V 1A) that can be used to power a WIFI converter or a GPRS module for example.

3.1.5 Lower panel unit

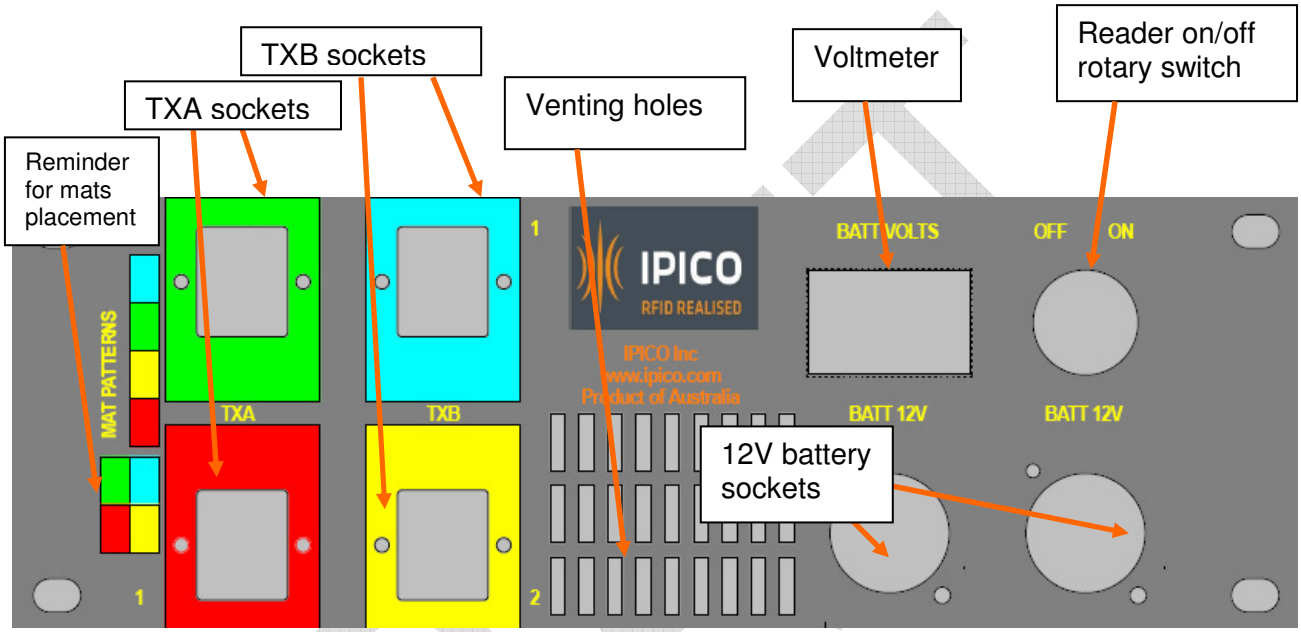

Figure 7: Lower panel unit

Reader on/off switch:

This is a rotary switch that switches on all different units in the reader.

Voltmeter:

It displays the battery voltage.

12V battery sockets:

There are 2 external battery input sockets. This allows adding an external 12V battery that can be hot swapped without loss of data capture, or used to plug a charger.

External batteries can be either any 12v battery (automotive etc) or an optional battery pack which can stack under the reader and be secured with the integral latches.

Venting holes:

These holes provide a better circulation of air inside the reader to cool it when it is used in high temperature countries.

TXA/TXB sockets:

These sockets correspond to the TX loops of the mats and are colour coded with the mats.

The mats configuration is colour coded and is screened on the lower panel plate.

All live TX pins enclosed in the socket for operator safety. Very robust TX plugs and sockets. Very easy to fit even in the dark. Cannot be plugged incorrectly. Securing clips on each.

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3.2 Metallic box

The reader is packaged in a Rugged Road Aluminium Case, 285mm H x 325mm W x 370mm L.

All fixings are in aluminium or stainless steel to minimise corrosion over time.

Figure 8: Road case box1

Figure 9: Road case box2

4 MATS

4.1 Mats description

The mats are 2.4m long and 1.2m wide

Figure 10: Mat on the floor

Figure 11: Mat carried

Figure 12: Mats stored

4.2 Mats configurations

The placement of the mats is colour coded. The colours on the following drawings correspond to the colour that is painted on the plug of the mat cables and also on the reader mat's sockets.

4.2.1 16m timing line: 8 mats in a row

2 Elite readers are needed.

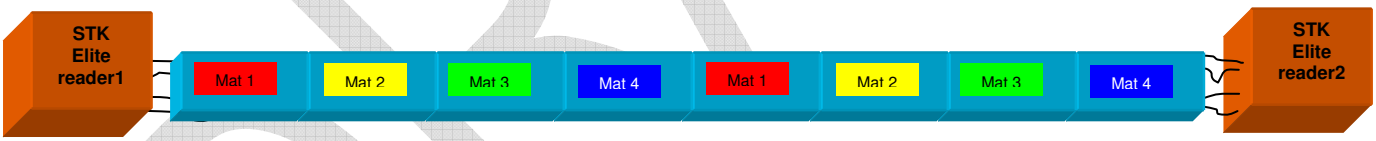

Figure 13: 16m timing line

4.2.2 16m timing line + backup: 2 rows of 8 mats

4 Elite readers are needed.

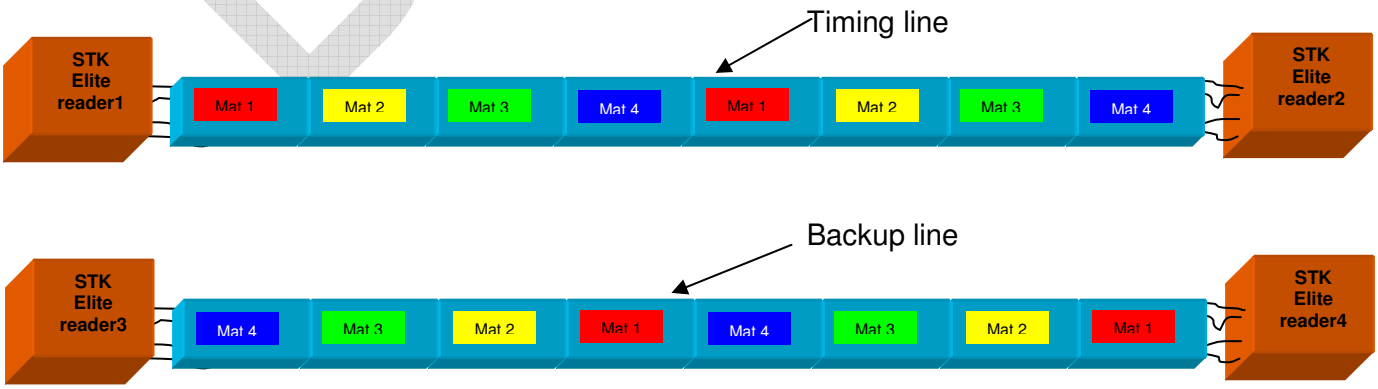

Figure 14: 16m timing line + backup

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4.2.3 8m timing line: 4 mats in a row

Only 1 Elite reader is needed.

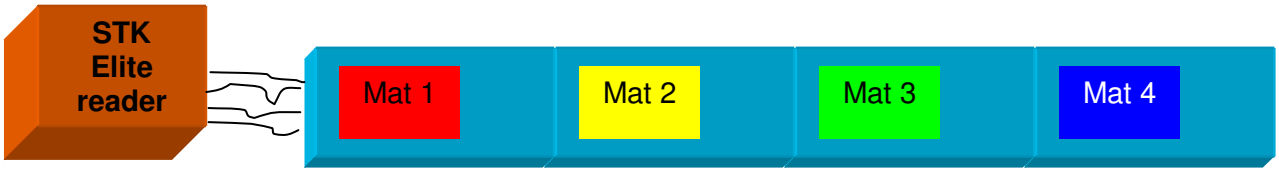

Figure 15: 8m timing line

4.2.4 8m timing line + backup: 2 rows of 4 mats

2 Elite readers are needed.

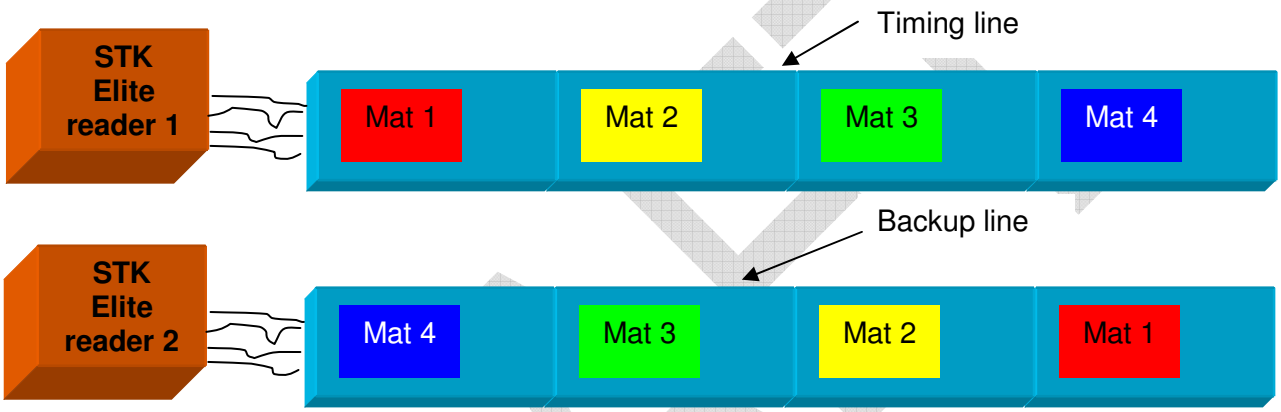

Figure 16: 8m timing line + backup

4.2.5 4m timing line + backup: 2 rows of 2 mats

Only 1 Elite reader is needed.

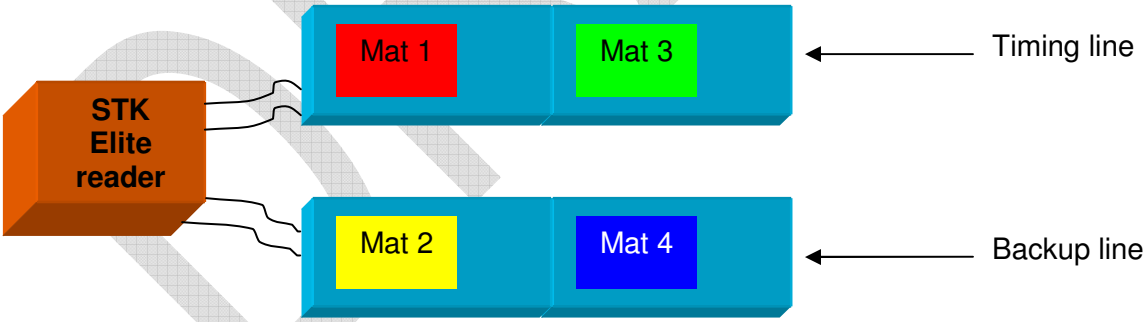

Figure 17: 4m timing line + backup

4.2.6 Precautions of use!

The tail of the mat's cables should be placed correctly under the mats. If it is not correctly done, the reader setup will not be in its optimal configuration and tags can be missed.

The correct placement is showed in *Figure 18.*

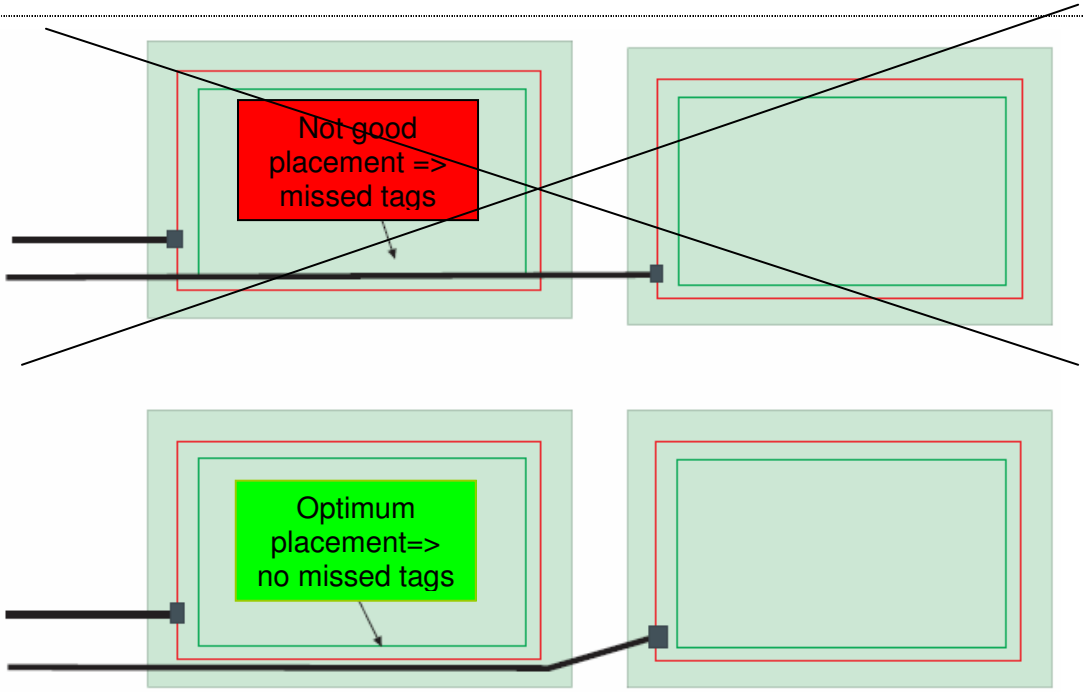

Figure 18: Mat's tail placement

5 TAGS

5.1 Shoe tag

It is a Half-Credit card size that must be attached to the shoe. It is robust and light.

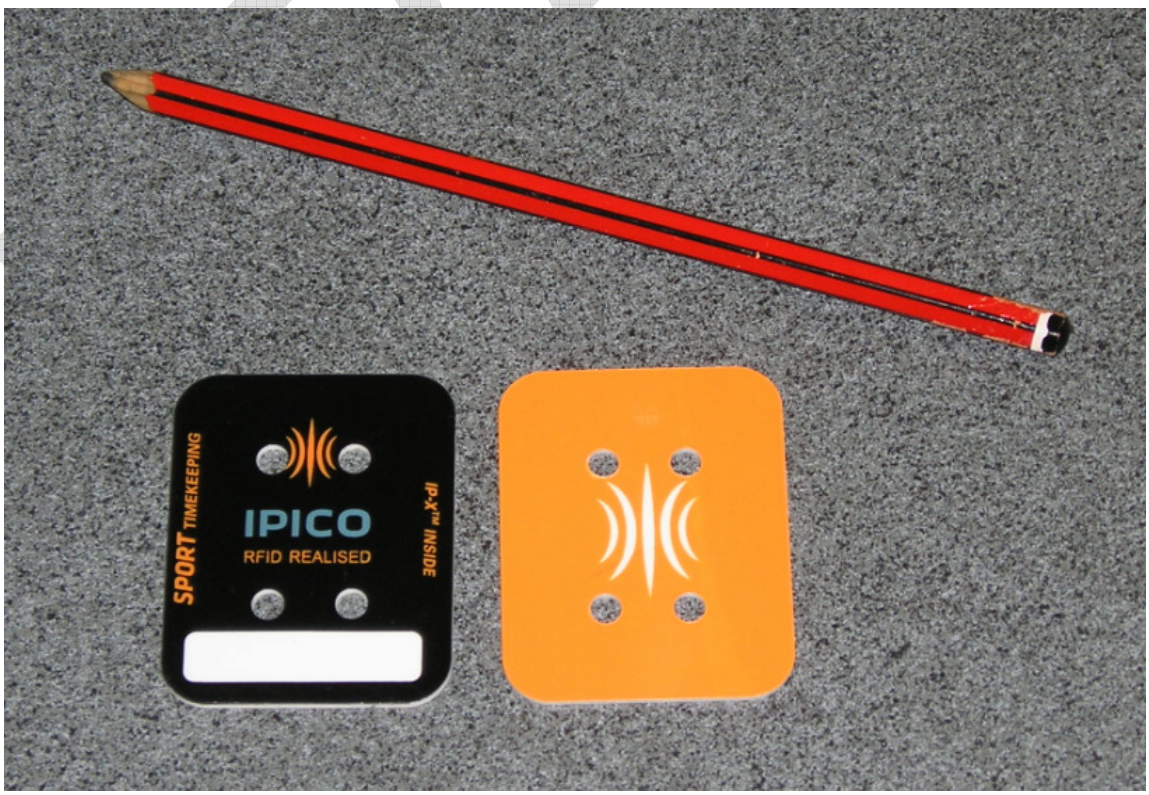

Figure 19: Shoe tag

5.2 Ankle tag

Product in development, it is not yet available.

5.3 Bike tag

It is an A5 format plate that can be fitted under the plate number of the bike.

Figure 20: Bike tag

6 COMMUNICATION WITH THE READER

To be added

7 INSTALLATION OF THE READER

7.1 Precautions of use!

- Timing mats should be placed at least 0.5m from any large metal / conducting objects such as fences, barb wire etc.
- The STK Elite reader and mats should be placed at a distance of at least 10m from other electromagnetic field generating equipment such as fan motors, audio equipment etc.

- Try to avoid as much as possible to put the mats on reinforced concrete, because it decrease the performances of the reading.
- No AC power lines including extension cords should be placed at a distance of less than 1m from the reader unit and timing mats.
- Ensure that mats are lain out in there full length and breadth and not rolled up or folded when being used, to use the system in the optimum configuration.
- During the race, the external conditions (temperature, humidity or new metallic object close the mats) can change and might decrease the performances of the system. In that case, to come back again to optimum performances, you should press for 2 seconds on the "Manual tuning button" (see chapter 3.1.1 Transmitter unit) to tune again the antennas. When you do that, be sure that there are no runners passing on the mats in order to not miss tags.

7.2 Installation of mats

1. Install the mats at the desired place on the floor in respecting the colour configurations (see chapter 4.2 Mats configurations)
2. Put the mat cable's tail as described in chapter 4.2.6

7.3 Installation of the reader

3. Position the reader where the mat's plugs are reachable
4. Plug the TX antennas in respecting the colour matching
5. Plug the RX antennas in respecting the colour matching
6. Switch on the reader
7. 2 seconds after switching on the reader, 2 beeps will be emitted
8. 40 seconds after switching on the reader, a beep will be emitted indicating that the reader is ready

7.4 Testing of tag reading distance

A test of reading with a tag should be done on each mat to be sure that there is not too much electromagnetic perturbations that will limit the reading distance.

9. The tag should be presented over each mat and you should check that the tag is read by the reader with a good reading distance (more than 40cm in height).
10. Now your system is ready!

8 SPECIFICATIONS

Consumption: 3Amps

Internal battery: 12V, 17Ah, 6Kg

External power supply: 12Vdc

Weight: 18Kg

Dimensions: 285mm H x 325mm W x 370mm L

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