

## ULTRASmart™ TRIPLE DUAL INTERFACE FOR PRODUCTION (USN3e, MX3e-3I3P)

Industrial Personalization Board for smartcard and chip card module.

Datasheet V2R01a

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## Abbreviations

|                |                                                |
|----------------|------------------------------------------------|
| <b>ESD</b>     | Electrostatic Discharge                        |
| <b>ISO7816</b> | ISO Standard for Contact Smartcard             |
| <b>SWP</b>     | Single Wire Protocol                           |
| <b>SPU</b>     | Serial Protocol User                           |
| <b>ETU</b>     | Elementary Time Unit                           |
| <b>AL</b>      | Active Low                                     |
| <b>AH</b>      | Active High                                    |
| <b>FI</b>      | Clock Rate conversion factor                   |
| <b>DI</b>      | Baud Rate Adjustment factor                    |
| <b>CD</b>      | Character Duration                             |
| <b>ODMT</b>    | Opposite Direction Minimum Time                |
| <b>WWT</b>     | Work Waiting Time                              |
| <b>CWT</b>     | Character Waiting Time                         |
| <b>BWT</b>     | Block Waiting Time                             |
| <b>BGT</b>     | Block Guard Time                               |
| <b>APDU</b>    | Application Protocol Data Unit                 |
| <b>SHDLC</b>   | Simplified High Level Data Link Control        |
| <b>CLT</b>     | ContactLess Tunnelling Protocol                |
| <b>ACT</b>     | Activation Protocol                            |
| <b>CRC</b>     | Cyclic redundancy check                        |
| <b>ISO</b>     | International Organization for Standardization |
| <b>DAC</b>     | Digital to Analog Converter                    |
| <b>ADC</b>     | Analog to Digital Converter                    |
| <b>NAD</b>     | Node Address                                   |
| <b>CID</b>     | Card Identifier                                |
| <b>FSCI</b>    | Card Frame size Integer                        |
| <b>FSDI</b>    | Reader Frame size Integer                      |
| <b>SOF</b>     | Start of frame                                 |
| <b>EOF</b>     | End of frame                                   |

## Glossary

**Modulation index:** Defined as the voltage ratio  $(V_{\max} - V_{\min}) / (V_{\max} + V_{\min})$ .

# 1 OVERVIEW

The USN3e and MX3e-3I3P are complete solutions for the personalization of contact/contactless card. The USN3e is perfect for Smartware industrial rack integration while MX3e-3I3P have been designed for the new Datacard MX smartcard module.

## Features

- **CORE:**
  - **Hardware specification**
    - 32 bit Freescale Coldfire® CPUs running at 240 MHz
    - 64 MB of RAM / 8 MB of Flash memories
- **Contact interfaces:**
  - **Supported contact protocols:**
    - ISO/IEC 7816-3 (T=0 / T=1)
    - SWP (ETSI TS 102 613 and TS 102 622)
    - Memory cards
    - Proprietary protocols
  - **Configurable hardware:**
    - Contacts voltage from 1.65 to 5.5 Volts.
    - Communication frequency from 1 to 20 MHz (ISO 7816)
    - User-specific protocol on all contacts
    - C1 current limit: 200 mA
    - C7 Boost functionality
- **Electrical tests:**
  - Open / short test
  - Continuity test
- **Contactless interfaces:**
  - **Supported contactless protocols:**
    - ISO 14443 A / B up to 424 kbps
    - PayPass A / B
    - FeliCa™
    - Mifare™ / Mifare+™
  - **Configurable hardware:**
    - RF output power
    - Various communication protocol parameters
- **In system** firmware updates.

## Target Application

- Production environment



## Electrostatic discharge sensitivity



The USN3e and MX3-3I3P uses semiconductors that can be damaged by electrostatic discharge (ESD). Observe precautions for handling. Damage due to inappropriate handling is not covered by the warranty.



Handling and connections should be done without power supply. This product includes a hot surface.

A fire enclosure must be provided in the end product.

## 2 BLOCK DIAGRAM

Below is a simplified synoptic of USN3e and MX3e-3I3P.

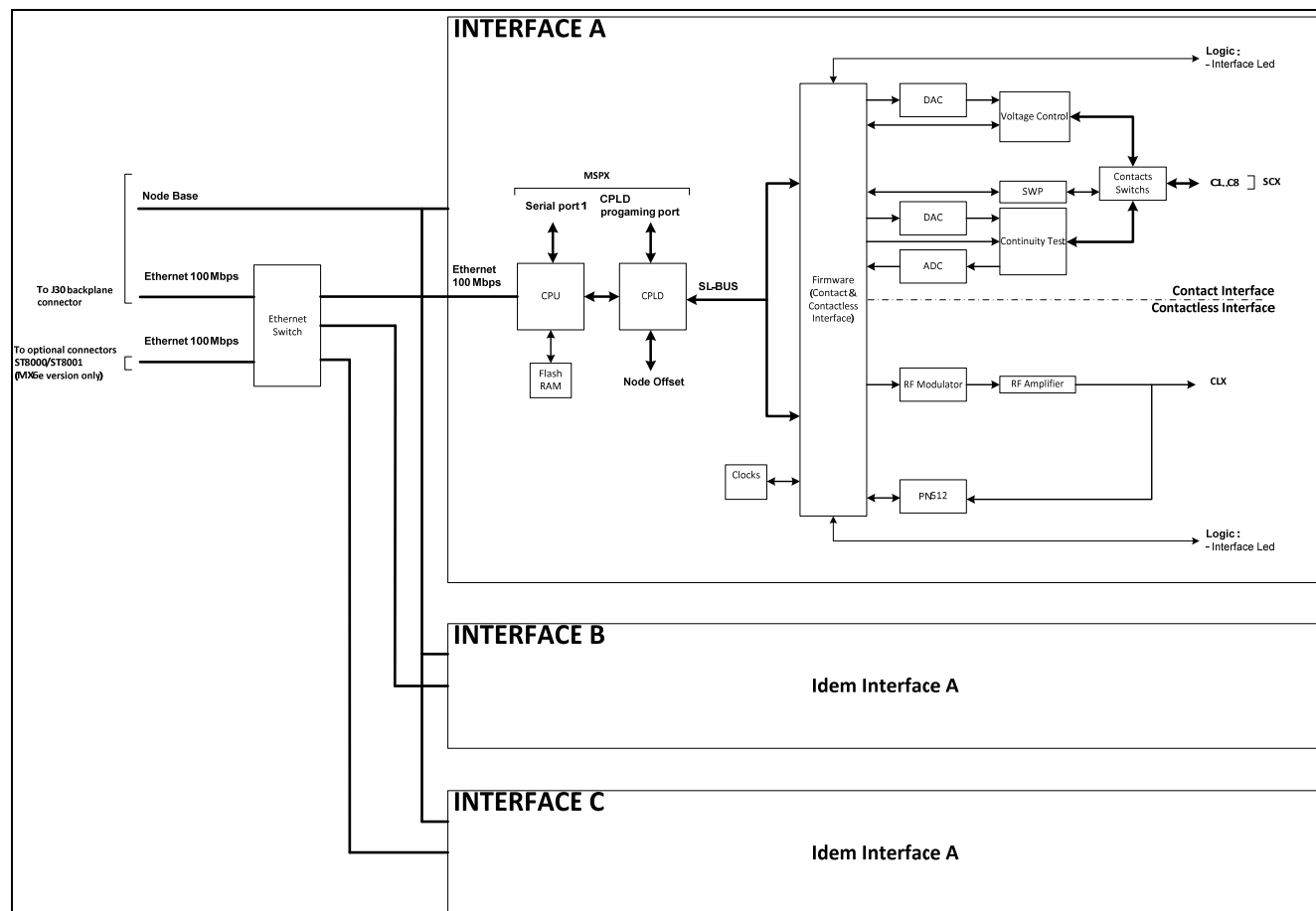


Figure 1

## 3 FUNCTIONAL DESCRIPTION

The USN3e and MX3e-3I3P includes three CPU cores and three dual communication interfaces for contact and contactless smartcards or smart objects.

The MLOS / CARD drivers manage the functionalities of the USN3e and MX3e-3I3P. Please refer to their documentation for more information.

### 3.1 CORES

The USN3e and MX3e-3I3P includes three US-Nano boards which integrates a 32 bit Freescale ColdFire® CPU.

The Cores manage several communication interfaces such as Ethernet 10 / 100 Mbps, and serial port.

The Cores are powered with MLOS proprietary embedded multitask system.

### 3.2 CONTACT INTERFACES

#### 3.2.1 Protocol & Standard

##### 3.2.1.1 *ISO/IEC 7816-3, ISO/IEC 7816-4*

Embedded software allows the easy configuration of:

- FI / DI (ETU).
- Timing parameters such as character duration, BGT, CWT, BWT, WWT, ODMT...
- Frequency.
- Automatic protocol handling.
- Error management with parity error retry mechanism (Configurable number of retries)
- APDU exchanges.
- Contact lines for custom protocols.

##### 3.2.1.2 *SWP*

Embedded software allows:

- Activation, Deactivation.
- Automatic CRC management (Compute & Check).
- Bit stuffing management.
- Manage payload exchanges according to SWP standard.
- Allows interfacing ACT, SHLDC, or CLT Logical Link Layers.

## 3.2.2 Basic measurement methods

### 3.2.2.1 Continuity test

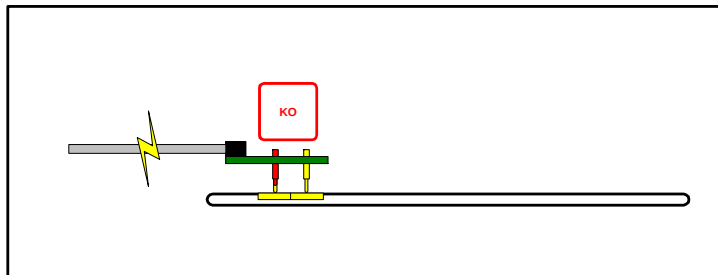
Embedded software provides the following functionalities for the contact interface:

- Check the connection from the contact interface to the smartcard pads.
- Measure the serial resistors (due to cable, test head, or deficient contact pin)
- Check if the measurement is possible. For this test, C5 should not be linked to the ground/earth.

This test is done with all others contacts in high impedance state.

The method will use the smartcard clamp diodes to perform the measurement.

This test can help you to anticipate a change of the contact pins, or cables.



**Figure 2**

### 3.2.2.2 Open / Short test

Embedded software provides the following functionalities for the contact interface:

- Check the smartcard clamp diodes between C1/2/3/4/6/7/8 and C5. The contact can be:
  - Open (i.e.: no bonding, damaged diode)
  - Short (i.e.: wrong bonding, shortcut, damaged diode...)
  - OK (bonding and diodes OK)
- Return the diode's threshold voltage value.
- Check if the measurement is possible. For this test, C5 should not be linked to the ground/earth.

This test is done with all others contacts in high impedance state.

A voltage is forced on contact C5, and a current will go through the smartcard diode.

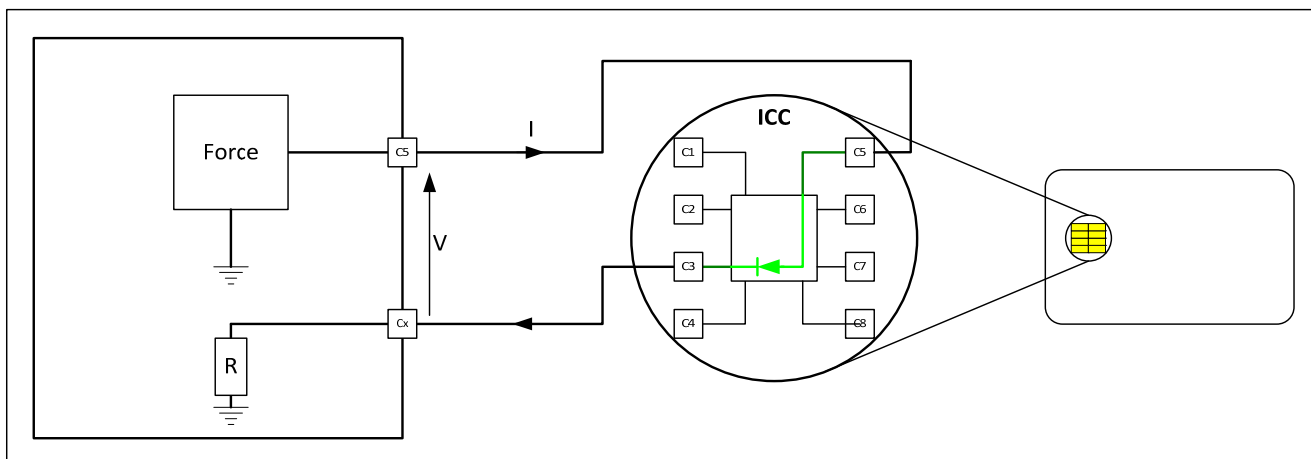
The contact interface will then measure the diode threshold voltage, and determine the contact's status.

This measurement is datasheet specified only if the smartcard chip is connected to the contact interface (without serial resistance).

If a serial resistor (lower than 2.2 kOhms) is present (i.e.: RC filter on contact C2), an embedded compensation algorithm will allow threshold voltage measurement with degraded accuracy.

The maximal allowed capacitance is 100 nF between the contacts C1 and C5.





**Figure 3**

### 3.3 CONTACTLESS INTERFACES

#### 3.3.1 Protocol & Standard

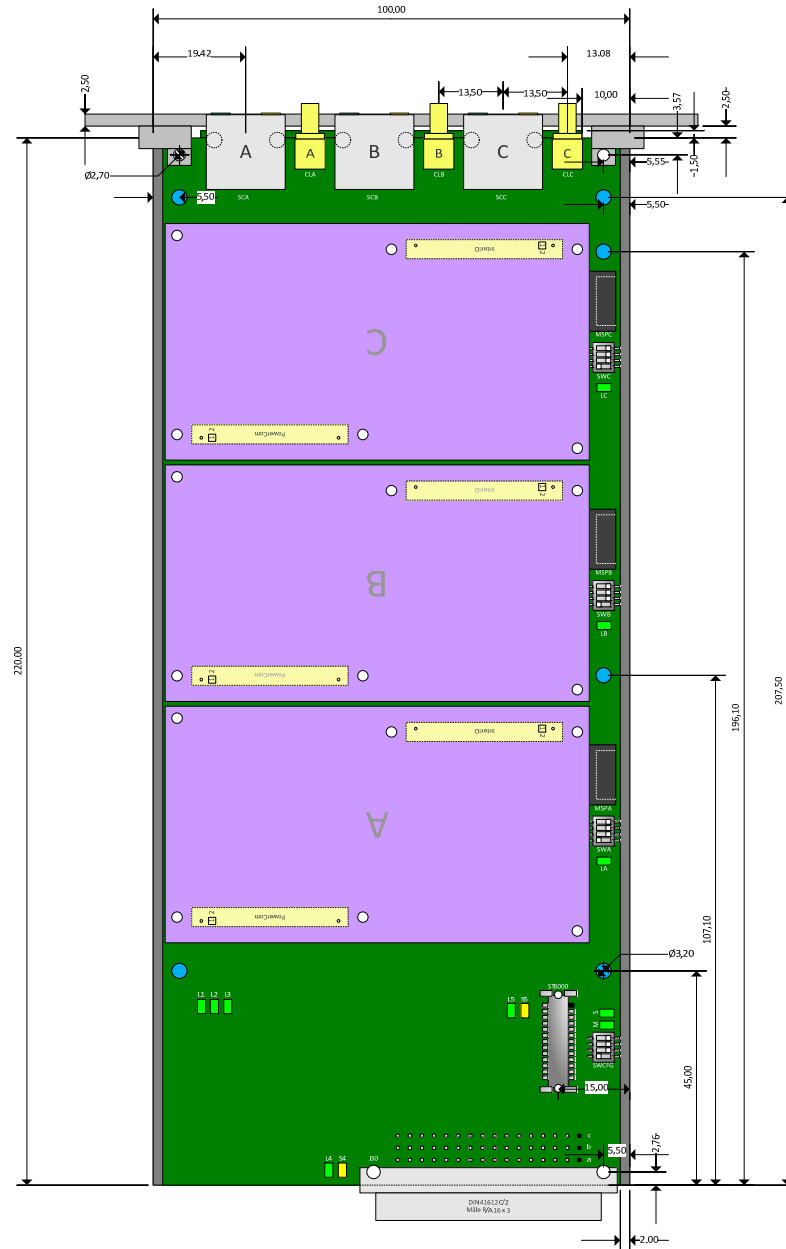
Embedded software provides the following functionalities for the contactless interface:

- Adjustable field strength
- Several timings parameters management such as Frame Waiting Time, Frame Delay Time, Startup Guard Time, RFOntWait, Extra Guard Time...
- Several protocol parameters management such as NAD, CID, FSCI, FSDI, SOF, EOF...
- Automatic protocol handling.
- Configurable retry mechanism
- Raw mode allowing user custom protocols.

The USN3e and MX3e-3I3P can be used to communicate with cards in contactless mode using an external antenna. It can also be used in direct contact mode by connecting chip card module or die (wafer) pins to the RF output.

## 4 TECHNICAL CHARACTERISTICS

### 4.1 MECHANICAL LAYOUTS



**Figure 4**

The fixing attachment holes and side strips are connected to the USN3e and MX3e-3I3P ground.

| GENERAL |          |
|---------|----------|
| Height  | 100 mm   |
| Length  | 221.5 mm |
| Width   | 1.6 mm   |
| Weight  | 360 g    |

Below are the front panels delivered with USN3e and MX3e-3I3P.

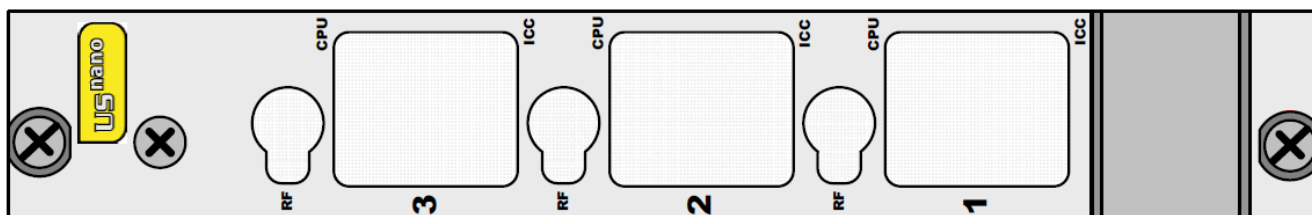


Figure 5 : 3U / 4TE front panel (USN3e)

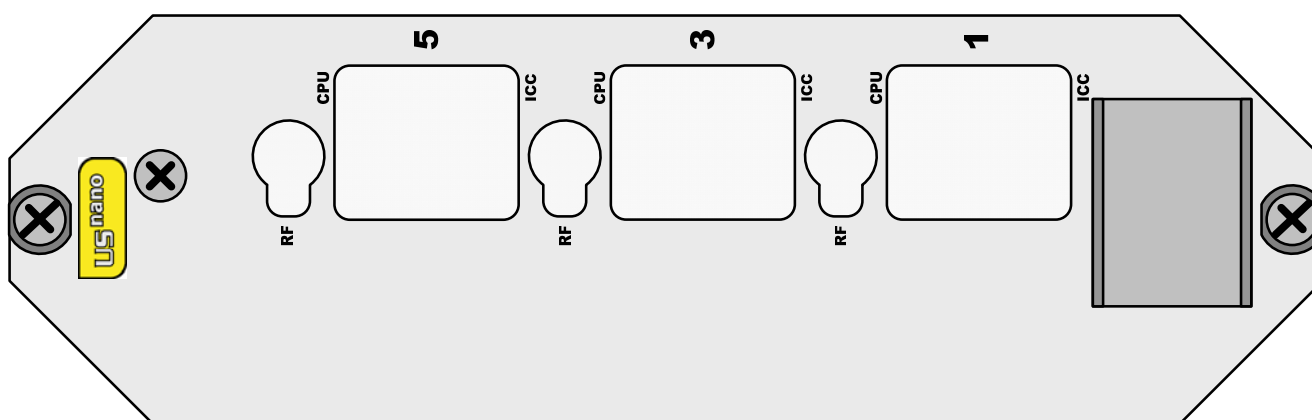


Figure 6 : 3U / 8TE front panel (MX3e-3I3P)

## 4.2 PHYSICAL INTERFACES

This chapter describes the physical interface.

As the three interfaces are similar, “X” refers to the interface identifier (A, B, or C)

### 4.2.1.1 SCX Pinout

This RJ45 connector is used for the contact interface.

It regroups several software selectable functionalities.

| Pin    | Name | 7816-3 | SWP     |
|--------|------|--------|---------|
| 1      | CC3  | CLK    |         |
| 2      | CC5  | GND    | GND     |
| 3      | CC4  | RFU1   |         |
| 4      | CC8  | RFU2   |         |
| 5      | CC1  | VCC    | VCC     |
| 6      | CC6  | SPU    | SWP I/O |
| 7      | CC2  | RST    |         |
| 8      | CC7  | I/O    |         |
| shield | GND  |        |         |

### 4.2.1.2 CLX Pinout

This SMB connector provides the contactless interface.

| Pin    | Name   | Description |
|--------|--------|-------------|
| Center | RF_ANT | RF output   |
| Body   | Gnd    | Ground      |

#### 4.2.1.3 J30 Pinout

This DIN41612 connector provides power, node identifier, serial ports, Ethernet port, safe mode, and leds. The pinout configuration will depend of model.

##### 4.2.1.3.1 USN3e model

| Pin                                                                               | Name      | Description                       |
|-----------------------------------------------------------------------------------|-----------|-----------------------------------|
| A1, A4, B15, C15, B16, C16                                                        | Gnd       | Ground                            |
| A2, B2, C2, A3, B3, C3, A7, B7, A8, B8, C8, A9, A10, B10, C10, C11, A14, B14, C14 | NC        | Not connected                     |
| A15, A16                                                                          | +Vaa      | Main Power Supply (+12V)          |
| B1                                                                                | L1Tx      | Line 1 RS232 transmit (US-Nano A) |
| C1                                                                                | L1Rx      | Line 1 RS232 receive (US-Nano A)  |
| B4                                                                                | Node0     | Node Base bit 0                   |
| C4                                                                                | Node1     | Node Base bit 1                   |
| A5                                                                                | Node2     | Node Base bit 2                   |
| B5                                                                                | Node3     | Node Base bit 3                   |
| C5                                                                                | Node4     | Node Base bit 4                   |
| A6                                                                                | Node5     | Node Base bit 5                   |
| B6                                                                                | Node6     | Node Base bit 6                   |
| C6                                                                                | Node7     | Node Base bit 7                   |
| C7                                                                                | Safe_Mode | Active low Safe Mode <sup>1</sup> |
| B9                                                                                | +3V3      | Internal +3.3V output             |
| C9                                                                                | LiLed     | Active Low Link Led <sup>2</sup>  |
| A11                                                                               | ETH_BP_3P | Ethernet Pair 3 + <sup>3</sup>    |
| B11                                                                               | ETH_BP_3M | Ethernet Pair 3 - <sup>3</sup>    |
| A12                                                                               | ETH_BP_1P | Ethernet Pair 1 +                 |
| B12                                                                               | ETH_BP_2P | Ethernet Pair 2 + <sup>3</sup>    |
| C12                                                                               | ETH_BP_0P | Ethernet Pair 0 +                 |
| A13                                                                               | ETH_BP_1M | Ethernet Pair 1 -                 |
| B13                                                                               | ETH_BP_2M | Ethernet Pair 2 - <sup>3</sup>    |
| C13                                                                               | ETH_BP_0M | Ethernet Pair 0 -                 |

<sup>1</sup> Internal pull up resistor

<sup>2</sup> Internal serial resistor for current limiting function

<sup>3</sup> Termination only

#### 4.2.1.3.2 MX3e-3I3P model

| Pin                                                                                                                   | Name      | Description                    |
|-----------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------|
| A1, B1, C1                                                                                                            | Gnd       | Ground                         |
| A2, B2, C2, C4, C5, C6, C7, C8, A9, B9, C9, A10, B10, C10, A11, B11, C11, C12, A13, C13, A14, C14, A15, C15, A16, C16 | NC        | Not connected                  |
| A3, B3, C3                                                                                                            | +Vaa      | Main Power Supply (+12V)       |
| A4                                                                                                                    | Node2     | Node Base bit 2                |
| B4                                                                                                                    | Node3     | Node Base bit 3                |
| A5                                                                                                                    | Node0     | Node Base bit 0                |
| B5                                                                                                                    | Node1     | Node Base bit 1                |
| A6                                                                                                                    | ETH_BP_1P | Ethernet Pair 1 +              |
| B6                                                                                                                    | ETH_BP_1M | Ethernet Pair 1 -              |
| A7                                                                                                                    | ETH_BP_0P | Ethernet Pair 0 +              |
| B7                                                                                                                    | ETH_BP_0M | Ethernet Pair 0 -              |
| A8                                                                                                                    | Node4     | Node Base bit 4                |
| B8                                                                                                                    | Node5     | Node Base bit 5                |
| A12                                                                                                                   | Node6     | Node Base bit 6                |
| B12                                                                                                                   | Node7     | Node Base bit 7                |
| B13                                                                                                                   | ETH_BP_2P | Ethernet Pair 2 + <sup>4</sup> |
| B14                                                                                                                   | ETH_BP_2M | Ethernet Pair 2 - <sup>4</sup> |
| B15                                                                                                                   | ETH_BP_3P | Ethernet Pair 3 + <sup>4</sup> |
| B16                                                                                                                   | ETH_BP_3M | Ethernet Pair 3 - <sup>4</sup> |

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<sup>4</sup> Termination only

## 4.2.2 Switches

### 4.2.2.1 SWCFG

This micro switch defines specific configuration mode.

| Pin | Name      | Description                                                    |
|-----|-----------|----------------------------------------------------------------|
| 1   | Node 7    | <b>Node Base</b> (bit 7)                                       |
| 2   | Node 6    | <b>Node Base</b> (bit 6)                                       |
| 3   | Mono Mode | <b>ON</b> : Boot in mono mode<br><b>OFF</b> : Normal operation |
| 4   | Safe Mode | <b>ON</b> : Boot in safe mode<br><b>OFF</b> : Normal operation |

The Safe Mode will not start the packages, and use a default MLOS.ini as boot parameters.

The Mono Mode will not start the MLOS system. Only serial port will be available to reload a correct MLOS system.

### 4.2.2.2 SWX

These micro switches define the associated US-Nano board node by adding this value to the global Node base (defined on J30 and/or SWCFG) common to all US-Nano.

$$\text{US-Nano Node (Interface X)} = \text{Node base} + \text{Node Offset (Interface X)}$$

| Pin | Name            | Description       |
|-----|-----------------|-------------------|
| 1   | Node offset (0) | Node offset bit 0 |
| 2   | Node offset (1) | Node offset bit 1 |
| 3   | Node offset (2) | Node offset bit 2 |
| 4   | RFU             |                   |

The default configurations of the Node Offset are:

| Model     | Interface | Node offset value |
|-----------|-----------|-------------------|
| USN3e     | A         | 0                 |
| USN3e     | B         | 1                 |
| USN3e     | C         | 2                 |
| MX3e-3I3P | A         | 0                 |
| MX3e-3I3P | B         | 2                 |
| MX3e-3I3P | C         | 4                 |

### 4.2.3 LEDS

| Name       | Description                                                                                                            |
|------------|------------------------------------------------------------------------------------------------------------------------|
| SCX_Green  | Contact interface power on status LED                                                                                  |
| SCX_Yellow | CPU status LED <ul style="list-style-type: none"> <li>Blink if CPU is running correctly</li> </ul>                     |
| CLX_Green  | Contactless interface power on status LED                                                                              |
| S          | Safe Mode Status <ul style="list-style-type: none"> <li>ON if Safe Mode is activated</li> </ul>                        |
| M          | Mono Mode Status <ul style="list-style-type: none"> <li>ON if Mono Mode is activated</li> </ul>                        |
| L1, LA     | US-Nano Ethernet link status (Interface A) <ul style="list-style-type: none"> <li>ON if link is established</li> </ul> |
| L2, LB     | US-Nano Ethernet link status (Interface B) <ul style="list-style-type: none"> <li>ON if link is established</li> </ul> |
| L3, LC     | US-Nano Ethernet link status (Interface C) <ul style="list-style-type: none"> <li>ON if link is established</li> </ul> |
| L4         | Backplane Ethernet link status <ul style="list-style-type: none"> <li>ON if link is established</li> </ul>             |
| S4         | Backplane Ethernet Speed <ul style="list-style-type: none"> <li>ON (100 MBps)</li> <li>OFF (10 MBps)</li> </ul>        |
| L5         | Not used for models USN3e and MX3e-3I3P                                                                                |
| S5         | Not used for models USN3e and MX3e-3I3P                                                                                |



### 4.3 ELECTRICAL CHARACTERISTICS

| GENERAL                                |                           |         |           |
|----------------------------------------|---------------------------|---------|-----------|
| Operating environment                  | 0 °C to 40 °C             |         |           |
| POWER SUPPLY                           | Conditions                | Typical | Precision |
| Voltage                                |                           | 12 V    | ±1.2V     |
| Current ( $V_{aa} = 12\text{ V}$ )     | Idle                      | 950 mA  |           |
|                                        |                           |         |           |
| Max Current ( $V_{aa} = 12\text{ V}$ ) | RF Output short circuited | 1850 mA |           |

### 4.3.1 Contact interfaces

#### 4.3.1.1 Pin drivers

| CONTACT DRIVING CAPABILITY |                                                  |          |            |           |
|----------------------------|--------------------------------------------------|----------|------------|-----------|
| C1 (VCC)                   | $V_{cc}$ , HiZ                                   |          |            |           |
| C2 (RST)                   | $V_{OH}$ , $V_{OL}$ , HiZ <sup>5</sup>           |          |            |           |
| C3 (CLK)                   | $V_{OH}$ , $V_{OL}$ , Clock, HiZ <sup>5</sup>    |          |            |           |
| C4 (RFU1)                  | $V_{OH}$ , $V_{OL}$ , HiZ <sup>5</sup>           |          |            |           |
| C5 (GND)                   | Gnd, HiZ <sup>5</sup>                            |          |            |           |
| C6 (SPU)                   | $V_{OH}$ , $V_{OL}$ , SWIO, HiZ <sup>5</sup>     |          |            |           |
| C7 (I/O)                   | $V_{OH}$ , $V_{OL}$ , Pull-up <sup>6</sup> , HiZ |          |            |           |
| C8 (RFU2)                  | $V_{OH}$ , $V_{OL}$ , HiZ <sup>5</sup>           |          |            |           |
| CONTACT SIGNAL CAPABILITY  | Min                                              | Max      | Resolution | Precision |
| $V_{cc}$                   | 1.65 V                                           | 5.50 V   | 10 mV      | ±20 mV    |
| Icc limitation             |                                                  |          |            |           |
| ISO/SWP Mode               |                                                  | 200 mA   |            |           |
| $V_{OH}$                   | $V_{cc} - 0.1$ V                                 | $V_{cc}$ |            |           |
| $V_{OL}$                   | 0 V                                              | 0.1 V    |            |           |
| $V_{IH}$                   | $0.8 \times V_{cc}$                              |          |            |           |
| $V_{IL}$                   |                                                  | 0.55 V   |            |           |
| Current limitation         |                                                  |          |            |           |
| 1.65 < $V_{cc}$ < 1.95     |                                                  | ±4 mA    |            |           |
| 2.30 < $V_{cc}$ < 2.70     |                                                  | ±8 mA    |            |           |
| 3.00 < $V_{cc}$ < 3.60     |                                                  | ±24 mA   |            |           |
| 4.50 < $V_{cc}$ < 5.50     |                                                  | ±32 mA   |            |           |
| Clock                      |                                                  |          |            |           |
| ISO Mode                   | 1 MHz                                            | 20 MHz   |            |           |
| C5 impedance to ground     |                                                  | 50 mΩ    |            |           |

#### 4.3.1.2 Measurement

| CONTINUITY TEST                   | Conditions | Min   | Typical | Max    |
|-----------------------------------|------------|-------|---------|--------|
| Resistor measurement range        |            | 0 Ω   |         | 10 kΩ  |
| Resistor measurement precision    | $R < 1$ kΩ |       | ±100 Ω  |        |
|                                   | $R > 1$ kΩ |       | ±10 %   |        |
| OPEN/SHORT TEST                   | Conditions | Min   | Typical | Max    |
| Current to perform measurement    |            |       | 2,5 mA  | 3,2 mA |
| Diode threshold voltage range     |            | 0.1 V |         | 2.5 V  |
| Diode threshold voltage precision |            |       | 0.1 V   |        |

<sup>5</sup> 470 kΩ internal pull-down

<sup>6</sup> 10 kΩ and 4.7 kΩ software selectable internal pull-ups connected to  $V_{cc}$

### 4.3.2 Contactless interfaces

| CONTACTLESS DRIVING CAPABILITY                    |                     |                     |             |                                |
|---------------------------------------------------|---------------------|---------------------|-------------|--------------------------------|
| RF output                                         | Modulated RF Signal |                     |             |                                |
|                                                   |                     |                     |             |                                |
| CONTACTLESS SIGNAL CAPABILITY                     | Min                 | Max                 | Typical     | Precision                      |
| RF Offset                                         |                     |                     | 400 mV      |                                |
| RF Signal peak to peak ( $R = \infty$ )           | 2 Vpp               | 20 Vpp              |             | $\pm 2\% \pm 0.05 \text{ Vpp}$ |
| RF Signal power ( $R = 50 \Omega$ )               |                     | 250 mW<br>(+24 dBm) |             |                                |
| RF Output Impedance                               |                     |                     | 50 $\Omega$ | $\pm 5 \Omega$                 |
| Current limitation                                |                     |                     |             |                                |
| Short circuit current ( $R = 0 \Omega$ ) RMS      |                     |                     | 150 mA      |                                |
| Recommended full power short circuit max duration |                     | 60 s                |             |                                |
| RF Frequency                                      |                     |                     | 13.56 MHz   | $\pm 7 \text{ kHz}$            |
| Modulation Index                                  |                     |                     |             |                                |
| ISO14443 A / PayPass A / Mifare                   | 90 %                | 100 %               | 100 %       |                                |
| ISO14443 B / PayPass B                            | 9.5 %               | 12.5 %              | 11 %        |                                |
| FeliCa <sup>TM</sup>                              | 9.5 %               | 12.5 %              | 11 %        |                                |

## 5 CONTACT INFORMATION

For more information, please send an email to: [support@smartware.fr](mailto:support@smartware.fr)

For ordering information, please send an email to: [sales@smartware.fr](mailto:sales@smartware.fr)

## 6 REGULATORY

The models **USN3e** and **MX3e-3I3P** are CE, FCC / IC modular approval, and RoHS compliant.

*Les modèles **USN3e**, et **MX3e-3I3P** sont certifiés CE, FCC / IC approbation modulaire, et RoHS.*



### WARNING TO USERS

**Warning 1:** The USN3e and MX3e-3I3P models are considered as components that will be operated in combination with the final equipment. Then, the final equipment (including power supply system) still needs to re-confirm that the whole system complies with the local EMC directives.

*Les modèles USN3e et MX3e-3I3P sont considérés comme des composants qui seront intégrés dans un équipement hôte. Le fabricant de l'équipement hôte (système d'alimentation inclus) devra alors reconfirmer que le système complet répond toujours aux différentes normes locales.*

**Warning 2:** The USN3e and MX3e-3I3P models are low power radiofrequency emitters, and then specific precaution should be taken to restrict the human presence near the antennas.

We recommend that persons should be at least at 20 cm far from the emitting antennas. This information also has to be mentioned in the end product.

Access should only be authorized to qualified personal.

If the product is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications.

*Les modèles USN3e et MX3e-3I3P intègrent plusieurs émetteurs radiofréquence. Des précautions particulières doivent être prises pour contrôler la présence humaine près des antennes.*

*Nous recommandons qu'aucune personne ne puisse se situer à une distance inférieure à 20 cm des antennes. Cette information doit également être mentionnée sur l'équipement hôte.*

*L'accès doit être restreint au personnel qualifié.*

*Si le produit n'est pas installé et utilisé tel que décrit dans la notice, il peut engendrer des perturbations radioélectriques.*

**Warning 3:** To reduce the risk of fire or injury to persons, follow these instructions:

All maintenance and servicing of this device must be performed in a safe area away from hazardous locations. Disconnect all power before servicing.

Use an earthed bracelet to avoid ESD damages.

Power supply must be SELV, no energy hazard.

*Afin de réduire les risques de feu ou blessure aux personnes, suivez les instructions suivantes :*

*Toutes les opérations de service et de maintenance doivent être réalisées dans un endroit sécurisé. Déconnectez toutes les alimentations avant manipulation.*

*Utilisez un bracelet relié à la terre pour éviter des dommages liés aux ESD.*

*L'alimentation doit être SELV, aucun danger énergétique.*

**Warning 4:** To comply with directives, the backplane Ethernet cable length should be less than 3 meters.

*Pour être en conformité avec les normes, le câble du connecteur Ethernet du fond de panier doit avoir une longueur inférieure à 3m.*

**Warning 5:** This device has been designed to operate with the antenna(s) listed below. Antennas not included in this list are strictly prohibited for use with this device

List of acceptable antenna(s):

- T70x45x2

Ce dispositif a été conçu pour fonctionner avec les antennes énumérées ci-dessous. Les antennes non incluses dans cette liste sont strictement interdites pour l'exploitation de ce dispositif.

Liste des antennes acceptables :

- T70x45x2

**Warning 6:** Use of shielded contact cable (with ferrite ref RICHOF RKCF-06-A5) is mandatory to comply with standards.

*L'utilisation d'un câble d'interface contact blindé (accompagné d'une ferrite RICHOF RKCF-06-A5) est nécessaire pour se conformer aux limites réglementaires.*

**Warning 7:** To comply with directives, RF power may be set from power 0 to power 10.

*Pour être en conformité avec les normes, la consigne de puissance RF peut être réglée de puissance 0 à puissance 10.*

**Warning 8:** In case of collocated transmitters, the maximum number of transmitters in a small place should be 48.

*Dans le cas de plusieurs émetteurs, le nombre maximum d'émetteurs dans un petit espace est de 48.*

**Warning 9:** The product shall not be modified without written authorisation of Smartware. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

*Le produit ne doit pas être modifié sans l'autorisation écrite de Smartware. Changements et modifications non approuvés par l'organisme responsable de la conformité pourrait annuler l'autorité de l'utilisateur à opérer cet équipement.*

**Warning 10:** The end product's sticker should mention that it "contains a FCCID: RPM-USN3D201 and IC: 4783A- USN3D201" product.

*L'étiquette du produit hôte doit mentionner « Contient un FCCID: RPM- USN3D201 et IC: 4783A- USN3D201 ».*

**Warning 11:****WARNING TO USERS IN THE UNITED STATES****Federal Communication Commission Interference****Section 15.105 Information to the user**

(a) For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device (USN3e and MX3e-3I3P models) 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.

**NO UNAUTHORIZED MODIFICATIONS****47 CFR Section 15.21**

**CAUTION:** This equipment may not be modified, altered, or changed in any way without signed written permission from *Smartware*. Unauthorized modification may void the equipment authorization from the FCC and will void the *Smartware* warranty.

This device complies with FCC RF radiation exposure limits set forth for general population (uncontrolled exposure). This device must be installed to provide a separation distance of at least 20cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter other than authorized in the present document.

**Warning 12:****WARNING TO USERS IN THE CANADA / ATTENTION POUR LES UTILISATEURS AU CANADA**

This device complies with 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.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This device complies with Industry Canada RF radiation exposure limits set forth for general population (uncontrolled exposure). This device must be installed to provide a separation distance of at least 20cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter other than authorized in the present document.

*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) il ne doit pas produire de brouillage, et (2) l'utilisateur du dispositif doit être prêt à accepter tout brouillage radioélectrique reçu, même si ce brouillage est susceptible de compromettre le fonctionnement du dispositif.*

*Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada.*

*Dans le but de réduire les risques de brouillage radioélectrique à l'intention d'autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.*

*Le présent appareil est conforme aux niveaux limites d'exigences d'exposition RF aux personnes définies par Industrie Canada. Cet appareil doit être installé afin d'offrir une distance de séparation d'au moins 20cm avec l'utilisateur, et ne doit pas être installé à proximité ou être utilisé en conjonction avec une autre antenne ou un autre émetteur autre qu'autorisé dans le présent document.*

This device has been designed to operate with the antenna(s) listed below. Antennas not included in this list are strictly prohibited for use with this device

List of acceptable antenna(s):

- T70x45x2

Ce dispositif a été conçu pour fonctionner avec les antennes énumérées ci-dessous. Les antennes non incluses dans cette liste sont strictement interdites pour l'exploitation de ce dispositif.

Liste des antennes acceptables :

- T70x45x2

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

*Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.*



## 7 REVISION HISTORY

| VERSION | DATE          | AUTHOR | CHANGES          |
|---------|---------------|--------|------------------|
| V2R01a  | December 2013 | FA     | Original version |
|         |               |        |                  |
|         |               |        |                  |
|         |               |        |                  |