# KIC301

## Interface Module

# User Manual

Rev. 1.3
December 2015

*The product described in this manual is compliant with all related CE standards.*

Product Title: KIC301
Document name: KIC301 User Manual
Manual version: 1.3



## Revision Record

| Revision No. | Brief description of changes | Board index | Revision date |
|---|---|---|---|
| 1.0 | Initial version | KIC301 | June 2014 |
| 1.1 | Clarification with regard to vibration resistance (5g). | KIC301 | June 2014 |
| 1.2 | Changes to the names of fixture elements in subsection 4.4. | KIC301 | June 2014 |
| 1.3 | Compliance assessment | KiC301 | December 2015 |

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# TRANSPORTATION, UNPACKING AND STORAGE

## *Transportation*

The device should be transported in original manufacturer's separate packaging (transport packaging), which contains an individual antistatic bag and a cardboard box, in the closed transport (automobile, railway, air transportation in heated and pressurized compartments) in storage conditions 5 defined in the IEC 721-2-1 standard (GOST standard 15150-69) or in storage conditions 3 during sea transportation.

The packaged modules should be transported in accordance with the shipping rules, specified for this particular type of transport.

During handling and transportation operations, the packaged modules should not undergo sharp pounding, falls, shocks and exposure to atmospheric precipitation. The goods should be stored in a carrier vehicle in such a manner which will prevent their moving.

## *Unpacking*

Prior to unpacking, before transportation at subzero temperature of ambient air the modules should be kept within 6 hours under storage conditions 1 defined in the IEC 721-2-1 standard (GOST standard 15150-69).

It is prohibited to place the packaged module close to the heat source, prior to unpacking.

Retain all original packaging at least until the warranty period is over. You may need it for shipments or for storage of the product.

After unpacking the product, you should inspect it for visible damage that could have occurred during shipping or unpacking. If damage is observed (usually in the form of bent component leads or loose socketed components), contact Fastwel's official distributor from which you have purchased the product for additional instructions.

## *Storage*

Module storage conditions for group 1 are defined in the IEC 721-2-1 standard (GOST standard 15150-69).

# MANUFACTURER'S WARRANTY

## Warranty Liabilities

The Manufacturer hereby guarantees the product conformity with the requirements of the 4013- 025-72782511-09 technical conditions provided that the Consumer complies with the operating, storage, transportation and installation conditions and procedures, specified by the accompanying documents.
The Manufacturer hereby guarantees that the products supplied thereby are free from defects in workmanship and materials, provided operation and maintenance norms were observed during the currently established warranty period. The Manufacturer's obligation under this warranty is to repair or replace free of charge any defective electronic component being a part of a returned product.
Products that broke down through the Manufacturer's fault during the warranty period will be repaired free of charge. Otherwise the Consumer will be invoiced as per the current labor remuneration rates and expendable materials cost

## Liability Limitation Right

The Manufacturer shall not be liable for the damage inflicted to the Consumer's property because of the product breakdown in the process of its utilization.

## Warranty Period

The warranty period for the products made by Fastwel Group is 24 months since the sale date (unless otherwise provided by the supply contract).
The warranty period for the custom-made products is 36 months since the sale date (unless otherwise provided by the supply contract.

## Limitation of warranty liabilities

The above warranty liabilities shall not be applied:
To the products (including software), which were repaired or were amended by the employees, that do not represent the manufacturer. Exceptions are the cases where the customer has made repairs or made amendments to the devices in the strict compliance with instructions, preliminary agreed and approved by the manufacturer in writing;
To the products, broken down due to unacceptable polarity reversal (to the opposite sign) of the power supply, improper operation, transportation, storage, installation, mounting or accident.

## Returning a product for repair

1. Apply to Fastwel company or to any of the Fastwel's official representatives for the Product Return Authorization.
2. Attach a failure inspection report with a product to be returned in the form, accepted by the Manufacturer, with a description of the failure circumstances and symptoms.
3. Place the product in the consumer packaging (antistatic bag) and cardboard box, in which the product had been supplied. Failure to package in antistatic material will VOID all warranties of the Customer on a unilateral basis.
4. The customer pays for shipping the product to Fastwel or to an official Fastwel representative or dealer

# 1. Introduction

## 1.1. Purpose

This User Manual is designed to provide general information on the device, its principle of operation and key figures required for commissioning and intended use on KIC301 interface module (hereinafter referred to as the Module).
KIC301 is intended for the use jointly with CPU module with StackPC-PCI support and extends the basic CPU module functions.
KIC301 is designed for systems operated in harsh environments. The module is manufactured in StackPC-PCI form-factor.
For safe and proper use of the module within the specified service life, first it is necessary to carefully read this User Manual.

## 1.2. Versions, delivery checklist, ordering information

### 1.2.1. Versions and ordering information

*Description of delivered configurations:*

- KIC301-01 – 2 x mPCI-E, 2x USB 2.0;

- KIC301-02 - 2 x mPCI-E, 2x USB 2.0; 2 x RS485/RS422, 2 x RS232, 1 x 1-Wire;

Description of available options: \COATED

### 1.2.2. Delivery checklist

- KIC301 Module – 1 pcs.

- Kit of mounting parts;

- Kit of jumpers;

- Antistatic bag;

- Package (cardboard box).

# 2. Technical characteristics

## 2.1. Technical specifications

Technical specifications of KIC301 are given in the table:

***Table 2-1: Technical specifications of KIC301***

| Technical specifications | Description |
|---|---|
| 2x MiniPCI | - Enables to connect peripheral devices in Mini PCI-E (Mini PCI Express) card form-factor;<br>- 2x slots for installation of Mini SIM-cards (interacts with modules installed in Mini PCI-E). |
| 2xRS232/2xRS485/2xRS422/1-Wire (only for KIC301-02) | - Independent selection of active interface and operation mode on each of the ports by way of jumpers;<br>- Signals of WLAN#, WPAN#, WWAN# activity LEDs from the both interfaces of Mini PCI-E are routed to a separate connector (see subsection 3.3.4);<br>- interface ports are routed and grouped on two connectors;<br>- 1-Wire interface is implemented on DS2480B;<br>- Galvanic isolation of interfaces – 500 V. |
| PCI-104 | According to the specification requirements, the board is equipped with PCI-104 bulkhead connector |
| StackPC-PCI | - Complies with the StackPC™ Specification Version 1.1;<br>- End-to-end propagation of interfaces: LPC, PCIe x 4, PCIe x 1 L2-L3, SPI, SMBus, UART (only for KIC301-01 version). |
| USB: | Possibility to switch lines of USB0 and USB1 interface between Mini PCI-E and StackPC-PCI using the jumper (see subsection 3.4.2). |
| SATA interface: | SATA II;<br>Connector for SATADOM drive;<br>Possibility to switch the SATA channel between module's connector and StackPC-PCI using jumper. |
| Operating temperature range | Industrial temperature range: - 40..+85°C |
| OS compatibility: | WinXP Embedded;<br>Win7 Embedded;<br>Linux 2.6. |

## 2.2. Power supply

The electric power supply should correspond to the requirements set forth in the table below. The module is supplied with power via XS4 connector in StackPC™ interface.

***Table 2-2: Power supply parameters***

| Power supply voltage | Rated current consumption | |
|---|---|---|
| 5 ± 0,25 | **Without peripheral devices, in A, no more than:** | **With peripheral devices, in A, no more than:** |
| | 0,3 | 4 |
| 3,3 ± 0,2 | 0,25 | 0,25 |

The peripheral devices include: Mini PCI Express modules; SATA drives; 1-Wire devices; equipment connected via RS-232, RS-485, RS-422 interfaces.

## 2.3 Operating conditions

The module should be used under the following operating conditions:
– Operating temperature range: from - 40 to +85 °C,
– The modules are resistant to the changes of ambient temperatures within a specified temperature range, with a relative humidity of up to 80%, without condensation.

## 2.4 Mechanical characteristics

The modules maintain structural integrity, external view and functional capabilities under the influence of exernal factors and within the limits of the following values:
– vibration resistance: acceleration amplitude of no more than – 5g, range of frequencies: from 10 to 500 Hz,
– resistance to single shocks: peak acceleration no more than – 50 g,
– resistance to multiple shocks: peak acceleration no more than – 25 g (number of shocks: 1000).

## 2.5 Module dimensions

Weight and overall dimensions for the module's versions are given in the table below:

***Table 2-3: Module's weight and dimensions***

| Module | Weight in kg, no more than | Boxed weight, in kg | Dimensions, in mm, no more than | Box dimensions, in mm |
|---|---|---|---|---|
| KIC301-0x | 0,100 | 0,400 | 96,1 x90,4 x22,2 | 155 x140 x45 |

Overall and connection dimensions of the module are shown on Fig. 3-2.

## 2.6 MTBF

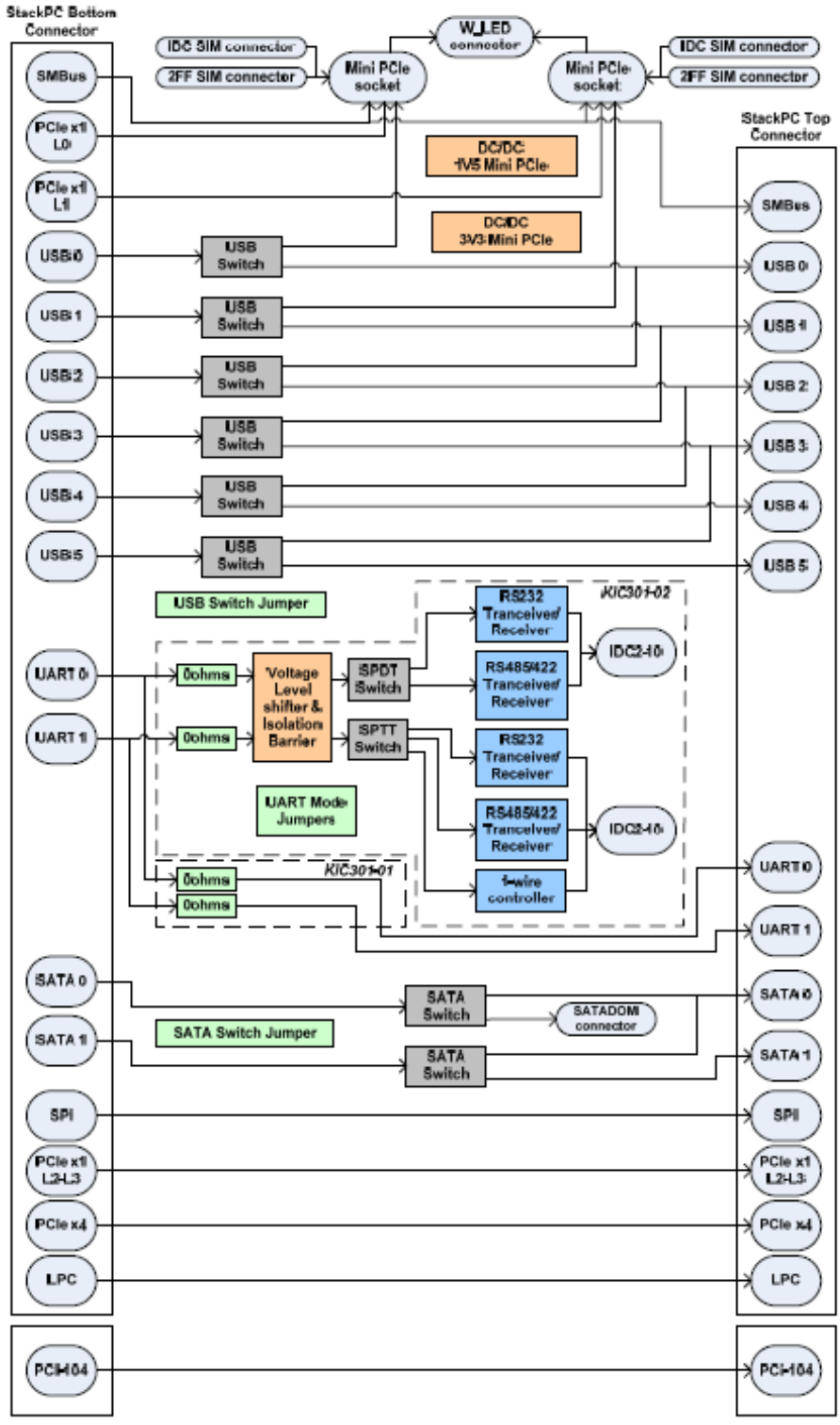
MTBF for the module amounts to no less than 560 000 hours. This MTBF value is calculated on the basis of the Telcordia Issue 1 calculation model (Method I Case 3) for continuous operation when located on land and under conditions corresponding to the Moderately Cold Climate 4 climatic category according to IEC 721-2-1:1982, at the ambient temperature of +30°C

# 3. SPECIFICATION

## 3.1. Block diagram

The block diagram of the board is shown on the Figure below:

***Fig. 3-1: Block diagram of the board***



The block diagram of the module shows main functional units. Technical features of the main functional units of the module are given in subsection 2.1 of the User Manual.

## 3.2. Location of main components

Location of the main components, related connectors for the TOP side and BOTTOM side of the module is shown on Fig. 3-2, Fig. 3-3 and Fig. 3-4.

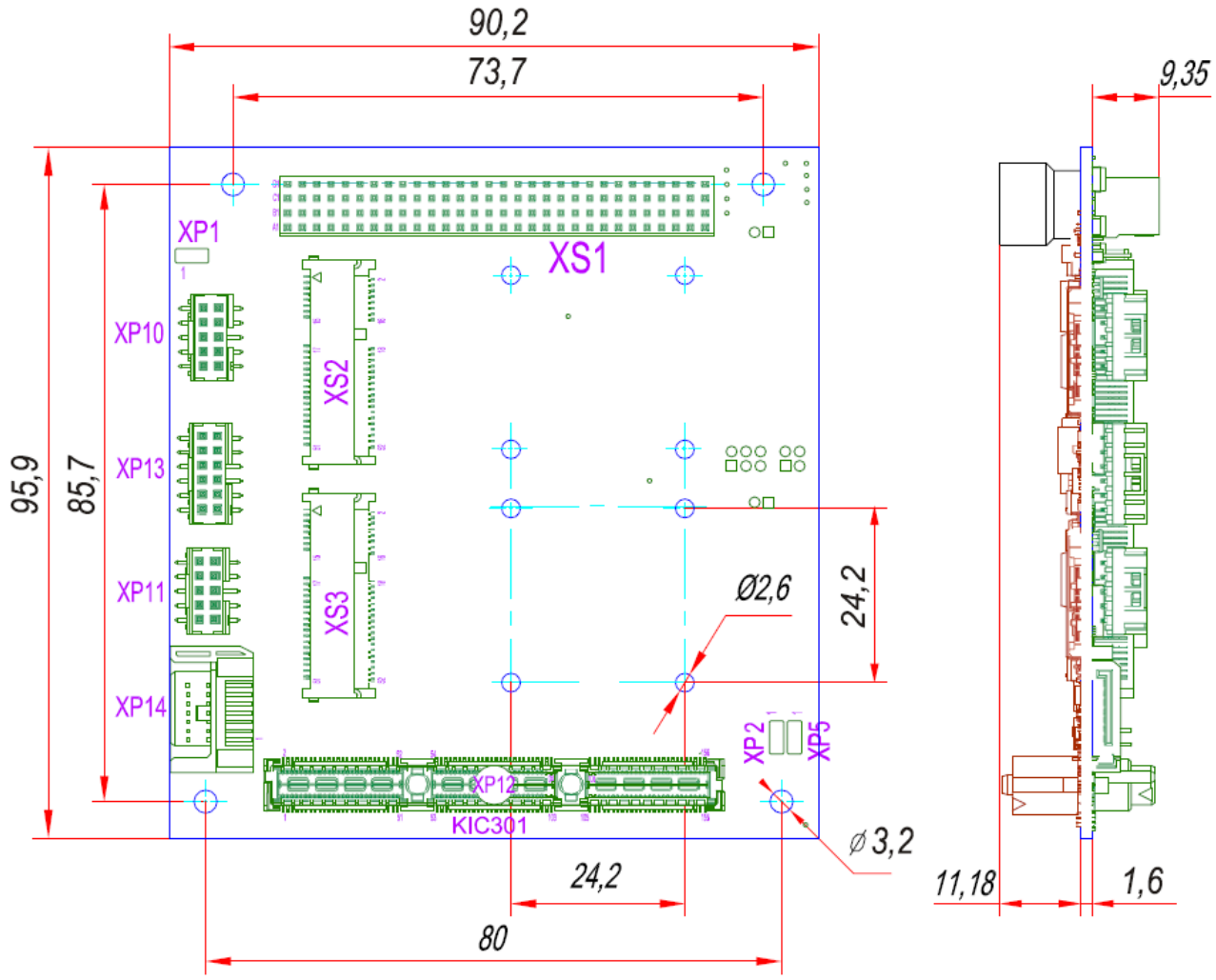



***Fig. 3-2: Location of KIC301-01 connectors on the top side and side view***

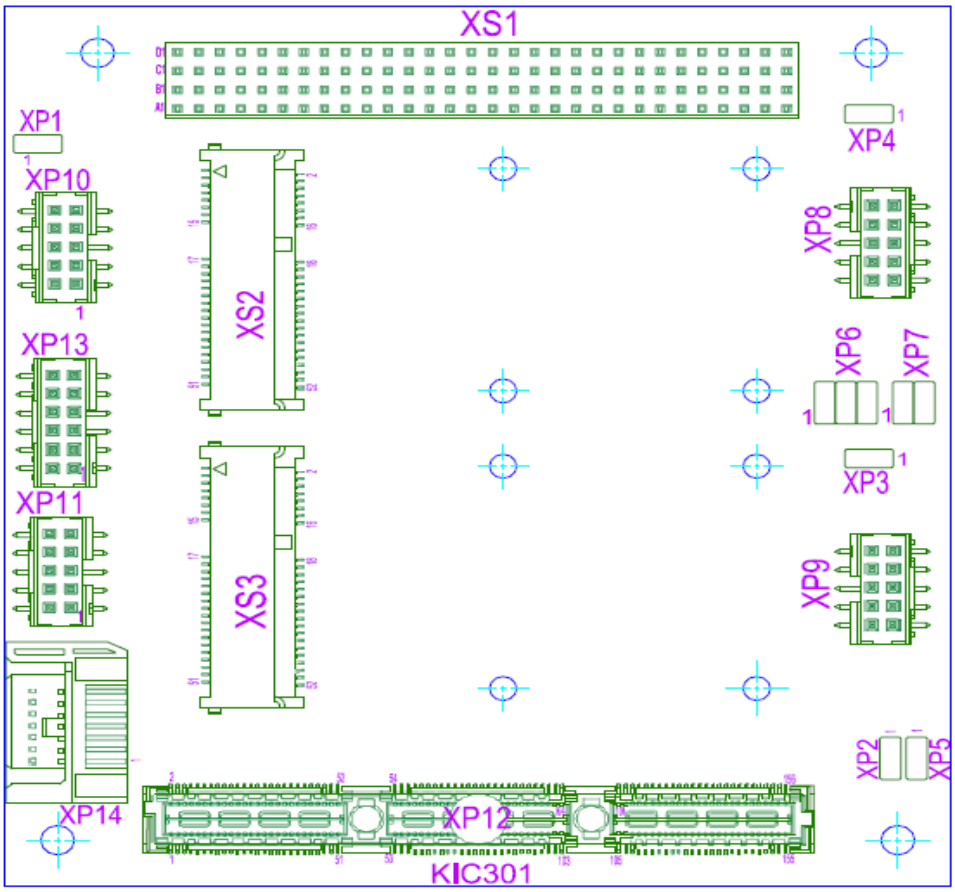



***Fig. 3-3: Location of KIC301-02 connectors on the TOP side***

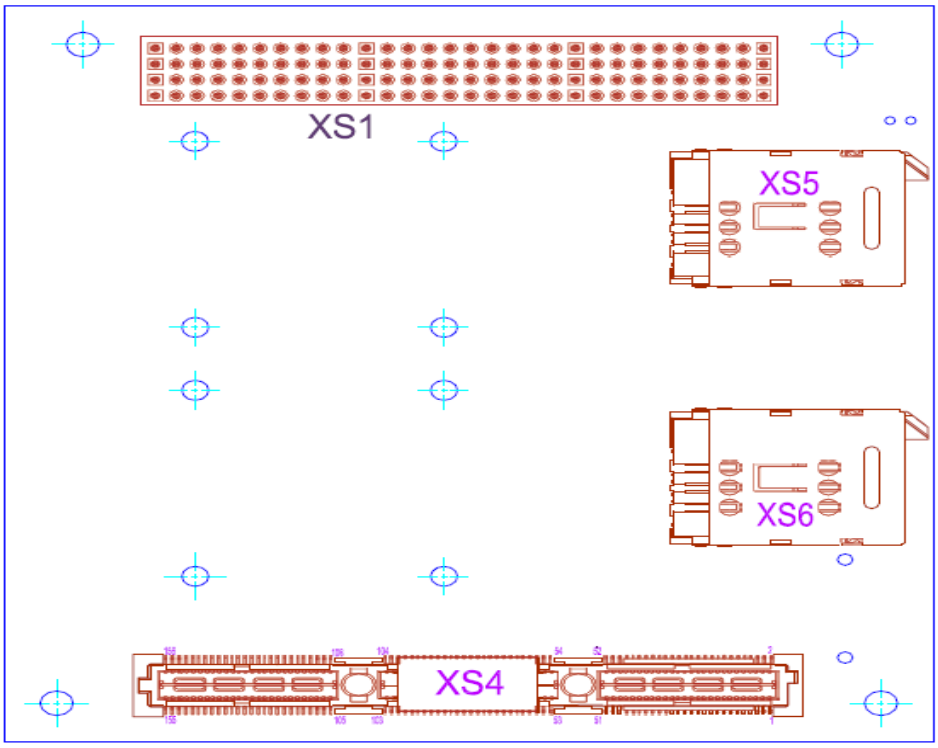



***Fig. 3-4: Location of KIC301 connectors on the BOTTOM side***

## 3.3 Interfaces and module connectors

### 3.3.1 StackPC-PCI

The modules is equipped with standard connectors of StackPC-PCI interface, which can be used by KIC301 for connection to other devices of the same form-factor.
According to the StackPC™ specification (mode detailed information can be found at: http://www.stackpc.org/ ), the module in such a format includes StackPC and PCI-104 connectors, described below.

#### 3.3.1.1 StackPC

Availability of StackPC™ connectors (XP12, XS4) enables to connect additional extension modules (End-to-end propagation of interfaces: LPC, PCIe x 4, PCIe x 1 L2-L3, SPI, SMBus, UART (for KIC301-01 version)) to KIC301. Location of StackPC™ connector contacts is shown on Fig. 3-5 and Fig. 3-6.

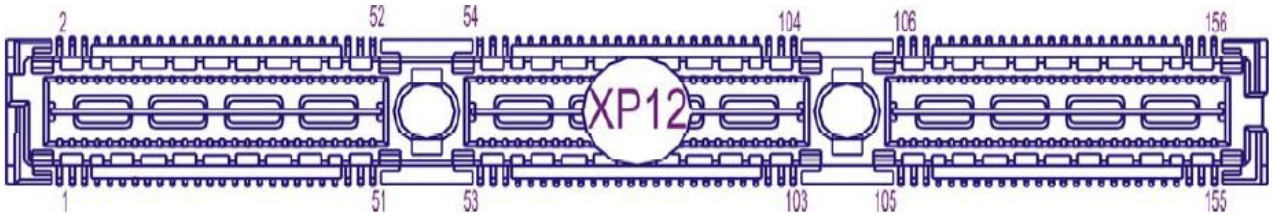
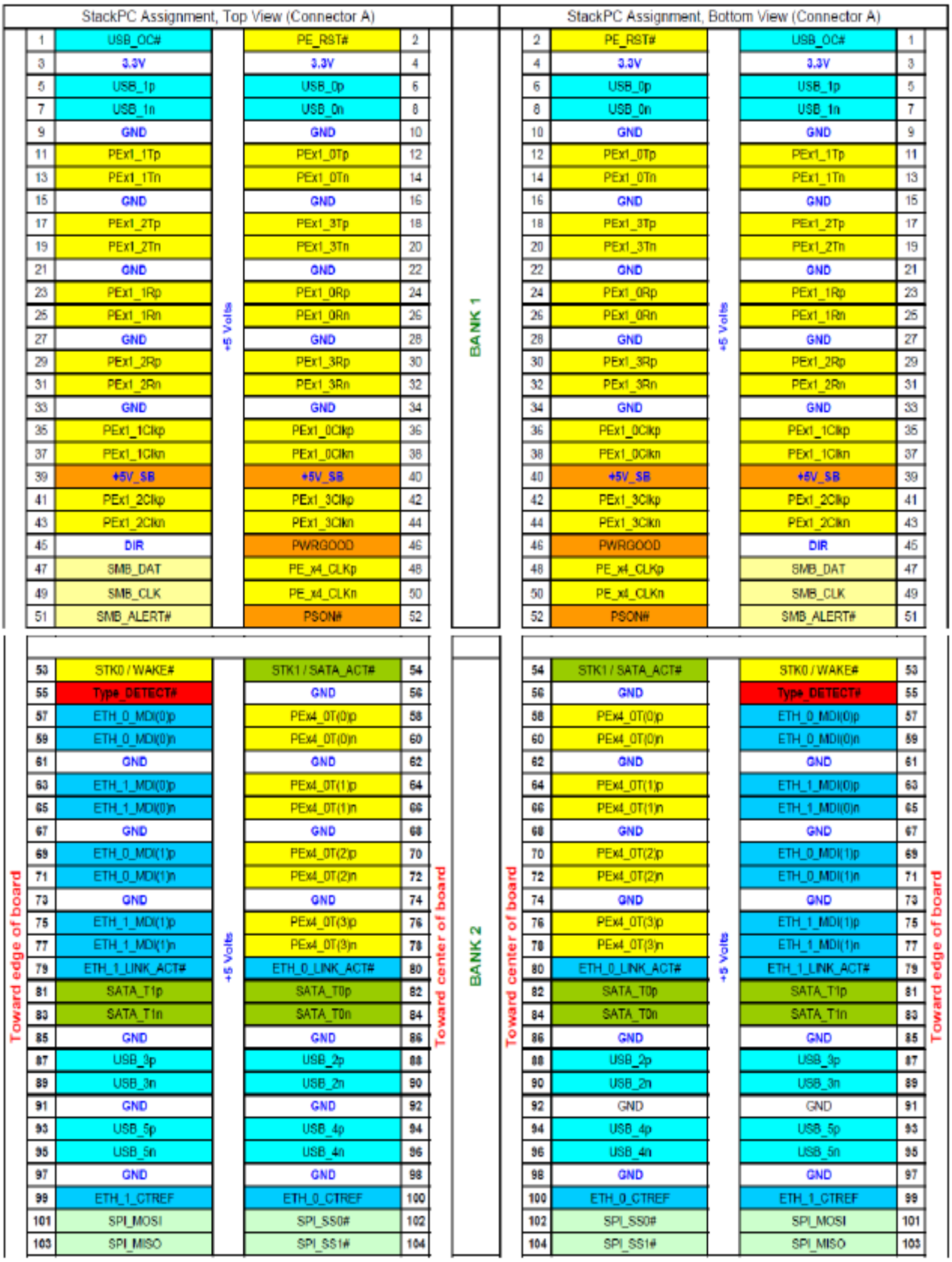



*Fig. 3-5: StackPC™ connector (XP12) TOP*


*Fig. 3-6: StackPC™ connector (XS4) BOTTOM*

Purpose of the connector's contacts are specified in Table 3-1 (according to the StackPC™ specification rev.1.1). Power supply contacts are located in the middle of the connector: Bank 1 and Bank 2 corresponding to +5 V, Bank 3 is corresponding to +12 V (power supply +12 V is not used for this module type).

**Table 3-1: Purpose of StackPC™ connector contacts**



StackPC Assignment, Top View (Connector A)

| | | | | | |
|---|---|---|---|---|---|
| 1 | USB_OC# | +5 Volts | PE_RST# | 2 | BANK 1 |
| 3 | 3.3V | | 3.3V | 4 | |
| 5 | USB_1p | | USB_0p | 6 | |
| 7 | USB_1n | | USB_0n | 8 | |
| 9 | GND | | GND | 10 | |
| 11 | PEx1_1Tp | | PEx1_0Tp | 12 | |
| 13 | PEx1_1Tn | | PEx1_0Tn | 14 | |
| 15 | GND | | GND | 16 | |
| 17 | PEx1_2Tp | | PEx1_3Tp | 18 | |
| 19 | PEx1_2Tn | | PEx1_3Tn | 20 | |
| 21 | GND | | GND | 22 | |
| 23 | PEx1_1Rp | | PEx1_0Rp | 24 | |
| 25 | PEx1_1Rn | | PEx1_0Rn | 26 | |
| 27 | GND | | GND | 28 | |
| 29 | PEx1_2Rp | | PEx1_3Rp | 30 | |
| 31 | PEx1_2Rn | | PEx1_3Rn | 32 | |
| 33 | GND | | GND | 34 | |
| 35 | PEx1_1Clkp | | PEx1_0Clkp | 36 | |
| 37 | PEx1_1Clkn | | PEx1_0Clkn | 38 | |
| 39 | +5V_SB | | +5V_SB | 40 | |
| 41 | PEx1_2Clkp | | PEx1_3Clkp | 42 | |
| 43 | PEx1_2Clkn | | PEx1_3Clkn | 44 | |
| 45 | DIR | | PWRGOOD | 46 | |
| 47 | SMB_DAT | | PE_x4_CLKp | 48 | |
| 49 | SMB_CLK | | PE_x4_CLKn | 50 | |
| 51 | SMB_ALERT# | | PSON# | 52 | |

StackPC Assignment, Bottom View (Connector A)

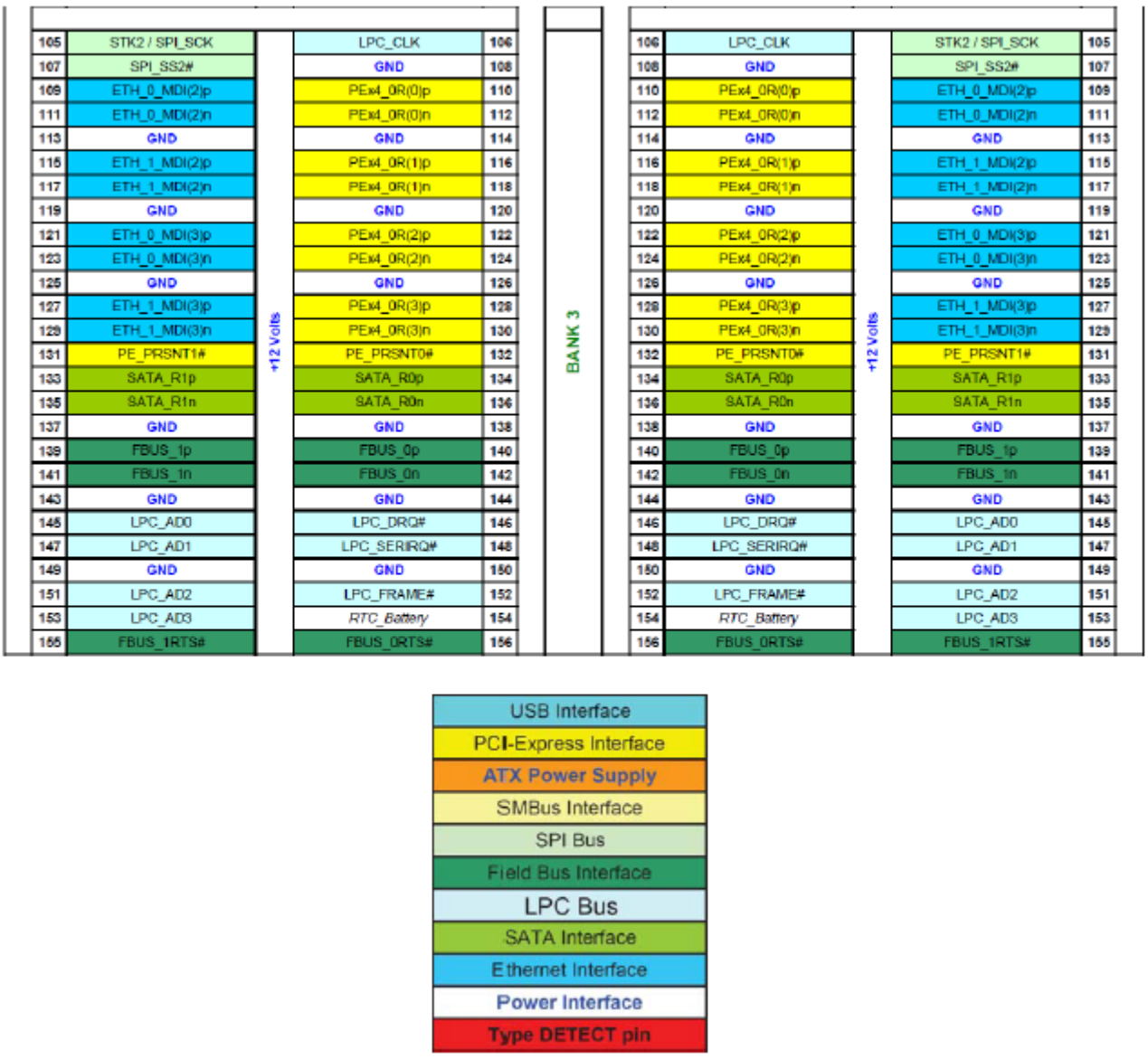
| | | | | | |
|---|---|---|---|---|---|
| 2 | PE_RST# | +5 Volts | USB_OC# | 1 | BANK 1 |
| 4 | 3.3V | | 3.3V | 3 | |
| 6 | USB_0p | | USB_1p | 5 | |
| 8 | USB_0n | | USB_1n | 7 | |
| 10 | GND | | GND | 9 | |
| 12 | PEx1_0Tp | | PEx1_1Tp | 11 | |
| 14 | PEx1_0Tn | | PEx1_1Tn | 13 | |
| 16 | GND | | GND | 15 | |
| 18 | PEx1_3Tp | | PEx1_2Tp | 17 | |
| 20 | PEx1_3Tn | | PEx1_2Tn | 19 | |
| 22 | GND | | GND | 21 | |
| 24 | PEx1_0Rp | | PEx1_1Rp | 23 | |
| 26 | PEx1_0Rn | | PEx1_1Rn | 25 | |
| 28 | GND | | GND | 27 | |
| 30 | PEx1_3Rp | | PEx1_2Rp | 29 | |
| 32 | PEx1_3Rn | | PEx1_2Rn | 31 | |
| 34 | GND | | GND | 33 | |
| 36 | PEx1_0Clkp | | PEx1_1Clkp | 35 | |
| 38 | PEx1_0Clkn | | PEx1_1Clkn | 37 | |
| 40 | +5V_SB | | +5V_SB | 39 | |
| 42 | PEx1_3Clkp | | PEx1_2Clkp | 41 | |
| 44 | PEx1_3Clkn | | PEx1_2Clkn | 43 | |
| 46 | PWRGOOD | | DIR | 45 | |
| 48 | PE_x4_CLKp | | SMB_DAT | 47 | |
| 50 | PE_x4_CLKn | | SMB_CLK | 49 | |
| 52 | PSON# | | SMB_ALERT# | 51 | |

| | | | | | |
|---|---|---|---|---|---|
| 53 | STK0 / WAKE# | +5 Volts | STK1 / SATA_ACT# | 54 | BANK 2 |
| 55 | Type_DETECT# | | GND | 56 | |
| 57 | ETH_0_MDI(0)p | | PEx4_0T(0)p | 58 | |
| 59 | ETH_0_MDI(0)n | | PEx4_0T(0)n | 60 | |
| 61 | GND | | GND | 62 | |
| 63 | ETH_1_MDI(0)p | | PEx4_0T(1)p | 64 | |
| 65 | ETH_1_MDI(0)n | | PEx4_0T(1)n | 66 | |
| 67 | GND | | GND | 68 | |
| 69 | ETH_0_MDI(1)p | | PEx4_0T(2)p | 70 | |
| 71 | ETH_0_MDI(1)n | | PEx4_0T(2)n | 72 | |
| 73 | GND | | GND | 74 | |
| 75 | ETH_1_MDI(1)p | | PEx4_0T(3)p | 76 | |
| 77 | ETH_1_MDI(1)n | | PEx4_0T(3)n | 78 | |
| 79 | ETH_1_LINK_ACT# | | ETH_0_LINK_ACT# | 80 | |
| 81 | SATA_T1p | | SATA_T0p | 82 | |
| 83 | SATA_T1n | | SATA_T0n | 84 | |
| 85 | GND | | GND | 86 | |
| 87 | USB_3p | | USB_2p | 88 | |
| 89 | USB_3n | | USB_2n | 90 | |
| 91 | GND | | GND | 92 | |
| 93 | USB_5p | | USB_4p | 94 | |
| 95 | USB_5n | | USB_4n | 96 | |
| 97 | GND | | GND | 98 | |
| 99 | ETH_1_CTREF | | ETH_0_CTREF | 100 | |
| 101 | SPI_MOSI | | SPI_SS0# | 102 | |
| 103 | SPI_MISO | | SPI_SS1# | 104 | |

Toward edge of board / Toward center of board

| | | | | | |
|---|---|---|---|---|---|
| 54 | STK1 / SATA_ACT# | +5 Volts | STK0 / WAKE# | 53 | BANK 2 |
| 56 | GND | | Type_DETECT# | 55 | |
| 58 | PEx4_0T(0)p | | ETH_0_MDI(0)p | 57 | |
| 60 | PEx4_0T(0)n | | ETH_0_MDI(0)n | 59 | |
| 62 | GND | | GND | 61 | |
| 64 | PEx4_0T(1)p | | ETH_1_MDI(0)p | 63 | |
| 66 | PEx4_0T(1)n | | ETH_1_MDI(0)n | 65 | |
| 68 | GND | | GND | 67 | |
| 70 | PEx4_0T(2)p | | ETH_0_MDI(1)p | 69 | |
| 72 | PEx4_0T(2)n | | ETH_0_MDI(1)n | 71 | |
| 74 | GND | | GND | 73 | |
| 76 | PEx4_0T(3)p | | ETH_1_MDI(1)p | 75 | |
| 78 | PEx4_0T(3)n | | ETH_1_MDI(1)n | 77 | |
| 80 | ETH_0_LINK_ACT# | | ETH_1_LINK_ACT# | 79 | |
| 82 | SATA_T0p | | SATA_T1p | 81 | |
| 84 | SATA_T0n | | SATA_T1n | 83 | |
| 86 | GND | | GND | 85 | |
| 88 | USB_2p | | USB_3p | 87 | |
| 90 | USB_2n | | USB_3n | 89 | |
| 92 | GND | | GND | 91 | |
| 94 | USB_4p | | USB_5p | 93 | |
| 96 | USB_4n | | USB_5n | 95 | |
| 98 | GND | | GND | 97 | |
| 100 | ETH_0_CTREF | | ETH_1_CTREF | 99 | |
| 102 | SPI_SS0# | | SPI_MOSI | 101 | |
| 104 | SPI_SS1# | | SPI_MISO | 103 | |

Toward center of board / Toward edge of board




### 3.3.1.2 PCI-104

KIC301 has the installed PCI-104 connector (TOP and BOTTOM).
PCI-104 interface uses the 120-pin (30x4) XS1 connector. It is designed for end-to-end transfer of CPU-module signals to mezzanine module (signals are not routed to KIC301).

Location of contacts of the PCI-104 connector is shown on the Figure below.


***Fig 3-7: Contacts of PCI-104 connector (XS1)***

Purpose of the connector's contacts is specified in Table 3-2: Purpose of PCI-104 connector contacts (XS1).

***Table 3-2: Purpose of PCI-104 connector contacts (XS1)***

| | A | B | C | D |
|---|---|---|---|---|
| 1 | GND | +5V_SB | +5V | AD00 |
| 2 | VI/O | AD02 | AD01 | +5V |
| 3 | AD05 | GND | AD04 | AD03 |
| 4 | C/BE0# | AD07 | GND | AD06 |
| 5 | GND | AD09 | AD08 | GND |
| 6 | AD11 | VI/O | AD10 | M66EN |
| 7 | AD14 | AD13 | GND | AD12 |
| 8 | +3.3V | C/BE1# | AD15 | +3.3V |
| 9 | SERR# | GND | PSON# | PAR |
| 10 | GND | PERR# | +3.3V | PME# |
| 11 | STOP# | +3.3V | LOCK# | GND |
| 12 | +3.3V | TRDY# | GND | DEVSEL# |
| 13 | FRAME# | GND | IRDY# | +3.3V |
| 14 | GND | AD16 | +3.3V | C/BE2# |
| 15 | AD18 | +3.3V | AD17 | GND |
| 16 | AD21 | AD20 | GND | AD19 |
| 17 | +3.3V | AD23 | AD22 | +3.3V |
| 18 | IDSEL0 | GND | IDSEL1 | IDSEL2 |
| 19 | AD24 | C/BE3# | VI/O | IDSEL3 |
| 20 | GND | AD26 | AD25 | GND |
| 21 | AD29 | +5V | AD28 | AD27 |
| 22 | +5V | AD30 | GND | AD31 |
| 23 | REQ0# | GND | REQ1# | VI/O |
| 24 | GND | REQ2# | +5V | GNT0# |
| 25 | GNT1# | VI/O | GNT2# | GND |
| 26 | +5V | CLK0 | GND | CLK1 |
| 27 | CLK2 | +5V | CLK3 | GND |
| 28 | GND | INTD# | +5V | RST# |
| 29 | +12V | INTA# | INTB# | INTC# |
| 30 | -12V | REQ3# | GNT3# | GND |

### 3.3.2 Mini PCI Express interface

The KIC301 board is equipped with connectors (XS2, XS3) of Mini PCI Express (Mini PCI-E) interface. Mini PCI-E interface enables to install into the module various extension boards:
-SSDs;
- Wireless modems GSM, Bluetooth, WiFi;
- Modules of interfaces: USB, SATA, SMBus, RS232, RS485, RS422 etc.;
- Modules of digital and analog I/O signals.

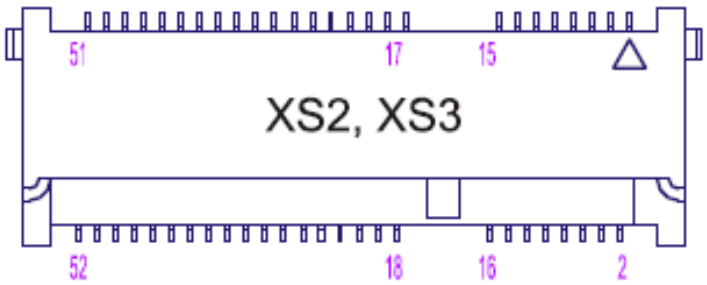



***Fig. 3-8: Contacts of Mini PCI-E Card Slot connector (XS2, XS3)***

***Table 3-3: Purpose of XS2, XS3 connector contacts - Mini PCI-E Card Slot***

| Contact number | Circuit | Contact number | Circuit |
|---|---|---|---|
| 51 | Reserved | 52 | +3,3V |
| 49 | Reserved | 50 | GND |
| 47 | Reserved | 48 | +1,5V |
| 45 | Reserved | 46 | LED_WPAN# |
| 43 | Reserved | 44 | LED_WLAN# |
| 41 | Reserved | 42 | LED_WWAN# |
| 39 | Reserved | 40 | GND |
| 37 | Reserved | 38 | USB_D+ |
| 35 | GND | 36 | USB_D- |
| 33 | PETp0 | 34 | GND |
| 31 | PETn0 | 32 | SMB_DATA |
| 29 | GND | 30 | SMB_CLK |
| 27 | GND | 28 | +1.5V |
| 25 | PERp0 | 26 | GND |
| 23 | PERn0 | 24 | +3,3Vaux |
| 21 | GND | 22 | PERST# |
| 19 | Reserved (UIM_C4) | 20 | Reserved |
| 17 | Reserved (UIM_C8) | 18 | GND |
| | Mechanical | | key |
| 15 | GND | 16 | UIM_VPP |
| 13 | REFCLK+ | 14 | UIM_RESET |
| 11 | REFCLK- | 12 | UIM_CLK |
| 9 | GND | 10 | UIM_DATA |
| 7 | CLKREQ# | 8 | UIM_PWR |
| 5 | Reserved | 6 | 1,5V |
| 3 | Reserved | 4 | GND |
| 1 | WAKE# | 2 | 3,3V |

### 3.3.3 SIM-cards

For support functionalities of Mini PCI Express interface, the KIC301 board has the installed slots (connectors) for installation (connection) of SIM-cards. The SIM-cards interact with the modules, are installed into Mini PCI-E, e.g. by 3G modem.

Peculiarities of interaction with SIM-cards are determined by the Mini PCI-E module used.

Connection of SIM-cards directly on the module's board (subsection 3.3.3.1) or via adapter (subsection 3.3.3.2).

### 3.3.3.1 SIM-slots on the module

The module is equipped with slots (XS5, XS6 connectors) for installation of Mini SIM (2FF) cards (P/N: 47388-3001 (Molex)). The SIM-card is inserted into connector as described in subsection 4.5.

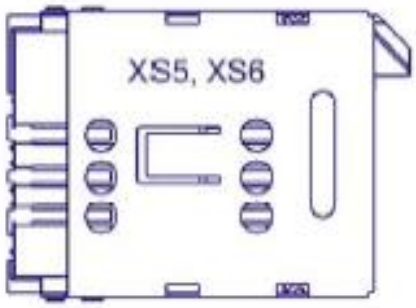



***Fig. 3-9: Connector for SIM-cards (XS5, XS6)***

***Table 3-4: Availability of connector contacts for SIM-cards (XS5, XS6)***

| No | Circuit |
|---|---|
| 1 | UIM Power |
| 2 | UIM Reset |
| 3 | UIM Clock |
| 4 | UIM USB Data+ |
| 5 | GND |
| 6 | UIM VPP |
| 7 | UIM Data |
| 8 | UIM USB Data- |
| 9 | GND |
| 10 | GND |

### 3.3.3.2 Connection of SIM-card via adapter

For connection of SIM-cards using adapter, XP11, XP10 connectors should be used (P/N: 98424 G52-10LF (FCI)).
Female part of the connector, P/N: 10073599-010LF (FCI).
Contacts (10 pcs) P/N: 10044403-101 (FCI).

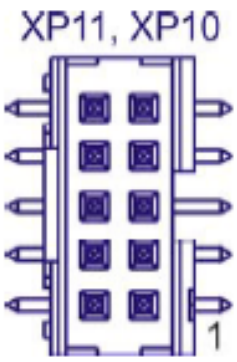



***Fig. 3-10: IDC SIM Connectors (XP11, XP10)***

***Table 3-5: Purpose of contacts of IDC SIM Connectors (XP11, XP10)***

| No | Circuit |
|---|---|
| 1 | UIM Power |
| 2 | UIM Reset |
| 3 | UIM Clock |
| 4 | UIM USB Data+ |
| 5 | GND |
| 6 | UIM VPP |
| 7 | UIM Data |
| 8 | UIM USB Data- |
| 9 | GND |
| 10 | GND |

### 3.3.4 Indication of Mini PCI-E network connection status

In order to support functionalities of Mini PCI Express interface, the board KIC301 has the connector (XP13) for installation of LEDs indicating status of network connections.
Connector P/N: 98424-G52-12LF (FCI).
Female part, P/N: 10073599-012LF (FCI).
Contacts (12 pcs) P/N: 10044403-101 (FCI).

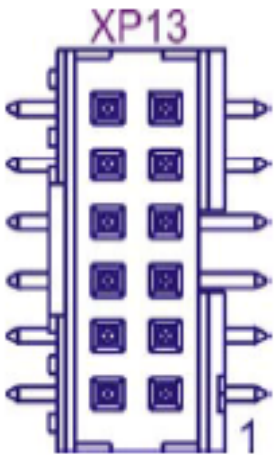



***Fig. 3-11: IDC connector for control pf LEDs indicating the state of XP13 network***

Connector's contacts: 2, 4, 6, 8, 10, 12 are connected via resistor 390 Ohm to power supply +3,3 V.
The LEDs are controlled by a low level on connector's contacts: 1, 3, 5, 7, 9, 11.

***Table 3-6: Purpose of connector contacts for control of LEDs of XP13 network status***

| No | Signal |
|---|---|
| 1 | LED1 - WWAN# |
| 2 | LED1 - Pullup |
| 3 | LED2 - WLAN# |
| 4 | LED2 - Pullup |
| 5 | LED3 - WPAN# |
| 6 | LED3 - Pullup |
| 7 | LED4 - WWAN# |
| 8 | LED4 - Pullup |
| 9 | LDE5 - WLAN# |
| 10 | LED5 - Pullup |
| 11 | LDE6 - WPAN# |
| 12 | LED6 - Pullup |

### 3.3.5 SATA interface

KIC301 is equipped with connector (XP14) of SATA II interface (Fig. 3-12).
The interface supports connection of both standard drives and SATADOM drives. The SATA channel is switched between XP14 connector of the module and StackPC-PCI interface using XP5 jumper.

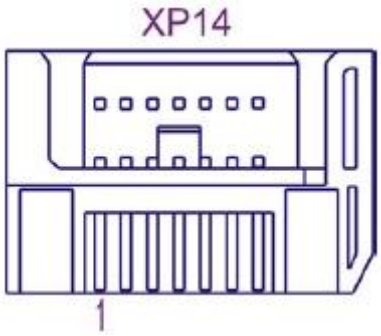



***Fig. 3-12: XP14 connector (SATA)***

***Table 3-7: Purpose of XP14 connector contacts (SATA)***

| No | Signal |
|---|---|
| 1 | GND |
| 2 | A+ |
| 3 | A- |
| 4 | GND |
| 5 | B- |
| 6 | B+ |
| 7 | GND / SATADOM VCC |

### 3.3.6 RS232/RS485/RS422/1-Wire interfaces

The board KIC301-02 is equipped with connectors of RS232/RS485/RS422/1-Wire interfaces which operational features are described in subsections 3.3.6.1 and 3.3.6.2.

#### 3.3.6.1 XP8 connector (RS232/RS485/RS422 interfaces)

The KIC301-02 module has the following galvanically isolated interfaces:
- RS232 (only data lines);
- RS485 (control of RTS signal flow);
- RS422 (duplex/half-duplex);

The specified interfaces are implemented on UART6 of StackPC interface. Operating temperature of galvanic isolation – up to 500 V. Signal lines RS485/RS422 of the modules are protected against excess voltage. Interfaces are routed to XP8 connector. Parameters of XP8 port are set by XP7 group of jumpers, as described in subsection 3.4.6.
Connector P/N: 98424-G52-10LF (FCI);
Female part, P/N: 10073599-010LF (FCI);
Contacts (10 pcs.) P/N: 10044403-101 (FCI).

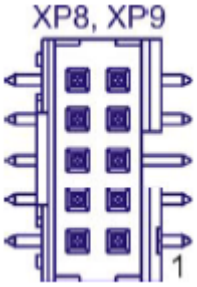



***Fig. 3-13: XP8 and XP9 connectors***

***Table 3-8: Purpose of connector contacts RS232/RS485/RS422 XP8***

| No | Signal | Purpose |
|---|---|---|
| 1 | TX+ | RS485/RS422 |
| 2 | TX- | RS485/RS422 |
| 3 | RXD | RS232 |
| 4 | GND | RS232 |
| 5 | TXD | RS232 |
| 6 | NC | Not connected |
| 7 | RX+ | RS422 |
| 8 | RX- | RS422 |
| 9 | GND | Power supply of peripheral device (up to 50 mA) |
| 10 | +5V | |

#### 3.3.6.2 XP9 connectors (RS232/RS485/RS422/1-Wire interfaces)

The KIC301-02 module has the second set of galvanically isolated interfaces:
- RS232 (only data lines);
- RS485 (control of RTS signal flow);
- RS422 (duplex/half-duplex).
- 1-Wire (controller DS2480B Maxim Integrated)).

The specified interfaces are implemented on UART5 of StackPC interface. Operating temperature of galvanic isolation – up to 500 V. RS485/RS422/1-Wire signal lines of the module re protected against excess voltage. Interfaces are routed to the XP9 connector.
Parameters of XP9 port are set by way of the XP6 jumper group (see subsection 3.4.5).
Connector P/N: 98424-G52-10LF (FCI);
Female part P/N: 10073599-010LF (FCI);
Contacts (10 pcs.) P/N: 10044403-101 (FCI).

***Table 3-9: Purpose of RS232/RS485/RS422/1-Wire XP9 connector contacts***

| No | Signal | Purpose |
|---|---|---|
| 1 | TX+ | RS485/RS422 |
| 2 | TX- | RS485/RS422 |
| 3 | RXD | RS232 |
| 4 | GND | RS232 |
| 5 | TXD | RS232 |
| 6 | 1W_RX/TX | 1-Wire |
| 7 | RX+ | RS422 |
| 8 | RX- | RS422 |
| 9 | GND | Power supply to peripheral device (up to 50 mA) |
| 10 | +5V | |

For connection of external 1-Wire devices, the following connector's contacts are used: 6, 9, 10.
Maximum consumed current of the connected devices as to the voltage +5 V – no more than 50 mA.

## 3.4 Purpose of jumpers

Location of jumpers on the board is shown on figures 3-2 and 3-3.

### 3.4.1 XP1 – jumper for operation shutdown of network interfaces of Mini PCI-E modules

The jumper is set – network interfaces of Mini PCI-E modules are shut down.

### 3.4.2 XP2 – Jumper of switching of USB-interface between Mini PCI-E and StackPC™

Jumper is removed – USB 0 and USB 1 lines are switched to Mini PCI-E. The rest USB-lines are switched to the similar USB lines of StackPC™ interface with lower number (see the table below).
Jumper is installed – all USB lines are switched to StackPC™.

| USB on StackPC BOT | USB ports on Mini PCI-E | | USB ports on StackPC™ TOP | |
|---|---|---|---|---|
| | XP2 is installed | XP2 is removed | XP2 is installed | XP2 is removed |
| 0 | - | 0 | 0 | - |
| 1 | - | 1 | 1 | - |
| 2 | - | - | 2 | 0 |
| 3 | - | - | 3 | 1 |
| 4 | - | - | 4 | 2 |
| 5 | - | - | 5 | 3 |

### 3.4.3 XP3, XP4 – jumpers for connecting terminators RS-485/RS422 (KIC301-02)

Jumpers are installed – terminators are connected. Terminators resistance amounts to 120 Ohm.

### 3.4.4 XP5 – Jumper for switching the SATA channel between module's connector and StackPC™.

Jumper is installed – SATA 0 is switched on connectors (XP14) on the board. In this case, the SATA 1 channel is switched to the similar SATA 0 channel of StackPC-PCI interface (see the table).

Jumper is removed – all SATA-channels are switched to the StackPC™ interface.

| SATA on StackPC™ BOT | SATA on KIC301 | | SATA on Stack-PC™ TOP | |
|---|---|---|---|---|
| | XP2 is installed | XP2 is removed | XP2 is installed | XP2 is removed |
| 0 | 0 | - | - | 0 |
| 1 | - | - | 0 | 1 |

### 3.4.5 XP6 – group of jumpers for setting parameters of XP9 combined port (KIC301-02)

| Jumper contacts | RS232 | 1-Wire | RS485/422 |
|---|---|---|---|
| 1-2 | Installed | Removed | Installed |
| 3-4 | Removed | Installed | Installed |
| 5-6 | - | - | Half-duplex (installed)<br>Duplex (removed) |

The first contact is specified on the board (see Fig. 3-3)

### 3.4.6 XP7 - group of jumpers for setting parameters of XP8 combined port (KIC301-02)

| Jumper contacts | RS232 | RS485/422 |
|---|---|---|
| 1-2 | - | Half-duplex (installed)<br>Duplex (removed) |
| 3-4 | Removed | Installed |

# 4 Installation of KIC301

It is necessary always to comply with the below regulations, warnings and procedures in order to properly install the module as well as to avoid damaging the device, system components or injuring employees.

## 4.1 Safety requirements

When handling KIC301, you'll need to strictly follow the below safety requirements.
Fastwel will not be responsible for any damages, resulted from the non-compliance with these requirements.

**Attention!**
Always disconnect the power supply of the CPU module before connecting or disconnecting the module's power supply cable. Failure to comply with this regulation may damage your health, as well as lead to malfunctions of the board or the whole system. In order to avoid accidental power on, disconnect the power supply cable of the CPU module before installation/ removal of extension modules and interface modules.

**ESD Sensitive Device!**
Electronic modules and their components are sensitive to static electricity. Even a non-perceptible by human being static discharge can be sufficient to destroy or degrade a component's operation! Therefore, all handling operations and inspections of this product must be performed with due care, in order to keep product integrity and operability

## 4.2 KIC301 Installation procedure

In order to install KIC301 into the CPU-module, please follow the below procedure:

1. Please make sure that the safety requirements laid out in section 4.1. are observed.

**Attention!**
Noncompliance with the following instructions can cause module damages and system malfunction.

2. Please make sure that power supply of the CPU-module is switched off. Make sure that the CPU-board (which is used for module installation) has been properly configured.

3. If necessary, please install SIM-cards into 2FF slots and Mini PCI-E cards into relative connectors (see subsection 4.4).

4. For installation of KIC301 module into the CPU-board, the following steps should be performed:
- Please fix the racks in holes of the CPU-module using screw nuts and stop washers (racks, stop washers and screw nuts from the module's delivery checklist).
- Install KIC301 into PCI-104 and StackPC™ connector of the CPU-module.
- Fix KIC301 by racks from the delivery checklist of KIC301 or by screws.

5. When necessary, connect cables to KIC301.
Now KIC301 is ready for operation. Next you should act according to the User Manual's requirements.

**Attention!**
When installing module inside an airtight body, it is especially necessary to ensure sufficient air exchange. This will prevent an excessive heating of the system components inside the body.

## 4.3. Module removal procedure

For module removal, the following operations should be performed:

1. Make sure that the safety requirements specified in section 4.1. are met.
2. Before start, please make sure that system power supply is switched off.
3. Disconnect all interface cables form the module.
4. Unscrew fastening elements of KIC301.
5. Now you can remove KIC301 from the CPU-module.

### 4.3.1 Installation of StackPC™ extension modules etc.

The extension modules are installed into the relative StackPC™ connectors. The modules can be installed one above the other in order to obtain highly integrated control systems. Before installation, please read subsection 4.1.

**Attention!**
During installation of extension modules, the power supply should be switched off

**Attention!**
When installing the extension modules, avoid bending and deforming the board. Contacts should be properly connected and required fasteners should be used.

**Note**
Before installation and operation of StackPC-PCI, PCI-104, PCI-104-Express extension modules, on the CPU-module it is required to choose voltage, applying to I/O buffer of PCI interface. For this purpose, follow the requirements of this User Manual.

## 4.4 Installation of additional Mini PCI-E cards

Carefully insert the Mini PCI-E card into XS2/XS3 connector of KIC301, as described on Fig. 4-1.

***Fig. 4-1: Installation of additional Mini PCI-E cards into a relevant connector***

The installed Mini PCI-E cards should be attached to KIC301 using fasteners from the delivery checklist.

| No | Name |
|---|---|
| 1 | Nut M2,5 |
| 2 | Stop washer M2,5 |
| 3 | Plastic rack |
| 4 | Washer M2,5 |
| 5 | Screw M2,5 x 10 |

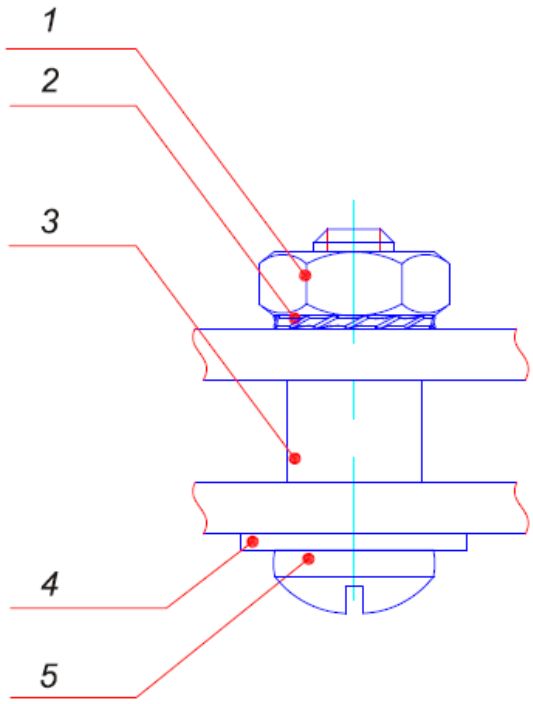



***Fig. 4-2: Installation of Mini PCI-E cards using fasteners***

Fasten the Mini PCI-E card on KIC301 in accordance with Fig. 4-2. Fig. 4-3 shows KIC301 with the installed Mini PCI-E card.

***Fig. 4-3: KIC301 with the installed Mini PCI-E card***

## 4.5. Installation of SIM-card

Mini SIM-cards are installed into 2FF slots (XS5, XS6 connectors). In order to install the SIM-cards, use a screwdriver to carefully move the metal slot cover towards the inside direction of the board.
Install the card into the slot and move the cover back to its place. The sequence of actions is shown on Fig. 4-4.


***Fig. 4-4: SIM-card installation into 2FF slot***

# ANNEX A DISCLAIMER

This Disclaimer contains special operating conditions of Fastwel in the following areas: intellectual property, warranty policy, conditions of the order and delivery.

## 1 INTELLECTUAL PRORETY

1.1 If any infraction, interference, improper use, illegitimate exploitation and/or violation of the industrial and/or intellectual property rights of any third party and/or property, exploitation during the use of Fastwel Embedded Module will take place – Fastwel does not guarantee to replace the materials, computer programs, procedures or equipment affected by the complaint and under no circumstances doesn't bear responsibility in any form for possible refusal in case of such a replacement.
1.2 Use of the Fastwel products as well as the objects of intellectual property containing in them, in the ways and for the purposes, not provided by the present user manual and datasheet isn't allowed without preliminary written approval of Fastwel.
1.3 Fastwel is not responsible for possible incidents and losses, related to the operation of end devices, in which the original Fastwel equipment is used.

## 2 WARRANTY POLICY

2.1 When the detected flaws in an element can be corrected without decreasing the foreseen technical features and functionality for it, User may demand Fastwel the urgent correction of the failures in additionally agreed period and an increasing of the period of the guarantee of the element equal as the time elapsed from the formal request to repair the failures, until the receipt of the repaired element. All costs associated to the correction of failures, included those of assembly, dismantle, transport, tests, etc, if they exist, shall be prosecuted according the Warranty Policy of Fastwel.

## 3 ORDER AND DELIVERY CONDITIONS

3.1 The general rule is that all Fastwel equipment prices are determined with due consideration of delivery under the EXW terms and conditions (Incoterms 2010). Delivery of the products under other terms and conditions should be preliminary agreed and stated in writing between the parties.
3.2 Unless otherwise expressly agreed with Fastwel, all the deliveries of Fastwel equipment will be carried out only after the official purchase order is obtained and provided that the ordered products have been prepaid in full. Other terms and conditions of cooperation should be made in writing.
3.3 Any delivery of Fastwel electronics is submitted with the right package in accordance with the current rules and standards in the Member States of the European Economic Area. The purchaser independently bears all risks regarding the compliance of package and marking of Fastwel products with legislation requirements being in effect at the place of purchased products destination (in the buyer's country). The specified condition excludes unequivocally any liability of Fastwel for possible non-compliance of package and marking of products with the requirements of legislation of the country of products destination.
3.4 In general, all components of the supply are properly protected with respect to freight, in order to avoid any damage to the supply, third parties, environmental damages or unrelated goods, as consequence of wrong packaging.
3.5 Each package unit is labeled on the exterior area with the indications of product's Part Number and Serial Number.
3.6 The support documents for the order should be made either in English or in Russian unless otherwise agreed between parties in writing.
3.7 Fastwel does not pay penalties and does not cover costs associated with delay in the delivery of the products caused by actions of the third parties, force-majeure etc. - Fastwel doesn't bear any responsibility for non-execution or inadequate execution of the obligations in a case when it is caused by actions of the third parties (for example producers or suppliers of accessories), force majeure etc.
3.8 Fastwel declares that independently and at any time without damage, it has an exclusive right to define and change functionality architecture, bill of materials of its products without any preliminary coordination and approvals of the third parties.

## 4 OTHER CONDITIONS

4.1 Fastwel has the obligation to respect the current Russian legislation (including, but not limited to environmental, labor, social laws) in each moment and to apply it to its embedded electronics considering all and each execution phase, that is to say, from the design until the commissioning and subsequent maintenance. In this regard Fastwel is not liable to the user or other persons in connection with possible changes of the company's rules (including, but not limited to warranty, ordering policy) caused by changes of the Russian legislation.
4.2 Unless otherwise expressly agreed in writing, Fastwel provides no training for assembly\installation\adjustment\operation of its equipment.