

# JX3 System Quick Reference



Quick Reference

**Jetter**

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# 1 Numbering Registers and I/Os for a JC-3xx Controller

## Introduction

Controllers and modules produced by Jetter AG offer a host of functions which can be accessed by the user via registers. A unique number is assigned to each register and each digital input or output.

## Usage: Register Number

Register numbers are used in the following cases:

- A module register is to be read or written in the Setup section of JetSym.
- A module register is to be declared as a variable in the application program of JetSym.
- A module register is to be declared as a tag in JetViewSoft.

## Usage: I/O Number

I/O numbers are used in the following cases:

- A digital input is to be read in the Setup section of JetSym.
- A digital output is to be read or written in the Setup section of JetSym.
- A digital input or output is to be declared as a variable in the application program of JetSym.
- A digital input or output is to be declared as a tag in JetViewSoft.

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## Registers and Module Registers

### Definition - Module Registers

Module registers are the data interface of a JX3 module. By means of module registers, process, configuration and diagnostic data can be read out of the JX3 module, respectively written to it.

- The module register number within a module is unique.
- A module register within the system is accessed using the register number assigned to it.

### Definition - Registers

Registers are the data interface of a controller and the modules connected to it. Registers allow the user to manage data, configure and troubleshoot the controller, as well as to access the module registers of connected modules.

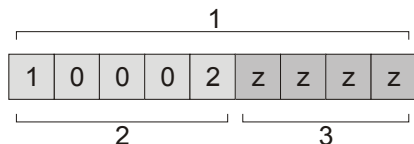
- The register number within a system is unique.
- Registers can be accessed directly in the application program of the controller, in a setup pane of JetSym, or via the user interface directly.
- Register numbers are used for access to JX3 module registers.

### Example - Module Register

Via module register 9 the OS revision of a JX3-AI4 module can be accessed.

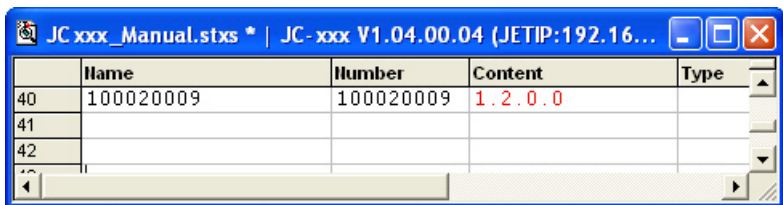
### Example - Register

A JX3 System module is connected to a controller JC-3xx. The module number of this module is 2.



| No. | Element                | Description   |
|-----|------------------------|---|
| 1   | Register number        | Can be used directly  |
| 2   | Register prefix        | 10002: assigned to the first JX3 module connected to a JC-xx controller |
| 3   | Module register number | zzzz = 0009: OS version   |

By means of register number 100020009 the OS version 1.2.0.0 can be directly read out in the setup pane of JetSym.



## Registers and I/O Numbers of JX3 Modules Connected to a JC-3xx

### Module Numbers of a JX3 Station

The module numbers within a JX3 station are determined as follows:

- The figures of the module numbers are counted from left to right, starting with 1.
- The power supply module JX3-PS1 is not assigned a module number.

### Register Numbers for JX3 Modules

The register number for JX3 modules with JC-3xx is composed as follows:

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | x | x | z | z | z | z |
|---|---|---|---|---|---|---|---|---|

| Element     | Meaning  | Value Range    |
|-------------|--|----------------|
| <b>xx</b>   | Module number of the module in the JX3 station | 02 ... 17      |
| <b>zzzz</b> | Module register number                         | 0000 .... 9999 |

### I/O Numbers for JX3 Modules

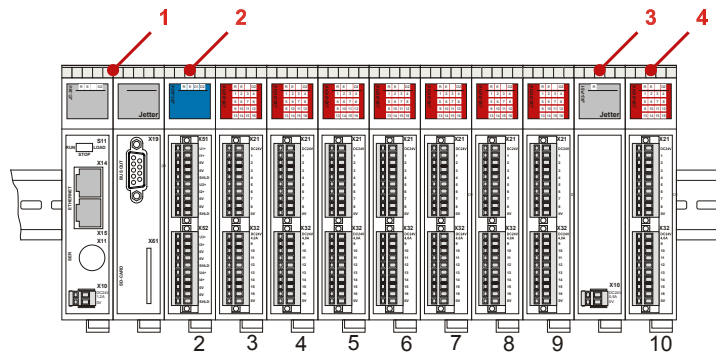
The I/O number for JX3 modules with JC-3xx is composed as follows:

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | x | x | z | z |
|---|---|---|---|---|---|---|---|---|

| Element   | Meaning  | Value Range |
|-----------|--|-------------|
| <b>xx</b> | Module number of the module in the JX3 station | 02 ... 17   |
| <b>zz</b> | I/O number of the module                       | 1 ... 16    |

### Example

Several JX3 modules have been connected to a JC-3xx controller.



| Number | Module    | Module Number | Register                 | I/O       |
|--------|-----------|---------------|--------------------------|-----------|
| 1      | JC-3xx    | 1             | see JC-3xx documentation |           |
| 2      | JX3-AO4   | 2             | 10002zzzz                | 1000002zz |
| 3      | JX3-PS1   | -             | -                        | -         |
| 4      | JX3-DIO16 | 10            | 10010zzzz                | 1000010zz |

## Register Numbers of Slave Modules on the JX2 System Bus

### Slave Module Numbers of Slave Modules

Slave module numbers of intelligent JX2 slave modules and JetMoves connected to the JX2 system bus of a JC-3xx are determined as follows:

- Slave module numbers are counted consecutively from the left to the right starting with 2.
- No I/O module number is assigned to the power supply module JX2-PS1.
- No slave module number is assigned to non-intelligent JX2-I/O modules.

### Register Numbers for Slave Modules

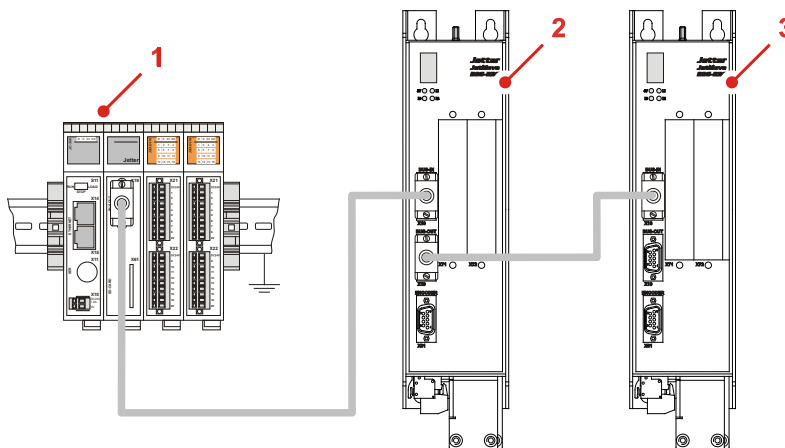
Register numbers for slave modules connected to the JX2 system bus of a JC-3xx consist of the following elements:

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 | 0 | 0 | 0 | x | x | z | z | z |
|---|---|---|---|---|---|---|---|---|

| Element    | Meaning                  | Value Range |
|------------|--------------------------|-------------|
| <b>xx</b>  | Slave module number + 10 | 12 ... 27   |
| <b>zzz</b> | Module register number   | 000 ... 999 |

### Example

Several JM-200 drives are connected to a JC-3xx controller.



| Number | Module | Slave Module Number | Register(s)              |
|--------|--------|---------------------|--------------------------|
| 1      | JC-3xx | 1                   | see JC-3xx documentation |
| 2      | JM-206 | 2                   | 200012zzz                |
| 3      | JM-206 | 3                   | 200013zzz                |



## Registers and I/O Numbers of JX2-I/O Modules on the JX2 System Bus

### I/O Module Numbers of JX2-I/O Modules

I/O module numbers of JX2-I/O modules connected to the JX2 system bus of a JC-3xx are determined as follows:

- I/O module numbers are counted consecutively from the left to the right starting with 2.
- No I/O module number is assigned to the power supply module JX2-PS1, as well as to intelligent JX2-Slave modules and JetMoves.

### Register Numbers for JX2-I/O modules

Register numbers for JX2-I/O modules connected to the JX2 system bus of a JC-3xx consist of the following elements:

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 | 0 | 0 | 0 | 0 | 3 | x | x | z |
|---|---|---|---|---|---|---|---|---|

| Element   | Meaning                   | Value Range |
|-----------|---------------------------|-------------|
| <b>xx</b> | I/O module number minus 2 | 00 ... 22   |
| <b>z</b>  | Module register number    | 0 .... 9    |

### I/O Numbers for JX2-I/O Modules

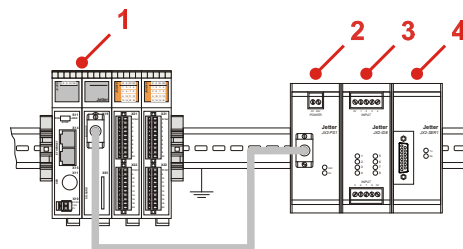
I/O numbers for JX2-I/O modules connected to the JX2 system bus of a JC-3xx consist of the following elements:

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 | 0 | 0 | 0 | 0 | x | x | z | z |
|---|---|---|---|---|---|---|---|---|

| Element   | Meaning                           | Value Range |
|-----------|-----------------------------------|-------------|
| <b>xx</b> | Module specific I/O module number | 02 ... 24   |
| <b>zz</b> | Module specific I/O number        | 1 ... 16    |

### Example

Several JX2-I/O modules are connected to a JC-3xx controller.



| Number | Module  | I/O Module Number | Register(s)              | I/O       |
|--------|---------|-------------------|--------------------------|-----------|
| 1      | JC-3xx  | 1                 | see JC-3xx documentation |           |
| 2      | JX2-PS1 | -                 | -                        | -         |
| 3      | JX2-ID8 | 2                 | 20000300z                | 2000002zz |
| 4      | JX2-CNT | 3                 | 20000301z                | 2000003zz |

## Registers and I/O Numbers of IP67-I/O Modules Connected to a JC-3xx

### I/O Module Numbers of IP67-I/O Modules

I/O module numbers of IP67-I/O modules connected to the JX2 system bus of a JC-3xx are determined as follows:

- I/O module numbers are set by means of the addressing switch located on the module itself.
- LioN-S and LJX7-CSL modules are counted among IP67-I/O modules.

### Register Numbers for IP67-I/O Modules

Register numbers for IP67-I/O modules connected to the JX2 system bus of a JC-3xx consist of the following elements:

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 | 0 | 0 | 0 | 0 | 3 | x | x | z |
|---|---|---|---|---|---|---|---|---|

| Element   | Meaning                   | Value Range |
|-----------|---------------------------|-------------|
| <b>xx</b> | I/O module number minus 2 | 00 ... 22   |
| <b>z</b>  | Module register number    | 0 ... 9     |

### I/O Numbers for IP67-I/O Modules

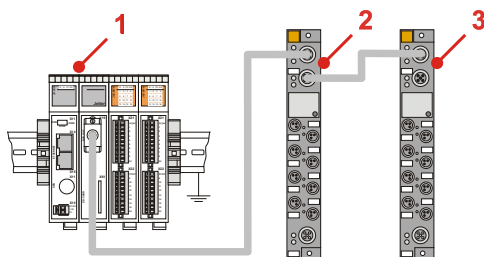
I/O numbers for IP67-I/O modules connected to the JX2 system bus of a JC-3xx consist of the following elements:

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 | 0 | 0 | 0 | 0 | x | x | z | z |
|---|---|---|---|---|---|---|---|---|

| Element   | Meaning                           | Value Range |
|-----------|-----------------------------------|-------------|
| <b>xx</b> | Module specific I/O module number | 02 ... 24   |
| <b>zz</b> | Module specific I/O number        | 1 ... 16    |

### Example

Several IP67-I/O modules are connected to a JC-3xx controller.



| Number | Module | I/O Module Number | Register(s)              | I/O       |
|--------|--------|-------------------|--------------------------|-----------|
| 1      | JC-3xx | 1                 | see JC-3xx documentation |           |
| 2      | LioN-S | 2                 | 20000300z                | 2000002zz |
| 3      | LioN-S | 3                 | 20000301z                | 2000003zz |

## Registers and I/O Numbers of CANopen® Modules on the JX2 System Bus

### I/O Module Numbers of CANopen® Modules

I/O module numbers of CANopen® modules connected to the JX2 system bus of a JC-3xx are determined as follows:

- In most cases, the I/O module numbers correspond to the node ID of the CANopen® module.
- Exceptions: SMC EX120 and frequency inverters by Lenze.

### Register Numbers for CANopen® Modules

Register numbers for CANopen® modules connected to the JX2 system bus of a JC-3xx consist of the following elements:

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 | 0 | 0 | 0 | 0 | x | x | z | z |
|---|---|---|---|---|---|---|---|---|

| Element | Meaning                | Value Range |
|---------|------------------------|-------------|
| xx      | I/O Module Number      | 70 ... 79   |
| z       | Module register number | 00 .... 99  |

### I/O Numbers for CANopen® Modules

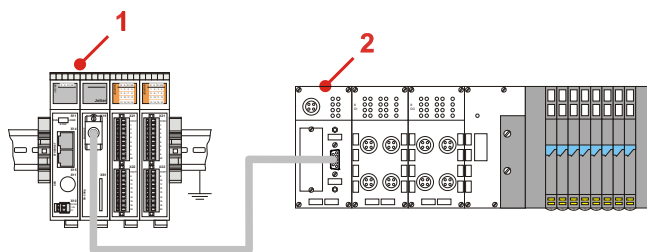
I/O numbers for CANopen® modules connected to the JX2 system bus of a JC-3xx consist of the following elements:

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 | 0 | 0 | 0 | 0 | x | x | z | z |
|---|---|---|---|---|---|---|---|---|

| Element | Meaning                           | Value Range |
|---------|-----------------------------------|-------------|
| xx      | Module specific I/O module number | 70 ... 79   |
| zz      | Module specific I/O number        | 1 ... 64    |

### Example

A CANopen® module is connected to a JC-3xx controller.



| Number | Module    | I/O Module Number | Register(s)              | I/O       |
|--------|-----------|-------------------|--------------------------|-----------|
| 1      | JC-3xx    | 1                 | see JC-3xx documentation |           |
| 2      | Festo CPX | 2                 | 2000070zz                | 2000070zz |



## 2 Quick Reference - JC-3xx

### Matching OS Versions

This quick reference gives an overview of registers and flags used in connection with the controllers JC-340, JC-350 with OS release 1.14.0.00, and JC-360 with OS release 1.14.0.00, as well as of the connector assignment.

### General Overview - Registers

|                           |   |
|---------------------------|---|
| 100000 ... 100999         | Electronic Data Sheet (EDS)   |
| 101000 ... 101999         | Configuration   |
| 102000 ... 102999         | Real-time clock (RTC)   |
| 103000 ... 103999         | Serial interface  |
| 104000 ... 104999         | Ethernet  |
| 107000 ... 107499         | SD memory card  |
| 107500 ... 107599         | Flash disk  |
| 108000 ... 108999         | CPU/backplane   |
| 200000 ... 209999         | General system registers  |
| 210000 ... 219999         | Application program   |
| 220000 ... 229999         | HMI control   |
| 230000 ... 239999         | Networking via JetIP  |
| 240000 ... 249999         | JetSync   |
| 250000 ... 259999         | Ethernet system bus   |
| 260000 ... 269999         | Remote scan   |
| 270000 ... 279999         | Modbus/TCP  |
| 290000 ... 299999         | E-mail  |
| 310000 ... 319999         | File system / data files  |
| 320000 ... 324999         | FTP client  |
| 350000 ... 359999         | User-programmable IP interface                                      |
| 380000 ... 389999         | Error history   |
| 390000 ... 399999         | I/O networking  |
| 1000000 ... 1001999       | JC-340: Application registers (remanent; Int/Float)                 |
| 1000000 ... 1019999       | JC-340: Application registers (remanent; Int/Float) with option -SD |
| 1000000 ... 1029999       | JC-350: Application registers (remanent; Int/Float)                 |
| 1000000 ... 1059999       | JC-360: Application registers (remanent; Int/Float)                 |
| 1000000 ... 1119999       | JC-360: Application registers (remanent; Int/Float) with option -R  |
| 100xx0000 ... 100xx9999   | JX3 modules (xx: 02 ... 17)   |
| 200002000 ... 200029999   | JX2 system bus  |
| 1GNN020000 ... 1GNN999999 | Network registers (GNN: 000 .. 399)                                 |

### I/Os - General Overview

|                           |                             |
|---------------------------|-----------------------------|
| 20001 ... 36000           | Virtual I/Os for RemoteScan |
| 10000xx01 ... 10000xx16   | JX3-Module (xx: 02 ... 17)  |
| 20000xx01 ... 20000xx16   | JX2 modules (xx: 02 ... 24) |
| 1000010101 ... 1399023216 | Network                     |

### General Overview - Flags

|               |  |
|---------------|--|
| 0 ... 255     | Application flags (remanent)                   |
| 256 ... 2047  | overlayed by registers 1000000 through 1000055 |
| 2048 ... 2303 | Special flags                                  |

### Electronic Data Sheet (EDS)

|        |                                      |
|--------|--------------------------------------|
| 100500 | Interface (0 = CPU, 1 = JX3 modules) |
|--------|--------------------------------------|

100501 Module number (2 ... 17)  
The EDS entries are shown below:

#### [Identification]

|            |                               |
|------------|-------------------------------|
| 100600     | Internal version number       |
| 100601     | Module ID                     |
| 100602 ... | Module name (register string) |
| 100612     |                               |
| 100613     | PCB revision                  |
| 100614     | PCB options                   |

#### [Production]

|            |                                 |
|------------|---------------------------------|
| 100700     | Internal version number         |
| 100701 ... | Serial number (register string) |
| 100707     |                                 |
| 100708     | Day                             |
| 100709     | Month                           |
| 100710     | Year                            |

|        |          |
|--------|----------|
| 100711 | TestNum. |
| 100712 | TestRev. |

#### [Features]

|        |                           |
|--------|---------------------------|
| 100800 | Internal version number   |
| 100801 | Diagnostic configuration  |
| 100802 | Digital inputs            |
| 100803 | Digital inputs, inverted  |
| 100804 | Digital outputs           |
| 100805 | Digital outputs, inverted |
| 100806 | Cyclic inputs             |
| 100807 | Cyclic outputs            |
| 100808 | Features                  |
| 100809 | Diagnostics mask          |

#### [Features]

|        |   |
|--------|---|
| 100800 | <b>JX3-BN-ETH/JC-3xx</b><br>Internal version number |
| 100801 | MAC Address (Jetter)                                |
| 100802 | MAC Address (device)                                |
| 100803 | Serial interface                                    |
| 100804 | Switch  |
| 100805 | STX   |
| 100806 | Remanent registers                                  |
| 100807 | JX3 bus   |
| 100808 | CAN bus   |
| 100809 | SD memory card                                      |
| 100810 | Motion control                                      |
| 100811 | Intelligent slave modules                           |
| 100812 | HTTP / e-mail                                       |
| 100813 | Modbus/TCP  |
| 100815 | LED for SD memory card                              |
| 100816 | User-defined LEDs                                   |
| 100817 | RTC   |

### Configuration

#### From file /system/ config.ini

|            |                             |
|------------|-----------------------------|
| 101100     | IP address                  |
| 101101     | Subnet mask                 |
| 101102     | Default gateway             |
| 101103     | DNS server                  |
| 101132     | Host name suffix type       |
| 101133 ... | Host name (register string) |
| 101151     |                             |
| 101164     | JetIP port number           |
| 101165     | STX debugger port number    |
|            | <b>Used by the system</b>   |
| 101200     | IP address                  |
| 101201     | Subnet mask                 |
| 101202     | Default gateway             |
| 101203     | DNS server                  |
| 101232     | Host name suffix type       |
| 101233 ... | Host name (register string) |
| 101251     |                             |
| 101264     | JetIP port number           |
| 101265     | STX debugger port number    |
| 101908     | CRC of ModConfig.da         |

## 2 Quick Reference - JC-3xx

### Real-time Clock (RTC)

| Direct access |                      |
|---------------|----------------------|
| 102910        | Milliseconds         |
| 102911        | Seconds              |
| 102912        | Minutes              |
| 102913        | Hours                |
| 102914        | Weekday (0 = Sunday) |
| 102915        | Day                  |
| 102916        | Month                |
| 102917        | Year                 |
| Buffer access |                      |
| 102920        | Milliseconds         |
| 102921        | Seconds              |
| 102922        | Minutes              |
| 102923        | Hours                |
| 102924        | Weekday (0 = Sunday) |
| 102925        | Day                  |
| 102926        | Month                |
| 102927        | Year                 |
| 102928        | Read/write trigger   |

### Serial Interface

|        |  |
|--------|--|
| 103000 | Error state (bit-coded)<br>Bit 14 = 1: framing error<br>Bit 13 = 1: parity error<br>Bit 12 = 1: overflow |
| 103001 | Protocol<br>1: System logger<br>2: PRIM<br>3: pcomX  |
| 103002 | Baud rate (1200 ... 115200)  |
| 103003 | Bits per character (5 ... 8)   |
| 103004 | Stop bits (1, 2)   |
| 103005 | Parity<br>0: none<br>1: odd<br>2: even<br>3: 1<br>4: 0   |
| 103006 | 0 = RS-232, 1 = RS-422, 3 = RS-485/2   |
| 103010 | Transmit buffer  |
| 103011 | Transmit buffer filling level  |
| 103012 | Receiving buffer (without immediate clearing)  |
| 103013 | Receiving buffer (with immediate clearing)   |
| 103014 | Receive buffer filling level   |
| 103015 | Receive buffer, 16-bit, little endian  |
| 103016 | Receive buffer, 16-bit, big endian   |
| 103017 | Receive buffer, 32-bit, little endian  |
| 103018 | Receive buffer, 32-bit, big endian   |
| 103019 | Error counter  |

### Ethernet

| Ethernet   |                             |
|------------|-----------------------------|
| 104100 ... | MIB counter                 |
| 104156     |                             |
| ARP        |                             |
| 104200     | Sent requests               |
| 104201     | Received requests           |
| 104202     | Sent responses              |
| 104203     | Received responses          |
| 104204     | Dynamic entries             |
| 104205     | Static entries              |
| 104206     | Obsolete entries            |
| 104250     | Enforce request             |
| IP         |                             |
| 104500     | Sent packets                |
| 104501     | Sent bytes                  |
| 104502     | Received packets            |
| 104503     | Received bytes              |
| 104504     | Invalid packets             |
| 104505     | Discarded received packets  |
| 104506     | Checksum error at reception |
| 104507     | Discarded transmit packets  |
| 104508     | Sent fragments              |

| 104509 | Received fragments           |
|--------|------------------------------|
| 104531 | Current IP address (rw)      |
| 104532 | Current subnet mask (rw)     |
| 104533 | Current default gateway (rw) |
| TCP    |                              |
| 104800 | Sent packets                 |
| 104801 | Sent bytes                   |
| 104802 | Received packets             |
| 104803 | Received bytes               |
| 104804 | Invalid packets              |
| 104805 | Discarded received packets   |
| 104806 | Checksum error               |
| 104807 | Connections                  |
| 104808 | Disconnections               |
| 104809 | Discarded connections        |
| 104810 | Repeated transmit packets    |
| UDP    |                              |
| 104900 | Sent packets                 |
| 104901 | Sent bytes                   |
| 104902 | Received packets             |
| 104903 | Received bytes               |
| 104904 | Invalid packets              |
| 104905 | Discarded received packets   |
| 104906 | Checksum error               |

### SD Memory Card

|        |   |
|--------|---|
| 107000 | Bit 0 = 1: Card installed<br>Bit 1 = 1: Card is ready         |
| 107001 | 1 = Card is write-protected<br>(only valid if REG 107000 = 3) |
| 107002 | Size in MBytes  |

### Flash Disk

| 107500            | Status                         |
|-------------------|--------------------------------|
| 107501            | Command<br>30: Read statistics |
| Sector statistics |                                |
| 107510            | Total                          |
| 107511            | Used                           |
| 107512            | Blocked                        |
| 107513            | Unassigned                     |
| Byte statistics   |                                |
| 107520            | Total                          |
| 107521            | Used                           |
| 107522            | Blocked                        |
| 107523            | Unassigned                     |

### CPU / Backplane

|        |   |
|--------|---|
| 108002 | All LEDs on/off (bit-coded)<br>Bit 0: "R" LED<br>Bit 1: "E" LED<br>Bit 2: "D1" LED<br>Bit 3: "D2" LED |
| 108003 | "R" LED<br>0 = OFF<br>1 = Blinking slowly<br>2 = Blinking fast<br>3 = ON                              |
| 108004 | "E" LED<br>0 = OFF<br>1 = Blinking slowly<br>2 = Blinking fast<br>3 = ON                              |
| 108005 | "D1" LED<br>0 = OFF<br>1 = Blinking slowly<br>2 = Blinking fast<br>3 = ON                             |
| 108006 | "D2" LED<br>0 = OFF<br>1 = Blinking slowly<br>2 = Blinking fast<br>3 = ON                             |
| 108007 | "SD" LED  |

|            |  |                                |  |
|------------|--|--------------------------------|--|
| 108008     | 0 = OFF<br>3 = ON<br>LEDs U1 ... U4 on/off (bit-coded)<br>Bit 0: LED U1<br>Bit 1: LED U2<br>Bit 2: LED U3<br>Bit 3: LED U4 | 202936<br><br>202960<br>202961 | 0xd364e64d: Formatting the SD Card<br>0x2c9b3c94: Checking SD card<br>Control register - File System<br>0xc4697a4b: Formatting the flash disk<br>0xd364e64d: Formatting the SD Card<br>0x2c9b3c94: Checking SD card<br>Password for system command register (0x424f6f74)<br>System command register<br>102: Restart the controller<br><br>104: Reset remanent parameters<br><br>122: Wait for communication - OFF<br>123: Wait for communication - ON<br><br>160: Task switch on I/O access - OFF<br>161: Task switch on I/O access - ON<br><br>310: Load configuration files<br>311: Load ModConfig.da<br>312: Load configuration for Ethernet system bus<br>313: Stop Ethernet system bus<br>330: JetIPScan client - OFF<br>331: JetIPScan client - ON |
| 108010     | DIP switch - all switches  |                                |  |
| 108011     | DIP switch - address   |                                | 104: Reset remanent parameters   |
| 108012     | DIP switch - mode  |                                | 122: Wait for communication - OFF  |
| 108015     | Mode selector<br>1 = LOAD<br>2 = RUN<br>3 = STOP   |                                | 123: Wait for communication - ON<br><br>160: Task switch on I/O access - OFF<br>161: Task switch on I/O access - ON  |
| 108020     | Backplane revision   |                                |  |
| 108021     | CPU revision   |                                | 310: Load configuration files<br>311: Load ModConfig.da  |
| 108099     | Clear EEPROM (0x12345678)  |                                | 312: Load configuration for Ethernet system bus  |
| 108100 ... | EEPROM registers on backplane  |                                | 313: Stop Ethernet system bus  |
| 108227     |  |                                | 330: JetIPScan client - OFF<br>331: JetIPScan client - ON  |

**General System Registers**

|        |   |  |   |
|--------|---|--|---|
| 200000 | OS version (major * 100 + minor)  | 202962   | System status register  |
| 200001 | Application program is running (bit 0 = 1)  |  | Bit 0 = 1: Task switch on I/O access  |
| 200008 | Error register 1 (identical with 210004)<br>Bit 1: Error on JX3 bus<br>Bit 2: Error on JX2 bus<br>Bit 3: Error on Ethernet system bus<br>Bit 7: At least 1 bit in error register 2 is set<br>Bit 8: Illegal jump<br>Bit 9: Illegal call<br>Bit 10: Illegal index<br>Bit 11: Illegal opcode<br>Bit 12: Division by 0<br>Bit 13: Stack overflow<br>Bit 14: Stack underflow<br>Bit 15: Illegal stack<br>Bit 16: Error when loading application program<br>Bit 24: Timeout - cycle time<br>Bit 25: Timeout - task lock<br>Bit 31: Unknown error | 202980<br>202981<br><br>203000<br>203001<br>203005<br><br>203100 ...<br>203107<br>203108 ...<br>203123<br>203124 ...<br>203131<br>203132 ...<br>203147 | Bit 1 = 1: Without waiting for communication<br>Bit 2 = 1: JetIPScan client is ON<br><br>Error history: Number of entries<br>Error history: Index<br><br>Interface monitoring: JetIP<br>Interface monitoring: SER<br>Interface monitoring: Debug server<br><br>32-bit overlaying - Flag 0 ... 255<br>16-bit overlaying - Flag 0 ... 255<br>32-bit overlaying - Flag 2048 ... 2303<br>16-bit overlaying - Flag 2048 ... 2303 |
| 200009 | Error Register 2<br>Bit 3: Error in ModConfig.da  |  |   |
| 200168 | Bootloader version (IP format)  |  |   |
| 200169 | OS version (IP format)  |  |   |
| 200170 | Controller type (340/350/360)   |  |   |
| 200300 | Currently available heap  | 209700   | System logger: Global enable  |
| 200301 | Available heap at system launch   | 209701 ...   | Enabling system components  |
| 200302 | Available heap before application program   | 209739   |   |

**Application Program**

|        |  |                  |  |
|--------|--|------------------|--|
| 201000 | Runtime register in milliseconds (rw)  | 210000           | Application program is running (bit 0 = 1)<br>0 / 2: Stop program<br><br>1: Start program<br><br>2: Continue program   |
| 201001 | Runtime register in seconds (rw)   |                  |  |
| 201002 | Runtime register in register 201003<br>Units (rw)  |                  |  |
| 201003 | * 10 ms units for register 201002 (rw)   |                  |  |
| 201004 | Runtime registers in milliseconds (ro)   | 210001<br>210004 | JetVM version<br>Error register (bit-coded)<br>Bit 1: Error on JX3 bus<br>Bit 2: Error on JX2 bus<br>Bit 3: Error on Ethernet system bus<br>Bit 7: At least 1 bit in error register 2 is set<br>Bit 8: Illegal jump<br>Bit 9: Illegal call<br>Bit 10: Illegal index<br>Bit 11: Illegal opcode<br>Bit 12: Division by 0<br>Bit 13: Stack overflow<br>Bit 14: Stack underflow<br>Bit 15: Illegal stack<br>Bit 16: Error when loading application program<br>Bit 24: Timeout - cycle time |
| 202930 | Web status (bit-coded)<br>Bit 0 = 1: FTP server available<br>Bit 1 = 1: HTTP server available<br>Bit 2 = 1: E-mail available<br><br>Bit 3 = 1: Data file function available<br>Bit 4 = 1: Modbus/TCP has been licensed<br><br>Bit 5 = 1: Modbus/TCP available<br>Bit 6 = : Reserved<br>Bit 7 = 1: FTP client available |                  |  |
| 202936 | Control register - File System<br>0xc4697a4b: Formatting the flash disk  |                  |  |

## 2 Quick Reference - JC-3xx

|            |  |        |  |
|------------|--|--------|--|
|            | Bit 25: Timeout - task lock                          | 222832 | Basic flag number for display 4              |
|            | Bit 31: Unknown error                                | 222833 | Register number - LED display 1              |
| 210006     | Highest task number                                  | 222834 | Register number - LED display 2              |
| 210007     | Minimum program cycle time                           | 222835 | Register number - LED display 3              |
| 210008     | Maximum program cycle time                           | 222836 | Register number - LED display 4              |
| 210009     | Current program cycle time                           |        |  |
| 210011     | Current task number                                  | 222837 | Module number of PRN (display redirection)   |
| 210050     | Current program position within a execution unit     | 222838 | Module number of SER (display redirection)   |
| 210051     | ID of the execution unit being processed             | 222839 | Character code for "Delete Screen"           |
| 210056     | Desired total cycle time in µs                       | 222840 | Character code for "Delete to end of line"   |
| 210057     | Calculated total cycle time in µs                    |        |  |
| 210058     | Maximum time slice per task in µs                    |        |  |
| 210060     | Task ID (for register 210061)                        |        |  |
| 210061     | Task priority for the task [reg. 210060]             | 230000 | JetIP/TCP Server: Number of open connections |
| 210063     | Length of scheduler table                            | 230001 | JetIP/TCP server: Mode                       |
| 210064     | Index in scheduler table                             | 230002 | JetIP/TCP server: Time                       |
| 210065     | Task ID in scheduler table                           |        |  |
| 210070     | Task ID (for register 210071)                        |        |  |
| 210071     | Timer number (0 ... 31)                              | 232708 | Timeout in milliseconds                      |
| 210072     | Manual triggering of a timer event (bit-coded)       | 232709 | Response time in milliseconds                |
| 210073     | End of cyclic task (task ID)                         | 232710 | Quantity of network errors                   |
| 210074     | Command for cyclic tasks                             | 232711 | Error code of last access                    |
| 210075     | Number of timers                                     |        | 0 = No error                                 |
| 210076     | Timer number (for register 210077)                   |        | 1 = Timeout                                  |
| 210077     | Timer value in milliseconds                          |        | 3 = Error message of the remote station      |
|            |  |        | 5 = Invalid network address                  |
|            |  |        | 6 = Invalid amount of registers              |
|            |  |        | 7 = Invalid interface number                 |
| 210100 ... | Task state (bit-coded)                               | 232717 | Max. number of retries                       |
| 210199     | Bit 0 = 1: Task is waiting for an event.             | 232718 | Number of retries                            |
|            | Bit 1 = 1: No task break condition                   |        |  |
|            | Bit 2 = 1: Task was stopped (debugger)               |        |  |
|            | Bit 3 = 1: Task is being started                     |        |  |
|            | Bit 4 = 1: Aborted by exception                      |        |  |
|            | Bit 5 = 1: Exception (debugger)                      |        |  |
|            | Bit 6 = 1: Indirection (debugger)                    |        |  |
|            | Bit 8 = 1: Motion semaphore (Motion API)             |        |  |
|            | Bit 9 = 1: Break Pending (Motion API)                |        |  |
|            | Bit 10 = 1: Restart Pending (Motion API)             |        |  |
| 210400 ... | Task - program address                               |        |  |
| 210499     |  |        |  |
| 210600     | Task ID of a cyclic task (for register 210601)       |        |  |
| 210601     | Processing time of a cyclical task in per mil figure |        |  |
| 210609     | Task lock timeout in ms                              |        |  |
|            | -1: Monitoring disabled                              |        |  |
| 210610     | Timeout (bit-coded,                                  |        |  |
|            | bit 0 -> timer 0, etc.)                              |        |  |

### Networking via JetIP

|            |  |
|------------|--|
| 230000     | JetIP/TCP Server: Number of open connections |
| 230001     | JetIP/TCP server: Mode                       |
| 230002     | JetIP/TCP server: Time                       |
|            |  |
| 232708     | Timeout in milliseconds                      |
| 232709     | Response time in milliseconds                |
| 232710     | Quantity of network errors                   |
| 232711     | Error code of last access                    |
|            | 0 = No error                                 |
|            | 1 = Timeout                                  |
|            | 3 = Error message of the remote station      |
|            | 5 = Invalid network address                  |
|            | 6 = Invalid amount of registers              |
|            | 7 = Invalid interface number                 |
| 232717     | Max. number of retries                       |
| 232718     | Number of retries                            |
|            |  |
|            | <b>Network registers</b>                     |
| 235000 ... | IP addresses                                 |
| 235399     |  |
| 235400 ... | Port numbers                                 |
| 235799     |  |
| 236000 ... | Indirect register numbers                    |
| 236399     |  |
| 1GNN980xxx | Value  |
|            | GNN: 000 ... 399                             |

### Ethernet System Bus

|            |                                   |
|------------|-----------------------------------|
|            | <b>Subscriber</b>                 |
| 250000     | Status (bit-coded)                |
|            | Bit 0 = 1: no CRC                 |
|            |                                   |
|            | Bit 1 = 1: Timeout                |
|            |                                   |
|            | Bit 7 = 1: Subscriber is running  |
| 250001     | Command                           |
|            | 102: Restart                      |
|            |                                   |
|            | 105: Stop                         |
|            | 110: Acknowledge timeout          |
| 250002     | Subscription ID of the last error |
| 250003     | Number of subscriptions           |
| 250004     | CRC of configuration file         |
|            |                                   |
| 250010     | Selection via command             |
| 250011     | Selection via ID                  |
|            | Subscription                      |
|            |                                   |
| 250020     | Status                            |
| 250021     | Mode                              |
| 250022     | Number of elements                |
| 250023     | Multicast group                   |
| 250024     | Hash                              |
| 250025     | Current sequence number           |
| 250026     | Size (bytes)                      |
| 250027     | Timeout                           |
| 250028     | Number of received publications   |
| 250029     | Number of timeout errors          |
| 250030     | Number of sequence number errors  |
|            |                                   |
| 250100 ... | 9 more subscriber register blocks |
| 250999     |                                   |

### HMI Control

|        |   |
|--------|---|
| 222804 | Total number of display characters          |
| 222805 | Number of characters per line               |
| 222806 | Text selection (DisplayText2)               |
| 222808 | Number of decimal places (UserInput)        |
| 222810 | Number of decimal places (DisplayValue)     |
| 222811 | Max. number of decimal places (UserInput)   |
| 222812 | Field length (DisplayValue)                 |
| 222813 | Field length (UserInput)                    |
| 222814 | Indirect cursor position                    |
| 222815 | Default value for UserInput (integer/float) |
| 222816 | Displaying signs                            |
|        |   |
| 222817 | Status UserInput                            |
| 222818 | Enable/disable monitor functions            |
| 222819 | Display text - monitor function             |
| 222820 | Switching over to monitor display           |
| 222821 | Dialog language                             |
| 222824 | Indirect buffer number                      |
|        | <b>Multi-Display Mode</b>                   |
| 222825 | Text buffer for display 1                   |
| 222826 | Text buffer for display 2                   |
| 222827 | Text buffer for display 3                   |
| 222828 | Text buffer for display 4                   |
| 222829 | Basic flag number for display 1             |
| 222830 | Basic flag number for display 2             |
| 222831 | Basic flag number for display 3             |



|            |   |
|------------|---|
|            | <b>Publisher</b>  |
| 255000     | Status (bit-coded)<br>Bit 0 = 1: no CRC<br><br>Bit 1 = 1: Timeout<br><br>Bit 7 = 1: Subscriber is running |
| 255001     | Command<br>102: Restart<br><br>105: Stop<br><br>110: Acknowledge timeout                                  |
| 255002     | Publication ID of the last error  |
| 255003     | Number of publications  |
| 255004     | CRC of configuration file   |
| 255010     | Selection via command   |
| 255011     | Selection via ID<br>Publication   |
| 255020     | Status  |
| 255021     | Mode  |
| 255022     | Number of elements  |
| 255023     | Multicast group   |
| 255024     | Hash  |
| 255025     | Current sequence number   |
| 255026     | Size (bytes)  |
| 255027     | Cycle time  |
| 255028     | Number of publications sent   |
| 255029     | Number of retries   |
| 255030     | Number of transmit errors   |
| 255100 ... | 9 more publisher register blocks  |
| 255999     |   |

|                   |                                |
|-------------------|--------------------------------|
| <b>RemoteScan</b> |                                |
| 262965            | Protocol type                  |
| 262966            | Number of configuration blocks |
| 262967            | Status                         |

|                     |   |
|---------------------|---|
| <b>Modbus / TCP</b> |   |
| 272702              | Register offset   |
| 272704              | Input offset  |
| 272705              | Output offset   |
| 278000 ...          | 16-bit I/O registers overlaid by virtual I/Os 20001 ... |
| 278999              | 36000   |

|               |                             |
|---------------|-----------------------------|
| <b>E-mail</b> |                             |
| 292932        | IP address of SMTP server   |
| 292933        | IP address of POP3 server   |
| 292934        | Port number of SMTP server  |
| 292935        | Port number of POP3 server  |
| 292937        | Status of e-mail processing |
| 292938        | Task ID - e-mail            |

|   |                          |
|---|--------------------------|
| <b>File System / Data File Function</b> |                          |
| 312977                                  | Status of file operation |
| 312978                                  | Task ID                  |

|                   |                            |
|-------------------|----------------------------|
| <b>FTP Client</b> |                            |
| 320000            | Number of open connections |
| 320001            | Command                    |
| 320002            | Timeout                    |
| 320003            | Server port                |
| 320004            | Selection via number       |
| 320005            | Selection via handle       |
| 320006            | Server socket: IP address  |
| 320007            | Server socket: Port        |
| 320008            | Server socket: IP address  |
| 320009            | Server socket: Port        |

|        |               |
|--------|---------------|
| 320100 | Access status |
| 320101 | Task ID       |

|  |  |
|--|--|
| <b>User-programmable IP Interface</b>  |  |
| <b>Reading out the connection list</b> |  |
| 350000                                 | Last result (-1 = no connection established) |
| 350001                                 | 1 = Client; 2 = Server                       |
| 350002                                 | 1 = UDP; 2 = TCP                             |
| 350003                                 | IP address                                   |
| 350004                                 | Port number                                  |
| 350005                                 | Connection state                             |
| 350006                                 | Number of sent bytes                         |
| 350007                                 | Number of received bytes                     |

|                      |   |
|----------------------|---|
| <b>Error History</b> |   |
| 380000               | Status<br>Bit 0 = 1: Recording<br><br>Bit 1 = 1: Stop if buffer is full<br><br>Bit 2 = 1: Stop on error code<br><br>Bit 3 = 1: Remanent memory  |
| 380001               | Command<br>1: Clear error log<br><br>2: Start error log<br><br>3: Stop error log<br><br>4: Stop if error buffer is full<br><br>5: Circular buffer<br><br>6: Stop on error code ON<br><br>7: Stop on error code OFF<br><br>10: Remanent memory<br><br>11: Dynamic memory |
| 380002               | Buffer length   |
| 380003               | Maximum buffer length   |
| 380004               | Number of error entries   |
| 380005               | Index to error list   |
| 380006               | Error entry   |
| 380007               | Error stop code   |
| 380008               | Number of codes until stop  |
| 380029               | Group index to error list   |
| 380030 ...           | 64 error entries  |
| 380093               |   |

|                         |                         |
|-------------------------|-------------------------|
| <b>I/O Networking</b>   |                         |
| <b>Status register</b>  |                         |
| 390000 + node           | JetSync status          |
| * 10                    |                         |
| 390001 + node           | Subscriber status       |
| * 10                    |                         |
| 390002 + node           | Subscriber error number |
| * 10                    |                         |
| 390003 + node           | Error register          |
| * 10                    |                         |
| <b>Control register</b> |                         |
| 395000 + node           | Command                 |
| * 10                    |                         |

|                              |  |
|------------------------------|--|
| <b>Application Registers</b> |  |
| 1000000 ...                  | JC-340: 32-bit integer or floating point number (permanent)                  |
| 1001999                      |  |
| 1000000 ...                  | JC-340: 32-bit integer or floating point number (permanent); with option -SD |
| 1019999                      |  |
| 1000000 ...                  | JC-350: 32-bit integer or floating point number (permanent)                  |
| 1029999                      |  |

## 2 Quick Reference - JC-3xx

1000000 ... JC-360: 32-bit integer or floating point number  
 1059999 (permanent)  
 1000000 ... JC-360: 32-bit integer or floating point number  
 1119999 (permanent); with option -R

### JX3 System Bus Registers

100002000 JX3 system bus revision  
 100002008 Errors (bit-coded)  
 Bit 3: Error  
 100002011 Module number in case of error  
 100002013 Number of detected JX3 modules  
 100002015 Index to module array  
 100002016 Module array  
 100002023 Dummy I/O module  
 100002034 Number of retries  
 100002111 Register number in case of error  
 100002764 Timeout for register access [ms]  
 100003xx0 ... Registers on I/O modules  
 100003xx9 (compatibility mode)  
 xx: Module number - 2 (00 ... 15)  
 100004000 Inputs/outputs mapped to registers  
 ... (see below)  
 100004367  
 100xx0000 ... Registers on I/O modules  
 100xx9999 (direct access)  
 xx: Module number (02 ... 17)

### JX2 System Bus Registers

200002000 Version of JX2 system bus driver (IP)  
 200002008 Errors (bit-coded)  
 Bit 3: I/O or CANopen® module timeout  
 Bit 4: JX2-Slave module timeout  
 Bit 9: Error of I/O module periphery  
 Bit 13: Error during JX2 system bus initialization  
 Bit 14: System registers timeout  
 200002011 I/O Module number with timeout  
 200002012 JX2-Slave module number with timeout  
 200002013 Amount of connected I/O modules  
 200002014 Amount of connected JX2-Slave modules  
 200002015 Index to module array  
 200002016 Module array  
 200002023 Dummy I/O module  
 200002024 JX2-Slave dummy modules  
 200002028 Monitoring interval for I/O modules [10 ms]  
 200002029 Baud rate of JX2 system bus  
 200002032 ON delay  
 200002039 I/O module where a peripheral fault has occurred  
 (bit-coded)  
 200002070 Number of CANopen® modules  
 200002071 Actual I/O sum of modules on the JX2 system bus  
 200002072 Version of JX2 system bus driver (IP)  
 200002073 Timeout for register access to CANopen® modules  
 200002074 CANopen® sync intervall [ms]  
 200002077 Enabling JX2 system bus special functions  
 Bit 2: CAN-PRIM  
 Bit 3: only CAN-PRIM  
 200002080 CANopen® module index for JX2 system bus application  
 registers  
 200002085 SysBus application regs: Register number (65-89)  
 200002086 SysBus application regs: Object number  
 200002087 SysBus application regs: Subindex  
 200002088 SysBus application regs: Length  
 200002760 Max. number of I/O update retries  
 200002761 Index to array of I/O retry counters  
 200002762 Array of I/O retry counters  
 200002763 Timeout for I/O update of I/O modules [ms]  
 200002764 Timeout for register access to I/O modules [ms]  
 200002765 Timeout for register access to JX2-Slave modules [ms]  
 200002995 Bootloader version of JX2 system bus interface

200003xx0 ... Registers on I/O modules  
 200003xx9 xx: I/O module number - 2 (00 ... 22)  
 200004000 Inputs/outputs mapped to registers  
 ... (see below)  
 200004367  
 200005x00 I/O registers: CANopen® / JX-SIO  
 x: I/O module number - 70 (0...9)  
 ...  
 200006x99  
 200007x00 Configuration registers: CANopen® / JX-SIO  
 x: I/O module number - 70 (0...9)  
 ...  
 200007x99  
 2000xx100 ... JX2-Slave registers  
 2000xx999 xx: JX2-Slave number + 10

### CAN-PRIM Registers

200010500 Status registers  
 Bit 1 = 1: CAN message received  
 Bit 2 = 0: 11-bit CAN ID  
 Bit 2 = 1: 29-bit CAN ID  
 200010501 Command registers  
 7 = clear FIFO  
 8 = Set CAN ID to 11 bits  
 9 = Set CAN ID to 29 bits  
 10 = Check boxes for received messages  
 200010503 FIFO buffer occupancy  
 200010504 FIFO data  
 200010506 Global receiving mask  
 200010507 Global receive ID  
 200010509 CAN-PRIM version (IP)  
 200010530 + Box status register  
 box \* 20  
 200010531 + Box configuration register  
 box \* 20  
 200010532 + CAN ID  
 box \* 20  
 200010533 + Number of data bytes  
 box \* 20  
 200010534 ... Data bytes  
 200010541 +  
 box \* 20  
 200010542 + CAN ID mask  
 box \* 20  
 200010543 + Box command register  
 box \* 20  
 200010544 + Received CAN ID  
 box \* 20

### Inputs / Outputs

20001 ... 36000 Virtual I/Os for RemoteScan  
 10000xx01 ... JX3 modules (xx: 02 ... 17)  
 10000xx16  
 20000xx01 ... JX2 modules (xx: 02 ... 24)  
 20000xx16  
 1GNN01xx01 ... Network (GNN: 000 ... 399)  
 1GNN01xx16 xx: 02 ... 24)

### 32 Combined Inputs

**JX3 system bus: + 100000000**  
**JX2 system bus: + 200000000**  
**Network: + 1GNN910000**

|      |          |          |          |          |
|------|----------|----------|----------|----------|
| 4000 | 101..108 | 109..116 | 201..208 | 209..216 |
| 4001 | 109..116 | 201..208 | 209..216 | 301..308 |
| 4002 | 201..208 | 209..216 | 301..308 | 309..316 |
| 4003 | 209..216 | 301..308 | 309..316 | 401..408 |
| 4004 | 301..308 | 309..316 | 401..408 | 409..416 |
| 4005 | 309..316 | 401..408 | 409..416 | 501..508 |

|      |            |            |            |            |
|------|------------|------------|------------|------------|
| 4006 | 401..408   | 409..416   | 501..508   | 509..516   |
| 4007 | 409..416   | 501..508   | 509..516   | 601..608   |
| 4008 | 501..508   | 509..516   | 601..608   | 609..616   |
| 4009 | 509..516   | 601..608   | 609..616   | 701..708   |
| 4010 | 601..608   | 609..616   | 701..708   | 709..716   |
| 4011 | 609..616   | 701..708   | 709..716   | 801..808   |
| 4012 | 701..708   | 709..716   | 801..808   | 809..816   |
| 4013 | 709..716   | 801..808   | 809..816   | 901..908   |
| 4014 | 801..808   | 809..816   | 901..908   | 909..916   |
| 4015 | 809..816   | 901..908   | 909..916   | 1001..1008 |
| 4016 | 901..908   | 909..916   | 1001..1008 | 1009..1016 |
| 4017 | 909..916   | 1001..1008 | 1009..1016 | 1101..1108 |
| 4018 | 1001..1008 | 1009..1016 | 1101..1108 | 1109..1116 |
| 4019 | 1009..1016 | 1101..1108 | 1109..1116 | 1201..1208 |
| 4020 | 1101..1108 | 1109..1116 | 1201..1208 | 1209..1216 |
| 4021 | 1109..1116 | 1201..1208 | 1209..1216 | 1301..1308 |
| 4022 | 1201..1208 | 1209..1216 | 1301..1308 | 1309..1316 |
| 4023 | 1209..1216 | 1301..1308 | 1309..1316 | 1401..1408 |
| 4024 | 1301..1308 | 1309..1316 | 1401..1408 | 1409..1416 |
| 4025 | 1309..1316 | 1401..1408 | 1409..1416 | 1501..1508 |
| 4026 | 1401..1408 | 1409..1416 | 1501..1508 | 1509..1516 |
| 4027 | 1409..1416 | 1501..1508 | 1509..1516 | 1601..1608 |
| 4028 | 1501..1508 | 1509..1516 | 1601..1608 | 1609..1616 |
| 4029 | 1509..1516 | 1601..1608 | 1609..1616 | 1701..1708 |
| 4030 | 1601..1608 | 1609..1616 | 1701..1708 | 1709..1716 |
| 4031 | 1609..1616 | 1701..1708 | 1709..1716 | 1801..1808 |
| 4032 | 1701..1708 | 1709..1716 | 1801..1808 | 1809..1816 |
| 4033 | 1709..1716 | 1801..1808 | 1809..1816 | 1901..1908 |
| 4034 | 1801..1808 | 1809..1816 | 1901..1908 | 1909..1916 |
| 4035 | 1809..1816 | 1901..1908 | 1909..1916 | 2001..2008 |
| 4036 | 1901..1908 | 1909..1916 | 2001..2008 | 2009..2016 |
| 4037 | 1909..1916 | 2001..2008 | 2009..2016 | 2101..2108 |
| 4038 | 2001..2008 | 2009..2016 | 2101..2108 | 2109..2116 |
| 4039 | 2009..2016 | 2101..2108 | 2109..2116 | 2201..2208 |
| 4040 | 2101..2108 | 2109..2116 | 2201..2208 | 2209..2216 |
| 4041 | 2109..2116 | 2201..2208 | 2209..2216 | 2301..2308 |
| 4042 | 2201..2208 | 2209..2216 | 2301..2308 | 2309..2316 |
| 4043 | 2209..2216 | 2301..2308 | 2309..2316 | 2401..2408 |
| 4044 | 2301..2308 | 2309..2316 | 2401..2408 | 2409..2416 |

**16 Combined Inputs**

**JX3 system bus: + 100000000**  
**JX2 system bus: + 200000000**  
**Network: + 1GNN910000**

|      |            |            |
|------|------------|------------|
| 4060 | 101..108   | 109..116   |
| 4061 | 109..116   | 201..208   |
| 4062 | 201..208   | 209..216   |
| 4063 | 209..216   | 301..308   |
| 4064 | 301..308   | 309..316   |
| 4065 | 309..316   | 401..408   |
| 4066 | 401..408   | 409..416   |
| 4067 | 409..416   | 501..508   |
| 4068 | 501..508   | 509..516   |
| 4069 | 509..516   | 601..608   |
| 4070 | 601..608   | 609..616   |
| 4071 | 609..616   | 701..708   |
| 4072 | 701..708   | 709..716   |
| 4073 | 709..716   | 801..808   |
| 4074 | 801..808   | 809..816   |
| 4075 | 809..816   | 901..908   |
| 4076 | 901..908   | 909..916   |
| 4077 | 909..916   | 1001..1008 |
| 4078 | 1001..1008 | 1009..1016 |
| 4079 | 1009..1016 | 1101..1108 |
| 4080 | 1101..1108 | 1109..1116 |
| 4081 | 1109..1116 | 1201..1208 |
| 4082 | 1201..1208 | 1209..1216 |
| 4083 | 1209..1216 | 1301..1308 |
| 4084 | 1301..1308 | 1309..1316 |
| 4085 | 1309..1316 | 1401..1408 |
| 4086 | 1401..1408 | 1409..1416 |
| 4087 | 1409..1416 | 1501..1508 |
| 4088 | 1501..1508 | 1509..1516 |
| 4089 | 1509..1516 | 1601..1608 |
| 4090 | 1601..1608 | 1609..1616 |
| 4091 | 1609..1616 | 1701..1708 |
| 4092 | 1701..1708 | 1709..1716 |
| 4093 | 1709..1716 | 1801..1808 |
| 4094 | 1801..1808 | 1809..1816 |

|      |            |            |
|------|------------|------------|
| 4095 | 1809..1816 | 1901..1908 |
| 4096 | 1901..1908 | 1909..1916 |
| 4097 | 1909..1916 | 2001..2008 |
| 4098 | 2001..2008 | 2009..2016 |
| 4099 | 2009..2016 | 2101..2108 |
| 4100 | 2101..2108 | 2109..2116 |
| 4101 | 2109..2116 | 2201..2208 |
| 4102 | 2201..2208 | 2209..2216 |
| 4103 | 2209..2216 | 2301..2308 |
| 4104 | 2301..2308 | 2309..2316 |
| 4105 | 2309..2316 | 2401..2408 |
| 4106 | 2401..2408 | 2409..2416 |

**8 Combined Inputs**

**JX3 system bus: + 100000000**  
**JX2 system bus: + 200000000**  
**Network: + 1GNN910000**

|      |            |
|------|------------|
| 4120 | 101..108   |
| 4121 | 109..116   |
| 4122 | 201..208   |
| 4123 | 209..216   |
| 4124 | 301..308   |
| 4125 | 309..316   |
| 4126 | 401..408   |
| 4127 | 409..416   |
| 4128 | 501..508   |
| 4129 | 509..516   |
| 4130 | 601..608   |
| 4131 | 609..616   |
| 4132 | 701..708   |
| 4133 | 709..716   |
| 4134 | 801..808   |
| 4135 | 809..816   |
| 4136 | 901..908   |
| 4137 | 909..916   |
| 4138 | 1001..1008 |
| 4139 | 1009..1016 |
| 4140 | 1101..1108 |
| 4141 | 1109..1116 |
| 4142 | 1201..1208 |
| 4143 | 1209..1216 |
| 4144 | 1301..1308 |
| 4145 | 1309..1316 |
| 4146 | 1401..1408 |
| 4147 | 1409..1416 |
| 4148 | 1501..1508 |
| 4149 | 1509..1516 |
| 4150 | 1601..1608 |
| 4151 | 1609..1616 |
| 4152 | 1701..1708 |
| 4153 | 1709..1716 |
| 4154 | 1801..1808 |
| 4155 | 1809..1816 |
| 4156 | 1901..1908 |
| 4157 | 1909..1916 |
| 4158 | 2001..2008 |
| 4159 | 2009..2016 |
| 4160 | 2101..2108 |
| 4161 | 2109..2116 |
| 4162 | 2201..2208 |
| 4163 | 2209..2216 |
| 4164 | 2301..2308 |
| 4165 | 2309..2316 |
| 4166 | 2401..2408 |
| 4167 | 2409..2416 |

**32 Combined Outputs**

**JX3 system bus: + 100000000**  
**JX2 system bus: + 200000000**  
**Network: + 1GNN910000**

|      |          |          |          |          |
|------|----------|----------|----------|----------|
| 4200 | 101..108 | 109..116 | 201..208 | 209..216 |
| 4201 | 109..116 | 201..208 | 209..216 | 301..308 |
| 4202 | 201..208 | 209..216 | 301..308 | 309..316 |
| 4203 | 209..216 | 301..308 | 309..316 | 401..408 |
| 4204 | 301..308 | 309..316 | 401..408 | 409..416 |
| 4205 | 309..316 | 401..408 | 409..416 | 501..508 |
| 4206 | 401..408 | 409..416 | 501..508 | 509..516 |

## 2 Quick Reference - JC-3xx

|      |            |            |            |            |
|------|------------|------------|------------|------------|
| 4207 | 409..416   | 501..508   | 509..516   | 601..608   |
| 4208 | 501..508   | 509..516   | 601..608   | 609..616   |
| 4209 | 509..516   | 601..608   | 609..616   | 701..708   |
| 4210 | 601..608   | 609..616   | 701..708   | 709..716   |
| 4211 | 609..616   | 701..708   | 709..716   | 801..808   |
| 4212 | 701..708   | 709..716   | 801..808   | 809..816   |
| 4213 | 709..716   | 801..808   | 809..816   | 901..908   |
| 4214 | 801..808   | 809..816   | 901..908   | 909..916   |
| 4215 | 809..816   | 901..908   | 909..916   | 1001..1008 |
| 4216 | 901..908   | 909..916   | 1001..1008 | 1009..1016 |
| 4217 | 909..916   | 1001..1008 | 1009..1016 | 1101..1108 |
| 4218 | 1001..1008 | 1009..1016 | 1101..1108 | 1109..1116 |
| 4219 | 1009..1016 | 1101..1108 | 1109..1116 | 1201..1208 |
| 4220 | 1101..1108 | 1109..1116 | 1201..1208 | 1209..1216 |
| 4221 | 1109..1116 | 1201..1208 | 1209..1216 | 1301..1308 |
| 4222 | 1201..1208 | 1209..1216 | 1301..1308 | 1309..1316 |
| 4223 | 1209..1216 | 1301..1308 | 1309..1316 | 1401..1408 |
| 4224 | 1301..1308 | 1309..1316 | 1401..1408 | 1409..1416 |
| 4225 | 1309..1316 | 1401..1408 | 1409..1416 | 1501..1508 |
| 4226 | 1401..1408 | 1409..1416 | 1501..1508 | 1509..1516 |
| 4227 | 1409..1416 | 1501..1508 | 1509..1516 | 1601..1608 |
| 4228 | 1501..1508 | 1509..1516 | 1601..1608 | 1609..1616 |
| 4229 | 1509..1516 | 1601..1608 | 1609..1616 | 1701..1708 |
| 4230 | 1601..1608 | 1609..1616 | 1701..1708 | 1709..1716 |
| 4231 | 1609..1616 | 1701..1708 | 1709..1716 | 1801..1808 |
| 4232 | 1701..1708 | 1709..1716 | 1801..1808 | 1809..1816 |
| 4233 | 1709..1716 | 1801..1808 | 1809..1816 | 1901..1908 |
| 4234 | 1801..1808 | 1809..1816 | 1901..1908 | 1909..1916 |
| 4235 | 1809..1816 | 1901..1908 | 1909..1916 | 2001..2008 |
| 4236 | 1901..1908 | 1909..1916 | 2001..2008 | 2009..2016 |
| 4237 | 1909..1916 | 2001..2008 | 2009..2016 | 2101..2108 |
| 4238 | 2001..2008 | 2009..2016 | 2101..2108 | 2109..2116 |
| 4239 | 2009..2016 | 2101..2108 | 2109..2116 | 2201..2208 |
| 4240 | 2101..2108 | 2109..2116 | 2201..2208 | 2209..2216 |
| 4241 | 2109..2116 | 2201..2208 | 2209..2216 | 2301..2308 |
| 4242 | 2201..2208 | 2209..2216 | 2301..2308 | 2309..2316 |
| 4243 | 2209..2216 | 2301..2308 | 2309..2316 | 2401..2408 |
| 4244 | 2301..2308 | 2309..2316 | 2401..2408 | 2409..2416 |

### 16 Combined Outputs

**JX3 system bus: + 100000000**  
**JX2 system bus: + 200000000**  
**Network: + 1GNN910000**

|      |            |            |
|------|------------|------------|
| 4260 | 101..108   | 109..116   |
| 4261 | 109..116   | 201..208   |
| 4262 | 201..208   | 209..216   |
| 4263 | 209..216   | 301..308   |
| 4264 | 301..308   | 309..316   |
| 4265 | 309..316   | 401..408   |
| 4266 | 401..408   | 409..416   |
| 4267 | 409..416   | 501..508   |
| 4268 | 501..508   | 509..516   |
| 4269 | 509..516   | 601..608   |
| 4270 | 601..608   | 609..616   |
| 4271 | 609..616   | 701..708   |
| 4272 | 701..708   | 709..716   |
| 4273 | 709..716   | 801..808   |
| 4274 | 801..808   | 809..816   |
| 4275 | 809..816   | 901..908   |
| 4276 | 901..908   | 909..916   |
| 4277 | 909..916   | 1001..1008 |
| 4278 | 1001..1008 | 1009..1016 |
| 4279 | 1009..1016 | 1101..1108 |
| 4280 | 1101..1108 | 1109..1116 |
| 4281 | 1109..1116 | 1201..1208 |
| 4282 | 1201..1208 | 1209..1216 |
| 4283 | 1209..1216 | 1301..1308 |
| 4284 | 1301..1308 | 1309..1316 |
| 4285 | 1309..1316 | 1401..1408 |
| 4286 | 1401..1408 | 1409..1416 |
| 4287 | 1409..1416 | 1501..1508 |
| 4288 | 1501..1508 | 1509..1516 |
| 4289 | 1509..1516 | 1601..1608 |
| 4290 | 1601..1608 | 1609..1616 |
| 4291 | 1609..1616 | 1701..1708 |
| 4292 | 1701..1708 | 1709..1716 |
| 4293 | 1709..1716 | 1801..1808 |
| 4294 | 1801..1808 | 1809..1816 |
| 4295 | 1809..1816 | 1901..1908 |

|      |            |            |
|------|------------|------------|
| 4296 | 1901..1908 | 1909..1916 |
| 4297 | 1909..1916 | 2001..2008 |
| 4298 | 2001..2008 | 2009..2016 |
| 4299 | 2009..2016 | 2101..2108 |
| 4300 | 2101..2108 | 2109..2116 |
| 4301 | 2109..2116 | 2201..2208 |
| 4302 | 2201..2208 | 2209..2216 |
| 4303 | 2209..2216 | 2301..2308 |
| 4304 | 2301..2308 | 2309..2316 |
| 4305 | 2309..2316 | 2401..2408 |
| 4306 | 2401..2408 | 2409..2416 |

### 8 Combined Outputs

**JX3 system bus: + 100000000**  
**JX2 system bus: + 200000000**  
**Network: + 1GNN910000**

|      |            |
|------|------------|
| 4320 | 101..108   |
| 4321 | 109..116   |
| 4322 | 201..208   |
| 4323 | 209..216   |
| 4324 | 301..308   |
| 4325 | 309..316   |
| 4326 | 401..408   |
| 4327 | 409..416   |
| 4328 | 501..508   |
| 4329 | 509..516   |
| 4330 | 601..608   |
| 4331 | 609..616   |
| 4332 | 701..708   |
| 4333 | 709..716   |
| 4334 | 801..808   |
| 4335 | 809..816   |
| 4336 | 901..908   |
| 4337 | 909..916   |
| 4338 | 1001..1008 |
| 4339 | 1009..1016 |
| 4340 | 1101..1108 |
| 4341 | 1109..1116 |
| 4342 | 1201..1208 |
| 4343 | 1209..1216 |
| 4344 | 1301..1308 |
| 4345 | 1309..1316 |
| 4346 | 1401..1408 |
| 4347 | 1409..1416 |
| 4348 | 1501..1508 |
| 4349 | 1509..1516 |
| 4350 | 1601..1608 |
| 4351 | 1609..1616 |
| 4352 | 1701..1708 |
| 4353 | 1709..1716 |
| 4354 | 1801..1808 |
| 4355 | 1809..1816 |
| 4356 | 1901..1908 |
| 4357 | 1909..1916 |
| 4358 | 2001..2008 |
| 4359 | 2009..2016 |
| 4360 | 2101..2108 |
| 4361 | 2109..2116 |
| 4362 | 2201..2208 |
| 4363 | 2209..2216 |
| 4364 | 2301..2308 |
| 4365 | 2309..2316 |
| 4366 | 2401..2408 |
| 4367 | 2409..2416 |

### Special Flags - Network

|      |                                       |
|------|---------------------------------------|
| 2075 | Error in networking via JetIP         |
| 2080 | Ethernet system bus error in R 200008 |
| 2081 | Ethernet system bus error             |

### Special Flags - Interface Monitoring

|      |                          |
|------|--------------------------|
| 2088 | OS flag - JetIP          |
| 2089 | User flag - JetIP        |
| 2090 | OS flag - SER            |
| 2091 | User flag - SER          |
| 2098 | OS flag - debug server   |
| 2099 | User flag - debug server |

**Special Flags - HMIs**

does not apply to LCD 27

|      |                     |
|------|---------------------|
| 2160 | Key "0"             |
| 2161 | Key "1"             |
| 2162 | Key "2"             |
| 2163 | Key "3"             |
| 2164 | Key "4"             |
| 2165 | Key "5"             |
| 2166 | Key "6"             |
| 2167 | Key "7"             |
| 2168 | Key "8"             |
| 2169 | Key "9"             |
|      |                     |
| 2170 | Key "Shift + 0"     |
| 2171 | Key "Shift + 1"     |
| 2172 | Key "Shift + 2"     |
| 2173 | Key "Shift + 3"     |
| 2174 | Key "Shift + 4"     |
| 2175 | Key "Shift + 5"     |
| 2176 | Key "Shift + 6"     |
| 2177 | Key "Shift + 7"     |
| 2178 | Key "Shift + 8"     |
| 2179 | Key "Shift + 9"     |
|      |                     |
| 2181 | Key "Shift + F1"    |
| 2182 | Key "Shift + F2"    |
| 2183 | Key "Shift + F3"    |
| 2184 | Key "Shift + F4"    |
| 2185 | Key "Shift + F5"    |
| 2186 | Key "Shift + F6"    |
| 2187 | Key "Shift + F7"    |
| 2188 | Key "Shift + F8"    |
| 2189 | Key "Shift + F9"    |
| 2190 | Key "Shift + F10"   |
| 2191 | Key "Shift + F11"   |
| 2192 | Key "Shift + F12"   |
|      |                     |
| 2193 | Key "Shift + ←"     |
| 2194 | Key "Shift + →"     |
| 2195 | Key "Shift + R"     |
| 2196 | Key "Shift + I/O"   |
| 2197 | Key "Shift + ="     |
| 2198 | Key "Shift + C"     |
| 2199 | Key "Shift + ENTER" |
|      |                     |
| 2200 | Key "Shift"         |
|      |                     |
| 2201 | Key "F1"            |
| 2202 | Key "F2"            |
| 2203 | Key "F3"            |
| 2204 | Key "F4"            |
| 2205 | Key "F5"            |
| 2206 | Key "F6"            |
| 2207 | Key "F7"            |
| 2208 | Key "F8"            |
| 2209 | Key "F9"            |
| 2210 | Key "F10"           |
| 2211 | Key "F11"           |
| 2212 | Key "F12"           |
|      |                     |
| 2213 | Key "→"             |
| 2214 | Key "←"             |
| 2215 | Key "R"             |
| 2216 | Key "I/O"           |
| 2217 | Key "='"            |
| 2218 | Key "C"             |
| 2219 | Key "ENTER"         |
| 2220 | Key "␣"             |
| 2221 | Key "Shift + ␣"     |
| 2222 | Key "␣"             |
| 2223 | Key "Shift + ␣"     |
|      |                     |
| 2224 | LED of key "F1"     |

|      |                  |
|------|------------------|
| 2225 | LED of key "F2"  |
| 2226 | LED of key "F3"  |
| 2227 | LED of key "F4"  |
|      |                  |
| 2228 | LED of key "F5"  |
| 2229 | LED of key "F6"  |
| 2230 | LED of key "F7"  |
| 2231 | LED of key "F8"  |
| 2232 | LED of key "F9"  |
| 2233 | LED of key "F10" |
| 2234 | LED of key "F11" |
| 2235 | LED of key "F12" |

**Special Flags for HMI LCD 27**

|      |             |
|------|-------------|
| 2209 | Key "↑"     |
| 2210 | Key "↓"     |
| 2211 | Key "C"     |
| 2212 | Key "ENTER" |

**Special Flags for HMI NUM 25**

|      |                  |
|------|------------------|
| 2186 | Key "Shift + S1" |
| 2187 | Key "Shift + S2" |
| 2188 | Key "Shift + S3" |
| 2189 | Key "Shift + S4" |
| 2190 | Key "Shift + S5" |
| 2206 | Key "S1"         |
| 2207 | Key "S2"         |
| 2208 | Key "S3"         |
| 2209 | Key "S4"         |
| 2210 | Key "S5"         |

**32 Combined Flags**

|        |             |
|--------|-------------|
| 203100 | 0 ... 31    |
| 203101 | 32 ... 63   |
| 203102 | 64 ... 95   |
| 203103 | 96 ... 127  |
| 203104 | 128 ... 159 |
| 203105 | 160 ... 191 |
| 203106 | 192 ... 223 |
| 203107 | 224 ... 255 |

**16 Combined Flags**

|        |             |
|--------|-------------|
| 203108 | 0 ... 15    |
| 203109 | 16 ... 31   |
| 203110 | 32 ... 47   |
| 203111 | 48 ... 63   |
| 203112 | 64 ... 79   |
| 203113 | 80 ... 95   |
| 203114 | 96 ... 111  |
| 203115 | 112 ... 127 |
| 203116 | 128 ... 143 |
| 203117 | 144 ... 159 |
| 203118 | 160 ... 175 |
| 203119 | 176 ... 191 |
| 203120 | 192 ... 207 |
| 203121 | 208 ... 223 |
| 203122 | 224 ... 239 |
| 203123 | 240 ... 255 |

**32 Combined Special Flags**

|        |               |
|--------|---------------|
| 203124 | 2048 ... 2079 |
| 203125 | 2080 ... 2111 |
| 203126 | 2112 ... 2143 |
| 203127 | 2144 ... 2175 |
| 203128 | 2176 ... 2207 |
| 203129 | 2208 ... 2239 |
| 203130 | 2240 ... 2271 |
| 203131 | 2272 ... 2303 |

**16 Combined Special Flags**

|        |               |
|--------|---------------|
| 203132 | 2048 ... 2063 |
| 203133 | 2064 ... 2079 |
| 203134 | 2080 ... 2095 |
| 203135 | 2096 ... 2111 |

## 2 Quick Reference - JC-3xx

|        |               |
|--------|---------------|
| 203136 | 2112 ... 2127 |
| 203137 | 2128 ... 2143 |
| 203138 | 2144 ... 2159 |
| 203139 | 2160 ... 2175 |
| 203140 | 2176 ... 2191 |
| 203141 | 2192 ... 2207 |
| 203142 | 2208 ... 2223 |
| 203143 | 2224 ... 2239 |
| 203144 | 2240 ... 2255 |
| 203145 | 2256 ... 2271 |
| 203146 | 2272 ... 2287 |
| 203147 | 2288 ... 2303 |

### Overlaid Application Registers/Flags

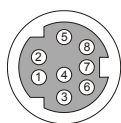
|         |               |
|---------|---------------|
| 1000000 | 256 ... 287   |
| 1000001 | 288 ... 319   |
| 1000002 | 320 ... 351   |
| 1000003 | 352 ... 383   |
| 1000004 | 384 ... 415   |
| 1000005 | 416 ... 447   |
| 1000006 | 448 ... 479   |
| 1000007 | 480 ... 511   |
| 1000008 | 512 ... 543   |
| 1000009 | 544 ... 575   |
| 1000010 | 576 ... 607   |
| 1000011 | 608 ... 639   |
| 1000012 | 640 ... 671   |
| 1000013 | 672 ... 703   |
| 1000014 | 704 ... 735   |
| 1000015 | 736 ... 767   |
| 1000016 | 768 ... 799   |
| 1000017 | 800 ... 831   |
| 1000018 | 832 ... 863   |
| 1000019 | 864 ... 895   |
| 1000020 | 896 ... 927   |
| 1000021 | 928 ... 959   |
| 1000022 | 960 ... 991   |
| 1000023 | 992 ... 1023  |
| 1000024 | 1024 ... 1055 |
| 1000025 | 1056 ... 1087 |
| 1000026 | 1088 ... 1119 |
| 1000027 | 1120 ... 1151 |
| 1000028 | 1152 ... 1183 |
| 1000029 | 1184 ... 1215 |
| 1000030 | 1216 ... 1247 |
| 1000031 | 1248 ... 1279 |
| 1000032 | 1280 ... 1311 |
| 1000033 | 1312 ... 1343 |
| 1000034 | 1344 ... 1375 |
| 1000035 | 1376 ... 1407 |
| 1000036 | 1408 ... 1439 |
| 1000037 | 1440 ... 1471 |
| 1000038 | 1472 ... 1503 |
| 1000039 | 1504 ... 1535 |
| 1000040 | 1536 ... 1567 |
| 1000041 | 1568 ... 1599 |
| 1000042 | 1600 ... 1631 |
| 1000043 | 1632 ... 1663 |
| 1000044 | 1664 ... 1695 |
| 1000045 | 1696 ... 1727 |
| 1000046 | 1728 ... 1759 |
| 1000047 | 1760 ... 1791 |
| 1000048 | 1792 ... 1823 |
| 1000049 | 1824 ... 1855 |
| 1000050 | 1856 ... 1887 |
| 1000051 | 1888 ... 1919 |
| 1000052 | 1920 ... 1951 |
| 1000053 | 1952 ... 1983 |
| 1000054 | 1984 ... 2015 |
| 1000055 | 2016 ... 2047 |

### System Functions

|    |                       |
|----|-----------------------|
| 4  | BCD to HEX conversion |
| 5  | HEX to BCD conversion |
| 20 | Square root           |
| 21 | Sine                  |
| 22 | Cosine                |
| 23 | Tangent               |

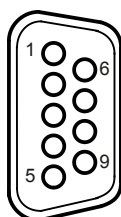
|       |   |
|-------|---|
| 24    | Arc sine  |
| 25    | Arc cosine  |
| 26    | Arc tangent   |
| 27    | Exponential function                                    |
| 28    | Natural logarithm                                       |
| 29    | Absolute value  |
| 30    | Separation of digits before and after the decimal point |
| 50    | Sorting register values                                 |
| 60    | CRC generation for Modbus RTU                           |
| 61    | CRC check for Modbus RTU                                |
| 65/67 | Reading register block via Modbus/TCP                   |
| 66/68 | Writing register block via Modbus/TCP                   |
| 80/85 | Initializing RemoteScan                                 |
| 81    | Starting RemoteScan                                     |
| 82    | Stopping RemoteScan                                     |
| 90    | Writing data file                                       |
| 91    | Appending data file                                     |
| 92    | Reading data file                                       |
| 96    | Deleting data file                                      |
| 110   | E-mail feature  |
| 150   | Configuring NetCopyList                                 |
| 151   | Deleting NetCopyList                                    |
| 152   | Sending NetCopyList                                     |

**Pin Assignment of Female MiniDIN Connector X11**



| Pin | Signal | Function   |
|-----|--------|--|
| 1   | RDA    | RS-422; receive data inverted  |
| 2   | GND    | Reference potential  |
| 3   | RDB    | RS-422; receive data not inverted  |
| 4   | RxD    | RS-232; receive data   |
| 5   | SDB    | RS-422; transmit data not inverted                                       |
| 6   | DC24V  | RS-485; transmit/receive data not inverted<br>HMI supply voltage         |
| 7   | SDA    | RS-422; transmit data inverted<br>RS-485; transmit/receive data inverted |
| 8   | TxD    | RS-232; transmit data  |

**Pin Assignment of Female SUB-D Connector X19**



| Pin | Signal | Function            |
|-----|--------|---------------------|
| 1   | CMODE0 | Commissioning       |
| 2   | CL     | Data signal         |
| 3   | GND    | Reference potential |
| 4   | CMODE1 | Commissioning       |
| 5   | Unused |                     |
| 6   | Unused |                     |
| 7   | CH     | Data signal         |
| 8   | Unused |                     |
| 9   | Unused |                     |



# 3 Quick Reference - JX3-AI4

## Matching OS Version

This quick reference summarizes the registers of the analog input module JX3-AI4 with OS version 1.04.0.00.

## Module Code

For identification purposes, a unique module code is assigned to each JX3 module.

You can read out the module code, for example, in the case of a JC-3xx using R 100002015 and R 100002016.

The module code is also contained in the EDS.  
Module code JX3-AI4: 303

## General Overview - Registers

|               |                                 |
|---------------|---------------------------------|
| 0             | Module state                    |
| 1             | Module command                  |
| 2 ... 5       | Analog inputs 1 through 4       |
| 9, 32, 257    | Versions / Revisions            |
| 1100 ... 1199 | Configuration of analog input 1 |
| 1200 ... 1299 | Configuration of analog input 2 |
| 1300 ... 1399 | Configuration of analog input 3 |
| 1400 ... 1499 | Configuration of analog input 4 |
| 9740 ... 9744 | Oscilloscope                    |

## Register Numbers

|               |           |   |
|---------------|-----------|---|
| <b>JC-3xx</b> | 100xxzzzz |   |
|               | xx        | Module number: 02 ... 17                            |
|               | zzzz      | Module register number: 0000 ... 9999               |
| <b>JC-24x</b> | 3xxz      |   |
|               | xx        | I/O module number - 2: 00 ... 30                    |
|               | z         | Module register number: 0 ... 9                     |
|               |           | Only indirect access to additional module registers |
| <b>JC-647</b> | 3m03xxz   |   |
|               | m         | Submodule position: 1 ... 3                         |
|               | xx        | I/O module number - 2: 00 ... 30                    |
|               | z :       | Module register number: 0 ... 9                     |
|               |           | Only indirect access to additional module registers |
| <b>JC-9xx</b> | 20SJ03xxz |   |
|               | S         | Number of module board: 1 ... 5                     |
|               | Y         | Number of JX6-I/O board: 1 ... 2                    |
|               | xx        | I/O module number - 2: 00 ... 30                    |
|               | z         | Module register number: 0 ... 9                     |
|               |           | Only indirect access to additional module registers |

## Meaning of y

y Number of analog input y = 1 ... 4

## Module State

|             |  |
|-------------|--|
| <b>0</b>    | <b>Module state</b>                                    |
| Bit 0 = 1:  | Hardware failure                                       |
| Bit 4 = 1:  | Error: Calibration values                              |
| Bit 6 = 1:  | AD converter error                                     |
| Bit 7 = 1:  | Error: Internal voltages                               |
| Bit 16 = 1: | Collective bit "Validity of analog input values"       |
| Bit 19 = 1: | Collective bit "The lower limit has been fallen below" |
| Bit 20 = 1: | Collective bit "The upper limit has been exceeded"     |

|             |  |
|-------------|--|
| Bit 21 = 1: | Collective bit "Negative measuring range exceeded" |
| Bit 22 = 1: | Collective bit "Positive measuring range exceeded" |
| Bit 23 = 1: | Collective bit "Forcing"                           |
| Bit 24 = 1: | Monitoring - voltages                              |
| Bit 30 = 1: | Synchronous data exchange                          |
| Bit 31 = 0: | Operating mode "Collective conversion"             |
| Bit 31 = 1: | Operating mode "Single conversion"                 |

## Module-Specific Command Registers

|          |   |
|----------|---|
| <b>1</b> | <b>Command</b>                                |
| 1        | Enable operating mode "Single conversion"     |
| 2        | Enable operating mode "Collective conversion" |
| 3        | Internal voltages - monitoring OFF            |
| 4        | Internal voltages - monitoring ON             |
| 5        | Acknowledgement of hardware failures          |
| 6        | Acknowledgement of collective bits            |

## Analog Inputs

|   |                |
|---|----------------|
| 2 | Analog input 1 |
| 3 | Analog input 2 |
| 4 | Analog input 3 |
| 5 | Analog input 4 |

## Versions / Revisions

|     |                    |
|-----|--------------------|
| 9   | OS version         |
| 32  | FPGA revision      |
| 257 | Bootloader version |

## State of Analog Input y

|             |  |
|-------------|--|
| <b>1y00</b> | <b>State of analog input y (y = 1 ... 4)</b> |
| Bit 16 = 1: | Validity of analog input value               |
| Bit 19 = 1: | Lower limit exceeded                         |
| Bit 20 = 1: | Upper limit exceeded                         |
| Bit 21 = 1: | Negative measuring range exceeded            |
| Bit 22 = 1: | Positive measuring range exceeded            |
| Bit 23 = 1: | Forcing function enabled                     |

## Instruction for Analog Input y

|             |   |
|-------------|---|
| <b>1y01</b> | <b>Instruction for analog input y (y = 1 ... 4)</b> |
| 30          | Forcing of analog input OFF                         |
| 31          | Forcing of analog input ON                          |

## Configuration of Analog Input y

|             |  |
|-------------|--|
| <b>1y07</b> | <b>Configuration of analog input y (y = 1 ... 4)</b> |
| 1           | -10 V ... +10 V                                      |
| 5           | 0 V ... +10 V  |
| 6           | 0 mA ... 20 mA                                       |

## User-defined Scaling

|      |   |
|------|---|
| 1y24 | 1. Voltage / current value for analog input y |
| 1y25 | 1. Digital value for analog input y           |
| 1y26 | 2. Voltage / current value for analog input y |
| 1y27 | 2. Digital value for analog input y           |

## Other Configurations

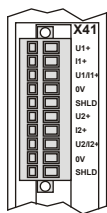
|      |  |
|------|--|
| 1y04 | Force value for analog input y                         |
| 1y06 | Averaging  |
| 1y08 | Lower limit of analog input y                          |
| 1y09 | Upper limit of analog input y                          |
| 1y20 | Trailing indicator for minimum value of analog input y |
| 1y21 | Trailing indicator for maximum value of analog input y |

## Oscilloscope

|      |                 |
|------|-----------------|
| 9740 | Command         |
| 9741 | Parameter index |
| 9742 | Parameter       |
| 9743 | Data index      |
| 9744 | Data            |

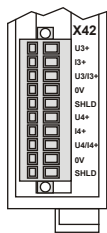


**Assignment of Terminal X41**



|                       |  |
|-----------------------|--|
| <b>Terminal Point</b> | <b>Signals: Analog input # 1</b>   |
| X41.U1+               | Voltage input  |
| X41.I1+               | Current input  |
| X41.U1/I1-            | Differential input. To be jumpered in case of 1-, or 2-wire technology.                  |
| X41.0V                | Reference potential  |
| X41.SHLD              | Shielding connection   |
| <b>Terminal Point</b> | <b>Signals: Analog input # 2</b>   |
| X41.U2+               | Voltage input  |
| X41.I2+               | Current input  |
| X41.U2/I2-            | Differential input. In case of 1-, or 2-wire technology to be connected with pin X41.0V. |
| X41.0V                | Reference potential  |
| X41.SHLD              | Shielding connection   |

**Assignment of Terminal X42**



|                       |  |
|-----------------------|--|
| <b>Terminal Point</b> | <b>Signals: Analog input # 3</b>   |
| X42.U3+               | Voltage input  |
| X42.I3+               | Current input  |
| X42.U3/I3-            | Differential input. In case of 1-, or 2-wire technology to be connected with pin X42.0V. |
| X42.0V                | Reference potential  |
| X42.SHLD              | Shielding connection   |
| <b>Terminal Point</b> | <b>Signals: Analog input # 4</b>   |
| X42.U4+               | Voltage input  |
| X42.I4+               | Current input  |
| X42.U4/I4-            | Differential input. In case of 1-, or 2-wire technology to be connected with pin X42.0V. |
| X42.0V                | Reference potential  |
| X42.SHLD              | Shielding connection   |

# 4 Quick Reference - JX3-AO4

## Matching OS Version

This quick reference summarizes the registers of the analog output module JX3-AO4 with OS version 1.04.0.00.

## Module Code

For identification purposes, a unique module code is assigned to each JX3 module.

You can read out the module code, for example, in the case of a JC-3xx using R 100002015 and R 100002016.

The module code is also contained in the EDS.

Module code JX3-AO4: 304

## General Overview - Registers

|               |                                    |
|---------------|------------------------------------|
| 0             | Module state                       |
| 1             | Module command                     |
| 2 ... 5       | Analog outputs 1 ... 4             |
| 9, 32, 257    | Versions / Revisions               |
| 1100 ... 1199 | Configuration of analog output # 1 |
| 1200 ... 1299 | Configuration of analog output # 2 |
| 1300 ... 1399 | Configuration of analog output # 3 |
| 1400 ... 1499 | Configuration of analog output # 4 |
| 9740 ... 9744 | Oscilloscope                       |

## Register Numbers

|               |           |   |
|---------------|-----------|---|
| <b>JC-3xx</b> | 100xxzzzz |   |
|               | xx        | Module number: 02 ... 17                            |
|               | zzzz      | Module register number: 0000 ... 9999               |
| <b>JC-24x</b> | 3xxz      |   |
|               | xx        | I/O module number - 2: 00 ... 30                    |
|               | z         | Module register number: 0 ... 9                     |
|               |           | Only indirect access to additional module registers |
| <b>JC-647</b> | 3m03xxz   |   |
|               | m         | Submodule position: 1 ... 3                         |
|               | xx        | I/O module number - 2: 00 ... 30                    |
|               | z :       | Module register number: 0 ... 9                     |
|               |           | Only indirect access to additional module registers |
| <b>JC-9xx</b> | 20SJ03xxz |   |
|               | S         | Number of module board: 1 ... 5                     |
|               | Y         | Number of JX6-I/O board: 1 ... 2                    |
|               | xx        | I/O module number - 2: 00 ... 30                    |
|               | z         | Module register number: 0 ... 9                     |
|               |           | Only indirect access to additional module registers |

## Meaning of y

y Number of analog output y = 1 ... 4

## Module State

|             |                              |
|-------------|------------------------------|
| <b>0</b>    | <b>Module state</b>          |
| Bit 0 = 1:  | Hardware failure             |
| Bit 4 = 1:  | Error: Calibration values    |
| Bit 6 = 1:  | DA converter error           |
| Bit 7 = 1:  | Error: Internal voltages     |
| Bit 19 = 1: | Collective bit "Lower limit" |
| Bit 20 = 1: | Collective bit "Upper limit" |
| Bit 23 = 1: | Collective bit "Forcing"     |

|             |                           |
|-------------|---------------------------|
| Bit 24 = 1: | Monitoring - voltages     |
| Bit 30 = 1: | Synchronous data exchange |

## Module-Specific Command Registers

|          |                                      |
|----------|--------------------------------------|
| <b>1</b> | <b>Command</b>                       |
| 3        | Internal voltages - monitoring OFF   |
| 4        | Internal voltages - monitoring ON    |
| 5        | Acknowledgement of hardware failures |
| 6        | Acknowledgement of collective bits   |

## Analog Outputs

|   |                   |
|---|-------------------|
| 2 | Analog output # 1 |
| 3 | Analog output # 2 |
| 4 | Analog output # 3 |
| 5 | Analog output # 4 |

## Versions / Revisions

|     |                    |
|-----|--------------------|
| 9   | OS version         |
| 32  | FPGA revision      |
| 257 | Bootloader version |

## State of Analog Output y

|             |   |
|-------------|---|
| <b>1y00</b> | <b>State of analog output y (y = 1 ... 4)</b> |
| Bit 8 = 1:  | Output of error values is enabled             |
| Bit 19 = 1: | Lower limit exceeded                          |
| Bit 20 = 1: | Upper limit exceeded                          |
| Bit 23 = 1: | Forcing function enabled                      |

## Command for Analog Output y

|             |  |
|-------------|--|
| <b>1y01</b> | <b>Command for analog output y (y = 1 ... 4)</b> |
| 20          | Leave analog value unchanged in case of error    |
| 21          | Output error value in case of error              |
| 30          | Forcing of analog output OFF                     |
| 31          | Forcing of analog output ON                      |

## Configuration of Analog Output y

|             |   |
|-------------|---|
| <b>1y07</b> | <b>Configuration of analog output y (y = 1 ... 4)</b> |
| 1           | -10 V ... +10 V                                       |
| 5           | 0 V ... +10 V   |
| 6           | 0 mA ... 20 mA  |

## User-defined Scaling

|      |  |
|------|--|
| 1y24 | 1. Voltage / current value for analog output y |
| 1y25 | 1. Digital value for analog output y           |
| 1y26 | 2. Voltage / current value for analog output y |
| 1y27 | 2. Digital value for analog output y           |

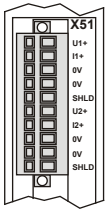
## Other Configurations

|      |   |
|------|---|
| 1y04 | Force value for analog output y                         |
| 1y08 | Lower limit of analog output y                          |
| 1y09 | Upper limit of analog output y                          |
| 1y10 | Error value   |
| 1y20 | Trailing indicator for minimum value of analog output y |
| 1y21 | Trailing indicator for maximum value of analog output y |
| 1y22 | Lower cap limit   |
| 1y23 | Upper cap limit   |

## Oscilloscope

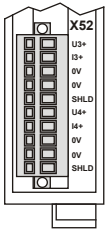
|      |                 |
|------|-----------------|
| 9740 | Command         |
| 9741 | Parameter index |
| 9742 | Parameter       |
| 9743 | Data index      |
| 9744 | Data            |

**Assignment of Terminal X51**



|                       |                                     |
|-----------------------|-------------------------------------|
| <b>Terminal Point</b> | <b>Signals of analog output # 1</b> |
| X51.U1+               | Voltage output                      |
| X51.I1+               | Current-controlled output           |
| X51.0V                | Reference potential                 |
| X51.SHLD              | Shielding connection                |
| <b>Terminal Point</b> | <b>Signals of analog output # 2</b> |
| X51.U2+               | Voltage output                      |
| X51.I2+               | Current-controlled output           |
| X51.0V                | Reference potential                 |
| X51.SHLD              | Shielding connection                |

**Assignment of Terminal X52**



|                       |                                     |
|-----------------------|-------------------------------------|
| <b>Terminal Point</b> | <b>Signals of analog output # 3</b> |
| X52.U3+               | Voltage output                      |
| X52.I3+               | Current-controlled output           |
| X52.0V                | Reference potential                 |
| X52.SHLD              | Shielding connection                |
| <b>Terminal Point</b> | <b>Signals of analog output # 4</b> |
| X52.U4+               | Voltage output                      |
| X52.I4+               | Current-controlled output           |
| X52.0V                | Reference potential                 |
| X52.SHLD              | Shielding connection                |

# 5 Quick Reference - JX3-CNT

## Matching OS Version

This quick reference summarizes the registers and I/O numbers of the digital counter module JX3-CNT with OS version 1.02.0.00.

## Module Code

For identification purposes, a unique module code is assigned to each JX3 module.

You can read out the module code, for example, in the case of a JC-3xx using R 100002015 and R 100002016.

The module code is also contained in the EDS.

Module code JX3-CNT: 308

## I/O Numbers

|               |                            |  |
|---------------|----------------------------|--|
| <b>JC-3xx</b> | 10000xxzz<br>xx            | Module number: 02 ... 17                               |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 100000201...<br>100000216  | I/O numbers for module # 02                            |
| <b>JC-24x</b> | xxzz<br>xx                 | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 201 ... 216                | I/O numbers for I/O module # 02                        |
| <b>JC-647</b> | m1xxzz<br>m1               | Submodule socket + 1: 2 ... 4                          |
|               | xx                         | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 20201 ... 20216            | I/O numbers for submodule socket 1 and I/O module # 02 |
| <b>JC-9xx</b> | 20SJ0xxzz<br>S             | Number of module board: 1 ... 5                        |
|               | Y                          | Number of JX6-I/O board: 1 ... 2                       |
|               | xx                         | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 201100201 ...<br>201100216 | I/O numbers for S = 1; J = 1 and I/O module # 02       |

## General Overview - Registers

|                  |   |
|------------------|---|
| 0                | Module state                            |
| 1                | Module command                          |
| 2 ... 3          | Process data                            |
| 7                | Index                                   |
| 8                | Value                                   |
| 9, 32, 769, 9600 | Versions / Revisions                    |
| 800 ... 801      | Pointer to process data                 |
| 900 ... 949      | Multi-strobe                            |
| 950 ... 999      | Counter-controlled outputs (Simple CAM) |
| 1100 ... 1199    | Counter 1 (X61.I/O1)                    |
| 1200 ... 1299    | Counter 2 (X61.I/O2)                    |
| 1300 ... 1399    | Counter 3 (X61.I/O3)                    |
| 1400 ... 1499    | Counter 4 (X61.I/O4)                    |
| 1500 ... 1599    | Counter A (X61.A)                       |
| 1600 ... 1699    | Counter B (X61.B)                       |

|               |   |
|---------------|---|
| 1700 ... 1799 | Counter C (X61.C)                           |
| 1800 ... 1899 | Dual-channel counter 24 V (X61.A ... X61.C) |
| 1900 ... 1999 | Dual-channel counter 5 V (X62)              |
| 2000 ... 2099 | SSI (X62)                                   |
| 9740 ... 9744 | Oscilloscope                                |

## Register Numbers

|               |                 |   |
|---------------|-----------------|---|
| <b>JC-3xx</b> | 100xxzzzz<br>xx | Module number: 02 ... 17                            |
|               | zzzz            | Module register number: 0000 ... 9999               |
| <b>JC-24x</b> | 3xxz<br>xx      | I/O module number - 2: 00 ... 30                    |
|               | z               | Module register number: 0 ... 9                     |
|               |                 | Only indirect access to additional module registers |
| <b>JC-647</b> | 3m03xxz<br>m    | Submodule position: 1 ... 3                         |
|               | xx              | I/O module number - 2: 00 ... 30                    |
|               | z :             | Module register number: 0 ... 9                     |
|               |                 | Only indirect access to additional module registers |
| <b>JC-9xx</b> | 20SJ03xxz<br>S  | Number of module board: 1 ... 5                     |
|               | Y               | Number of JX6-I/O board: 1 ... 2                    |
|               | xx              | I/O module number - 2: 00 ... 30                    |
|               | z               | Module register number: 0 ... 9                     |
|               |                 | Only indirect access to additional module registers |

## Module State

|            |   |
|------------|---|
| <b>0</b>   | <b>Module state</b>                           |
| Bit 17 = 1 | Short circuit 24 V                            |
| Bit 18 = 1 | Short circuit 5 V                             |
| Bit 19 = 1 | Collective bit "Lower limit"                  |
| Bit 20 = 1 | Collective bit "Upper limit"                  |
| Bit 21 = 1 | 24 V sensor supply (X61.DC24V0.5A) is enabled |
| Bit 22 = 1 | 5 V sensor supply (X62.10) is enabled         |
| Bit 23 = 1 | 24 V sensor supply (X62.12) is enabled        |
| Bit 30 = 1 | Synchronous data exchange                     |

## Module-Specific Command Registers

|          |  |
|----------|--|
| <b>1</b> | <b>Command</b>                             |
| 1        | Status register reset 0                    |
| 2        | 24 V sensor supply (X61.DC24V0.5A) disable |
| 3        | 24 V sensor supply (X61.DC24V0.5A) enable  |
| 4        | 5 V sensor supply (X62.10) disable         |
| 5        | 5 V sensor supply (X62.10) enable          |
| 6        | 24 V sensor supply (X62.12) disable        |
| 7        | 24 V sensor supply (X62.12) enable         |

## Versions / Revisions

|      |                                 |
|------|---------------------------------|
| 9    | OS version                      |
| 32   | FPGA revision                   |
| 769  | Bootloader version              |
| 9600 | FPGA version - counter features |

## Pointer to Process Data

**800, 801: Pointer to process data in MR 2 ... 3.**

|               |                           |
|---------------|---------------------------|
| Value 1 ... 4 | Counters 1 ... 4          |
| Value 5 ... 7 | Counters A ... C          |
| Value 8       | Dual-channel counter 24 V |
| Value 9       | Dual-channel counter 5 V  |
| Value 10      | SSI encoder               |

800 := Value. The result is stored to MR 2.  
 801 := Value. The result is stored to MR 3.

**Multi-strobe**

|             |  |                           |
|-------------|--|---------------------------|
| 900         | Status   |                           |
|             | Bit 1 = 1:                                     | Multi-strobe data max.    |
|             | Bit 2 = 1:                                     | Multi-strobe enabled      |
|             | Bit 4 = 1:                                     | Multi-strobe overflow     |
| 901         | Command  |                           |
|             | 2  | Enable multi-strobe       |
|             | 3  | Disable multi-strobe      |
|             | 4  | Reset data                |
| 902         | Assignment                                     |                           |
|             | 5 ... 7  | Counters A ... C          |
|             | 8  | Dual-channel counter 24 V |
|             | 9  | Dual-channel counter 5 V  |
| 903         | Strobe count                                   |                           |
| 904         | Strobe index                                   |                           |
| 905         | Strobe Data                                    |                           |
| 910 ... 925 | Strobe DirectData[0] ... Strobe DirectData[15] |                           |

**Counter-controlled Outputs (simple CAM)**

|     |   |                            |
|-----|---|----------------------------|
| 950 | Status  |                            |
|     | Bit 0 = 1:  | Output 1: No error         |
|     | Bit 1 = 1:  | Output 2: No error         |
|     | Bit 2 = 1:  | Output 3: No error         |
|     | Bit 3 = 1:  | Output 4: No error         |
|     | Bit 6 = 1:  | Counter-control enabled    |
|     | Bit 7 = 1:  | An error has occurred      |
| 951 | Command   |                            |
|     | 0   | Counter-control initialize |
|     | 30  | Counter-control enable     |
|     | 31  | Counter-control disable    |
| 952 | Assign counter 1 ... 10 to simple CAM                             |                            |
| 959 | Software version of counter-control                               |                            |
| 960 | Index register for output 1                                       |                            |
| 961 | Count value for rising edge at output 1 (depending on index 960)  |                            |
| 962 | Count value for falling edge at output 1 (depending on index 960) |                            |
| 963 | Index register for output 2                                       |                            |
| 964 | Count value for rising edge at output 2 (depending on index 963)  |                            |
| 965 | Count value for falling edge at output 2 (depending on index 963) |                            |
| 966 | Index register for output 3                                       |                            |
| 967 | Count value for rising edge at output 3 (depending on index 966)  |                            |
| 968 | Count value for falling edge at output 3 (depending on index 966) |                            |
| 969 | Index register for output 4                                       |                            |
| 970 | Count value for rising edge at output 4 (depending on index 969)  |                            |
| 971 | Count value for falling edge at output 4 (depending on index 969) |                            |

**Counter 1, 2, 3, 4 at X61**

|      |               |                    |
|------|---------------|--------------------|
| 1y00 | Counter state |                    |
|      | Bit 26 = 1:   | Counter is enabled |
| 1y01 | Command       |                    |

30 Enable counter  
 31 Disable counter

1y03 Count value

where y = 1 represents counter 1  
 where y = 2 represents counter 2  
 where y = 3 represents counter 3  
 where y = 4 represents counter 4

**Counter A, B, C at X61**

|      |                                |  |
|------|--------------------------------|--|
| 1y00 | Counter state                  |  |
|      | Bit 8 = 1:                     | Gate function is enabled                               |
|      | Bit 9 = 1:                     | Strobe function is enabled                             |
|      | Bit 10 = 1:                    | Search for reference is enabled                        |
|      | Bit 14 = 1:                    | Modulo function is enabled                             |
|      | Bit 15 = 1:                    | Modulo error   |
|      | Bit 16 = 1:                    | Measurement is enabled                                 |
|      | Bit 19 = 1:                    | Lower limit is reached                                 |
|      | Bit 20 = 1:                    | Upper limit is reached                                 |
|      | Bit 24 = 1:                    | Strobe value is received                               |
|      | Bit 25 = 1:                    | Counter is blocked by gate function                    |
|      | Bit 26 = 1:                    | Counter is enabled                                     |
|      | Bit 27 = 1:                    | Reference is set                                       |
|      | Bit 28 = 1:                    | Strobe overflow  |
|      | Bit 29 = 1:                    | Reversal of counting direction is enabled              |
| 1y01 | Command                        |  |
|      | 30                             | Enable counter   |
|      | 31                             | Disable counter  |
|      | 32                             | Positive counting direction                            |
|      | 33                             | Negative counting direction                            |
|      | 34                             | Enable gate function                                   |
|      | 35                             | Disable gate function                                  |
|      | 36                             | Enable strobe function                                 |
|      | 37                             | Disable strobe function                                |
|      | 38                             | Enable reference function                              |
|      | 39                             | Disable reference function                             |
|      | 40                             | Clear strobe bit on reading                            |
|      | 41                             | Clear strobe bit manually                              |
|      | 50                             | Activate measurement                                   |
|      | 51                             | Disable measurement                                    |
|      | 60                             | Enable modulo function                                 |
|      | 61                             | Disable modulo function                                |
|      | 70                             | Reset trailing indicator for minimum value             |
|      | 71                             | Reset trailing indicator for maximum value             |
|      | 72                             | Reset trailing indicator for minimum and maximum value |
| 1y03 | Count value                    |  |
| 1y04 | Strobe                         |  |
| 1y05 | Reference offset               |  |
| 1y06 | Time period                    |  |
| 1y07 | Pulse width                    |  |
| 1y08 | Lower limit                    |  |
| 1y09 | Upper limit                    |  |
| 1y13 | Multiplication factor          |  |
| 1y14 | Division factor                |  |
| 1y15 | Offset                         |  |
| 1y18 | Count value after scaling      |  |
| 1y20 | Trailing pointer - lower limit |  |

## 5 Quick Reference - JX3-CNT

|      |                                |
|------|--------------------------------|
| 1y21 | Trailing pointer - upper limit |
| 1y23 | Digital filter                 |
| 1y26 | Gate mask                      |
| 1y27 | Gate active low                |
| 1y28 | Strobe - Rising edge           |
| 1y29 | Strobe - Falling edge          |
| 1y32 | Reference - Rising edge        |
| 1y33 | Reference - Falling edge       |
| 1y40 | Modulo - lower limit           |
| 1y41 | Modulo - upper limit           |
| 1y42 | Modulo Revolutions             |

where y = 5 represents channel A  
 where y = 6 represents channel B  
 where y = 7 represents channel C

|      |                                |
|------|--------------------------------|
| 1y18 | Count value after scaling      |
| 1y20 | Trailing pointer - lower limit |
| 1y21 | Trailing pointer - upper limit |
| 1y23 | Digital filter                 |
| 1y26 | Gate mask                      |
| 1y27 | Gate active low                |
| 1y28 | Strobe - Rising edge           |
| 1y29 | Strobe - Falling edge          |
| 1y30 | Reference mask                 |
| 1y31 | Reference active low           |
| 1y40 | Modulo - lower limit           |
| 1y41 | Modulo - upper limit           |
| 1y42 | Modulo Revolutions             |

where y = 8 represents dual-channel counter 24 V (X61.A bis X61.C)  
 where y = 9 represents dual-channel counter 5 V (X62)

### Dual-channel Counter

|      |   |
|------|---|
| 1y00 | Counter state   |
|      | Bit 8 = 1: Gate function is enabled                       |
|      | Bit 9 = 1: Strobe function is enabled                     |
|      | Bit 10 = 1: Search for reference is enabled               |
|      | Bit 14 = 1: Modulo function is enabled                    |
|      | Bit 15 = 1: Modulo error                                  |
|      | Bit 19 = 1: Lower limit is reached                        |
|      | Bit 20 = 1: Upper limit is reached                        |
|      | Bit 24 = 1: Strobe value is received                      |
|      | Bit 25 = 1: Counter is blocked by gate function           |
|      | Bit 26 = 1: Counter is enabled                            |
|      | Bit 27 = 1: Reference is set                              |
|      | Bit 28 = 1: Strobe overflow                               |
|      | Bit 29 = 1: Reversal of counting direction is enabled     |
| 1y01 | Command   |
|      | 30 Enable counter   |
|      | 31 Disable counter  |
|      | 32 Positive counting direction                            |
|      | 33 Negative counting direction                            |
|      | 34 Enable gate function                                   |
|      | 35 Disable gate function                                  |
|      | 36 Enable strobe function                                 |
|      | 37 Disable strobe function                                |
|      | 38 Enable reference function                              |
|      | 39 Disable reference function                             |
|      | 40 Strobe bit is cleared on reading                       |
|      | 41 Strobe bit is cleared by user                          |
|      | 60 Enable modulo function                                 |
|      | 61 Disable modulo function                                |
|      | 70 Reset trailing indicator for minimum value             |
|      | 71 Reset trailing indicator for maximum value             |
|      | 72 Reset trailing indicator for minimum and maximum value |
| 1y03 | Count value   |
| 1y04 | Strobe  |
| 1y05 | Reference offset  |
| 1y06 | Time period   |
| 1y08 | Lower limit   |
| 1y09 | Upper limit   |
| 1y13 | Multiplication factor                                     |
| 1y14 | Division factor   |
| 1y15 | Offset  |

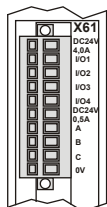
### SSI at X62

|      |   |
|------|---|
| 2000 | Status  |
|      | Bit 0 = 1: New value has been received                    |
|      | Bit 2 = 1: Parity check failed                            |
|      | Bit 18 = 1: Forcing function is enabled                   |
| 2001 | Command   |
|      | 1 Reset   |
|      | 8 Software strobe   |
|      | 10 Enable continuous update                               |
|      | 11 Disable continuous update                              |
|      | 12 Enable continuous strobe                               |
|      | 13 Disable continuous strobe                              |
|      | 20 Enable the forcing function                            |
|      | 21 Disable the forcing function                           |
|      | 70 Reset trailing indicator for minimum value             |
|      | 71 Reset trailing indicator for maximum value             |
|      | 72 Reset trailing indicator for minimum and maximum value |
| 2003 | Count value   |
| 2005 | Offset  |
| 2008 | Lower limit   |
| 2009 | Upper limit   |
| 2020 | Trailing Indicator for Minimum Value                      |
| 2021 | Trailing Indicator for Maximum Value                      |
| 2034 | SSI clock frequency                                       |
|      | 0 100 kHz   |
|      | 1 200 kHz   |
|      | 2 1 MHz   |
| 2035 | Configuration   |
| 2036 | Resolution  |
| 2043 | Force value   |

**Oscilloscope**

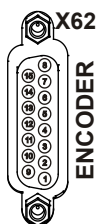
|      |                 |
|------|-----------------|
| 9740 | Command         |
| 9741 | Parameter index |
| 9742 | Parameter       |
| 9743 | Data index      |
| 9744 | Data            |

**Assignment of Terminal X61**



| Terminal Point | Description  |
|----------------|--|
| X61.DC24V4.0A  | Infeed I/O supply  |
| X61.I/O1       | Digital universal I/O (DC 24 V)                                  |
| X61.I/O2       | Digital universal I/O (DC 24 V)                                  |
| X61.I/O3       | Digital universal I/O (DC 24 V)                                  |
| X61.I/O4       | Digital universal I/O (DC 24 V)                                  |
| X61.DC24V0.5A  | 24 V encoder supply,<br>0.5 A max.                               |
| X61.A          | 24 V single-channel counter, also K0<br>24 V incremental counter |
| X61.B          | 24 V single-channel counter, also K1<br>24 V incremental counter |
| X61.C          | 24 V single-channel counter, also K2<br>24 V incremental counter |
| X61.0V         | Reference potential (GND)  |

**Assignment of Terminal X62**



| Pin    | Description  |
|--------|--|
| X62.1  | Reference potential (GND)  |
| X62.2  | 5 V index signal, pos. differential<br>input,<br>also SSI Clock+ |
| X62.3  | 5 V index signal, neg. differential<br>input,<br>also SSI Clock- |
| X62.4  | 5 V channel 1, pos. differential input,<br>also SSI Data+        |
| X62.5  | 5 V channel 1, neg. differential input,<br>also SSI Data-        |
| X62.6  | 5 V channel 2, pos. differential input                           |
| X62.7  | 5 V channel 2, neg. differential input                           |
| X62.8  | 5 V index signal, neg. differential<br>input,<br>also SSI Clock- |
| X62.9  | 5 V index signal, pos. differential<br>input,<br>also SSI Clock+ |
| X62.10 | 5 V encoder supply,<br>0.2 A max.                                |
| X62.11 | Not connected  |
| X62.12 | 24 V encoder supply,<br>0.5 A max.                               |
| X62.13 | Not connected  |
| X62.14 | Not connected  |
| X62.15 | Not connected  |

# 6 Quick Reference - JX3-DI16

## Matching OS Version

This quick reference summarizes the registers and I/O numbers of the digital input module JX3-DI16 with OS version 2.35.0.00.

## Module Code

For identification purposes, a unique module code is assigned to each JX3 module.

You can read out the module code, for example, in the case of a JC-3xx using R 100002015 and R 100002016.

The module code is also contained in the EDS.

Module code JX3-DI16: 300

## I/O Numbers

|               |                            |  |
|---------------|----------------------------|--|
| <b>JC-3xx</b> | 10000xxzz<br>xx            | Module number: 02 ... 17                               |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 100000201...<br>100000216  | I/O numbers for module # 02                            |
| <b>JC-24x</b> | xxzz<br>xx                 | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 201 ... 216                | I/O numbers for I/O module # 02                        |
| <b>JC-647</b> | m1xxzz<br>m1               | Submodule socket + 1: 2 ... 4                          |
|               | xx                         | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 20201 ... 20216            | I/O numbers for submodule socket 1 and I/O module # 02 |
| <b>JC-9xx</b> | 20SJ0xxzz<br>S             | Number of module board: 1 ... 5                        |
|               | Y                          | Number of JX6-I/O board: 1 ... 2                       |
|               | xx                         | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 201100201 ...<br>201100216 | I/O numbers for S = 1; J = 1 and I/O module # 02       |

## General Overview - Registers

|             |                                      |
|-------------|--------------------------------------|
| 0           | Module state                         |
| 2           | Process data input                   |
| 9           | Revision                             |
| 256         | All inputs IN 1 ... IN 16            |
| 257 ... 259 | Pulse Stretching with Digital Inputs |
| 262 ... 266 | Digital input filters                |
| 320 ... 342 | Counters A and B                     |

## Register Numbers

|               |                 |                                       |
|---------------|-----------------|---------------------------------------|
| <b>JC-3xx</b> | 100xxzzzz<br>xx | Module number: 02 ... 17              |
|               | zzzz            | Module register number: 0000 ... 9999 |
| <b>JC-24x</b> | 3xxz            |                                       |

|    |   |
|----|---|
| xx | I/O module number - 2: 00 ... 30                    |
| z  | Module register number: 0 ... 9                     |
|    | Only indirect access to additional module registers |

|               |              |   |
|---------------|--------------|---|
| <b>JC-647</b> | 3m03xxz<br>m | Submodule position: 1 ... 3                         |
|               | xx           | I/O module number - 2: 00 ... 30                    |
|               | z :          | Module register number: 0 ... 9                     |
|               |              | Only indirect access to additional module registers |

|               |                |   |
|---------------|----------------|---|
| <b>JC-9xx</b> | 20SJ03xxz<br>S | Number of module board: 1 ... 5                     |
|               | Y              | Number of JX6-I/O board: 1 ... 2                    |
|               | xx             | I/O module number - 2: 00 ... 30                    |
|               | z              | Module register number: 0 ... 9                     |
|               |                | Only indirect access to additional module registers |

## State and Diagnostics

|    |  |
|----|--|
| 0  | Module state                             |
|    | Bit 1 = 1: Voltage at X21.DC24V < 16.3 V |
|    | Bit 2 = 1: Voltage at X22.DC24V < 16.3 V |
| 9  | FPGA revision                            |
| 32 | FPGA revision                            |

## Pulse Stretching

|     |  |
|-----|--|
| 257 | Activation of pulse stretching   |
|     | Bit 0 = 1: Activate pulse stretching for IN 1  |
|     | Bit 1 = 1: Activate pulse stretching for IN 2  |
|     | etc.   |
|     | Bit 7 = 1: Activate pulse stretching for IN 8  |
| 258 | Duration of pulse stretching IN 1 ... IN 4 can be configured in steps of 0.5 ms, 7.5 ms max. |
| 259 | Duration of pulse stretching IN 5 ... IN 8 can be configured in steps of 0.5 ms, 7.5 ms max. |

## Digital Input Filters

|     |   |
|-----|---|
| 262 | Activation of digital input filters           |
|     | Bit 0 = 1: Activate digital filter for IN 1   |
|     | Bit 1 = 1: Activate digital filter for IN 2   |
|     | etc.  |
|     | Bit 15 = 1: Activate digital filter for IN 16 |

Steps 0 = 0.125 ms; 1 = 0.25 ms; 2 = 2 ms; 3 = 1 ms; 4 = 2 ms; 5 = 4 ms; 6 = 8 ms; 7 = 16 ms

|     |   |
|-----|---|
| 263 | Delay of digital filter IN 1 ... IN 4   |
| 264 | Delay of digital filter IN 5 ... IN 8   |
| 265 | Delay of digital filter IN 9 ... IN 12  |
| 266 | Delay of digital filter IN 13 ... IN 16 |

## Counter Function

|     |   |
|-----|---|
| 320 | State of counter A                            |
|     | Bit 1 = 1: Upper counting limit is exceeded   |
| 321 | Command registers of counter A                |
|     | 0x01 Count value is reset to 0.               |
|     | 0x02 Counting falling edges                   |
|     | 0x12 Counting rising edges                    |
|     | 0x06 Counting falling edges at X21.1          |
|     | Gate function at X21.2 responds to low level. |

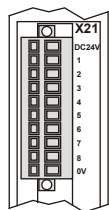


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|     |                                |   |
|-----|--------------------------------|---|
|     | 0x26                           | Counting falling edges at X21.1<br>Gate function at X21.2 responds to high level.             |
|     | 0x16                           | Counting rising edges at X21.1<br>Gate function at X21.2 responds to low level.               |
|     | 0x36                           | Counting rising edges at X21.1<br>Gate function at X21.2 responds to high level.              |
|     | 0x42                           | Counting falling edges. The adjustable upper limit in MR 325 of counter A is enabled.         |
|     | 0x52                           | Counting falling edges. The adjustable upper limit in MR 325 of counter A is enabled.         |
|     | 0x80                           | State in MR 320 is set to 0.  |
| 324 | Prescaler A                    |   |
|     | 0                              | Stops counter A. Counting pulses at the input are not taken into account.                     |
|     | 1                              | Each single pulse increments the count value.   |
|     | 2                              | Every second pulse increments the count value.  |
|     | etc.                           |   |
|     | 255                            | After registration of 255 pulses at the input the count value is incremented.                 |
| 325 |                                | Upper counting limit (0 ... 4.294.967.295)  |
| 326 |                                | Count value A (0 ... 4.294.967.295)   |
| 336 |                                | State of counter B  |
|     | Bit 1 = 1:                     | Upper counting limit is exceeded  |
| 337 | Command registers of counter B |   |
|     | 0x01                           | Count value is reset to 0.  |
|     | 0x02                           | Counting falling edges  |
|     | 0x12                           | Counting rising edges   |
|     | 0x06                           | Counting falling edges at X21.5<br>Gate function at X21.6 responds to low level.              |
|     | 0x26                           | Counting falling edges at X21.1<br>Gate function at X21.2 responds to high level.             |
|     | 0x16                           | Counting rising edges at X21.1<br>Gate function at X21.2 responds to low level.               |
|     | 0x36                           | Counting rising edges at X21.1<br>Gate function at X21.2 responds to high level.              |
|     | 0x42                           | Counting falling edges. The adjustable upper limit in MR 341 of counter B is enabled.         |
|     | 0x52                           | Counting falling edges. The adjustable upper limit in MR 341 of counter B is enabled.         |
|     | 0x80                           | State in MR 336 is set to 0.  |
| 340 | Prescaler B                    |   |
|     | 0                              | Stops counter B. Counting pulses at the input are not taken into account.                     |
|     | 1                              | Each single pulse increments the count value of counter B.                                    |
|     | 2                              | Every second pulse increments the count value of counter B.                                   |
|     | etc.                           |   |
|     | 255                            | After registration of 255 pulses at input X21.5 of counter B, the count value is incremented. |
| 341 |                                | Upper counting limit (0 ... 4.294.967.295)  |
| 342 |                                | Count value B (0 ... 4.294.967.295)   |

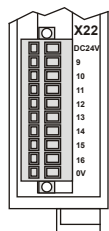
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### Assignment of Terminal X21



| Terminal Point | Digital inputs 1 ... 8     |
|----------------|----------------------------|
| X21.DC24V      | Sensor voltage recognition |
| X21.1          | Digital input IN 1         |
| X21.2          | Digital input IN 2         |
| X21.3          | Digital input IN 3         |
| X21.4          | Digital input IN 4         |
| X21.5          | Digital input IN 5         |
| X21.6          | Digital input IN 6         |
| X21.7          | Digital input IN 7         |
| X21.8          | Digital input IN 8         |
| X21.0V         | Reference potential        |

### Assignment of Terminal X22



| Terminal Point | Digital inputs 9 ... 16    |
|----------------|----------------------------|
| X22.DC24V      | Sensor voltage recognition |
| X22.9          | Digital input IN 9         |
| X22.10         | Digital input IN 10        |
| X22.11         | Digital input IN 11        |
| X22.12         | Digital input IN 12        |
| X22.13         | Digital input IN 13        |
| X22.14         | Digital input IN 14        |
| X22.15         | Digital input IN 15        |
| X22.16         | Digital input IN 16        |
| X22.0V         | Reference potential        |

# 7 Quick Reference - JX3-DIO16

## Matching OS Version

This quick reference summarizes the registers and I/O numbers of the digital input/output module JX3-DIO16 with OS version 2.35.0.00.

## Module Code

For identification purposes, a unique module code is assigned to each JX3 module.

You can read out the module code, for example, in the case of a JC-3xx using R 100002015 and R 100002016.

The module code is also contained in the EDS.

Module code JX3-DIO16: 301

## I/O Numbers

|               |                            |  |
|---------------|----------------------------|--|
| <b>JC-3xx</b> | 10000xxzz<br>xx            | Module number: 02 ... 17                               |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 100000201...<br>100000216  | I/O numbers for module # 02                            |
| <b>JC-24x</b> | xxzz<br>xx                 | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 201 ... 216                | I/O numbers for I/O module # 02                        |
| <b>JC-647</b> | m1xxzz<br>m1               | Submodule socket + 1: 2 ... 4                          |
|               | xx                         | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 20201 ... 20216            | I/O numbers for submodule socket 1 and I/O module # 02 |
| <b>JC-9xx</b> | 20SJ0xxzz<br>S             | Number of module board: 1 ... 5                        |
|               | Y                          | Number of JX6-I/O board: 1 ... 2                       |
|               | xx                         | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 201100201 ...<br>201100216 | I/O numbers for S = 1; J = 1 and I/O module # 02       |

## General Overview - Registers

|             |                                      |
|-------------|--------------------------------------|
| 0           | Module state                         |
| 2           | Process data input                   |
| 3           | Process data output                  |
| 9           | Version                              |
| 256         | All inputs IN 1 ... IN 8             |
| 257 ... 259 | Pulse Stretching with Digital Inputs |
| 262 ... 266 | Digital input filters                |
| 320 ... 342 | Counters A and B                     |
| 512         | All outputs OUT 9 ... OUT 16         |
| 513 ... 514 | Error States                         |
| 515 ... 535 | PWM                                  |

## Register Numbers

|               |           |
|---------------|-----------|
| <b>JC-3xx</b> | 100xxzzzz |
|---------------|-----------|

|               |                |   |
|---------------|----------------|---|
|               | xx             | Module number: 02 ... 17                            |
|               | zzzz           | Module register number: 0000 ... 9999               |
| <b>JC-24x</b> | 3xxz<br>xx     | I/O module number - 2: 00 ... 30                    |
|               | z              | Module register number: 0 ... 9                     |
|               |                | Only indirect access to additional module registers |
| <b>JC-647</b> | 3m03xxz<br>m   | Submodule position: 1 ... 3                         |
|               | xx             | I/O module number - 2: 00 ... 30                    |
|               | z :            | Module register number: 0 ... 9                     |
|               |                | Only indirect access to additional module registers |
| <b>JC-9xx</b> | 20SJ03xxz<br>S | Number of module board: 1 ... 5                     |
|               | Y              | Number of JX6-I/O board: 1 ... 2                    |
|               | xx             | I/O module number - 2: 00 ... 30                    |
|               | z              | Module register number: 0 ... 9                     |
|               |                | Only indirect access to additional module registers |

## State and Diagnostics

|            |                                       |
|------------|---------------------------------------|
| 0          | Module state                          |
| Bit 0 = 1: | Short circuit/overload - OUT 9 ... 16 |
| Bit 1 = 1: | Voltage at X21.DC24V < 16.3 V         |
| Bit 2 = 1: | Voltage at X31.DC24V < 16.3 V         |
| 9          | FPGA revision                         |
| 32         | FPGA revision                         |

## Pulse Stretching

|            |  |
|------------|--|
| 257        | Activation of pulse stretching   |
| Bit 0 = 1: | Activate pulse stretching for IN 1   |
| Bit 1 = 1: | Activate pulse stretching for IN 2   |
|            | etc.   |
| Bit 7 = 1: | Activate pulse stretching for IN 8   |
| 258        | Duration of pulse stretching IN 1 ... IN 4 can be configured in steps of 0.5 ms, 7.5 ms max. |
| 259        | Duration of pulse stretching IN 5 ... IN 8 can be configured in steps of 0.5 ms, 7.5 ms max. |

## Digital Input Filters

|             |                                     |
|-------------|-------------------------------------|
| 262         | Activation of digital input filters |
| Bit 0 = 1:  | Activate digital filter for IN 1    |
| Bit 1 = 1:  | Activate digital filter for IN 2    |
|             | etc.                                |
| Bit 15 = 1: | Activate digital filter for IN 16   |

**Steps** 0 = 0.125 ms; 1 = 0.25 ms; 2 = 2 ms; 3 = 1 ms; 4 = 2 ms; 5 = 4 ms; 6 = 8 ms; 7 = 16 ms

|     |   |
|-----|---|
| 263 | Delay of digital filter IN 1 ... IN 4   |
| 264 | Delay of digital filter IN 5 ... IN 8   |
| 265 | Delay of digital filter IN 9 ... IN 12  |
| 266 | Delay of digital filter IN 13 ... IN 16 |

## Counter Function

|            |                                  |
|------------|----------------------------------|
| 320        | State of counter A               |
| Bit 1 = 1: | Upper counting limit is exceeded |
| 321        | Command registers of counter A   |
| 0x01       | Count value is reset to 0.       |

## 7 Quick Reference - JX3-DIO16

|            |   |
|------------|---|
| 0x02       | Counting falling edges  |
| 0x12       | Counting rising edges   |
| 0x06       | Counting falling edges at X21.1<br>Gate function at X21.2 responds to low level.              |
| 0x26       | Counting falling edges at X21.1<br>Gate function at X21.2 responds to high level.             |
| 0x16       | Counting rising edges at X21.1<br>Gate function at X21.2 responds to low level.               |
| 0x36       | Counting rising edges at X21.1<br>Gate function at X21.2 responds to high level.              |
| 0x42       | Counting falling edges. The adjustable upper limit in MR 325 of counter A is enabled.         |
| 0x52       | Counting falling edges. The adjustable upper limit in MR 325 of counter A is enabled.         |
| 0x80       | State in MR 320 is set to 0.  |
| <b>324</b> | <b>Prescaler A</b>  |
| 0          | Stops counter A. Counting pulses at the input are not taken into account.                     |
| 1          | Each single pulse increments the count value.   |
| 2          | Every second pulse increments the count value.  |
| etc.       |   |
| 255        | After registration of 255 pulses at the input the count value is incremented.                 |
| <b>325</b> | <b>Upper counting limit (0 ... 4.294.967.295)</b>   |
| <b>326</b> | <b>Count value A (0 ... 4.294.967.295)</b>  |
| <b>336</b> | <b>State of counter B</b>   |
| Bit 1 = 1: | Upper counting limit is exceeded  |
| <b>337</b> | <b>Command registers of counter B</b>   |
| 0x01       | Count value is reset to 0.  |
| 0x02       | Counting falling edges  |
| 0x12       | Counting rising edges   |
| 0x06       | Counting falling edges at X21.5<br>Gate function at X21.6 responds to low level.              |
| 0x26       | Counting falling edges at X21.1<br>Gate function at X21.2 responds to high level.             |
| 0x16       | Counting rising edges at X21.1<br>Gate function at X21.2 responds to low level.               |
| 0x36       | Counting rising edges at X21.1<br>Gate function at X21.2 responds to high level.              |
| 0x42       | Counting falling edges. The adjustable upper limit in MR 341 of counter B is enabled.         |
| 0x52       | Counting falling edges. The adjustable upper limit in MR 341 of counter B is enabled.         |
| 0x80       | State in MR 336 is set to 0.  |
| <b>340</b> | <b>Prescaler B</b>  |
| 0          | Stops counter B. Counting pulses at the input are not taken into account.                     |
| 1          | Each single pulse increments the count value of counter B.                                    |
| 2          | Every second pulse increments the count value of counter B.                                   |
| etc.       |   |
| 255        | After registration of 255 pulses at input X21.5 of counter B, the count value is incremented. |
| <b>341</b> | <b>Upper counting limit (0 ... 4.294.967.295)</b>   |
| <b>342</b> | <b>Count value B (0 ... 4.294.967.295)</b>  |

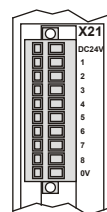
### Error States

|            |   |
|------------|---|
| <b>513</b> | <b>Activating error state</b>             |
| Bit 8 = 0: | OUT 9 remains unchanged                   |
| Bit 8 = 1: | OUT 9 assumes the state from MR 514       |
| Bit 9 = 0: | OUT 10 remains unchanged                  |
| Bit 9 = 1: | OUT 10 assumes the state from MR 514 etc. |
| <b>514</b> | <b>Error state of outputs</b>             |
| Bit 8 = 0: | OUT 9 assumes the state OFF               |
| Bit 8 = 1: | OUT 9 assumes the state ON                |
| Bit 9 = 0: | OUT 10 assumes the state OFF              |
| Bit 9 = 1: | OUT 10 assumes the state ON etc.          |

### PWM

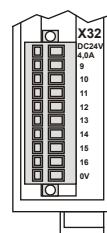
|             |  |
|-------------|--|
| <b>515</b>  | <b>Enabling the PWM functionality</b>            |
| Bit 8 = 1:  | Enabling PWM function for OUT 9                  |
| Bit 9 = 1:  | Enabling PWM function for OUT 10                 |
| Bit 10 = 1: | Enabling PWM function for OUT 11                 |
| Bit 11 = 1: | Enabling PWM function for OUT 12                 |
| Bit 12 = 1: | Enabling PWM function for OUT 13                 |
| Bit 13 = 1: | Enabling PWM function for OUT 14                 |
| Bit 14 = 1: | Enabling PWM function for OUT 15                 |
| Bit 15 = 1: | Enabling PWM function for OUT 16                 |
| <b>526</b>  | <b>PWM prescaler 1 for outputs OUT 9 ... 12</b>  |
| <b>527</b>  | <b>PWM duty cycle for output OUT 9</b>           |
| <b>528</b>  | <b>PWM duty cycle for output OUT 10</b>          |
| <b>529</b>  | <b>PWM duty cycle for output OUT 11</b>          |
| <b>530</b>  | <b>PWM duty cycle for output OUT 12</b>          |
| <b>531</b>  | <b>PWM prescaler 2 for outputs OUT 13 ... 16</b> |
| <b>532</b>  | <b>PWM duty cycle for output OUT 13</b>          |
| <b>533</b>  | <b>PWM duty cycle for output OUT 14</b>          |
| <b>534</b>  | <b>PWM duty cycle for output OUT 15</b>          |
| <b>535</b>  | <b>PWM duty cycle for output OUT 16</b>          |

### Assignment of Terminal X21



| Terminal Point | Digital inputs 1 ... 8     |
|----------------|----------------------------|
| X21.DC24V      | Sensor voltage recognition |
| X21.1          | Digital input IN 1         |
| X21.2          | Digital input IN 2         |
| X21.3          | Digital input IN 3         |
| X21.4          | Digital input IN 4         |
| X21.5          | Digital input IN 5         |
| X21.6          | Digital input IN 6         |
| X21.7          | Digital input IN 7         |
| X21.8          | Digital input IN 8         |
| X21.0V         | Reference potential        |

### Assignment of Terminal X32



| Terminal Point | Digital inputs/outputs 9 ... 16                    |
|----------------|--|
| X32.DC24V      | Actuator supply infeed or sensor voltage detection |
| X32.9          | Multi-purpose I/O: IN 9 / OUT 9                    |
| X32.10         | Multi-purpose I/O: IN 10 / OUT 10                  |
| X32.11         | Multi-purpose I/O: IN 11 / OUT 11                  |
| X32.12         | Multi-purpose I/O: IN 12 / OUT 12                  |
| X32.13         | Multi-purpose I/O: IN 13 / OUT 13                  |
| X32.14         | Multi-purpose I/O: IN 14 / OUT 14                  |
| X32.15         | Multi-purpose I/O: IN 15 / OUT 15                  |
| X32.16         | Multi-purpose I/O: IN 16 / OUT 16                  |
| X32.0V         | Reference potential                                |

# 8 Quick Reference - JX3-DMS2

## Matching OS Version

This quick reference summarizes the registers of the strainometer module JX3-DMS2 with OS version 1.03.0.00.

## Module Code

For identification purposes, a unique module code is assigned to each JX3 module.

You can read out the module code, for example, in the case of a JC-3xx using R 100002015 and R 100002016.

The module code is also contained in the EDS.

Module code JX3-DMS2: 316

## General Overview - Registers

|               |                                 |
|---------------|---------------------------------|
| 0             | Module state                    |
| 2 ... 3       | Analog inputs 1 through 2       |
| 9, 32, 257    | Versions/Revisions              |
| 1100 ... 1199 | Configuration of analog input 1 |
| 1200 ... 1299 | Configuration of analog input 2 |
| 9740 ... 9744 | Oscilloscope                    |

## Register Numbers

|               |   |                                       |
|---------------|---|---------------------------------------|
| <b>JC-3xx</b> | 100xxzzzz<br>xx                                     | Module number: 02 ... 17              |
|               | zzzz  | Module register number: 0000 ... 9999 |
| <b>JC-24x</b> | 3xxz<br>xx  | I/O module number - 2: 00 ... 30      |
|               | z   | Module register number: 0 ... 9       |
|               | Only indirect access to additional module registers |                                       |
| <b>JC-647</b> | 3m03xxz<br>m  | Submodule position: 1 ... 3           |
|               | xx  | I/O module number - 2: 00 ... 30      |
|               | z :   | Module register number: 0 ... 9       |
|               | Only indirect access to additional module registers |                                       |
| <b>JC-9xx</b> | 20SJ03xxz<br>S                                      | Number of module board: 1 ... 5       |
|               | Y   | Number of JX6-I/O board: 1 ... 2      |
|               | xx  | I/O module number - 2: 00 ... 30      |
|               | z   | Module register number: 0 ... 9       |
|               | Only indirect access to additional module registers |                                       |

## Meaning of y

|   |                                    |
|---|------------------------------------|
| y | Number of analog input y = 1 ... 2 |
|---|------------------------------------|

## Module State

|             |                                     |
|-------------|-------------------------------------|
| <b>0</b>    | <b>Module state</b>                 |
| Bit 16 = 1: | Collective bit "Readings are valid" |
| Bit 19 = 1: | Collective bit "Lower limit"        |
| Bit 20 = 1: | Collective bit "Upper limit"        |
| Bit 23 = 1: | Collective bit "Forcing"            |
| Bit 24 = 1: | Monitoring - voltages               |
| Bit 30 = 1: | Synchronous data exchange           |

## Readings - channel 1 and channel 2

|   |                                    |
|---|------------------------------------|
| 2 | Digital value for analog input # 1 |
| 3 | Digital value for analog input # 2 |

## Versions / Revisions

|     |                    |
|-----|--------------------|
| 9   | OS version         |
| 32  | FPGA revision      |
| 257 | Bootloader version |

## State of Analog Input y

|             |  |
|-------------|--|
| <b>1y00</b> | <b>State of analog input y (y = 1 ... 2)</b> |
| Bit 1 = 1:  | Readings are valid                           |
| Bit 3 = 1:  | Fastest possible conversion                  |
| Bit 4 = 1:  | Fast conversion                              |
| Bit 5 = 1:  | Slower conversion                            |
| Bit 6 = 1:  | Even slower conversion                       |
| Bit 8 = 1:  | Force value is displayed                     |
| Bit 9 = 1:  | Slowest possible conversion                  |
| Bit 12 = 1: | Minimum of channel y was scaled              |
| Bit 13 = 1: | Maximum of channel y was scaled              |
| Bit 14 = 1: | Channel y is active                          |

## Instruction for Analog Input y

|             |   |
|-------------|---|
| <b>1y01</b> | <b>Instruction for analog input y (y = 1 ... 2)</b>                                     |
| 6           | Acknowledgement of collective bits  |
| 160         | Show scaled reading   |
| 161         | Show digitized value without scaling/conversion   |
| 170         | Show (again) the strain gage value. (Forcing OFF)                                       |
| 171         | Show force value  |
| 210         | Capture the minimum value of the physical variable: Store ADC minimum value to MR 1y24. |
| 220         | Capture the maximum value of the physical variable: Store ADC maximum value to MR 1y26. |

## User-defined Scaling

|      |   |
|------|---|
| 1y06 | Number of averaging cycles: 1, 2, 4, 8, 16, 32, 64, 128       |
| 1y11 | Sensor sensitivity in $\mu V/V$                               |
| 1y24 | 1. Digital value for analog input y                           |
| 1y25 | 1. value of the physical variable (minimum)                   |
| 1y26 | 2. Digital value for analog input y                           |
| 1y27 | 2. value of the physical variable (maximum)                   |
| 1y28 | Offset t of straight line $y = mx + t$                        |
| 1y29 | Offset of actual value (similar to tare function with scales) |

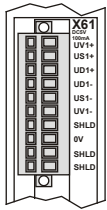
## Other Configurations

|      |  |
|------|--|
| 1y04 | Force value for analog input y                         |
| 1y08 | Lower limit of analog input y                          |
| 1y09 | Upper limit of analog input y                          |
| 1y20 | Trailing indicator for minimum value of analog input y |
| 1y21 | Trailing indicator for maximum value of analog input y |

## Oscilloscope

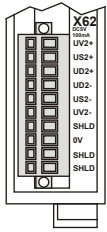
|      |                 |
|------|-----------------|
| 9740 | Command         |
| 9741 | Parameter index |
| 9742 | Parameter       |
| 9743 | Data index      |
| 9744 | Data            |

### Assignment of Terminal X61



| Terminal Point | Signals of resistive sensor 1             |
|----------------|---|
| X61.UV1+       | Power supply (+) for sensor (+5 V/100 mA) |
| X61.US1+       | Do not connect                            |
| X61.UD1+       | Sensor: Signal+                           |
| X61.UD1-       | Sensor: Signal-                           |
| X61.US1-       | Do not connect                            |
| X61.UV1-       | Power supply (-) for sensor               |
| X61.SHLD       | Shielding connection                      |
| X61.0V         | Reference potential                       |
| X61.SHLD       | Shielding connection                      |
| X61.SHLD       | Shielding connection                      |

### Assignment of Terminal X62



| Terminal Point | Signals of resistive sensor 2             |
|----------------|---|
| X62.UV2+       | Power supply (+) for sensor (+5 V/100 mA) |
| X62.US2+       | Do not connect                            |
| X62.UD2+       | Sensor: Signal+                           |
| X62.UD2-       | Sensor: Signal-                           |
| X62.US2-       | Do not connect                            |
| X62.UV2-       | Power supply (-) for sensor               |
| X62.SHLD       | Shielding connection                      |
| X62.0V         | Reference potential                       |
| X62.SHLD       | Shielding connection                      |
| X62.SHLD       | Shielding connection                      |

# 9 Quick Reference - JX3-DO16

## Matching OS Version

This quick reference summarizes the registers and I/O numbers of the digital output module JX3-DO16 with OS version 2.35.0.00.

## Module Code

For identification purposes, a unique module code is assigned to each JX3 module.

You can read out the module code, for example, in the case of a JC-3xx using R 100002015 and R 100002016.

The module code is also contained in the EDS.

Module code JX3-DO16: 302

## I/O Numbers

|               |                            |  |
|---------------|----------------------------|--|
| <b>JC-3xx</b> | 10000xxzz<br>xx            | Module number: 02 ... 17                               |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 100000201...<br>100000216  | I/O numbers for module # 02                            |
| <b>JC-24x</b> | xxzz<br>xx                 | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 201 ... 216                | I/O numbers for I/O module # 02                        |
| <b>JC-647</b> | m1xxzz<br>m1               | Submodule socket + 1: 2 ... 4                          |
|               | xx                         | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 20201 ... 20216            | I/O numbers for submodule socket 1 and I/O module # 02 |
| <b>JC-9xx</b> | 20SJ0xxzz<br>S             | Number of module board: 1 ... 5                        |
|               | Y                          | Number of JX6-I/O board: 1 ... 2                       |
|               | xx                         | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 201100201 ...<br>201100216 | I/O numbers for S = 1; J = 1 and I/O module # 02       |

## General Overview - Registers

|             |                              |
|-------------|------------------------------|
| 0           | Module state                 |
| 9           | Revision                     |
| 512         | All outputs OUT 1 ... OUT 16 |
| 513 ... 514 | Error States                 |
| 515 ... 535 | PWM                          |

## Register Numbers

|               |                 |                                       |
|---------------|-----------------|---------------------------------------|
| <b>JC-3xx</b> | 100xxzzzz<br>xx | Module number: 02 ... 17              |
|               | zzzz            | Module register number: 0000 ... 9999 |
| <b>JC-24x</b> | 3xxz<br>xx      | I/O module number - 2: 00 ... 30      |

|               |   |   |
|---------------|---|---|
| z             | Module register number: 0 ... 9                     |   |
|               | Only indirect access to additional module registers |   |
| <b>JC-647</b> | 3m03xxz<br>m  | Submodule position: 1 ... 3                         |
|               | xx  | I/O module number - 2: 00 ... 30                    |
|               | z :   | Module register number: 0 ... 9                     |
|               |   | Only indirect access to additional module registers |
| <b>JC-9xx</b> | 20SJ03xxz<br>S                                      | Number of module board: 1 ... 5                     |
|               | Y   | Number of JX6-I/O board: 1 ... 2                    |
|               | xx  | I/O module number - 2: 00 ... 30                    |
|               | z   | Module register number: 0 ... 9                     |
|               |   | Only indirect access to additional module registers |

## State and Diagnostics

|         |  |
|---------|--|
| 0       | Module state                                     |
|         | Bit 0 = 1: Short circuit/overload - OUT 1 ... 8  |
|         | Bit 1 = 1: Short circuit/overload - OUT 9 ... 16 |
| 9<br>32 | FPGA revision<br>FPGA revision                   |

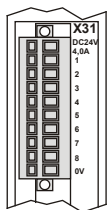
## Error States

|     |  |
|-----|--|
| 513 | Activating error state                         |
|     | Bit 0 = 0: OUT 1 remains unchanged             |
|     | Bit 0 = 1: OUT 1 assumes the state from MR 514 |
|     | Bit 0 = 0: OUT 2 remains unchanged             |
|     | Bit 1 = 1: OUT 2 assumes the state from MR 514 |
|     | etc.   |
| 514 | Error state of outputs                         |
|     | Bit 0 = 0: OUT 1 assumes the state OFF         |
|     | Bit 0 = 1: OUT 1 assumes the state ON          |
|     | Bit 1 = 0: OUT 2 assumes the state OFF         |
|     | Bit 1 = 1: OUT 2 assumes the state ON          |
|     | etc.   |

## PWM

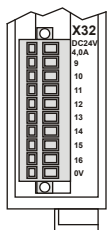
|     |  |
|-----|--|
| 515 | Enabling the PWM functionality               |
|     | Bit 8 = 1: Enabling PWM function for OUT 9   |
|     | Bit 9 = 1: Enabling PWM function for OUT 10  |
|     | Bit 10 = 1: Enabling PWM function for OUT 11 |
|     | Bit 11 = 1: Enabling PWM function for OUT 12 |
|     | Bit 12 = 1: Enabling PWM function for OUT 13 |
|     | Bit 13 = 1: Enabling PWM function for OUT 14 |
|     | Bit 14 = 1: Enabling PWM function for OUT 15 |
|     | Bit 15 = 1: Enabling PWM function for OUT 16 |
| 526 | PWM prescaler 1 for outputs OUT 9 ... 12     |
| 527 | PWM duty cycle for output OUT 9              |
| 528 | PWM duty cycle for output OUT 10             |
| 529 | PWM duty cycle for output OUT 11             |
| 530 | PWM duty cycle for output OUT 12             |
| 531 | PWM prescaler 2 for outputs OUT 13 ... 16    |
| 532 | PWM duty cycle for output OUT 13             |
| 533 | PWM duty cycle for output OUT 14             |
| 534 | PWM duty cycle for output OUT 15             |
| 535 | PWM duty cycle for output OUT 16             |

### Assignment of Terminal X31



| Terminal Point | Digital outputs 1 ... 8   |
|----------------|---------------------------|
| X31.DC24V      | Infeed of actuator supply |
| X31.1          | Digital output OUT 1      |
| X31.2          | Digital output OUT 2      |
| X31.3          | Digital output OUT 3      |
| X31.4          | Digital output OUT 4      |
| X31.5          | Digital output OUT 5      |
| X31.6          | Digital output OUT 6      |
| X31.7          | Digital output OUT 7      |
| X31.8          | Digital output OUT 8      |
| X31.0V         | Reference potential       |

### Assignment of Terminal X32



| Terminal Point | Digital outputs 9 ... 16  |
|----------------|---------------------------|
| X32.DC24V      | Infeed of actuator supply |
| X32.9          | Digital output OUT 9      |
| X32.10         | Digital output OUT 10     |
| X32.11         | Digital output OUT 11     |
| X32.12         | Digital output OUT 12     |
| X32.13         | Digital output OUT 13     |
| X32.14         | Digital output OUT 14     |
| X32.15         | Digital output OUT 15     |
| X32.16         | Digital output OUT 16     |
| X32.0V         | Reference potential       |

---



# 10 Quick Reference - JX3-MIX1

## Matching OS Version

This quick reference summarizes the registers and I/O numbers of the multifunctional module JX3-MIX1 with OS version 1.00.0.00.

## Module Code

For identification purposes, a unique module code is assigned to each JX3 module.

You can read out the module code, for example, in the case of a JC-3xx using R 100002015 and R 100002016.

The module code is also contained in the EDS.

Module code JX3-MIX1: 305

## I/O Numbers

|               |                            |  |
|---------------|----------------------------|--|
| <b>JC-3xx</b> | 10000xxzz<br>xx            | Module number: 02 ... 17                               |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 100000201...<br>100000216  | I/O numbers for module # 02                            |
| <b>JC-24x</b> | xxzz<br>xx                 | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 201 ... 216                | I/O numbers for I/O module # 02                        |
| <b>JC-647</b> | m1xxzz<br>m1               | Submodule socket + 1: 2 ... 4                          |
|               | xx                         | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 20201 ... 20216            | I/O numbers for submodule socket 1 and I/O module # 02 |
| <b>JC-9xx</b> | 20SJ0xxzz<br>S             | Number of module board: 1 ... 5                        |
|               | Y                          | Number of JX6-I/O board: 1 ... 2                       |
|               | xx                         | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 201100201 ...<br>201100216 | I/O numbers for S = 1; J = 1 and I/O module # 02       |

## General Registers of JX3-MIX

|               |                                    |
|---------------|------------------------------------|
| 0             | Module state                       |
| 1             | Module command                     |
| 2 ... 5       | Process data                       |
| 9             | Version                            |
| 500 ... 599   | Error states of multi-purpose I/Os |
| 1100 ... 1199 | Analog input 1 (X61.AI1)           |
| 1200 ... 1299 | Analog input 2 (X61.AI2)           |
| 1300 ... 1399 | Analog input 3 (X61.AI3)           |
| 1400 ... 1499 | Analog output 1 (X61.AO1)          |
| 1500 ... 1599 | Counter input A (X61.CNTA)         |
| 1600 ... 1699 | Counter input B (X61.CNTB)         |
| 1800 ... 1899 | Stepper Motor                      |
| 9740 ... 9744 | Oscilloscope                       |

## Register Numbers

|               |                 |   |
|---------------|-----------------|---|
| <b>JC-3xx</b> | 100xxzzzz<br>xx | Module number: 02 ... 17                            |
|               | zzzz            | Module register number: 0000 ... 9999               |
| <b>JC-24x</b> | 3xxz<br>xx      | I/O module number - 2: 00 ... 30                    |
|               | z               | Module register number: 0 ... 9                     |
|               |                 | Only indirect access to additional module registers |
| <b>JC-647</b> | 3m03xxz<br>m    | Submodule position: 1 ... 3                         |
|               | xx              | I/O module number - 2: 00 ... 30                    |
|               | z :             | Module register number: 0 ... 9                     |
|               |                 | Only indirect access to additional module registers |
| <b>JC-9xx</b> | 20SJ03xxz<br>S  | Number of module board: 1 ... 5                     |
|               | Y               | Number of JX6-I/O board: 1 ... 2                    |
|               | xx              | I/O module number - 2: 00 ... 30                    |
|               | z               | Module register number: 0 ... 9                     |
|               |                 | Only indirect access to additional module registers |

## Module State

|            |   |
|------------|---|
| <b>0</b>   | <b>Module state</b>                           |
| Bit 0 = 1  | Error: Internal voltage reference             |
| Bit 1 = 1  | Error: Multi-purpose I/Os                     |
| Bit 4 = 1  | Error: Serial interface                       |
| Bit 5 = 1  | Error: Stepper motor                          |
| Bit 6 = 1  | Error: Analog converter (D/A and A/D)         |
| Bit 16 = 1 | Stepper motor: Referencing completed          |
| Bit 17 = 1 | Stepper motor: Target window has been reached |
| Bit 18 = 1 | Stepper motor: Window is defined              |
| Bit 19 = 1 | Stepper motor: Axis stopped                   |
| Bit 20 = 1 | Stepper motor: Deceleration ramp is enabled   |
| Bit 25 = 1 | Analog I/O: Analog values are valid           |
| Bit 30 = 1 | Synchronous data exchange                     |

## Module-Specific Command Registers

|          |                                  |
|----------|----------------------------------|
| <b>1</b> | <b>Command</b>                   |
| 6        | Clear error of status register 0 |

## Versions / Revisions

|     |                    |
|-----|--------------------|
| 9   | OS version         |
| 32  | FPGA revision      |
| 769 | Bootloader version |

## Pointer to Process Data

### Pointer to process data in MR 800 ... MR 802

|         |  |
|---------|--|
| Value 0 | Averaged value of analog input 1 (X61.AI1) |
| Value 1 | Averaged value of analog input 2 (X61.AI2) |
| Value 2 | Averaged value of analog input 3 (X61.AI3) |
| Value 3 | Reading of counter A                       |
| Value 4 | Reading of counter B                       |
| Value 5 | Stepper motor: Actual position             |
| Value 6 | Stepper motor: Actual speed                |

MR 800 <- value. The result is stored to MR 2 and MR 64.

MR 801 <- value. The result is stored to MR 3 and MR 65.

MR 802 <- value. The result is stored to MR 4 and MR 66.

MR 80: The value ranging from 0 ... 4.095 is output as voltage ranging from 0 ... 10 V at analog output X61.AO1.

## Analog Input AI1 ... AI3

|      |       |
|------|-------|
| 1y00 | State |
|------|-------|

## 10 Quick Reference - JX3-MIX1

|      |                |  |
|------|----------------|--|
|      | Bit 0 = 1:     | Error: Analog hardware                             |
|      | Bit 4 = 1:     | Error: Incorrect calibration value                 |
|      | Bit 7 = 1:     | Error: Internal voltages                           |
|      | Bit 12 = 1:    | Validity: Buffer for average values is filled      |
|      | Bit 25 = 1:    | Validity of measured values                        |
| 1y01 | Command        |  |
|      | 5              | Reset error bits of MR 1y00                        |
| 1y02 | AI1...AI3      | Averaged reading of the corresponding analog input |
| 1y06 | Moving average |  |
|      | 1              | Averaging disabled                                 |
|      | 4              | 4-fold moving average                              |
|      | 16             | 16-fold moving average                             |

with y = 1 ... 3 for analog input X61.AI1 ... X61.AI3

### Analog Output AO1

|       |                                       |
|-------|---------------------------------------|
| 80    | Analog output value                   |
| Range | 12 bits: 0 ... 4.095                  |
| 0     | corresponds to 0 V at output X61.AO1  |
| 4.095 | corresponds to 10 V at output X61.AO1 |

Conversion

$$MR = U \cdot \frac{4095}{10V}$$

Analog output X61.AO1

### Counter Inputs A, B (single- and dual-channel counter)

|      |             |   |
|------|-------------|---|
| 1y00 | State       |   |
|      | Bit 3 = 1:  | Edge evaluation: positive edge                            |
|      | Bit 4 = 1:  | Edge evaluation: negative edge                            |
|      | Bit 5 = 1:  | Edge evaluation: both edges                               |
|      | Bit 6 = 1:  | Forcing function is enabled                               |
|      | Bit 7 = 1:  | Modulo function is enabled                                |
|      | Bit 8 = 1:  | Gate function is enabled                                  |
|      | Bit 9 = 1:  | Strobe function is enabled                                |
|      | Bit 10 = 1: | Reset function is enabled                                 |
|      | Bit 11 = 0: | Negative counting direction (single-channel counter only) |
|      | Bit 11 = 1: | Positive counting direction (single-channel counter only) |
|      | Bit 12 = 0: | Single-channel counter is enabled                         |
|      | Bit 12 = 1: | Dual-channel counter is enabled                           |
|      | Bit 14 = 1: | Gate function is enabled                                  |
|      | Bit 15 = 1: | Counter is enabled  |
| 1y01 | Command     |   |
|      | 20          | Enable the forcing function                               |
|      | 21          | Disable the forcing function                              |
|      | 30          | Enable counter y (counter A: y = 5, counter B: y = 6)     |
|      | 31          | Disable counter y   |
|      | 32          | Counting direction: forward                               |
|      | 33          | Counting direction: reverse                               |
|      | 34          | Enable gate function                                      |
|      | 35          | Disable gate function                                     |
|      | 36          | Enable strobe function                                    |
|      | 37          | Disable strobe function                                   |
|      | 40          | Enable single-channel counter, only MR 1501               |

|      |  |                       |
|------|--|-----------------------|
| 41   | Enable dual-channel counter, only MR 1501                                |                       |
| 50   | Enable rising edge   |                       |
| 51   | Enable falling edge  |                       |
| 52   | Enable both edges  |                       |
| 60   | Enable modulo function   |                       |
| 61   | Disable modulo function  |                       |
| 1y02 | Force value  |                       |
| 1y03 | Count value  |                       |
| 1y04 | Strobe value   |                       |
| 1y05 | Reset value  |                       |
| 1y06 | Modulo value   |                       |
| 1y10 | Allocation of gate to input DIO1 ... DIO8                                |                       |
| 1y11 | Allocation of strobe to input DIO1 ... DIO8                              |                       |
| 1y12 | Allocation of reset to input DIO1 ... DIO8                               |                       |
| 1y13 | Polarity of strobe, gate, reset; bit-coded                               |                       |
|      | Bit 0 = 0  | Gate is low-active    |
|      | Bit 0 = 1  | Gate is high-active   |
|      | Bit 1 = 0  | Strobe is low-active  |
|      | Bit 1 = 1  | Strobe is high-active |
|      | Bit 2 = 0  | Reset is low-active   |
|      | Bit 2 = 1  | Reset is high-active  |
| 1y20 | Frequency (( Δcounting pulses * 1,000) / MR 1y21                         |                       |
| 1y21 | Time base for frequency in ms  |                       |
|      | where y = 5 represents counter A (X61.CNTA)                              |                       |
|      | where y = 6 represents counter B (X61.CNTB)                              |                       |
|      | where y = 5 represents dual-channel counter A, B (X61.CNTA and X61.CNTB) |                       |

### Stepper Motor

|      |                      |   |
|------|----------------------|---|
| 1800 | State: Stepper motor |   |
|      | Bit 0 = 1:           | The positive limit switch is active once the axis has reached the positive hardware or software limit switch.       |
|      | Bit 1 = 1:           | The negative limit switch is active once the axis has reached the negative hardware or software limit switch.       |
|      | Bit 2 = 1:           | The reference switch is active  |
|      | Bit 3 = 1:           | Software limit switch LIM:<br>The actual motor position has exceeded the set position of the software limit switch. |
|      | Bit 4 = 1:           | Hardware limit switch LIM:<br>The actual motor position has exceeded the set position of the hardware limit switch. |
|      | Bit 5 = 1:           | Error: Stepper motor  |
|      | Bit 6 = 1:           | Machine referencing error   |
|      | Bit 7 = 1:           | Software limit switch has been activated  |
|      | Bit 8 = 1:           | Stop at the reference point   |
|      | Bit 9 = 0:           | Axis type: Linear   |
|      | Bit 9 = 1:           | Axis type: Modulo   |
|      | Bit 10 = 0:          | Absolute positioning  |
|      | Bit 10 = 1:          | Relative positioning  |
|      | Bit 11 = 1:          | Endless positioning is enabled  |
|      | Bit 12 = 0:          | DIR: Negative direction of travel (if DIR polarity = 0)   |
|      | Bit 12 = 1:          | DIR: Positive direction of travel (if DIR polarity = 0)   |
|      | Bit 16 = 1:          | Reference position is valid   |
|      | Bit 17 = 1:          | AXARR: Will be set once the destination window is reached   |
|      | Bit 18 = 1:          | Within the destination window   |
|      | Bit 19 = 1:          | The axis is at standstill   |

---

|      |             |   |
|------|-------------|---|
|      | Bit 20 = 1: | Busy: Motor is running                                  |
|      | Bit 21 = 1: | Axis is in deceleration ramp                            |
| 1801 | Command     |   |
|      | 0           | Stop with programmed decel: Stop with deceleration ramp |
|      | 1           | Enable the software limit switch                        |
|      | 2           | Disable the software limit switch                       |
|      | 3           | Set reference   |
|      | 4           | Clearing the reference                                  |
|      | 5           | Stop without deceleration ramp                          |
|      | 9           | Automatic reference run, mode # 1                       |
|      | 10          | Automatic reference run, mode # 2                       |
|      | 11          | Automatic reference run, mode # 3                       |
|      | 12          | Automatic reference run, mode # 4                       |
|      | 17          | Positioning mode: Relative positioning                  |
|      | 18          | Positioning mode: Absolute positioning                  |
|      | 19          | Continue the interrupted positioning motion             |
|      | 22          | Stop at the reference point                             |
|      | 23          | Do not stop at the reference point                      |
|      | 56          | Start endless positioning in positive direction         |
|      | 57          | Start endless positioning in negative direction         |
| 1802 |             | Set position  |
| 1803 |             | Set stepping rate                                       |
| 1804 |             | Polarities  |
| 1805 |             | Acceleration ramp                                       |
| 1806 |             | Deceleration ramp                                       |
| 1807 |             | Destination window                                      |
| 1808 |             | Start-stop frequency                                    |
| 1809 |             | Actual position   |
| 1810 |             | Width of STEP pulse                                     |
| 1811 |             | Actual stepping rate                                    |
| 1814 |             | Position SW LIM+  |
| 1815 |             | Position SW LIM-  |
| 1816 |             | Assignment of REF to DIO1 ... DIO8                      |
| 1817 |             | Assignment of HW LIM+ to DIO1 ... DIO8                  |
| 1818 |             | Assignment of HW LIM- to DIO1 ... DIO8                  |
| 1868 |             | Last absolute set position                              |
| 1885 |             | Overflow position                                       |
| 1899 |             | Software version of the stepper motor module            |

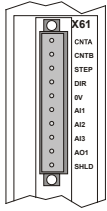
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### Oscilloscope

|      |                 |
|------|-----------------|
| 9740 | Command         |
| 9741 | Parameter index |
| 9742 | Parameter       |
| 9743 | Data index      |
| 9744 | Data            |

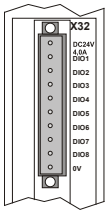
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**Assignment of Terminal X61**



| Terminal Point | Description                          |
|----------------|--------------------------------------|
| X61.CNTA       | Counter input A                      |
| X61.CNTB       | Counter input B                      |
| X61.STEP       | Open-drain stepper motor output STEP |
| X61.DIR        | Open-drain stepper motor output DIR  |
| X61.0V         | Reference potential                  |
| X61.AI1        | Analog input # 1, 0 ... 10 V         |
| X61.AI2        | Analog input # 2, 0 ... 10 V         |
| X61.AI3        | Analog input # 3, 0 ... 10 V         |
| X61.AO1        | Analog output # 1, 0 ... 10 V        |
| X61.SHLD       | Shield                               |

**Assignment of Terminal X32**



| Terminal Point | Description                    |
|----------------|--------------------------------|
| X32.DC24v.0A   | Supply voltage +12 VDC         |
| X32.DIO1       | Multi-purpose input/output # 1 |
| X32.DIO2       | Multi-purpose input/output # 2 |
| X32.DIO3       | Multi-purpose input/output # 3 |
| X32.DIO4       | Multi-purpose input/output # 4 |
| X32.DIO5       | Multi-purpose input/output # 5 |
| X32.DIO6       | Multi-purpose input/output # 6 |
| X32.DIO7       | Multi-purpose input/output # 7 |
| X32.DIO8       | Multi-purpose input/output # 8 |
| X32.0V         | Reference potential            |

# 11 Quick Reference - JX3-MIX2

## Matching OS Version

This quick reference summarizes the registers and I/O numbers of the multifunctional module JX3-MIX2 with OS version 1.00.0.00.

## Module Code

For identification purposes, a unique module code is assigned to each JX3 module.

You can read out the module code, for example, in the case of a JC-3xx using R 100002015 and R 100002016.

The module code is also contained in the EDS.

Module code JX3-MIX2: 310

## I/O Numbers

|               |                            |  |
|---------------|----------------------------|--|
| <b>JC-3xx</b> | 10000xxzz<br>xx            | Module number: 02 ... 17                               |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 100000201...<br>100000216  | I/O numbers for module # 02                            |
| <b>JC-24x</b> | xxzz<br>xx                 | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 201 ... 216                | I/O numbers for I/O module # 02                        |
| <b>JC-647</b> | m1xxzz<br>m1               | Submodule socket + 1: 2 ... 4                          |
|               | xx                         | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 20201 ... 20216            | I/O numbers for submodule socket 1 and I/O module # 02 |
| <b>JC-9xx</b> | 20SJ0xxzz<br>S             | Number of module board: 1 ... 5                        |
|               | Y                          | Number of JX6-I/O board: 1 ... 2                       |
|               | xx                         | I/O module number: 02 ... 32                           |
|               | zz                         | Module specific I/O number: 01 ... 16                  |
| IN / OUT      | 201100201 ...<br>201100216 | I/O numbers for S = 1; J = 1 and I/O module # 02       |

## General Registers of JX3-MIX2

|               |                                    |
|---------------|------------------------------------|
| 0             | Module state                       |
| 1             | Module command                     |
| 2 ... 5       | Process data                       |
| 9             | Version                            |
| 500 ... 599   | Error states of multi-purpose I/Os |
| 1100 ... 1199 | Analog input 1 (X61.A11)           |
| 1200 ... 1299 | Analog input 2 (X61.A12)           |
| 1300 ... 1399 | Analog input 3 (X61.A13)           |
| 1400 ... 1499 | Analog output 1 (X61.AO1)          |
| 1500 ... 1599 | Counter input A (X61.CNTA)         |
| 1600 ... 1699 | Counter input B (X61.CNTB)         |
| 1700 ... 1799 | Serial interface                   |
| 1800 ... 1899 | Stepper Motor                      |
| 9740 ... 9744 | Oscilloscope                       |

## Register Numbers

|               |                 |   |
|---------------|-----------------|---|
| <b>JC-3xx</b> | 100xxzzzz<br>xx | Module number: 02 ... 17                            |
|               | zzzz            | Module register number: 0000 ... 9999               |
| <b>JC-24x</b> | 3xxz<br>xx      | I/O module number - 2: 00 ... 30                    |
|               | z               | Module register number: 0 ... 9                     |
|               |                 | Only indirect access to additional module registers |
| <b>JC-647</b> | 3m03xxz<br>m    | Submodule position: 1 ... 3                         |
|               | xx              | I/O module number - 2: 00 ... 30                    |
|               | z :             | Module register number: 0 ... 9                     |
|               |                 | Only indirect access to additional module registers |
| <b>JC-9xx</b> | 20SJ03xxz<br>S  | Number of module board: 1 ... 5                     |
|               | Y               | Number of JX6-I/O board: 1 ... 2                    |
|               | xx              | I/O module number - 2: 00 ... 30                    |
|               | z               | Module register number: 0 ... 9                     |
|               |                 | Only indirect access to additional module registers |

## Module State

|            |   |
|------------|---|
| <b>0</b>   | <b>Module state</b>                           |
| Bit 0 = 1  | Error: Internal voltage reference             |
| Bit 1 = 1  | Error: Multi-purpose I/Os                     |
| Bit 4 = 1  | Error: Serial interface                       |
| Bit 5 = 1  | Error: Stepper motor                          |
| Bit 6 = 1  | Error: Analog converter (D/A and A/D)         |
| Bit 16 = 1 | Stepper motor: Referencing completed          |
| Bit 17 = 1 | Stepper motor: Target window has been reached |
| Bit 18 = 1 | Stepper motor: Window is defined              |
| Bit 19 = 1 | Stepper motor: Axis stopped                   |
| Bit 20 = 1 | Stepper motor: Deceleration ramp enabled      |
| Bit 25 = 1 | Analog I/O: Analog values are valid           |
| Bit 26 = 1 | Serial interface: Receiving data              |
| Bit 30 = 1 | Synchronous data exchange                     |

## Module-Specific Command Registers

|          |                                  |
|----------|----------------------------------|
| <b>1</b> | <b>Command</b>                   |
| 6        | Clear error of status register 0 |

## Versions / Revisions

|     |                    |
|-----|--------------------|
| 9   | OS version         |
| 32  | FPGA revision      |
| 769 | Bootloader version |

## Pointer to Process Data

Pointer to process data in MR 800 ... MR 802

|         |  |
|---------|--|
| Value 0 | Averaged value of analog input 1 (X61.A11) |
| Value 1 | Averaged value of analog input 2 (X61.A12) |
| Value 2 | Averaged value of analog input 3 (X61.A13) |
| Value 3 | Reading of counter A                       |
| Value 4 | Reading of counter B                       |
| Value 5 | Stepper motor: Actual position             |
| Value 6 | Stepper motor: Actual speed                |

MR 800 <- value. The result is stored to MR 2 and MR 64.

MR 801 <- value. The result is stored to MR 3 and MR 65.

MR 802 <- value. The result is stored to MR 4 and MR 66.

MR 80: The value ranging from 0 ... 4.095 is output as voltage ranging from 0 ... 10 V at analog output X61.AO1.

**Analog Input AI1 ... AI3**

|      |                |  |
|------|----------------|--|
| 1y00 | State          |  |
|      | Bit 0 = 1:     | Error: Analog hardware                             |
|      | Bit 4 = 1:     | Error: Incorrect calibration value                 |
|      | Bit 7 = 1:     | Error: Internal voltages                           |
|      | Bit 12 = 1:    | Validity: Buffer for average values is filled      |
|      | Bit 25 = 1:    | Validity of measured values                        |
| 1y01 | Command        |  |
|      | 5              | Reset error bits of MR 1y00                        |
| 1y02 | AI1...AI3      | Averaged reading of the corresponding analog input |
| 1y06 | Moving average |  |
|      | 1              | Averaging disabled                                 |
|      | 4              | 4-fold moving average                              |
|      | 16             | 16-fold moving average                             |

with y = 1 ... 3 for analog input X61.AI1 ... X61.AI3

**Analog Output AO1**

|       |                                       |
|-------|---------------------------------------|
| 80    | Analog output value                   |
| Range | 12 bits: 0 ... 4.095                  |
| 0     | corresponds to 0 V at output X61.AO1  |
| 4.095 | corresponds to 10 V at output X61.AO1 |

Conversion

$$MR = U \cdot \frac{4095}{10V}$$

Analog output X61.AO1

**Counter Inputs A, B (single- and dual-channel counter)**

|      |             |   |
|------|-------------|---|
| 1y00 | State       |   |
|      | Bit 3 = 1:  | Edge evaluation: positive edge                            |
|      | Bit 4 = 1:  | Edge evaluation: negative edge                            |
|      | Bit 5 = 1:  | Edge evaluation: both edges                               |
|      | Bit 6 = 1:  | Forcing function is enabled                               |
|      | Bit 7 = 1:  | Modulo function is enabled                                |
|      | Bit 8 = 1:  | Gate function is enabled                                  |
|      | Bit 9 = 1:  | Strobe function is enabled                                |
|      | Bit 10 = 1: | Reset function is enabled                                 |
|      | Bit 11 = 0: | Negative counting direction (single-channel counter only) |
|      | Bit 11 = 1: | Positive counting direction (single-channel counter only) |
|      | Bit 12 = 0: | Single-channel counter is enabled                         |
|      | Bit 12 = 1: | Dual-channel counter is enabled                           |
|      | Bit 14 = 1: | Gate function is enabled                                  |
|      | Bit 15 = 1: | Counter is enabled  |
| 1y01 | Command     |   |
|      | 20          | Enable the forcing function                               |
|      | 21          | Disable the forcing function                              |
|      | 30          | Enable counter y (counter A: y = 5, counter B: y = 6)     |
|      | 31          | Disable counter y   |
|      | 32          | Counting direction: forward                               |
|      | 33          | Counting direction: reverse                               |
|      | 34          | Enable gate function                                      |
|      | 35          | Disable gate function                                     |
|      | 36          | Enable strobe function                                    |

|      |  |                       |
|------|--|-----------------------|
| 37   | Disable strobe function                          |                       |
| 40   | Enable single-channel counter, only MR 1501      |                       |
| 41   | Enable dual-channel counter, only MR 1501        |                       |
| 50   | Enable rising edge                               |                       |
| 51   | Enable falling edge                              |                       |
| 52   | Enable both edges                                |                       |
| 60   | Enable modulo function                           |                       |
| 61   | Disable modulo function                          |                       |
| 1y02 | Force value                                      |                       |
| 1y03 | Count value                                      |                       |
| 1y04 | Strobe value                                     |                       |
| 1y05 | Reset value                                      |                       |
| 1y06 | Modulo value                                     |                       |
| 1y10 | Allocation of gate to input DIO1 ... DIO4        |                       |
| 1y11 | Allocation of strobe to input DIO1 ... DIO4      |                       |
| 1y12 | Allocation of reset to input DIO1 ... DIO4       |                       |
| 1y13 | Polarity of strobe, gate, reset; bit-coded       |                       |
|      | Bit 0 = 0  | Gate is low-active    |
|      | Bit 0 = 1  | Gate is high-active   |
|      | Bit 1 = 0  | Strobe is low-active  |
|      | Bit 1 = 1  | Strobe is high-active |
|      | Bit 2 = 0  | Reset is low-active   |
|      | Bit 2 = 1  | Reset is high-active  |
| 1y20 | Frequency (( Δcounting pulses * 1,000) / MR 1y21 |                       |
| 1y21 | Time base for frequency in ms                    |                       |

where y = 5 represents counter A (X61.CNTA)  
 where y = 6 represents counter B (X61.CNTB)  
 where y = 5 represents dual-channel counter A, B (X61.CNTA and X61.CNTB)

**Serial Interface**

|      |                                   |                         |
|------|-----------------------------------|-------------------------|
| 1700 | Serial interface: Status          |                         |
|      | Bit 12 = 1: Buffer overflow       |                         |
|      | Bit 13 = 1: Parity error          |                         |
|      | Bit 14 = 1: Framing error         |                         |
| 1701 | Command                           |                         |
|      | 9                                 | Clear error             |
|      | 10                                | Serial interface: Reset |
| 1702 | Baud rate:                        |                         |
|      | 2.400                             | 2,400 Baud              |
|      | 4.800                             | 4,800 Baud              |
|      | 9.600                             | 9,600 Baud              |
|      | 19.200                            | 19,200 Baud             |
|      | 38.400                            | 38,400 Baud             |
|      | 57.600                            | 57,600 Baud             |
|      | 115.200                           | 115,200 Baud            |
| 1703 | Number of data bits per character |                         |
|      | 7                                 | 7 data bits             |
|      | 8                                 | 8 data bits             |
| 1704 | Number of stop bits               |                         |
|      | 1                                 | 1 stop bit              |
|      | 2                                 | 2 stop bits             |
| 1705 | Parity                            |                         |
|      | 0                                 | None (no parity)        |
|      | 1                                 | Odd parity              |
|      | 2                                 | Even parity             |

|      |  |
|------|--|
| 1706 | Interface standard   |
| 0    | RS-232   |
| 3    | RS485 (2-wire)   |
| 1710 | Transmit buffer, always 8 bits per character   |
| 1711 | Transmit buffer filling level  |
| 1712 | Receive buffer, 8 bits (without deleting the character on reading)   |
| 1713 | Receive buffer, 8 bits (with deleting the character on reading)  |
| 1714 | Receive buffer filling level   |
| 1715 | Receive buffer, 16-bit, little endian (first character bit 0 ... 7; second character bit 8 ... 15)<br>2 characters are removed from the buffer   |
| 1716 | Receive buffer, 16-bit, big endian (first character bit 8 ... 15; second character bit 0 ... 7)<br>2 characters are removed from the buffer  |
| 1717 | Receive buffer, 32 bits, little endian (first character bit 0 ... 7; second character bit 8 ... 15; third character bit 16 ... 23; fourth character bit 24 ... 31)<br>4 characters are removed from the buffer |
| 1718 | Receive buffer, 32 bits, big endian (first character bit 24 ... 31; second character bit 16 ... 23; third character bit 8 ... 15; fourth character bit 0 ... 7)<br>4 characters are removed from the buffer    |
| 1719 | Error counter  |

**Stepper Motor**

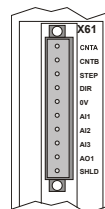
|             |   |
|-------------|---|
| 1800        | State: Stepper motor  |
| Bit 0 = 1:  | The positive limit switch is active once the axis has reached the positive hardware or software limit switch.       |
| Bit 1 = 1:  | The negative limit switch is active once the axis has reached the negative hardware or software limit switch.       |
| Bit 2 = 1:  | The reference switch is active  |
| Bit 3 = 1:  | Software limit switch LIM:<br>The actual motor position has exceeded the set position of the software limit switch. |
| Bit 4 = 1:  | Hardware limit switch LIM:<br>The actual motor position has exceeded the set position of the hardware limit switch. |
| Bit 5 = 1:  | Error: Stepper motor  |
| Bit 6 = 1:  | Error during referencng   |
| Bit 7 = 1:  | Software limit switch has been actived  |
| Bit 8 = 1:  | Stop at the reference point   |
| Bit 9 = 0:  | Axis type: Linear   |
| Bit 9 = 1:  | Axis type: Modulo   |
| Bit 10 = 0: | Absolute positioning  |
| Bit 10 = 1: | Relative positioning  |
| Bit 11 = 1: | Endless positioning is enabled  |
| Bit 12 = 0: | DIR: Negative direction of travel (if DIR polarity = 0)   |
| Bit 12 = 1: | DIR: Positive direction of travel (if DIR polarity = 0)   |
| Bit 16 = 1: | Reference is valid  |
| Bit 17 = 1: | AXARR: Will be set once the destination window is reached   |
| Bit 18 = 1: | Within the destination window   |
| Bit 19 = 1: | The axis is at standstill   |
| Bit 20 = 1: | Busy: Motor is running  |
| Bit 21 = 1: | Axis is in deceleration ramp  |
| 1801        | Command   |
| 0           | Decelariate using the set braking rate:<br>Stop with deceleration ramp  |

|      |   |
|------|---|
| 1    | Enable the software limit switch                |
| 2    | Disable the software limit switch               |
| 3    | Set reference                                   |
| 4    | Clearing the reference                          |
| 5    | Stop without deceleration ramp                  |
| 9    | Search for reference to mode 1                  |
| 10   | Search for reference to mode 2                  |
| 11   | Search for reference to mode 3                  |
| 12   | Search for reference to mode 4                  |
| 17   | Positioning mode: Relative positioning          |
| 18   | Positioning mode: Absolute positioning          |
| 19   | Continue the interrupted positioning motion     |
| 22   | Stop at the reference point                     |
| 23   | Do not stop at the reference point              |
| 56   | Start endless positioning in positive direction |
| 57   | Start endless positioning in negative direction |
| 1802 | Set position                                    |
| 1803 | Set stepping rate                               |
| 1804 | Polarities                                      |
| 1805 | Acceleration ramp                               |
| 1806 | Deceleration ramp                               |
| 1807 | Destination window                              |
| 1808 | Start-stop frequency                            |
| 1809 | Actual position                                 |
| 1810 | Width of STEP pulse                             |
| 1811 | Actual stepping rate                            |
| 1814 | Position SW LIM+                                |
| 1815 | Position SW LIM-                                |
| 1816 | Assignment of REF to DIO1 ... DIO4              |
| 1817 | Assignment of HW LIM+ to DIO1 ... DIO4          |
| 1818 | Assignment of HW LIM- to DIO1 ... DIO4          |
| 1868 | Last absolute set position                      |
| 1885 | Overflow position                               |
| 1899 | Software version of the stepper motor module    |

**Oscilloscope**

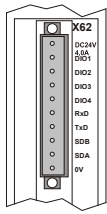
|      |                 |
|------|-----------------|
| 9740 | Command         |
| 9741 | Parameter index |
| 9742 | Parameter       |
| 9743 | Data index      |
| 9744 | Data            |

**Assignment of Terminal X61**



| Terminal Point | Description                          |
|----------------|--------------------------------------|
| X61.CNTA       | Counter input A                      |
| X61.CNTB       | Counter input B                      |
| X61.STEP       | Open-drain stepper motor output STEP |
| X61.DIR        | Open-drain stepper motor output DIR  |
| X61.0V         | Reference potential                  |
| X61.A11        | Analog input # 1, 0 ... 10 V         |
| X61.A12        | Analog input # 2, 0 ... 10 V         |
| X61.A13        | Analog input # 3, 0 ... 10 V         |
| X61.AO1        | Analog output # 1, 0 ... 10 V        |
| X61.SHLD       | Shield                               |

### Assignment of Terminal X62



| Terminal Point | Description                                  |
|----------------|--|
| X62.DC24v4.0A  | Supply voltage +12 VDC                       |
| X62.DIO1       | Multi-purpose input/output # 1               |
| X62.DIO2       | Multi-purpose input/output # 2               |
| X62.DIO3       | Multi-purpose input/output # 3               |
| X62.DIO4       | Multi-purpose input/output # 4               |
| X62.RxD        | RS-232, serial input of the JX3-MIX2 module  |
| X62.TxD        | RS-232, serial output of the JX3-MIX2 module |
| X62.D-         | RS-485, serial input/output, half-duplex     |
| X62.D+         | RS-485, serial input/output, half-duplex     |
| X62.0V         | Reference potential                          |

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# 12 Quick Reference - JX3-THI2-RTD

## Matching OS Version

This quick reference summarizes the registers of the Pt100/Pt1000 temperature measurement module JX3-THI2-RTD with OS version 1.04.0.00.

## Module Code

For identification purposes, a unique module code is assigned to each JX3 module.

You can read out the module code, for example, in the case of a JC-3xx using R 100002015 and R 100002016.

The module code is also contained in the EDS.

Module code JX3-THI2-RTD: 307

## General Overview - Registers

|               |                                 |
|---------------|---------------------------------|
| 0             | Module state                    |
| 2 ... 3       | Analog inputs 1 through 2       |
| 9, 32, 257    | Versions/Revisions              |
| 1100 ... 1199 | Configuration of analog input 1 |
| 1200 ... 1299 | Configuration of analog input 2 |
| 9740 ... 9744 | Oscilloscope                    |

## Register Numbers

|               |                 |   |
|---------------|-----------------|---|
| <b>JC-3xx</b> | 100xxzzzz<br>xx | Module number: 02 ... 17                            |
|               | zzzz            | Module register number: 0000 ... 9999               |
| <b>JC-24x</b> | 3xxz<br>xx      | I/O module number - 2: 00 ... 30                    |
|               | z               | Module register number: 0 ... 9                     |
|               |                 | Only indirect access to additional module registers |
| <b>JC-647</b> | 3m03xxz<br>m    | Submodule position: 1 ... 3                         |
|               | xx              | I/O module number - 2: 00 ... 30                    |
|               | z :             | Module register number: 0 ... 9                     |
|               |                 | Only indirect access to additional module registers |
| <b>JC-9xx</b> | 20SJ03xxz<br>S  | Number of module board: 1 ... 5                     |
|               | Y               | Number of JX6-I/O board: 1 ... 2                    |
|               | xx              | I/O module number - 2: 00 ... 30                    |
|               | z               | Module register number: 0 ... 9                     |
|               |                 | Only indirect access to additional module registers |

## Meaning of y

y Number of analog input y = 1 ... 2

## Module State

|             |                                     |
|-------------|-------------------------------------|
| <b>0</b>    | <b>Module state</b>                 |
| Bit 0 = 1:  | There is a hardware error.          |
| Bit 4 = 1:  | Error when reading reference values |
| Bit 6 = 1:  | AD converter error                  |
| Bit 7 = 1:  | Error: Internal voltages            |
| Bit 16 = 1: | Collective bit "Readings are valid" |
| Bit 17 = 1: | Collective bit "Cable Break"        |
| Bit 18 = 1: | Collective bit "Short circuit"      |
| Bit 19 = 1: | Collective bit "Lower limit"        |

|             |                              |
|-------------|------------------------------|
| Bit 20 = 1: | Collective bit "Upper limit" |
| Bit 23 = 1: | Collective bit "Forcing"     |
| Bit 30 = 1: | Synchronous data exchange    |

## Readings - Channel 1 and Channel 2

|   |                                    |
|---|------------------------------------|
| 2 | Digital value for analog input # 1 |
| 3 | Digital value for analog input # 2 |

## Versions / Revisions

|     |                    |
|-----|--------------------|
| 9   | OS version         |
| 32  | FPGA revision      |
| 257 | Bootloader version |

## Status of Analog Input y

|             |  |
|-------------|--|
| <b>1y00</b> | <b>State of analog input y (y = 1 ... 2)</b>   |
| Bit 0 = 0:  | Displaying the reading in degrees centigrades. |
| Bit 0 = 1:  | Displaying the reading in Fahrenheit           |
| Bit 1 = 1:  | 2-wire measurement is active                   |
| Bit 2 = 1:  | 3-wire measurement is active                   |
| Bit 3 = 1:  | 4-wire measurement is active                   |
| Bit 5 = 0:  | Slow measuring mode (approx. 100 ms)           |
| Bit 5 = 1:  | Fast measuring mode (approx. 10 ms)            |
| Bit 6 = 1:  | Values of this channel are valid               |
| Bit 7 = 1:  | This channel is calibrated                     |
| Bit 8 = 1:  | Force value is displayed                       |
| Bit 9 = 0:  | PT1000 measurement                             |
| Bit 9 = 1:  | PT100 measurement                              |
| Bit 11 = 0: | Resistance value is being displayed            |
| Bit 11 = 1: | Temperature value is being displayed           |
| Bit 12 = 1: | Calibration mode is active                     |
| Bit 13 = 1: | Potentiometer mode is active                   |
| Bit 14 = 1: | Channel y is active                            |
| Bit 15 = 1: | Initiating a reset (synchronously)             |
| Bit 16 = 1: | Cable breakage - channel y                     |
| Bit 17 = 1: | Short circuit - channel y                      |
| Bit 18 = 1: | Deficient temperature - channel y              |
| Bit 19 = 1: | Excess temperature - channel y                 |

## Instruction for Analog Input y

|             |   |
|-------------|---|
| <b>1y01</b> | <b>Instruction for analog input y (y = 1 ... 2)</b>       |
| 102         | 2-wire measuring  |
| 103         | 3-wire measuring  |
| 104         | 4-wire measuring  |
| 105         | Fast mode   |
| 106         | Slow mode   |
| 107         | Switching the display to degrees centigrade               |
| 108         | Switching the display to Fahrenheit                       |
| 109         | Switch to PT100 measurement                               |
| 110         | Switch to PT1000 measurement                              |
| 111         | Re-acquisition of line resistance                         |
| 112         | Disabling the channel                                     |
| 150         | Pt sensor measurement                                     |
| 151         | Measurement of supply conductor resistance R <sub>L</sub> |
| 160         | Displaying the temperature value                          |
| 161         | Displaying the resistance                                 |
| 170         | Show the temperature value (again). (Forcing OFF)         |
| 171         | Show force value  |
| 180         | Deactivation of potentiometer mode                        |
| 181         | Activation of potentiometer mode                          |

## User-defined Scaling

|      |   |
|------|---|
| 1y06 | Number of averaging cycles: 2, 4, 8, 16, 32, 64<br>No averaging: 0, 1 |
|------|---|

## Other Configurations

|      |   |
|------|---|
| 1y03 | Potentiometer position measurement                          |
| 1y04 | Force value for temperature input y                         |
| 1y08 | Lower limit of temperature input y                          |
| 1y09 | Upper limit of temperature input y                          |
| 1y20 | Trailing indicator for minimum value of temperature input y |

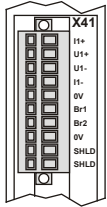
## 12 Quick Reference - JX3-THI2-RTD

1y21 Trailing indicator for maximum value of temperature input y

### Oscilloscope

|      |                 |
|------|-----------------|
| 9740 | Command         |
| 9741 | Parameter index |
| 9742 | Parameter       |
| 9743 | Data index      |
| 9744 | Data            |

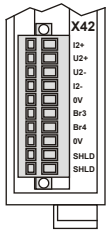
### Assignment of Terminal X41



| Terminal Point | Signals of sensor 1  |
|----------------|----------------------|
| X41.I1+        | Current supply - PT1 |
| X41.U1+        | Voltage supply - PT1 |
| X41.U1-        | Voltage supply - PT1 |
| X41.I1-        | Current supply - PT1 |
| X41.0V         | Ground               |
| X41.Br1        | Unassigned           |
| X41.Br2        | Unassigned           |
| X41.0V         | Ground               |
| X41.SHLD       | Shielding connection |
| X41.SHLD       | Shielding connection |

Jumper I1+ with U1+ and I1- with U1- Two-wire connection  
 Jumper I1+ with U1+ 3-wire connection

### Assignment of Terminal X42



| Terminal Point | Signals of sensor 2  |
|----------------|----------------------|
| X42.I2+        | Current supply - PT2 |
| X42.U2+        | Voltage supply - PT2 |
| X42.U2-        | Voltage supply - PT2 |
| X42.I2-        | Current supply - PT2 |
| X42.0V         | Ground               |
| X42.Br3        | Unassigned           |
| X42.Br4        | Unassigned           |
| X42.0V         | Ground               |
| X42.SHLD       | Shielding connection |
| X42.SHLD       | Shielding connection |

Jumper I2+ with U2+ and I2- with U2- Two-wire connection  
 Jumper I2+ with U2+ 3-wire connection

### Important!

Inputs X41 and X42 are **measurement inputs only!**  
 Connecting voltage or current to any input pin may destroy the module!

# 13 Quick Reference - JX3-THI2-TC

## Matching OS Version

This quick reference summarizes the registers of the thermocouple temperature measurement module JX3-THI2-TC with OS version 1.03.0.00.

## Module Code

For identification purposes, a unique module code is assigned to each JX3 module.

You can read out the module code, for example, in the case of a JC-3xx using R 100002015 and R 100002016.

The module code is also contained in the EDS.

Module code JX3-THI2-TC: 312

## General Overview - Registers

|               |                                 |
|---------------|---------------------------------|
| 0             | Module state                    |
| 2 ... 3       | Analog inputs 1 through 2       |
| 9, 32, 257    | Versions/Revisions              |
| 1100 ... 1199 | Configuration of analog input 1 |
| 1200 ... 1299 | Configuration of analog input 2 |
| 9740 ... 9744 | Oscilloscope                    |

## Register Numbers

|   |   |                                       |
|---|---|---------------------------------------|
| <b>JC-3xx</b>                                       | 100xxzzzz   |                                       |
|   | xx  | Module number: 02 ... 17              |
| <b>JC-24x</b>                                       | zzzz  | Module register number: 0000 ... 9999 |
|   | 3xxz  |                                       |
|   | xx  | I/O module number - 2: 00 ... 30      |
| <b>JC-647</b>                                       | z   | Module register number: 0 ... 9       |
|   | Only indirect access to additional module registers |                                       |
|   | 3m03xxz   |                                       |
|   | m   | Submodule position: 1 ... 3           |
| <b>JC-9xx</b>                                       | xx  | I/O module number - 2: 00 ... 30      |
|   | z:  | Module register number: 0 ... 9       |
|   | Only indirect access to additional module registers |                                       |
|   | 20SJ03xxz   |                                       |
| <b>JC-9xx</b>                                       | S   | Number of module board: 1 ... 5       |
|   | Y   | Number of JX6-I/O board: 1 ... 2      |
|   | xx  | I/O module number - 2: 00 ... 30      |
|   | z   | Module register number: 0 ... 9       |
| Only indirect access to additional module registers |   |                                       |

## Meaning of y

|   |                                    |
|---|------------------------------------|
| y | Number of analog input y = 1 ... 2 |
|---|------------------------------------|

## Module State

|             |                                     |
|-------------|-------------------------------------|
| <b>0</b>    | <b>Module state</b>                 |
| Bit 0 = 1:  | There is a hardware error.          |
| Bit 4 = 1:  | Error when reading reference values |
| Bit 6 = 1:  | AD converter error                  |
| Bit 7 = 1:  | Error: Internal voltages            |
| Bit 16 = 1: | Collective bit "Readings are valid" |
| Bit 17 = 1: | Collective bit "Cable Break"        |
| Bit 18 = 1: | Collective bit "Short circuit"      |
| Bit 19 = 1: | Collective bit "Lower limit"        |

|             |                              |
|-------------|------------------------------|
| Bit 20 = 1: | Collective bit "Upper limit" |
| Bit 23 = 1: | Collective bit "Forcing"     |
| Bit 30 = 1: | Synchronous data exchange    |

## Readings - Channel 1 and Channel 2

|   |                                    |
|---|------------------------------------|
| 2 | Digital value for analog input # 1 |
| 3 | Digital value for analog input # 2 |

## Versions / Revisions

|     |                    |
|-----|--------------------|
| 9   | OS version         |
| 32  | FPGA revision      |
| 257 | Bootloader version |

## Status of Analog Input y

|             |   |
|-------------|---|
| <b>1y00</b> | <b>State of analog input y (y = 1 ... 2)</b>          |
| Bit 0 = 0:  | Displaying the reading in degrees centigrades.        |
| Bit 0 = 1:  | Displaying the reading in Fahrenheit                  |
| Bit 1 = 1:  | Ice point compensation is enabled                     |
| Bit 5 = 0:  | Slow measuring mode (approx. 100 ms)                  |
| Bit 5 = 1:  | Fast measuring mode (approx. 10 ms)                   |
| Bit 6 = 1:  | Values of this channel are valid                      |
| Bit 7 = 1:  | This channel is calibrated                            |
| Bit 8 = 1:  | Force value is displayed                              |
| Bit 9 = 0:  | Ice point temperature compensation is being displayed |
| Bit 9 = 1:  | Thermocouple temperature is being displayed           |
| Bit 11 = 0: | Voltage value is being displayed                      |
| Bit 11 = 1: | Temperature value is being displayed                  |
| Bit 12 = 1: | Calibration mode is active                            |
| Bit 13 = 1: | Potentiometer mode is active                          |
| Bit 14 = 1: | Channel y is active                                   |
| Bit 15 = 1: | Initiating a reset (synchronously)                    |

## Instruction for Analog Input y

|             |   |
|-------------|---|
| <b>1y01</b> | <b>Instruction for analog input y (y = 1 ... 2)</b>                             |
| 105         | Fast mode   |
| 106         | Slow mode   |
| 107         | Switching the display to degrees centigrade                                     |
| 108         | Switching the display to Fahrenheit   |
| 112         | Disabling the channel   |
| 113         | Re-enabling the channel   |
| 160         | Displaying the temperature value  |
| 161         | Show thermoelectric e.m.f.  |
| 170         | Show the temperature value (again). (Forcing OFF)                               |
| 171         | Show force value  |
| 180         | Displaying the temperature measured by the thermocouple at the measuring point. |
| 181         | Show reference temperature  |
| 190         | Enable ice point compensation   |
| 191         | Disable ice point compensation  |

## User-defined Scaling

|      |   |
|------|---|
| 1y06 | Number of averaging cycles: 2, 4, 8, 16, 32, 64 |
|      | No averaging: 0, 1                              |

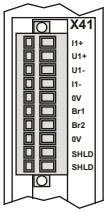
## Other Configurations

|      |   |
|------|---|
| 1y04 | Force value for temperature input y                         |
| 1y08 | Lower limit of temperature input y                          |
| 1y09 | Upper limit of temperature input y                          |
| 1y20 | Trailing indicator for minimum value of temperature input y |
| 1y21 | Trailing indicator for maximum value of temperature input y |

## Oscilloscope

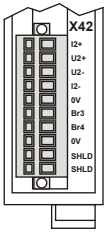
|      |                 |
|------|-----------------|
| 9740 | Command         |
| 9741 | Parameter index |
| 9742 | Parameter       |
| 9743 | Data index      |
| 9744 | Data            |

**Assignment of Terminal X41**



| Terminal Point | Signals of sensor 1     |
|----------------|-------------------------|
| X41.I1+        | Here: GND               |
| X41.U1+        | pos. termination - TC 1 |
| X41.U1-        | Here: GND               |
| X41.I1-        | neg. termination - TC 1 |
| X41.0V         | Ground                  |
| X41.Br1        | Unassigned              |
| X41.Br2        | Unassigned              |
| X41.0V         | Ground                  |
| X41.SHLD       | Shielding connection    |
| X41.SHLD       | Shielding connection    |

**Assignment of Terminal X42**



| Terminal Point | Signals of sensor 2     |
|----------------|-------------------------|
| X42.I2+        | Here: GND               |
| X42.U2+        | pos. termination - TC 2 |
| X42.U2-        | Here: GND               |
| X42.I2-        | neg. termination - TC 2 |
| X42.0V         | Ground                  |
| X42.Br3        | Unassigned              |
| X42.Br4        | Unassigned              |
| X42.0V         | Ground                  |
| X42.SHLD       | Shielding connection    |
| X42.SHLD       | Shielding connection    |

**Important!**

Inputs X41 and X42 are **measurement inputs only!**  
 Connecting voltage or current to any input pin may destroy the module!





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