

JX3-AI4

Version Update

from V 1.02 to V 1.03



Revision 1.01

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1 Introduction

Introduction

This chapter shows the history of the JX3-AI4 module's operating system versions.

The Purpose of an Operating System Update

What can be done by an operating system update on the JX3-AI4 module:

- Expanding the function range
 - Fixing software bugs
 - Transmitting a certain operating system version, for example at releasing a customer-specific operating system version
-

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Operating System Update

OS File for Operating System Update

For an operating system update, you will need the following file:

OS File	Description
JX3-AI4_1.03.0.00.os	Operating system file for JX3-AI4 mit der Version 1.03.0.00.

OS File Download

Jetter AG provides OS files for operating system download to our **Homepage** <http://www.jetter.de>. OS files can be found via quicklink on the support site of the JX3-AI4 module.

Operating System Update by means of JetSym

Carry out the following steps for an operating system update:

Step	Action
1	OS File Download from www.jetter.de
2	Establishing a connection between PC and controller
3	Executing the menu item Build > Operating System Update in JetSym
4	Selecting the OS File
5	Depending on the controller and on the module, the following items are to be specified: <ul style="list-style-type: none"> ▪ Module number ▪ Submodule socket ▪ Slave number ▪ I/O module number
6	Start the operating system update by ok
7	Result: After Power Off / Power On, the new operating system starts.

Overview of Version Updates

V. 1.03

The following table gives an overview of the newly added functions and the fixed software bugs in operating system version 1.03:

Function	New	Bug
Oscilloscope:		
Time base of the recordings		✓
Continuous recording	✓	
Post-buffer	✓	
Commands:		
MR 1 und MR 1y01: Command 6, clearing the diagnostic bits	✓	

2 Expansions

Introduction

Jetter AG are continuously striving to add new features and functions to the JX3-AI4 module. By updating your OS you are given the possibility to enhance the functionality of your module. To do so, you need the following ...

- an OS file
- the JetSym software tool
- a connection between PC and controller

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2.1 Oscilloscope

Introduction

The JX3-A14 is equipped with an internal oscilloscope function. By means of the oscilloscope function, you can record values of various module registers.

JetSym

The JetSym programming software JetSym offers possibilities of easily operating the oscilloscope function and of graphically displaying the recorded values.

Technical Data

Parameter	Value
Recording interval	1 ms ... 65,535 ms
Number of channels	max. 4
Number of measuring values per channel	max. 300
Recordable module registers	MR 2: <i>Digital value of analog input 1</i> MR 3: <i>Digital value of analog input 2</i> MR 4: <i>Digital value of analog input 3</i> MR 5: <i>Digital value of analog input 4</i>
Module registers to which a trigger condition can be assigned	MR 2: <i>Digital value of analog input 1</i> MR 3: <i>Digital value of analog input 2</i> MR 4: <i>Digital value of analog input 3</i> MR 5: <i>Digital value of analog input 4</i>

Applications

The following applications are possible:

- Graphic evaluation of input values for documentation
- etc.

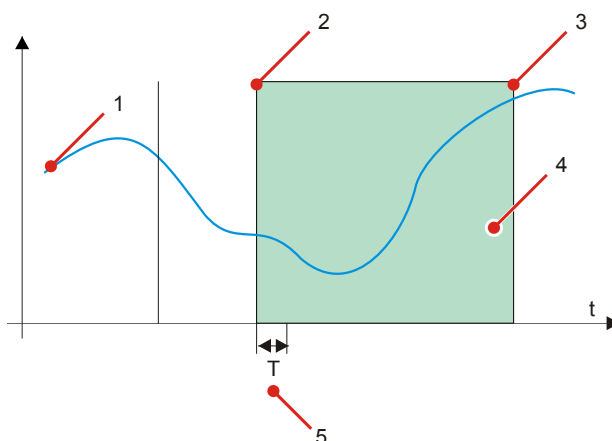
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Start/Stop Recording

Start/Stop Recording

At Start/Stop recording, the JX3-AI4 module is recording measuring values, until the maximum number of measuring values per channel has been recorded. Start/Stop recording is started by issuing command 1.



Number	Element
1	Values of the module register, out of which recordings are to be made.
2	Start of recording
3	End of recording
4	Recorded values
5	Recording interval

Configuration

Configuring the Start/Stop recording comprises the following steps:

Stage	Element
1	Configure the module registers to be recorded. MR 9741 := 11 ... 14; MR 9742 := Module register number;
2	Configure the interval to be recorded. MR 9741 := 10; MR 9742 := Interval to be recorded;
3	Write value 1 into MR 9740 <i>Command for oscilloscope</i> . Result: The JX3-AI4 module starts recording.
4	The JX3-AI4 module keeps recording values, until the set number of values per channel has been recorded.

2 Expansions

Stage	Element				
5	Check bit 0 of parameter <i>Status</i> . MR 9741 := 0;				
	<table border="1"><thead><tr><th>If ...</th><th>... Then ...</th></tr></thead><tbody><tr><td>Bit 0 = 0 in MR 9742</td><td>the module has terminated recording</td></tr></tbody></table>	If Then ...	Bit 0 = 0 in MR 9742	the module has terminated recording
	If Then ...			
Bit 0 = 0 in MR 9742	the module has terminated recording				

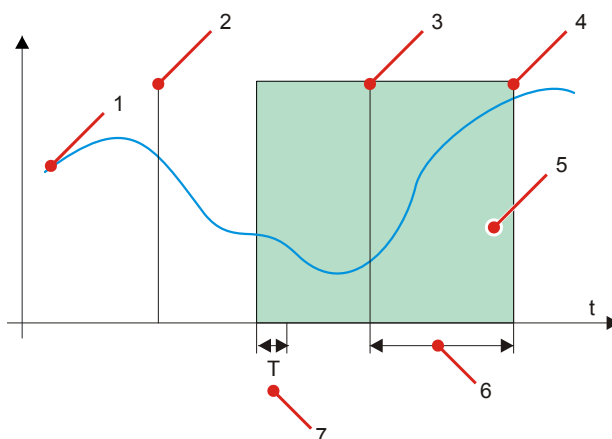
Related Topics

- **Register Description Oscilloscope** on page 21
 - **Example: Recording and Reading of Values** on page 18
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Continuous Recording

Continuous Recording

At continuous recording, the JX3-AI4 module continually records measuring values. After issuing command 2 "Stop", recording is continued, until the post-buffer is filled with values. Continuous recording is started by issuing command 4.



Number	Element
1	Values of the module register, out of which recordings are to be made.
2	Start of continuous recording
3	Instance of "Stop" instruction
4	End of recording; the post-buffer is filled with values
5	Recorded values
6	Size of the post-buffer
7	Recording interval

Configuration

Configuration of continuous recording comprises the following stages:

Stage	Element
1	Configure the module registers to be recorded. MR 9741 := 11 ... 14; MR 9742 := Module register number;
2	Configure the interval to be recorded. MR 9741 := 10; MR 9742 := Interval to be recorded;
3	Configure the size of the post-buffer. MR 9741 := 30; MR 9742 := Percentage of the max. number of measuring values per channel;

2 Expansions

Stage	Element				
4	Write value 4 into MR 9740 <i>Command for oscilloscope</i> . Result: The JX3-AI4 module starts recording.				
5	Stop recording by writing value 2 into MR 9740 <i>Command for oscilloscope</i> .				
6	The JX3-AI4 module further records values, until the post-buffer is filled.				
7	Check bit 0 of parameter <i>Status</i> . MR 9741 := 0; <table border="1" data-bbox="587 622 1390 712"><thead><tr><th>If ...</th><th>... Then ...</th></tr></thead><tbody><tr><td>Bit 0 = 0 in MR 9742</td><td>the module has terminated recording</td></tr></tbody></table>	If Then ...	Bit 0 = 0 in MR 9742	the module has terminated recording
If Then ...				
Bit 0 = 0 in MR 9742	the module has terminated recording				

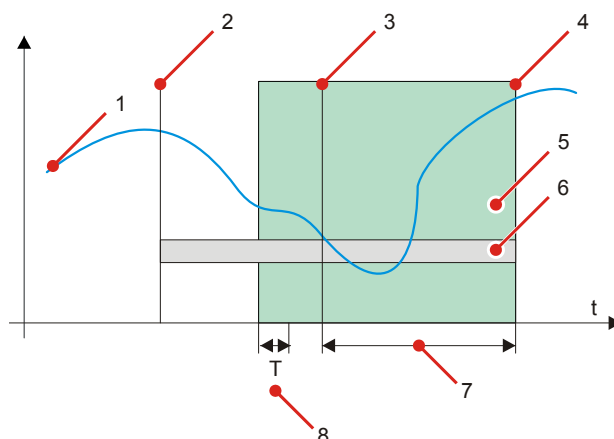
Related Topics

- **Register Description Oscilloscope** on page 21
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Recording with Trigger Condition

Recording with Trigger Condition

At recording with trigger condition, the JX3-AI4 module continually records measuring values. When the trigger condition has been met, recording is continued, until the post-buffer is filled with values. Recording with trigger condition is started by issuing command 3.



Number	Element
1	Values of the module register, out of which recordings are to be made.
2	Start of recording with trigger condition
3	Trigger condition has been met
4	End of recording; the post-buffer is filled with values
5	Recorded values
6	Value range of the trigger condition
7	Size of the post-buffer
8	Recording interval

Trigger Condition

The JX3-AI4 module checks the trigger condition by the following rules:

- The value in the module register for trigger 1 has to be greater than a configured value.
- The value in the module register for trigger 2 has to be smaller than a configured value.
- There can be different module register numbers for trigger 1 respectively trigger 2.

$$MR[\text{Trigger1}] > VAL[\text{Trigger1}]$$

AND

$$MR[\text{Trigger2}] < VAL[\text{Trigger2}]$$

Element	Function
MR[Trigger1]	Value in the module register for trigger 1
VAL[Trigger1]	Value for trigger 1
MR[Trigger2]	Value in the module register for trigger 2
VAL[Trigger2]	Value for trigger 2

Configuration

To configure recording with trigger condition, take the following stages:

Stage	Element				
1	Configure the module registers to be recorded. MR 9741 := 11 ... 14; MR 9742 := Module register number;				
2	Configure the interval to be recorded. MR 9741 := 10; MR 9742 := Interval to be recorded;				
3	Configure the size of the post-buffer. MR 9741 := 30; MR 9742 := Percentage of the max. number of measuring values per channel;				
4	Configure trigger 1: MR 9741 := 20; MR 9742 := Module register number for trigger 1; MR 9741 := 21; MR 9742 := Value for trigger 1;				
5	Configure trigger 2: MR 9741 := 22; MR 9742 := Module register number for trigger 2; MR 9741 := 23; MR 9742 := Value for trigger 2;				
6	Write value 3 into MR 9740 <i>Command for oscilloscope</i> . Result: The JX3-AI4 module starts recording.				
7	The JX3-AI4 module continually checks the trigger condition. <table border="1" data-bbox="587 1693 1388 1814"> <thead> <tr> <th>If ...</th> <th>... Then ...</th> </tr> </thead> <tbody> <tr> <td>the trigger condition has been met</td> <td>the JX3-AI4 module further records values, until the post-buffer is filled</td> </tr> </tbody> </table>	If Then ...	the trigger condition has been met	the JX3-AI4 module further records values, until the post-buffer is filled
If Then ...				
the trigger condition has been met	the JX3-AI4 module further records values, until the post-buffer is filled				

Stage	Element				
8	Check bit 0 of parameter <i>Status</i> . MR 9741 := 0; <table border="1" data-bbox="663 398 1461 488"><thead><tr><th data-bbox="663 398 1027 443">If ...</th><th data-bbox="1027 398 1461 443">... Then ...</th></tr></thead><tbody><tr><td data-bbox="663 443 1027 488">Bit 0 = 0 in MR 9742</td><td data-bbox="1027 443 1461 488">the module has terminated recording</td></tr></tbody></table>	If Then ...	Bit 0 = 0 in MR 9742	the module has terminated recording
If Then ...				
Bit 0 = 0 in MR 9742	the module has terminated recording				

Related Topics

- **Register Description Oscilloscope** on page 21
 - **Example: Recording and Reading of Values** on page 18
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Reading Out the Recorded Values

Introduction

The JX3-AI4 module saves the recorded values to a volatile memory range. At deactivating the modules, the values get lost. Even at a recording restart, the values are overwritten.

Reading Out the Recorded Values

For reading out the recorded values, take the following steps:

Step	Action			
1	Check bit 0 of parameter <i>Status</i> . MR 9741 := 0;			
	<table border="1"> <thead> <tr> <th>If ...</th> <th>... Then ...</th> </tr> </thead> <tbody> <tr> <td>Bit 0 = 0 in MR 9742</td> <td>the module has terminated recording</td> </tr> </tbody> </table>	If Then ...	Bit 0 = 0 in MR 9742
If Then ...			
Bit 0 = 0 in MR 9742	the module has terminated recording			
2	Write value 0 into MR 9743 <i>Index of recorded values</i> . MR 9743 := 0;			
3	By each reading access to MR 9744 <i>Recorded values</i> the next recorded value is read.			
	<table border="1"> <thead> <tr> <th>If ...</th> <th>... Then ...</th> </tr> </thead> <tbody> <tr> <td>you have read MR 9744 300 times,</td> <td>all values recorded to channel 1 are read.</td> </tr> </tbody> </table>	If Then ...	you have read MR 9744 300 times,
If Then ...			
you have read MR 9744 300 times,	all values recorded to channel 1 are read.			
4	Write value 300 into MR 9743 <i>Index of recorded values</i> . MR 9743 := 300;			
5	By each reading access to MR 9744 <i>Recorded values</i> the next recorded value is read.			
	<table border="1"> <thead> <tr> <th>If ...</th> <th>... Then ...</th> </tr> </thead> <tbody> <tr> <td>you have read MR 9744 300 times,</td> <td>all values recorded to channel 2 are read.</td> </tr> </tbody> </table>	If Then ...	you have read MR 9744 300 times,
If Then ...			
you have read MR 9744 300 times,	all values recorded to channel 2 are read.			
6	Write value 300 into MR 9743 <i>Index of recorded values</i> . MR 9743 := 600;			
7	By each reading access to MR 9744 <i>Recorded values</i> the next recorded value is read.			
	<table border="1"> <thead> <tr> <th>If ...</th> <th>... Then ...</th> </tr> </thead> <tbody> <tr> <td>you have read MR 9744 300 times,</td> <td>all values recorded to channel 3 are read.</td> </tr> </tbody> </table>	If Then ...	you have read MR 9744 300 times,
If Then ...			
you have read MR 9744 300 times,	all values recorded to channel 3 are read.			
8	Write value 300 into MR 9743 <i>Index of recorded values</i> . MR 9743 := 900;			

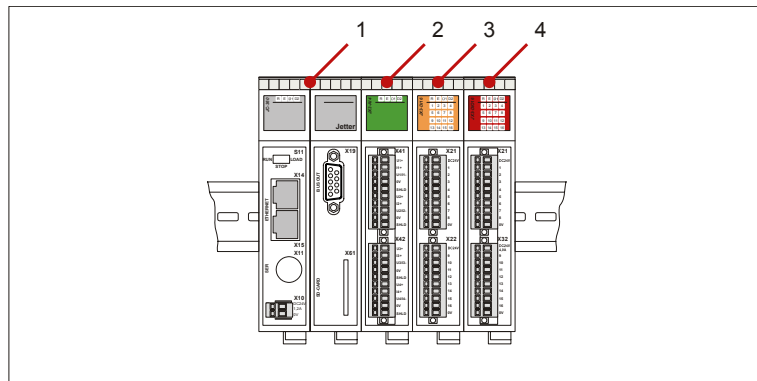
9	By each reading access to MR 9744 <i>Recorded values</i> the next recorded value is read.	
	If Then ...
	you have read MR 9744 300 times,	all values recorded to channel 4 are read.

Example: Recording and Reading of Values

Task The values at the analog inputs of a JX3-AI4 module are to be recorded in intervals of 20 ms. After this, the values are stored to the registers of the controller.

Solution The oscilloscope function of the JX3-AI4 module records the values. After that, it reads the application program to the controller.

Sample Configuration



Number	Element	Function
1	JC-3xx	Controller
2	JX3-AI4	Analog input module, module number 2
3 ... 4	JX3-xxx	Further JX3 Modules

JetSym STX Program Variable Declaration

```
Type
TYPE_JX3_AI4_OSCI :
Struct
    // Module registers of the oscilloscope function
    Command : Int at 4 * 9740;
    ParaIdx  : Int at 4 * 9741;
    Para     : Int at 4 * 9742;
    DataIdx  : Int at 4 * 9743;
    Data     : Int at 4 * 9744;
End_Struct;
End_Type;

Var
JX3_AI4_02 : TYPE_JX3_AI4_OSCI at %v1 100020000;
// Control register for saving the values
ValIdx : Int;
ValChannel1 : Array[300] of Int;
ValChannel2 : Array[300] of Int;
ValChannel3 : Array[300] of Int;
ValChannel4 : Array[300] of Int;
```

JetSym STX Program Configuration

```

End_Var;

```

```

Task main autorun
    // Default: MR 2 ... MR 5 are recorded
    // Recording interval up to 20 ms
    JX3_AI4_02.ParaIdx := 10;
    JX3_AI4_02.Para := 20;
    // ...

```

Starting and Reading Out the JetSym STX Program

```

Task main autorun
    // ...
    // Start recording
    JX3_AI4_02.Command := 1;

    // Wait for recording to be ended
    JX3_AI4_02.ParaIdx := 0;
    When
        BitClear(JX3_AI4_02.Para, 0)
    Continue;

    // Set the index to 0
    JX3_AI4_02.DataIdx := 0;
    // Read values of analog input 1
    FOR ValIdx := 0 To 299 Do
        ValChannel1[ValIdx] := JX3_AI4_02.Data;
    End_For;

    // Set the index to 300
    JX3_AI4_02.DataIdx := 300;
    // Read values of analog input 2
    FOR ValIdx := 0 To 299 Do
        ValChannel2[ValIdx] := JX3_AI4_02.Data;
    End_For;

    // Set the index to 600
    JX3_AI4_02.DataIdx := 600;
    // Read values of analog input 3
    FOR ValIdx := 0 To 299 Do
        ValChannel3[ValIdx] := JX3_AI4_02.Data;
    End_For;

    // Set the index to 900
    JX3_AI4_02.DataIdx := 900;
    // Read values of analog input 4
    FOR ValIdx := 0 To 299 Do
        ValChannel4[ValIdx] := JX3_AI4_02.Data;
    End_For;
    // ...

```

2 Expansions

Related Topics

- **Register Description Oscilloscope** on page 21
 - **Example: Recording and Reading of Values** on page 18
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Register Description Oscilloscope

MR 9740

Command for Oscilloscope

The oscilloscope function on the JX3-AI4 module can be controlled by this module register.

Commands

- | | |
|----------|---|
| 1 | Starting a Recording Session
The JX3-AI4 module starts recording immediately. Recording stops, when the memory for measuring values is full. |
| 2 | Stopping a Recording Session
The JX3-AI4 module stops recording immediately. |
| 3 | Starting a Recording Session Once a Trigger Condition is Fulfilled
The JX3-AI4 module starts monitoring the trigger condition. Once the trigger condition is fulfilled, the module starts recording. Recording stops, when the memory for measuring values is full. |
| 4 | Starting Continuous Recording
The JX3-AI4 module starts recording immediately. Recording is not stopped before issuing the <i>Stop recording</i> command. |

MR 9741

Parameter Index for the Oscilloscope

Via the parameter index, the parameter in MR 9742 *Parameter oscilloscope* is selected.

MR 9742

Parameters for Oscilloscope

Via these module registers, the oscilloscope function can be configured.

Index	Parameter(s)
0	Status (Read Only) Bit 0: 1 = Recording is running Bit 1: 1 = Trigger active
10	Recording Interval Value range: 1 ms ... 65,535 ms
11 ... 14	Module Register Number for Channel # 1 ... 4 Via parameters 11 through 14, the module registers to be recorded by the module are configured.
20	Module Register Number for Trigger # 1 Number of the module register for trigger condition # 1.

2 Expansions

21	Value for Trigger 1 Value in the module register for trigger condition # 1.
22	Module Register Number for Trigger # 2 Number of the module register for trigger condition # 2.
23	Value for Trigger 2 Value in the module register for trigger condition # 2.
30	Size of the Post-Buffer Value range: 0 % ... 100 %

MR 9743

Index of the Recorded Values

Via this index, the recorded values are selected.

MR 9744

Recorded Values

Via this module register, the recorded values are read.

2.2 Description of the Changed Module Registers

Introduction

In version 1.03 of the JX3-AI4 module, new functions of the module registers have been added.

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Description of the Changed Module Registers

MR 1

Module Command

Via MR 1, various functions of the entire JX3-AI4 module can be configured.

Commands

- | | |
|----------|---|
| 1 | Activate the operating mode "Individual Conversion"
The JX3-AI4 module reads out one analog output a time in instances of 500 μ s. Reading out all analog outputs takes 2 ms.
After switching on, the operating mode "Individual Conversion" is active. |
| 2 | Activate the operating mode "Collective Conversion"
The JX3-AI4 module reads out all four analog outputs at a time in instances of 1 ms. |
| 3 | Monitoring of internal voltages is deactivated
The JX3-AI4 module does not monitor the internal voltages any more. |
| 4 | Monitoring of internal voltages is active
The JX3-AI4 module monitors the internal voltages. This is also the default behavior at power-up. |
| 5 | Acknowledging the hardware errors
The module acknowledges the hardware errors. If the cause of the hardware error persists, the module sets the error bits once more. |
| 6 | Acknowledging collective bits
The command clears the collective bits in MR 0 mentioned below and the respective diagnostic bits in MR 1y00.
Bit 19: The lower limit has been fallen below
Bit 20: The upper limit has been exceeded
Bit 21: Leave the measuring range in negative direction
Bit 22: Leave the measuring range in positive direction |
-

MR 1y01**Command for Analog Input y (y = 1 ... 4)**

Via MR 1y01, specific functions are configured for analog input y.

Commands

6 Acknowledging diagnostic bits

This command causes the following bits in MR 1y00 to be cleared:

MR 1y00.19: The lower limit has been fallen below

MR 1y00.20: The upper limit has been exceeded

MR 1y00.21: Leave the measuring range in negative direction

MR 1y00.22: Leave the measuring range in positive direction

30 Deactivation of forcing

At the analog outputs, the value of MR 2 through 5 is output.

31 Activation of forcing

At the analog outputs, the value of MR 1y04 is output.

3 Fixed Software Bugs

Introduction

This chapter describes the software bugs which have been fixed in the new operating system release.

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Time Base of the Oscilloscope Recordings

Effects of this Bug The time base that is applied by the JX3-AI4 module to record measuring values is 1 ms greater than expected.

Affected Releases The following releases of the JX3-AI4 are affected by this bug:

OS version	< 1.03.0.0
Hardware revision	not relevant
Configuration or operating mode	not relevant
Internal remark	888

Remedy / Workaround There is no remedy to be applied to the releases concerned.

Bug Fix Starting from the following revisions of the JX3-AI4 this bug has been fixed:

OS version	1.03.0.0
Hardware revision	not relevant
Configuration or operating mode	not relevant
