JC-340

Version Update
from V. 1.16 to V. 1.18



Version Update

Jetter

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1 Introduction

Introduction

This chapter shows the history of OS versions.

Operating system update - why?

An operating system offers you the following opportunities:

- Adding new functions to your device
- Fixing software bugs
- Transmitting an OS of a definite version, e.g. a new OS release

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Updating the operating system

OS file for an operating system update

For an OS update, you will need the following file:

OS file	Description
JC-340_1.18.0.00.os	OS file for JC-340 with version 1.18

OS file download

Jetter AG make OS files available for download from their **homepage http://www.jetter.de**. OS files can be found in the support area and on the page of the JC-340 controller via quicklink.

OS update by means of JetSym

To update the OS proceed as follows:

Step	Action
1	Download the OS file from www.jetter.de.
2	Establish a connection between PC and controller.
3	In JetSym: Select menu item "Build -> Update OS" or Click on the button "OS Update" in the CPU window of the hardware manager.
4	Select the OS file.
5	Start the operating system update by OK.
6	**Result:** After Power Off/Power On, the new operating system starts.

Minimum requirements

For programming a JC-340 with version 1.18, JetSym 5.0.0 or higher is required.

JC-340 Version update - Overview

V. 1.04

The following table gives an overview of newly added features and fixed software bugs in OS version 1.04:

Description	New	Fixed
JX2 system bus		
Register overlaying for digital inputs/outputs	✓	
Support of JX-SIO modules and third-party CANopen® devices	✓	
JX3 system bus:		
Register overlaying for digital inputs/outputs	✓	
System bus special registers for status and control	✓	
Operating system update:		
Via FTP: On completion notification the OS has actually been stored.		✓
Updating a JX2 follower module while registers are being accessed blocks communication.		✓
Application program:		
Task switch could fail to happen.		✓
Error signal in case of invalid file "/app/start.ini"		✓
Display commands:		
Redirection to JX2-SER1 works only if JX2-PRN1 has been configured, too.		✓

V. 1.05

The following table gives an overview of newly added features and fixed software bugs in OS version 1.05:

Description	New	Fixed
JX2 system bus: V. 1.05.0.00		
AS interface gateway BWU1821 is supported.	✓	
Frequency inverter 8200 vector is supported.	✓	
JetMove 1xx is not detected during boot process.		✓
Automatic baud rate recognition does not work reliably for some of the baud rates and configurations of IP67 modules.		✓
Repetition counter does not work when polling I/O modules.		✓
AutoCopy function:		
Automatic copying of controller data	✓	
Application program:		
Pending cyclic tasks are started immediately after Taskunlock.	✓	

Description	New	Fixed
For function pow(x,y) a floating point number can be entered as exponent.	✓	
Cyclic tasks can be debugged.	✓	
Length of project and program names > 39 characters.		✓
Restart of an elapsed timer		✓
The value returned by DateTimeDecode() was always 1 day short of the actual day.		✓
DateTimeEncode and -IsValid might return the value TRUE irrespective of an invalid date.		✓
User registers:		
The register type can be set up without having to start the application program.	✓	
Displays and HMIs:		
A floating point value can be used as default for UserInput.	✓	
The default value for UserInput is not displayed correctly.		✓
It is not possible to enter LED register numbers.		✓

V. 1.08

The following table gives an overview of newly added features and fixed software bugs in OS version 1.08:

Description	New	Fixed
System configuration:		
System rights for configuration file	✓	
JX2 system bus: V. 1.11.0.00		
Timeout after CAN-PRIM message		✓
Registers of LJX7-CSL modules		✓
Write access to analog outputs of CANopen® modules		✓
State of digital inputs when the controller is powered on		✓
Digital outputs on JX-SIO or CANopen® modules		✓
Input/output 64 on JX-SIO or CANopen® modules		✓
User-programmable CAN interface		✓
Application program:		
NetCopyList functions	✓	
StrCopy()		✓
Crash in the case of "invalid" application program		✓

Description	New	Fixed
NetCopyVarFromReg()		✓
JX3 system bus:		
Module registers for digital I/Os	✓	
Displays and HMIs:		
UserInput()		✓

V. 1.09

The following table gives an overview of newly added features and fixed software bugs in OS version 1.09:

Description	New	Fixed
System:		
System command register	✓	
JX2 system bus: V. 1.13.0.00		
Status change of inputs on JX2-ID8		✓
Status change of fast inputs		✓
Application program:		
FTP client	✓	
Axis instructions		✓
Taskrestart in the case of Delay()		✓
Crash in the case of missing library		✓
Floating-point number registers in data files		✓
NetCopyVarToReg with floating-point number registers		✓
JX3 system bus:		
Dummy modules	✓	
AutoCopy:		
FTP commands	✓	
Serial interface:		
Initialization after booting		✓

V. 1.10

The following table gives an overview of newly added features and fixed software bugs in OS version 1.10:

Description	New	Fixed
System:		
LED registers		✓

Description	New	Fixed
SD memory card		✓
JX2 system bus: V. 1.17.0.00		
Further modules	✓	
CAN-PRIM	✓	
Application program:		
Task instructions using variable parameters	✓	
UserInput()		✓
NetCopyListSend()		✓
Task status register		✓
Real-time clock:		
Additional register for milliseconds	✓	
User-programmable IP Interface:		
More connections	✓	

V. 1.12

The following table gives an overview of newly added features and fixed software bugs in OS version 1.12:

Description	New	Fixed
System:		
System command register	✓	
JX2 system bus: V. 1.21.0.00		
Initialization		✓
CAN-PRIM		✓
CANopen® SYNC interval		✓
CANopen® application registers		✓
CANopen® type string		✓
Write access to CANopen® output		✓
CANopen® version number		✓
WAGO 750		✓
JX3 system bus:		
Register accesses		✓
Application program:		
Program control	✓	✓

Description	New	Fixed
Assigning structures	✓	
Sorting data	✓	
Displaying variables in JetSym		✓
HTTP server:		
New file type	✓	
Serial interface:		
Error detection		✓

V. 1.14

The following table gives an overview of newly added features and fixed software bugs in OS version 1.14:

Description	New	Fixed
JX2 system bus: V. 1.22.0.00		
Operating system update		✓
Application program:		
New instructions	✓	

V. 1.16

The following table gives an overview of newly added features and fixed software bugs in OS version 1.16:

Description	New	Fixed
JX2 system bus: V. 1.23.0.00		
CANopen® registers		✓
Application program:		
New data types	✓	
New functions	✓	
Memory protection	✓	
Cyclic tasks		✓
NetCopyVarToReg		✓
Cycle time register		✓

V. 1.18

The following table gives an overview of newly added features and fixed software bugs in OS version 1.18:

Description	New	Fixed
Application program:		
Debugging	✓	

Description	New	Fixed
Memory protection	✓	✓
Partial download		✓
StrFormat()		✓
Exceptions		✓
Ethernet system bus:		
Enhanced diagnostic functions	✓	
Module support		✓
JX3 system bus:		
Register	✓	
Initialization		✓
OS update		✓
STX debug server:		
TCP connection management	✓	

2 New features

Introduction

Jetter AG are continuously striving to add new features and functions to the controller JC-340. By updating your OS you are given the possibility to enhance the functionality of your controller. To do so, you need the following ...

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

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2.1 Various new features and modifications

Introduction

This chapter covers the new features and modifications.

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STX memory corruption

New feature	As of this operating system version, the JC-340 sets bit 17 in error register 200008 in the case of memory corruption.
Prerequisites	To make use of memory protection feature, JetSym programming tool version 5.0.0 or higher must be installed.
Reference	For more information on STX memory protection refer to JetSym online help.

Description of the runtime registers

Register overview

The device is equipped with the following runtime registers:

Register	Description
R 201000	Application time base in milliseconds
R 201001	Application time base in seconds
R 201002	Application time base in R 201003 * 10 ms
R 201003	Application time base unit for R 201002
R 201004	System time base in milliseconds
R 201005	System time base in microseconds

R 201000

Application time base in milliseconds

Every millisecond this register is incremented by one.

Register properties	
Values	-2,147,483,648 ... 2,147,483,647 (overflowing)

R 201001

Application time base in seconds

Every second this register is incremented by one.

Register properties	
Values	-2,147,483,648 ... 2,147,483,647 (overflowing)

R 201002

Application time base in application time base units

Every [R 201003] * 10 ms this register is incremented by one. Using the reset value 10 in register 201003, this register is incremented every 100 ms.

Register properties	
Values	-2,147,483,648 ... 2,147,483,647 (overflowing)

R 201003 **Application time base unit for R 201002**

This register contains the multiplier for runtime register R 201002.

Register properties	
Values	1 ... 2,147,483,647 (* 10 ms)
Value after reset	10 (--> 100 ms)
Enabling conditions	After at least 10 ms

R 201004 **System time base in milliseconds**

Every millisecond this register is incremented by one.

Register properties	
Values	-2,147,483,648 ... 2,147,483,647 (overflowing)
Type of access	Read access

R 201005 **System time base in microseconds**

Every microsecond this register is incremented by one.

Register properties	
Values	-2,147,483,648 ... 2,147,483,647 (overflowing)
Type of access	Read access

Error message on part of a subscription

Detecting the error

If a subscriber has not received any process data from the assigned publisher before timeout, the subscriber will generate an error. The subscriber for whose subscription the error has been generated, can run either on a controller or on a remote network device, which is, for example, a JX3-BN-ETH.

Root cause of the error

The error may be caused as follows:

- Communication with the bus node providing the process data is interrupted.

Response of the device to this error

The operating system of the device responds to the error by taking the following steps:

Step	Description	
1	Sets bit 1 in R 250000.	
2	Writes the subscription ID to R 250002.	
3	Sets flag 2081.	
4	Enters value 11103 and the ID into the error buffers. The error buffer can be accessed via registers 380000 and the following (error history).	
5	Enters the GNN of the network device communication with which has been interrupted into R 254001.	
6	Enters the IP address of the network device communication with which has been interrupted into R 254002.	
7	Enters the port number of the network device communication with which has been interrupted into R 254003.	
8	**If ...**	**... then ...**
	... flag 2080 is set,	... bit 3 is set in R 210004 and R 200008. The red status LED of the controller is lit.

Fixing the root cause

By means of NetCopy commands, you can precisely locate the error and fix the root cause. This works, because GNN, IP address and port number of the remote network device are known.

Resetting the error

To reset the error, enter command 110 into register 250001.

Controller evaluates errors reported by a network device

Access to the status registers

The controller has got read access to the contents of the following status registers of all network devices on the Jetter Ethernet system bus.

The contents are accessed via registers 39nnn0 through 39nnn5. (GNN: nnn = 001 ... 199).

Register	JX3-BN-ETH, JX3-COM-EIPA	Controller
Error register	200008	39nnn0
Enhanced error register 1	200009	39nnn1
Enhanced error register 2	200010	39nnn2
JetSync status	240010	39nnn3
Subscriber status	250000	39nnn4
Subscription ID	250002	39nnn5

The operating system writes the ID of the subscription having last reported an error to register 250002.

Locating an error

If the value of register 39nnn0 is unequal zero, an error has occurred. A bus node has reported this error to the controller via its status registers.

In consequence, the operating system (OS) of the controller reacts by taking the following steps:

<table>
<tr><th>Step</th><th colspan="3">Description</th></tr>
<tr><td>1</td><td colspan="3">The OS sets bit 10 in R 200009.</td></tr>
<tr><td rowspan="2">2</td><td>If ...</td><td>... or ...</td><td>... then ...</td></tr>
<tr><td>... Bit x = 1 of R 200009</td><td>... Bit x = 1 of R 200010,</td><td>... the OS sets bit 7 of R 200008.</td></tr>
<tr><td>3</td><td colspan="3">The OS enters the GNN of the network device having last reported an error into R 394001.</td></tr>
<tr><td>4</td><td colspan="3">The OS writes the IP address of the network device having last reported an error to R 394002.</td></tr>
<tr><td>5</td><td colspan="3">The OS writes the port number of the network device having last reported an error to R 394003.</td></tr>
</table>

Fixing the root cause

By means of NetCopy commands, you can precisely locate the error and fix the root cause. This works, because GNN, IP address and port number of the network device are known.

Make sure the contents of registers 39nnn0 through 39nnn5 are read by the application program. If further registers have got a value unequal zero, further network devices have reported an error. Make sure you also clear these errors.

Debugging enabled for Tasklock

Obsolete function	If, in an area protected by `Tasklock` ... `Taskunlock`, you set a breakpoint by means of the JetSym debugger, the task stops at the breakpoint. This results in a timeout of tasklock monitoring. The debugger will not be able to restart the task, as this will not be possible again.
New function	If a task at inhibited task switch (tasklock) stops at a breakpoint, the controller disables timeout monitoring for this task. If the debugger restarts the task, the task is processed further, and timeout monitoring is automatically re-activated.

Debugging of properties

Introduction	As of this operating system version, debugging of properties in monitor mode is supported by JetSym.
Prerequisites	To display properties in monitor mode, JetSym programming tool version 5.0.0 or higher must be installed.
Reference	For a detailed description of object properties and their application, refer to the JetSym online help.

Software version number of the JX3 system bus

Version numbers

Register 100002000 already contains the hardware version number of the JX3 system bus. As of this operating system version, the software version of the JX3 system bus can also be read from a register.

Register

The register value shows the software version number of the JX3 system bus.

Register	Description
R 100002072	Software version (IP format)

New error bit "Fatal Error" at the JX3 system bus

Fatal error

As of this OS version, the JC-340 PLC sets bit 16 in the diagnostic register 100002008 of the JX3 system bus in case of a fatal system bus error.

Register 100002008

The register value shows the diagnostic bits of the JX3 system bus.

Meaning of the individual bits	
Bit 3	**Error at module access** 1 = When accessing a module, an error occurred.
Bit 16	**Fatal error** 1 = A fatal, non-recoverable error has occurred on the JX3 system bus. Data interchange has been terminated.

Module register properties	
Value after reset	Depending on the initialization state

2.2 TCP server - Connection management

Introduction

This document covers the connection management enhancements of the JetIP/TCP server and of the STX debug server in a JetControl PLC.

Previous to this enhancement, clients were only able to clear active connections with other clients. If, for example, the Ethernet cable was unplugged or cut, the client was not able to clear the connection. The connection remained active.

The enhanced connection management allows for the server to clear connections according to criteria that can be set by the user.

Number of connections

The number of simultaneously established connections for the TCP server in a JetControl is limited to the following value:

Server	Connections
JetIP/TCP server	4
STX debug server	20

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Automatic termination of connections

Introduction

If the maximum number of simultaneously established connections has been reached, any further connections cannot be established. If further connection requests are made, the user can set the response by the JetIP/TCP server and of the STX Debug server. There are the following options:

- Reject new connection.
- Terminate one existing connection and establish the new one.
- Terminate all existing connections and establish the new one.

Default setting

By default, the connection with the longest time of inactivity is terminated.

No automatic termination of connections

If none of the existing connections is to be terminated automatically, proceed as follows:

Step	Action
1	Enter value 0 into MR 1.

Terminating the connection with the longest time of inactivity

If the connection with the longest time of inactivity is to be terminated, proceed as follows:

Step	Action
1	Enter value -1 into MR 2.
2	Enter value 1 into MR 1.

Terminating the connection after exceeding the minimum time of inactivity

If the time of inactivity has exceeded a set minimum value, the respective connection is terminated. Otherwise, the new connection is rejected. To make these settings proceed as follows:

Step	Action
1	Enter the minimum time [ms] into MR 2.
2	Enter value 1 into MR 1.

Terminating any connection

If any of the existing connections is to be terminated, proceed as follows:

Step	Action
1	Enter value -1 into MR 2.
2	Enter value 2 into MR 1.

Terminating all connections which exceed the minimum time of inactivity

If all established, yet inactive connections are to be terminated, proceed as follows:

Step	Action
1	Enter the minimum time [ms] into MR 2.
2	Enter value 2 into MR 1.

Register

Register numbers

The register numbers to be used are calculated by adding and the controller-dependent basic register number and the module register number.

Controller/server	Basic register number	Register numbers
JC-24x: JetIP/TCP	2755	2755 ... 2757
JC-340, JC-350, JC-360(MC), JC-940MC: JetIP/TCP	230000	230000 ... 230002
JC-340, JC-350, JC-360(MC), JC-940MC: STX Debug	212000	212000 ... 212002

MR 0

Number of connections

The number of currently established connections can be read from module register 0.

Module register properties	
Values	0 ... 4 (JetIP/TCP server) 0 ... 20 (STX Debug server)

MR 1

Mode

If the maximum number of connections is active, and if a new connection is to be established, module registers 1 and 2 determine the behavior.

Module register properties	
Values	0 ... 2
Value after reset	1

MR 2

Activity: total time

If the maximum number of connections is active, and if a new connection is to be established, module registers 1 and 2 determine the behavior.

Module register properties	
Values	-1 ... 2,147,483,647 [ms]
Value after reset	-1

3 Fixed software bugs

Introduction

This chapter describes the software bugs which have been fixed in the new OS version.

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Crash when Taskcontinue is applied to a completed/aborted task

Symptoms

The controller can crash in the following cases:

- Applying the `Taskcontinue` instruction to a task that has already come to an end.
- Applying the `Taskcontinue` instruction to a task that has been aborted by `Taskexit`.

Affected versions/revisions

The following versions/revisions are affected by this bug:

Operating system version	JC-340/350/360(MC) JC-940MC	< 1.18.0.00 < 1.05.0.00
Hardware revision	Not relevant	
Configuration or operating mode	Not relevant	

Remedy/workaround

There is no remedy to be applied to the releases concerned.

Fixed versions/revisions

Starting from the following versions/revisions this bug has been fixed:

Operating system version	JC-340/350/360(MC) JC-940MC	1.18.0.00 1.05.0.00
Hardware revision	Not relevant	
Configuration or operating mode	Not relevant	

Crash when different StrFormat() types are used

Symptoms

If in a `StrFormat()` command the string format types differ from those of the variables, the controller crashes.

Affected versions/revisions

The following versions/revisions are affected by this bug:

Operating system version	JC-340/350/360(MC) JC-940MC	< 1.18.0.00 < 1.05.0.00
Hardware revision	Not relevant	
Configuration or operating mode	Not relevant	

Remedy/workaround

Make sure the string format types comply with the types of the variables used.

Fixed versions/revisions

Starting from the following versions/revisions this bug has been fixed:

Operating system version	JC-340/350/360(MC) JC-940MC	1.18.0.00 1.05.0.00
Hardware revision	Not relevant	
Configuration or operating mode	Not relevant	

Exceptions are not cleared when a new program is downloaded

Symptoms

If you download a new program to the controller when exceptions occurred in a program, the following may happen:

- The exceptions of the former program version are still displayed, although there are no exceptions in the new program.

Affected versions/revisions

The following versions/revisions are affected by this bug:

Operating system version	JC-340/350/360(MC) JC-940MC	< 1.18.0.00 < 1.05.0.00
Hardware revision	Not relevant	
Configuration or operating mode	Not relevant	

Remedy/workaround

There is no remedy to be applied to the releases concerned.

Fixed versions/revisions

Starting from the following versions/revisions this bug has been fixed:

Operating system version	JC-340/350/360(MC) JC-940MC	1.18.0.00 1.05.0.00
Hardware revision	Not relevant	
Configuration or operating mode	Not relevant	

No memory protection in the case of pointer access to strings

Symptoms

If in a program compiled under memory protection a pointer is used to access a string variable, the memory protection will not detect the error.

Affected versions/revisions

The following versions/revisions are affected by this bug:

Operating system version	JC-340/350/360(MC) JC-940MC	< 1.18.0.00 < 1.05.0.00
Hardware revision	Not relevant	
Configuration or operating mode	Not relevant	

Remedy/workaround

There is no remedy to be applied to the releases concerned.

Fixed versions/revisions

Starting from the following versions/revisions this bug has been fixed:

Operating system version	JC-340/350/360(MC) JC-940MC	1.18.0.00 1.05.0.00
Hardware revision	Not relevant	
Configuration or operating mode	Not relevant	

Modifications to task parameters are not incorporated at partial download

Symptoms

In the following case, modifications after program download will not be activated:

- In a program, only the task parameters, e.g priority or cycle, are changed, and "Try partial download" is set.

Affected versions/revisions

The following versions/revisions are affected by this bug:

Operating system version	JC-340/350/360(MC) JC-940MC	< 1.18.0.00 < 1.05.0.00
Hardware revision	Not relevant	
Configuration or operating mode	Not relevant	

Remedy/workaround

In addition to the task parameters change the program code, even it is only to a small extend.

Fixed versions/revisions

Starting from the following versions/revisions this bug has been fixed:

Operating system version	JC-340/350/360(MC) JC-940MC	1.18.0.00 1.05.0.00
Hardware revision	Not relevant	
Configuration or operating mode	Not relevant	

Error on the JX3 system bus after power-up of the PLC

Symptoms

After power-up of the controller, in very few cases there might occur initialization errors of the JX3 system bus.

The controller, for example, might determine the wrong number of connected modules, or it might read the wrong values from the EDS files of the module.

Affected versions/revisions

The following versions/revisions are affected by this bug:

Operating system version	JC-340/JC-350 JC-360/JC-360MC	< 1.18.0.00 < 1.18.0.00
Hardware revision	Not relevant	
Configuration or operating mode	Not relevant	

Remedy/workaround

There is no remedy for the affected versions/revisions.

Fixed versions/revisions

Starting from the following versions/revisions this bug has been fixed:

Operating system version	JC-340/JC-350 JC-360/JC-360MC	1.18.0.00 1.18.0.00
Hardware revision	Not relevant	
Configuration or operating mode	Not relevant	

OS update of a JX3 module by application program fails

Symptoms

The OS update of a JX3 module does not work, when it was triggered by the application program and was to be processed via the file system of the controller.

Affected versions/revisions

The following versions/revisions are affected by this bug:

Operating system version	JC-340/JC-350 JC-360/JC-360MC	1.12.0.00 ... 1.16.0.00 1.10.0.14 ... 1.17.0.03
Hardware revision	Not relevant	
Configuration or operating mode	Not relevant	

Remedy/workaround

There is no remedy for the affected versions/revisions.

Fixed versions/revisions

Starting from the following versions/revisions this bug has been fixed:

Operating system version	JC-340/JC-350 JC-360/JC-360MC	1.18.0.00 1.18.0.00
Hardware revision	Not relevant	
Configuration or operating mode	Not relevant	

Functional error at Publish/Subscribe in connection with JX3-CNT and JX3-MIX

Symptoms

Publish/Subscribe fails to transmit the state of the digital inputs and outputs of the JX3-CNT, JX3-MIX1 and JX3-MIX2 modules via network.

Affected versions/revisions

The following versions/revisions are affected by this bug:

Operating system version	JC-340/JC-350/JC-360(MC) JC-940MC	< 1.18.0.00 < 1.05.0.00
Hardware revision	Not relevant	
Configuration or operating mode	Not relevant	

Remedy/workaround

Make use of asynchronous access (e. g. NetCopy commands) to module registers that overlay the inputs/outputs.

Fixed versions/revisions

Starting from the following versions/revisions this bug has been fixed:

Operating system version	JC-340/JC-350/JC-360(MC) JC-940MC	1.18.0.00 1.05.0.00
Hardware revision	Not relevant	
Configuration or operating mode	Not relevant	