MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Selected official pages for procurement and maintenance review

PRODUCT BRAND

Siemens

PRODUCT MODEL

6ES7517-3HP00-0AB0

Redundant CPU 1517H-3 PN. Relevant section pages: 13, 14, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52. Adjacent model text on shared pages is outside this product reference.

OFFICIAL SOURCE

CPU 1517H-3 PN (6ES7517-3HP00-0AB0); 01/2024

Siemens original documentation and product reference

January 2024 technical reference for firmware V3.1. Earlier firmware differs. Confirm the supplied revision and licenses. Not a standalone installation guide.

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Amikon Limited prepared this independent reference package. Selected manufacturer pages follow with their original content and pagination visible.

Legal information

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This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

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indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

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Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Product overview

3

3.1 New functions

This section contains an overview of the most important new firmware functions of the CPU compared with the predecessor version CPU (V3.0).

New functions of the CPU in firmware version V3.1

New functions	Customer benefits	Where can I find information?
Power supply modules	System power supplies (PS) supply the internal electronics of the S7-1500R/H modules with power via the backplane bus. The following system power supply modules are supported: • PS 25W 24V DC • PS 60W 24/48/60V DC • PS 60W 120/230V AC/DC The redundant design of system power supply modules in the H-CPUs increases the availability of the supply voltage. If a PS (or supply voltage) fails, the H-CPU (with the central CPs) remains in the RUN-Redundant operating state.	S7-1500R/H System Manual (https://support.industry.siemens.com/cs/ww/en/view/109754833)
Communications processors CPs	The CPs relieve the R/H CPUs from communication tasks and enable further communication connections: • To the automation level • To the IT world The redundant design of the CPs (per R/H CPU) increases the availability of the redundant system for communication tasks. From FW version V3.1 the S7-1500R/H redundant system supports the CP 1543-1 communications processor: • S7-1500H: max. 6 CPs per H-CPU	• S7-1500R/H System Manual (https://support.industry.siemens.com/cs/ww/en/view/109754833) • CP 1543-1 (https://support.industry.siemens.com/cs/de/de/view/67700710/en) operating instructions
Active backplane bus	The active backplane bus provides you with the following advantages with the S7-1500H redundant system: • Pulling or plugging of CP 1543-1 communications processors in the RUN-Redundant system state. • Module reserves (CP 1543-1) can be kept ready for later use. The active backplane bus can be used with the H-CPUs as of firmware version V3.1. You can find more information on the active backplane bus (e.g. installing, config-	Active backplane bus (https://support.industry.siemens.com/cs/de/de/view/109778694/en) Equipment Manual

New functions	Customer benefits	Where can I find information?
	uring, technical specifications) in the Active backplane bus Equipment Manual. The active backplane bus can be ordered as an accessory/spare part.	
IE/PB LINK HA	The IE/PB LINK HA connects PROFINET IO and PROFIBUS DP as a gateway. This enables the IE/PB LINK HA to access all DP devices connected to the lower-level PROFIBUS network. The IE/PB LINK HA supports up to 64 DP devices. In the redundant S7-1500R/H system, the IE/PB LINK HA is integrated into the PROFINET network as an S2 device.	• S7-1500R/H System Manual (https://support.industry.siemens.com/cs/ww/en/view/109754833) • IE/PB LINK (https://support.industry.siemens.com/cs/de/de/view/109744280/en) operating instructions
Web API of the Web server (Application Programming Interface)	As of firmware version V3.1, the S7-1500R/H redundant system supports the Web API of the Web server. An overview of which mechanisms and methods support the R/H CPUs can be found in the Web server Function Manual.	Web server (https://support.industry.siemens.com/cs/de/en/view/59193560) Function Manual
Data exchange via OPC UA as server	As of firmware version V3.1, the S7-1500R/H redundant system supports data exchange as an OPC UA server. An OPC UA server provides information within a network, e.g. relating to the CPU, the OPC UA server itself, the data, and the data types. An OPC UA client accesses this information.	• S7-1500R/H System Manual (https://support.industry.siemens.com/cs/ww/en/view/109754833) • Communication (https://support.industry.siemens.com/cs/ww/en/view/59192925) Function Manual
Data logging	As of firmware version V3.1 the S7-1500R/H redundant system supports data logging. With data logging, you can save process values from the user program in a file known as the data log. The data logs are saved on the SIMATIC Memory Card in CSV format and stored in the "DataLogs" directory. You can create and modify data logs using the asynchronous "data logging" instructions. Data logs from the S7-1500R/H are loaded via the Web API of the Web server.	Structure and use of the CPU memory (https://support.industry.siemens.com/cs/ww/en/view/59193101) Function Manual
User files	As of firmware version V3.1, the S7-1500R/H redundant system supports user files. User files are user-specific files that are stored on the SIMATIC Memory Card and in the "UserFiles" directory. You can read and write user files via the asynchronous "File handling" instructions (FileReadC, FileWriteC) or via the Web API of the Web server.	STEP 7 online help

Technical specifications

6

The following table shows the technical specifications as of 01/2024. You can find a data sheet including daily updated technical specifications on the Internet (https://support.industry.siemens.com/cs/ww/en/pv/6ES7517-3HP00-0AB0/td?dl=en).

Article number	6ES7517-3HP00-0AB0
General information	
Product type designation	CPU 1517H-3 PN
HW functional status	FS06
Firmware version	V3.1
• FW update possible	Yes
Product function	
• I&M data	Yes; I&M0 to I&M3
• Isochronous mode	No
• SysLog	Yes
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	V19 (FW V3.1) / V15.1 (FW V2.6) or higher
Display	
Screen diagonal [cm]	6.1 cm
Control elements	
Number of keys	6
Mode selector switch	1
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Mains buffering	
• Mains/voltage failure stored energy time	5 ms
• Repeat rate, min.	1/s
Input current	
Current consumption (rated value)	1.5 A
Current consumption, max.	1.9 A
Inrush current, max.	1.9 A; Rated value
I^2t	0.4 $A^2 \cdot s$
Power loss	
Power loss, typ.	24 W

Article number	6ES7517-3HP00-0AB0
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	
• integrated (for program)	2 Mbyte
• integrated (for data)	8 Mbyte
Load memory	
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	
• maintenance-free	Yes
CPU processing times	
for bit operations, typ.	4 ns
for word operations, typ.	6 ns
for fixed point arithmetic, typ.	6 ns
for floating point arithmetic, typ.	24 ns
CPU-blocks	
Number of elements (total)	12 000; Blocks (OB, FB, FC, DB) and UDTs
DB	
• Number range	Number range: 1 to 59 999
• Size, max.	8 Mbyte; For non-optimized block accesses, the max. size of the DB is 64 KB
FB	
• Number range	0 ... 65 535
• Size, max.	1 Mbyte
FC	
• Number range	0 ... 65 535
• Size, max.	1 Mbyte
OB	
• Size, max.	1 Mbyte
• Number of free cycle OBs	100
• Number of time alarm OBs	20
• Number of delay alarm OBs	20
• Number of cyclic interrupt OBs	20; with minimum OB 3x cycle of 1 ms
• Number of process alarm OBs	50
• Number of DPV1 alarm OBs	3
• Number of startup OBs	100
• Number of asynchronous error OBs	4
• Number of synchronous error OBs	2
• Number of diagnostic alarm OBs	1

Article number	6ES7517-3HP00-0AB0
Nesting depth	
• per priority class	24
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
Retentivity	
– adjustable	Yes
IEC counter	
• Number	Any (only limited by the main memory)
Retentivity	
– adjustable	Yes
S7 times	
• Number	2 048
Retentivity	
– adjustable	Yes
IEC timer	
• Number	Any (only limited by the main memory)
Retentivity	
– adjustable	Yes
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	768 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 700 KB
Flag	
• Size, max.	16 kbyte
• Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte
Data blocks	
• Retentivity adjustable	Yes
• Retentivity preset	No
Local data	
• per priority class, max.	64 kbyte; max. 16 KB per block
Address area	
Number of IO modules	8 192; max. number of modules / submodules
I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image
per integrated IO subsystem	
– Inputs (volume)	16 kbyte
– Outputs (volume)	16 kbyte

Article number	6ES7517-3HP00-0AB0
Subprocess images	
• Number of subprocess images, max.	31
Hardware configuration	
Number of distributed IO systems	64; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET, but also by the connection of I/O via IE/PB-Links.
Number of IO Controllers	
• integrated	1
Rack	
• Modules per rack, max.	9; CPU + 2 PS + 6 CP
Time of day	
Clock	
• Type	Hardware clock
• Backup time	6 wk; At 40 °C ambient temperature, typically
• Deviation per day, max.	10 s; Typ.: 2 s
Operating hours counter	
• Number	16
Clock synchronization	
• supported	Yes
• on Ethernet via NTP	Yes
Interfaces	
Number of PROFINET interfaces	2
1. Interface	
Interface types	
• RJ 45 (Ethernet)	Yes; X1
• Number of ports	2
• integrated switch	Yes
Protocols	
• IP protocol	Yes; IPv4
• PROFINET IO Controller	Yes
• PROFINET IO Device	No
• SIMATIC communication	Yes; Only Server
• Open IE communication	Yes; Optionally also encrypted
• Web server	Yes
• Media redundancy	Yes

Article number	6ES7517-3HP00-0AB0
PROFINET IO Controller	
Services	
– Isochronous mode	No
– IRT	No
– PROFIenergy	Yes; per user program
– Number of connectable IO Devices, max.	256
– Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
– PROFINET Security Class	1
Update time for RT	
– for send cycle of 1 ms	1 ms to 512 ms
2. Interface	
Interface types	
• RJ 45 (Ethernet)	Yes; X2
• Number of ports	1
• integrated switch	No
Protocols	
• IP protocol	Yes; IPv4
• PROFINET IO Controller	No
• PROFINET IO Device	No
• SIMATIC communication	Yes; Only Server
• Open IE communication	Yes; Optionally also encrypted
• Web server	Yes
• Media redundancy	No
3. Interface	
Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization module 6ES7960-1CB00-0AA5, 6ES7960-1FB00-0AA5 or 6ES7 960-1FE00-0AA5
4. Interface	
Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization module 6ES7960-1CB00-0AA5, 6ES7960-1FB00-0AA5 or 6ES7960-1FE00-0AA5
Interface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
• Autonegotiation	Yes
• Autocrossing	Yes
• Industrial Ethernet status LED	Yes

Article number	6ES7517-3HP00-0AB0
Protocols	
PROFIsafe	No
Number of connections	
• Number of connections, max.	320; via integrated interfaces of the CPU and connected CPs
• Number of connections reserved for ES/HMI/web	10
• Number of connections via integrated interfaces	288
• Number of S7 routing paths	64
Redundancy mode	
• PROFINET system redundancy (S2)	Yes
• PROFINET system redundancy (R1)	Yes
Media redundancy	
– MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0
– MRP interconnection, supported	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0
– MRPD	No
– Switchover time on line break, typ.	200 ms; PROFINET MRP
– Number of stations in the ring, max.	50
SIMATIC communication	
• PG/OP communication	Yes; encryption with TLS V1.3 pre-selected
• S7 routing	Yes
• S7 communication, as server	Yes
• S7 communication, as client	No
Open IE communication	
• TCP/IP	Yes
– Data length, max.	64 kbyte
– several passive connections per port, supported	Yes
• ISO-on-TCP (RFC1006)	Yes
– Data length, max.	64 kbyte
• UDP	Yes
– Data length, max.	2 kbyte; 1 472 bytes for UDP broadcast
– UDP multicast	Yes; 128 multicast circuits (of which max. 5 via X1)

Article number	6ES7517-3HP00-0AB0
• DHCP	No
• DNS	Yes
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
• Encryption	Yes; Optional
Web server	
• HTTP	No
• HTTPS	Yes; only via Web API
• web API	Yes
– Number of sessions, max.	200
– number of simultaneous HTTP calls, max.	4
– HTTP request body, max.	131 072 byte
OPC UA	
• Runtime license required	Yes
• OPC UA Client	No
• OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address space
– Application authentication	Yes
– Security policies	available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256, Aes128Sha256RsaOaep, Aes256Sha256RsaPss
– User authentication	"anonymous" or by user name & password
– GDS support (certificate management)	No
– Number of sessions, max.	32
– Number of subscriptions per session, max.	25
– Sampling interval, min.	25 ms
– Publishing interval, min.	25 ms
– Number of server methods, max.	100
– Number of inputs/outputs per server method, max.	20
– Number of monitored items, recommended max.	5 000; for 1 s sampling interval and 1 s send interval
– Number of server interfaces, max.	10 of each "Server interfaces" / "Companion specification" type and 20 of the type "Reference namespace"
– Number of nodes for user-defined server interfaces, max.	30 000
• Alarms and Conditions	No

Article number	6ES7517-3HP00-0AB0
Further protocols	
• MODBUS	Yes; MODBUS TCP
S7 message functions	
Number of login stations for message functions, max.	64
number of subscriptions, max.	750
number of tags/attributes for subscriptions, max.	20 000
Program alarms	Yes
Number of configurable program messages, max.	10 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	10 000
Number of simultaneously active program alarms	
• Number of program alarms	2 000
• Number of alarms for system diagnostics	1 000
Test commissioning functions	
Joint commission (Team Engineering)	No
Status block	Yes; Up to 16 simultaneously
Single step	No
Number of breakpoints	20; Breakpoints are only supported in RUN-Solo status
Status/control	
• Status/control variable	Yes
• Variables	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
• Number of variables, max.	
– of which status variables, max.	200; per job
– of which control variables, max.	200; per job
Forcing	
• Forcing	Yes
• Forcing, variables	Peripheral inputs/outputs
• Number of variables, max.	200
Diagnostic buffer	
• present	Yes
• Number of entries, max.	3 200
– of which powerfail-proof	1 000
Traces	
• Number of configurable Traces	8
• Memory size per trace, max.	512 kbyte

Article number	6ES7517-3HP00-0AB0
Interrupts/diagnostics/status information	
Diagnostics indication LED	
• RUN/STOP LED	Yes
• ERROR LED	Yes
• MAINT LED	Yes
• Connection display LINK TX/RX	Yes
Supported technology objects	
Motion Control	No
Controller	
• PID_Compact	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves
• PID-Temp	Yes; PID controller with integrated optimization for temperature
Counting and measuring	Yes
Standards, approvals, certificates	
Suitable for safety functions	No
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
configuration / header	
configuration / programming / header	
Programming language	
– LAD	Yes
– FBD	Yes
– STL	Yes
– SCL	Yes
– CFC	No
– GRAPH	Yes

Article number	6ES7517-3HP00-0AB0
Know-how protection	
• User program protection/password protection	Yes
• Copy protection	No
• Block protection	Yes
Access protection	
• protection of confidential configuration data	Yes
• Password for display	Yes
• Protection level: Write protection	Yes
• Protection level: Read/write protection	Yes
• Protection level: Write protection for Failsafe	No
• Protection level: Complete protection	Yes
• User administration	Yes
programming / cycle time monitoring / header	
• lower limit	adjustable minimum cycle time
• upper limit	adjustable maximum cycle time
Dimensions	
Width	210 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	2 094 g; Interface modules: 2x 18 g

General technical specifications

You can find information on the general technical specifications, such as standards and approvals, electromagnetic compatibility, protection class, etc. in the S7-1500R/H redundant system System Manual.

See also

Redundant System S7-1500R/H System Manual
(https://support.industry.siemens.com/cs/ww/en/view/109754833)