

Siemens
EcoTech



SIMATIC S7-1500R, CPU 1515R-2 PN central processing unit with work memory 1 MB for program and 4.5 MB for data, 1st interface: PROFINET RT with 2-port switch, 2nd interface: PROFINET, SIMATIC Memory Card required



General information

Product type designation	CPU 1515R-2 PN
HW functional status	FS05
Firmware version	V4.0
• 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	V20 (FW V4.0) / V18 (FW V3.0) or higher; configurable with older TIA Portal versions as 6ES7 515-2RM00-0AB0
Redundancy	
• stand-alone operation	Yes

Display

Screen diagonal [cm]	6.1 cm
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Control elements

Number of keys	8
Mode buttons	2

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)	0.65 A
Current consumption, max.	0.88 A
Inrush current, max.	1.15 A
I^2t	0.6 A ² ·s

Power

Infeed power to the backplane bus	12 W
Power consumption from the backplane bus (balanced)	6.2 W

Power loss

Power loss, typ.	3.6 W
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Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	
• integrated (for program)	1 Mbyte
• integrated (for data)	4.5 Mbyte
Load memory	
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	
• maintenance-free	Yes
CPU processing times	
for bit operations, typ.	20 ns
for word operations, typ.	24 ns
for fixed point arithmetic, typ.	32 ns
for floating point arithmetic, typ.	128 ns
CPU-blocks	
Number of elements (total)	8 000; Blocks (OB, FB, FC, DB) and UDTs
DB	
• Number range	Number range: 1 to 59 999
• Size, max.	4.5 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 10 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
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.	512 kbyte; Available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 KB
Extended retentive data area (incl. timers, counters, flags), max.	4.5 Mbyte; When using PS 6 0W 24/48/60 V DC HF

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	4 096; 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)	8 kbyte
— Outputs (volume)	8 kbyte
Subprocess images	
• Number of subprocess images, max.	31
Hardware configuration	
Number of distributed IO systems	16; 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.	5; CPU + 2 PS + 2 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
PROFINET IO Controller	
Services	
— Isochronous mode	No
— IRT	No
— PROFINergy	Yes; per user program
— Number of connectable IO Devices, max.	64
— 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
Interface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
• Autonegotiation	Yes
• Autocrossing	Yes
• Industrial Ethernet status LED	Yes
Protocols	
PROFIsafe	No
Number of connections	
• Number of connections, max.	256; via integrated interfaces of the CPU and connected CPs
• Number of connections reserved for ES/HMI/web	10
• Number of connections via integrated interfaces	128
• Number of S7 routing paths	16
Redundancy mode	
• PROFINET system redundancy (S2)	Yes
• PROFINET system redundancy (R1)	No
Media redundancy	
— Media redundancy	Yes; only via 1st interface (X1)
— 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; Only 16 are recommended, however
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; max. 118 multicast circuits
• 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 — Number of sessions, max. — number of simultaneous HTTP calls, max. — HTTP request body, max.	Yes 100 4 131 072 byte
OPC UA	
• Runtime license required • OPC UA Client • OPC UA Server — Application authentication — Security policies — User authentication — GDS support (certificate management) — Number of sessions, max. — Number of subscriptions per session, max. — Sampling interval, min. — Publishing interval, min. — Number of server methods, max. — Number of inputs/outputs per server method, max. — Number of monitored items, recommended max. — Number of server interfaces, max. — Number of nodes for user-defined server interfaces, max. • Alarms and Conditions	Yes; "Medium" license required per CPU No Yes; data access (read, write, subscribe), method call, custom address space, role-based access control Yes available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256, Aes128Sha256RsaOaep, Aes256Sha256RsaPss "anonymous" or by user name & password No 24 25 250 ms 250 ms 50; max. 20 concurrently running jobs each for asynchronous instructions OPC-UA_ServerMethodPre (V1.1) and OPC-UA_ServerMethodPost (V1.1) 20 2 000; for 1 s sampling interval and 1 s send interval 10 of each "Server interfaces" / "Companion specification" type and 20 of the type "Reference namespace" 30 000 No
Further protocols	
• MODBUS	Yes; MODBUS TCP
S7 message functions	
Number of login stations for message functions, max.	64
number of subscriptions, max.	500
number of tags/attributes for subscriptions, max.	8 000
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 • Number of alarms for system diagnostics	1 000 200
Test commissioning functions	
Joint commission (Team Engineering)	Yes
Status block	Yes; up to 8 simultaneously
Single step	No
Number of breakpoints	8; Breakpoints are only supported in RUN-Solo status
Profiling	Yes
Status/control	
• Status/control variable • Variables • Number of variables, max. — of which status variables, max. — of which control variables, max.	Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job 200; per job
Forcing	
• Forcing • Forcing, variables • Number of variables, max.	Yes Peripheral inputs/outputs 200
Diagnostic buffer	
• present • Number of entries, max. — of which powerfail-proof	Yes 3 200 500
Traces	
• Number of configurable Traces	4

• Memory size per trace, max.	512 kbyte
Interrupts/diagnostics/status information	
Diagnostics indication LED	
• RUN/STOP LED	Yes
• ERROR LED	Yes
• MAINT LED	Yes
• STOP ACTIVE 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	
Siemens Eco Profile (SEP)	Siemens EcoTech
Ecological footprint	
• environmental product declaration	Yes
Global warming potential	
— global warming potential, (total) [CO2 eq]	100 kg
— global warming potential, (during production) [CO2 eq]	25.8 kg
— global warming potential, (during operation) [CO2 eq]	75.2 kg
— global warming potential, (after end of life cycle) [CO2 eq]	-0.83 kg
product functions / security / header	
PROFINET Security Class	1
signed firmware update	Yes
Secure Boot	Yes
safely removing data	Yes
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-30 °C; No condensation
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	-30 °C; No condensation
• 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	Yes
— GRAPH	Yes
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 • Protection level: Write protection for Failsafe • Protection level: Complete protection • User administration • Number of users • Number of groups • Number of roles	Yes No Yes Yes; device-wide and centralized 100 100 50																																							
programming / cycle time monitoring / header																																								
• lower limit • upper limit	adjustable minimum cycle time adjustable maximum cycle time																																							
Dimensions																																								
Width	70 mm																																							
Height	147 mm																																							
Depth	129 mm																																							
Weights																																								
Weight, approx.	456 g																																							
Classifications																																								
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