



Spare part SIMATIC S7-1500, CPU 1515-2 PN, Central processing unit with work memory 500 KB for Program and 3 MB for data, 1st interface, PROFINET IRT with 2-port switch, 2nd interface, Ethernet, 30 ns bit performance, SIMATIC Memory Card required

General information	
Product type designation	CPU 1515-2 PN
HW functional status	FS02
Firmware version	V1.8
Product function	
• Isochronous mode	Yes; With minimum OB 6x cycle of 500 µs
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	V13 SP1 Update 4
Configuration control	
via dataset	Yes
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
Input current	
Current consumption (rated value)	0.8 A
Inrush current, max.	2.4 A; Rated value
I ² t	0.02 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.	6.3 W
Memory	
SIMATIC memory card required	Yes
Work memory	
• integrated (for program)	500 kbyte
• integrated (for data)	3 Mbyte
Load memory	
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	

• maintenance-free	Yes
CPU processing times	
for bit operations, typ.	30 ns
for word operations, typ.	36 ns
for fixed point arithmetic, typ.	48 ns
for floating point arithmetic, typ.	192 ns
CPU-blocks	
Number of elements (total)	6 000; Blocks (OB, FB, FC, DB) and UDTs
DB	
• Number range	1 ... 60 999; subdivided into: number range that can be used by the user: 1 ... 59 999, and number range of DBs created via SFC 86: 60 000 ... 60 999
• Size, max.	3 Mbyte; For non-optimized block accesses, the max. size of the DB is 64 KB
FB	
• Number range	0 ... 65 535
• Size, max.	500 kbyte
FC	
• Number range	0 ... 65 535
• Size, max.	500 kbyte
OB	
• Size, max.	500 kbyte
• Number of free cycle OBs	100
• Number of time alarm OBs	20
• Number of delay alarm OBs	20
• Number of cyclic interrupt OBs	20
• Number of process alarm OBs	50
• Number of DPV1 alarm OBs	3
• Number of isochronous mode OBs	1
• Number of technology synchronous alarm OBs	2
• 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; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 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)	8 kbyte
— Outputs (volume)	8 kbyte
per CM/CP	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
Subprocess images	
• Number of subprocess images, max.	32
Hardware configuration	
Number of distributed IO systems	20
Number of DP masters	
• Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Number of IO Controllers	
• integrated	1
• Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Rack	
• Modules per rack, max.	32; CPU + 31 modules
• Number of lines, max.	1
PtP CM	
• Number of PtP CMs	the number of connectable PtP CMs is only limited by the number of available slots
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
• in AS, master	Yes
• in AS, slave	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	
• PROFINET IO Controller	Yes
• PROFINET IO Device	Yes
• SIMATIC communication	Yes
• Open IE communication	Yes
• Web server	Yes
• Media redundancy	Yes
PROFINET IO Controller	
Services	
— PG/OP communication	Yes
— Isochronous mode	Yes
— IRT	Yes
— PROFIenergy	Yes
— Prioritized startup	Yes; Max. 32 PROFINET devices
— Number of connectable IO Devices, max.	256; In total, up to 512 distributed I/O devices can be connected via PROFIBUS or PROFINET

— Of which IO devices with IRT, max.	64
— Number of connectable IO Devices for RT, max.	256
— of which in line, max.	256
— Number of IO Devices that can be simultaneously activated/deactivated, max.	8
— Number of IO Devices per tool, max.	8
— 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
Update time for IRT	
— for send cycle of 250 µs	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive
— for send cycle of 500 µs	500 µs to 8 ms
— for send cycle of 1 ms	1 ms to 16 ms
— for send cycle of 2 ms	2 ms to 32 ms
— for send cycle of 4 ms	4 ms to 64 ms
— With IRT and parameterization of "odd" send cycles	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)
Update time for RT	
— for send cycle of 250 µs	250 µs to 128 ms
— for send cycle of 500 µs	500 µs to 256 ms
— for send cycle of 1 ms	1 ms to 512 ms
— for send cycle of 2 ms	2 ms to 512 ms
— for send cycle of 4 ms	4 ms to 512 ms
PROFINET IO Device	
Services	
— PG/OP communication	Yes
— Isochronous mode	No
— IRT	Yes
— PROFIenergy	Yes
— Shared device	Yes
— Number of IO Controllers with shared device, max.	4
2. Interface	
Interface types	
• RJ 45 (Ethernet)	Yes; X2
• Number of ports	1
• integrated switch	No
Protocols	
• PROFINET IO Controller	No
• PROFINET IO Device	No
• SIMATIC communication	Yes
• Open IE communication	Yes
• Web server	Yes
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.	192; via integrated interfaces of the CPU and connected CPs / CMs
• Number of connections reserved for ES/HMI/web	10
• Number of connections via integrated interfaces	108
• Number of S7 routing paths	16
Redundancy mode	
Media redundancy	
— MRP	Yes; as MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
— Switchover time on line break, typ.	200 ms
— Number of stations in the ring, max.	50
SIMATIC communication	

<ul style="list-style-type: none"> • S7 routing • S7 communication, as server • S7 communication, as client • User data per job, max. 	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>See online help (S7 communication, user data size)</p>
Open IE communication	
<ul style="list-style-type: none"> • TCP/IP <ul style="list-style-type: none"> — Data length, max. — several passive connections per port, supported • ISO-on-TCP (RFC1006) <ul style="list-style-type: none"> — Data length, max. • UDP <ul style="list-style-type: none"> — Data length, max. • DHCP • SNMP • DCP • LLDP 	<p>Yes</p> <p>64 kbyte</p> <p>Yes</p> <p>Yes</p> <p>64 kbyte</p> <p>Yes</p> <p>1 472 byte</p> <p>No</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>
Web server	
<ul style="list-style-type: none"> • HTTP • HTTPS 	<p>Yes; Standard and user-defined pages</p> <p>Yes; Standard and user-defined pages</p>
Further protocols	
<ul style="list-style-type: none"> • MODBUS 	<p>Yes; MODBUS TCP</p>
Isochronous mode	
<p>Equidistance</p>	<p>Yes</p>
S7 message functions	
<p>Number of login stations for message functions, max.</p> <p>Program alarms</p> <p>Number of configurable program messages, max.</p> <p>Number of simultaneously active program alarms</p> <ul style="list-style-type: none"> • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects 	<p>32</p> <p>Yes</p> <p>10 000</p> <p>600</p> <p>200</p> <p>160</p>
Test commissioning functions	
<p>Joint commission (Team Engineering)</p> <p>Status block</p> <p>Single step</p>	<p>Yes; Parallel online access possible for up to 8 engineering systems</p> <p>Yes; Up to 8 simultaneously (in total across all ES clients)</p> <p>No</p>
Status/control	
<ul style="list-style-type: none"> • Status/control variable • Variables • Number of variables, max. <ul style="list-style-type: none"> — of which status variables, max. — of which control variables, max. 	<p>Yes</p> <p>Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters</p> <p>200; per job</p> <p>200; per job</p>
Forcing	
<ul style="list-style-type: none"> • Forcing, variables • Number of variables, max. 	<p>Peripheral inputs/outputs</p> <p>200</p>
Diagnostic buffer	
<ul style="list-style-type: none"> • present • Number of entries, max. <ul style="list-style-type: none"> — of which powerfail-proof 	<p>Yes</p> <p>3 200</p> <p>500</p>
Traces	
<ul style="list-style-type: none"> • Number of configurable Traces 	<p>4; Up to 512 KB of data per trace are possible</p>
Interrupts/diagnostics/status information	
Diagnostics indication LED	
<ul style="list-style-type: none"> • RUN/STOP LED • ERROR LED • MAINT LED • Connection display LINK TX/RX 	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>
Supported technology objects	
<p>Motion Control</p> <ul style="list-style-type: none"> • Speed-controlled axis <ul style="list-style-type: none"> — Number of speed-controlled axes, max. 	<p>Yes</p> <p>30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool</p>

<ul style="list-style-type: none"> • Positioning axis <ul style="list-style-type: none"> — Number of positioning axes, max. • Synchronized axes (relative gear synchronization) <ul style="list-style-type: none"> — Number of axes, max. • External encoders <ul style="list-style-type: none"> — Number of external encoders, max. 	<p>30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool</p> <p>15; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool</p> <p>30; Requirement: There must be no other motion technology objects created; note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool</p>
Controller <ul style="list-style-type: none"> • PID_Compact • PID_3Step • PID-Temp 	<p>Yes; Universal PID controller with integrated optimization</p> <p>Yes; PID controller with integrated optimization for valves</p> <p>Yes; PID controller with integrated optimization for temperature</p>
Counting and measuring <ul style="list-style-type: none"> • High-speed counter 	Yes
Ambient conditions	
Ambient temperature during operation	
<ul style="list-style-type: none"> • horizontal installation, min. • horizontal installation, max. • vertical installation, min. • vertical installation, max. 	<p>0 °C</p> <p>60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off</p> <p>0 °C</p> <p>40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off</p>
configuration / header	
configuration / programming / header	
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— GRAPH	Yes
Know-how protection	
<ul style="list-style-type: none"> • User program protection/password protection • Copy protection • Block protection 	<p>Yes</p> <p>Yes</p> <p>Yes</p>
Access protection	
<ul style="list-style-type: none"> • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Complete protection 	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>
programming / cycle time monitoring / header	
<ul style="list-style-type: none"> • lower limit • upper limit 	<p>adjustable minimum cycle time</p> <p>adjustable maximum cycle time</p>
Dimensions	
Width	70 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	830 g