



Figure similar

SIPLUS ET 200SP CPU 1515SP PC2 RAIL based on 6ES7677-2DB42-0GB0 with conformal coating, -40...+60 °C, OT2 with ST1/2 (+70 °C für 10 minutes), 8 GB RAM, 128 GB CFast with Windows 10 IoT Enterprise 64-bit and S7-1500 Software Controller CPU 1505SP preinstalled, interfaces: 1x slot CFast, 1x slot SD/MMC, 1x connection for ET 200SP BusAdapter PROFINET, 1x 10/100/1000 Mbps Ethernet 2x USB 3.0; 2x USB 2.0, 1x DisplayPort,

General information	
Product type designation	CPU 1515SP PC2
based on	6ES7677-2DB42-0GB0
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275
Installed software	
• Visualization	No
• Control	S7-1500 Software Controller CPU 1505SP
Configuration control	
via dataset	Yes
Control elements	
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)	1.8 A; Full processor load, incl. ET 200SP modules and using USB
Current consumption (in no-load operation), typ.	0.5 A
Current consumption, max.	2.9 A
I ² t	0.426 A ² -s; with starting current inrush
Power	
Active power input, max.	43 W; incl. ET 200SP modules and using USB
Infeed power to the backplane bus	8.75 W
Power loss	
Power loss, typ.	16 W
Processor	
Processor type	Intel Atom E3940, 1.6 GHz, 4 cores
Storage	
Type of memory	DDR3L
Main memory	8 GB RAM
CFast memory card	Yes; 128 GB flash memory
SIMATIC memory card required	No
Work memory	
• integrated (for program)	1 Mbyte

• integrated (for data)	5 Mbyte
• integrated (for CPU function library of CPU Runtime)	20 Mbyte
Load memory	
• integrated (on PC mass storage)	320 Mbyte
Backup	
• with UPS	Yes; all memory areas declared retentive
• with non-volatile memory	Yes
CPU-blocks	
Number of elements (total)	6 000; In addition to blocks such as DBs, FBs and FCs, UDTs, global constants, etc. are also regarded as elements
DB	
• Number, max.	5 999; Number range: 1 to 65535
• Size, max.	5 Mbyte
FB	
• Number, max.	5 998; Number range: 1 to 65535
• Size, max.	1 024 kbyte
FC	
• Number, max.	5 999; Number range: 1 to 65535
• Size, max.	1 024 kbyte
OB	
• Size, max.	1 024 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	
— can be set	Yes
IEC counter	
• Number	Any (only limited by the main memory)
Retentivity	
— can be set	Yes
S7 timer	
• 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.	410 kbyte; For storage in NVRAM; for storage in mass storage 5 242 020 bytes
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
I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image
Subprocess images	
• Number of subprocess images, max.	32
Hardware configuration	
Integrated power supply	Yes
Number of distributed IO systems	20
Number of DP masters	
• Via CM	1
Number of IO Controllers	
• via PC interfaces	1
Rack	
• Modules per rack, max.	64; CPU 1515SP PC + 64 modules + server module
• 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
• Hardware clock (real-time)	Yes; Resolution: 1 s
• Backup time	6 wk; At 40 °C ambient temperature, typically
• Deviation per day, max.	10 s; Typ.: 2 s
Clock synchronization	
• supported	Yes
• to DP, master	Yes
• on Ethernet via NTP	Yes
• on Windows clock, device	Yes
Interfaces	
Number of industrial Ethernet interfaces	2
Number of PROFINET interfaces	1
Number of PROFIBUS interfaces	1
Number of RS 485 interfaces	1; Via CM DP module
Number of USB interfaces	4; 2x USB 2.0, 2x USB 3.0 on front side
Number of SD card slots	1
Video interfaces	
• Graphics interface	1x DisplayPort
1. Interface	
Interface type	PROFINET
automatic detection of transmission rate	Yes
Autonegotiation	Yes
Autocrossing	Yes
Number of connections	88
Interface types	
• RJ 45 (Ethernet)	Yes; Via BusAdapter BA 2x RJ45
— Transmission rate, max.	100 Mbit/s
— Industrial Ethernet status LED	Yes
• Number of ports	2
• integrated switch	Yes
• BusAdapter (PROFINET)	Yes; Compatible BusAdapter: BA 2x RJ45, BA 2x FC, BA 2x SCRJ (from FS03, V2.2), BA SCRJ / RJ45 (from FS03, V3.1), BA SCRJ / FC (from FS03, V3.1), BA 2x LC (from FS03, V3.3), BA LC / RJ45 (from FS03, V3.3), BA LC / FC (from FS03, V3.3)
Protocols	

• IP protocol	Yes; IPv4
• PROFINET IO Controller	Yes
• PROFINET IO Device	Yes
• SIMATIC communication	Yes
• Open IE communication	Yes; Optionally also encrypted
• Web server	Yes
PROFINET IO Controller	
Services	
— Isochronous mode	Yes
— shortest clock pulse	500 µs
— IRT	Yes
— Dynamic Frame Packing (DFP)	No
— PROFINergy	Yes
— Prioritized startup	Yes; max. 32 PROFINET devices; if you want to use the "Prioritized startup" functionality in STEP 7 for the PROFINET interface of the CPU, the CPU and the device must be separated by means of a switch (e.g. SCALANCE)
— Number of connectable IO Devices, max.	128
— Of which IO devices with IRT, max.	64
— of which in line, max.	64
— Number of connectable IO Devices for RT, max.	128
— of which in line, max.	128
— Number of IO Devices that can be simultaneously activated/deactivated, max.	8
— IO Devices changing during operation (partner ports), supported	Yes
— 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 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: 625 µs ... 3 875 µs) minimum cycle time start from 500 µs
Update time for RT	
— 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
Address area	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
PROFINET IO Device	
Services	
— Isochronous mode	No
— shortest clock pulse	500 µs
— IRT	Yes
— Dynamic Frame Packing (DFP)	No
— PROFINergy	Yes
— Prioritized startup	Yes
— Shared device	Yes
— Number of IO Controllers with shared device, max.	4
— Asset management record	Yes
2. Interface	
Interface type	Integrated Ethernet interface
automatic detection of transmission rate	Yes
Autonegotiation	Yes
Autocrossing	Yes
Interface types	

<ul style="list-style-type: none"> • RJ 45 (Ethernet) <ul style="list-style-type: none"> — Transmission rate, max. — Industrial Ethernet status LED • Number of ports 	Yes; Integrated 1 000 Mbit/s No 1
3. Interface	
Interface type	PROFIBUS with CM DP
Number of connections	44
Interface types	
<ul style="list-style-type: none"> • RS 485 	Yes
Protocols	
<ul style="list-style-type: none"> • PROFIBUS DP master • PROFIBUS DP device • SIMATIC communication 	Yes Yes Yes
PROFIBUS DP master	
<ul style="list-style-type: none"> • max. number of DP devices 	125
Services	
<ul style="list-style-type: none"> — Equidistance — Isochronous mode 	No No
Address area	
<ul style="list-style-type: none"> — Inputs, max. — Outputs, max. 	8 kbyte 8 kbyte
Interface types	
RS 485	
<ul style="list-style-type: none"> • Transmission rate, max. 	12 Mbit/s
Protocols	
PROFIsafe	No
Number of connections	
<ul style="list-style-type: none"> • Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of S7 routing paths 	88 10 16
Redundancy mode	
<ul style="list-style-type: none"> • PROFINET system redundancy (S2) • PROFINET system redundancy (R1) 	No No
Media redundancy	
<ul style="list-style-type: none"> — MRP — MRP interconnection, supported — MRPD — Switchover time on line break, typ. — Number of stations in the ring, max. 	Yes Yes Yes 200 ms 50
SIMATIC communication	
<ul style="list-style-type: none"> • PG/OP communication • S7 routing • S7 communication, as server • S7 communication, as client • User data per job, max. 	Yes Yes Yes Yes 64 kbyte; BSEND/BRCV: 64 KB; PUT/GET: 960 bytes
Open IE communication	
<ul style="list-style-type: none"> • TCP/IP <ul style="list-style-type: none"> — Data length, max. • ISO-on-TCP (RFC1006) <ul style="list-style-type: none"> — Data length, max. • UDP <ul style="list-style-type: none"> — Data length, max. • SNMP • DCP • LLDP 	Yes 64 kbyte Yes 64 kbyte Yes 1 472 kbyte Yes Yes Yes
Web server	
<ul style="list-style-type: none"> • HTTP • HTTPS 	Yes; Via Windows and PROFINET interface Yes; Via Windows and PROFINET interface
OPC UA	

<ul style="list-style-type: none"> • Runtime license required • OPC UA Client • OPC UA Server <ul style="list-style-type: none"> — Application authentication — Security policies — User authentication 	Yes; "Small" license required Yes; From SW CPU 1505SP V2.6 Yes; Data access (read, write, subscribe), runtime license required Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 Yes; "anonymous" or by user name & password
Further protocols	
<ul style="list-style-type: none"> • MODBUS 	Yes; MODBUS TCP
S7 message functions	
Number of login stations for message functions, max.	32
Program alarms	Yes
Number of configurable program messages, max.	10 000
Number of simultaneously active program alarms	1 000
<ul style="list-style-type: none"> • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects 	1 000 200 160
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 8 engineering systems
Status block	Yes; up to 8 simultaneously
Single step	No
Number of breakpoints	8
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. 	Yes Inputs, outputs, memory bits, DB, times, counters 200 200
Forcing	
<ul style="list-style-type: none"> • Forcing • Forcing, variables • Number of variables, max. 	Yes Inputs, outputs 200
Diagnostic buffer	
<ul style="list-style-type: none"> • present • Number of entries, max. <ul style="list-style-type: none"> — of which powerfail-proof 	Yes 1 000 300
Traces	
<ul style="list-style-type: none"> • Number of configurable Traces • Memory size per trace, max. 	4 512 kbyte
Interrupts/diagnostics/status information	
Diagnostics indication LED	
<ul style="list-style-type: none"> • RUN/STOP LED • ERROR LED • MAINT LED 	Yes Yes Yes
Supported technology objects	
Motion Control	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
<ul style="list-style-type: none"> • Number of available Motion Control resources for technology objects • Required Motion Control resources <ul style="list-style-type: none"> — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track — per probe • Positioning axis <ul style="list-style-type: none"> — Number of positioning axes at motion control cycle 	2 400 40; per axis 80; per axis 160; per axis 80; per external encoder 20; per cam 160; per cam track 40; per probe 15

of 4 ms (typical value) — Number of positioning axes at motion control cycle of 8 ms (typical value)	30
Controller <ul style="list-style-type: none"> • PID_Compact • PID_3Step • PID-Temp 	Yes; Universal PID controller with integrated optimization Yes; PID controller with integrated optimization for valves Yes; PID controller with integrated optimization for temperature
Counting and measuring <ul style="list-style-type: none"> • High-speed counter 	Yes
Isolation	
Isolation tested with	750 V DC (type test) and according to EN 50155 (routine test)
Standards, approvals, certificates	
Ecological footprint	
• environmental product declaration	Yes
Global warming potential	
— global warming potential, (total) [CO2 eq]	432 kg
— global warming potential, (during production) [CO2 eq]	73.8 kg
— global warming potential, (during operation) [CO2 eq]	365 kg
— global warming potential, (after end of life cycle) [CO2 eq]	-6.71 kg
Railway application	
• EN 50121-3-2	Yes; EMC for rail vehicles
• EN 50121-4	Yes; EMC for signal and telecommunications systems
• EN 50124-1	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
• EN 50125-1	Yes; Rail vehicles - see ambient conditions
• EN 50125-2	Yes; Stationary electrical equipment - see ambient conditions
• EN 50125-3	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
• EN 50155	Yes; Rail vehicles - temperature class OT4, ST1/ST2, horizontal mounting position
• EN 61373	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
• Fire protection acc. to EN 45545-2	Yes; For proof of conformity, see Service & Support
Ambient conditions	
Ambient temperature during operation	
• min.	-40 °C; = Tmin
• max.	up to 55 °C with max. 64 ET 200SP modules, max. 2x 900 mA USB load and max. 2x 500 mA USB load; up to 60 °C with max. 32 ET 200SP modules and 4x 500 mA USB load; FS06 or higher: up to 70 °C with max. 16 ET 200SP modules, 4x 100 mA USB load and no visualization
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax; +85 °C for 10 min (OT4, ST1/ST2 acc. to EN 50155)
• vertical installation, min.	-40 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax; with max. 32 ET 200SP modules and max. 4x 500 mA USB load
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Vibrations	
• Operation, tested according to IEC 60068-2-6	Yes
• Transport, tested acc. to IEC 60068-2-6	Yes
Shock testing	
• tested according to IEC 60068-2-6	Yes
• tested according to IEC 60068-2-27	Yes

• tested according to IEC 60068-2-29	Yes
• Storage/transport, tested acc. to IEC 60068-2-27	Yes
Resistance	
Coolants and lubricants	
— Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
Use in stationary industrial systems	
— to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
— to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
— to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
— Against mechanical environmental conditions acc. to EN 60721-3-3	Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0/6AG1193-6AB00-0AA0)
Use on land craft, rail vehicles and special-purpose vehicles	
— to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
— to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
— to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 incl. sand, dust; *
— Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0/6AG1193-6AB00-0AA0)
— against mechanical environmental conditions in agriculture acc. to ISO 15003	Yes; Level 1 (Location LE) using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0/6AG1193-6AB00-0AA0)
Usage in industrial process technology	
— Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
— Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
Remark	
— Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A
Operating systems	
pre-installed operating system	Windows 10 IoT Enterprise 2016 LTSP, 64bit, MUI
Configuration	
Programming	
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— CFC	No
— GRAPH	Yes
Know-how protection	
• User program protection/password protection	Yes
• Copy protection	Yes
• Block protection	Yes
Access protection	
• protection of confidential configuration data	Yes
• Protection level: Write protection	Yes
• Protection level: Read/write protection	Yes

• Protection level: Complete protection	Yes
Cycle time monitoring	
• lower limit	adjustable minimum cycle time
• upper limit	adjustable maximum cycle time
Open Development interfaces	
• Size of ODK SO file, max.	5.8 Mbyte
Peripherals/Options	
SD card	Optionally for additional mass storage
Dimensions	
Width	160 mm
Height	117 mm
Depth	75 mm
Weights	
Weight, approx.	0.83 kg
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776
Classifications	

		Version	Classification
	eClass	16	27-24-26-07
	eClass	14	27-24-26-07
	eClass	12	27-24-26-07
	eClass	9.1	27-24-26-07
	eClass	9	27-24-26-07
	eClass	8	27-24-26-07
	eClass	7.1	27-24-26-07
	eClass	6	27-24-26-07
	ETIM	10	EC001603
	ETIM	9	EC001603
	ETIM	8	EC001603
	ETIM	7	EC001603
	IDEA	4	3565
	UNSPSC	15	32-15-17-05

Approvals / Certificates	
General Product Approval	Environment

[Manufacturer Declaration](#)

[China RoHS](#)



last modified:

5/21/2026