



Figure similar

SIMATIC ET 200SP Open Controller, CPU 1515SP PC2 + HMI 128PT, 8 GB RAM (basic device 6ES7677-2DB40-0AA0), 128 GB CFast with Windows 10 IoT Enterprise LTSC 2019 64-bit, S7-1500 Software Controller CPU 1505SP V2x and WinCC Runtime Advanced V17 preinstalled, with 128 PowerTags license; 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; documentation on CFast,

General information	
Product type designation	CPU 1515SP PC2
HW functional status	from FS04
Firmware version	V20.8
Engineering with	
<ul style="list-style-type: none"> <li>STEP 7 TIA Portal configurable/integrated from version</li> </ul>	V16
Installed software	
<ul style="list-style-type: none"> <li>Visualization</li> <li>Control</li> </ul>	WinCC Runtime Advanced V16 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	
<ul style="list-style-type: none"> <li>Mains/voltage failure stored energy time</li> </ul>	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
$I^2t$	0.426 A <sup>2</sup> ·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
Memory	
Type of memory	DDR3L
Main memory	8 GB RAM
CFast memory card	Yes; 128 GB flash memory
SIMATIC memory card required	No
Work memory	

<ul style="list-style-type: none"> <li>integrated (for program)</li> </ul>	1 Mbyte
<ul style="list-style-type: none"> <li>integrated (for data)</li> </ul>	5 Mbyte
<ul style="list-style-type: none"> <li>integrated (for CPU function library of CPU Runtime)</li> </ul>	20 Mbyte
<b>Load memory</b>	
<ul style="list-style-type: none"> <li>integrated (on PC mass storage)</li> </ul>	320 Mbyte
<b>Backup</b>	
<ul style="list-style-type: none"> <li>with UPS</li> </ul>	Yes; all memory areas declared retentive
<ul style="list-style-type: none"> <li>with non-volatile memory</li> </ul>	Yes
<b>CPU-blocks</b>	
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
<b>DB</b>	
<ul style="list-style-type: none"> <li>Number, max.</li> </ul>	5 999; Number range: 1 to 65535
<ul style="list-style-type: none"> <li>Size, max.</li> </ul>	5 Mbyte
<b>FB</b>	
<ul style="list-style-type: none"> <li>Number, max.</li> </ul>	5 998; Number range: 1 to 65535
<ul style="list-style-type: none"> <li>Size, max.</li> </ul>	1 024 kbyte
<b>FC</b>	
<ul style="list-style-type: none"> <li>Number, max.</li> </ul>	5 999; Number range: 1 to 65535
<ul style="list-style-type: none"> <li>Size, max.</li> </ul>	1 024 kbyte
<b>OB</b>	
<ul style="list-style-type: none"> <li>Size, max.</li> </ul>	1 024 kbyte
<ul style="list-style-type: none"> <li>Number of free cycle OBs</li> </ul>	100
<ul style="list-style-type: none"> <li>Number of time alarm OBs</li> </ul>	20
<ul style="list-style-type: none"> <li>Number of delay alarm OBs</li> </ul>	20
<ul style="list-style-type: none"> <li>Number of cyclic interrupt OBs</li> </ul>	20
<ul style="list-style-type: none"> <li>Number of process alarm OBs</li> </ul>	50
<ul style="list-style-type: none"> <li>Number of DPV1 alarm OBs</li> </ul>	3
<ul style="list-style-type: none"> <li>Number of isochronous mode OBs</li> </ul>	1
<ul style="list-style-type: none"> <li>Number of technology synchronous alarm OBs</li> </ul>	2
<ul style="list-style-type: none"> <li>Number of startup OBs</li> </ul>	100
<ul style="list-style-type: none"> <li>Number of asynchronous error OBs</li> </ul>	4
<ul style="list-style-type: none"> <li>Number of synchronous error OBs</li> </ul>	2
<ul style="list-style-type: none"> <li>Number of diagnostic alarm OBs</li> </ul>	1
<b>Nesting depth</b>	
<ul style="list-style-type: none"> <li>per priority class</li> </ul>	24
<b>Counters, timers and their retentivity</b>	
<b>S7 counter</b>	
<ul style="list-style-type: none"> <li>Number</li> </ul>	2 048
Retentivity	
— adjustable	Yes
<b>IEC counter</b>	
<ul style="list-style-type: none"> <li>Number</li> </ul>	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
<b>S7 times</b>	
<ul style="list-style-type: none"> <li>Number</li> </ul>	2 048
Retentivity	
— adjustable	Yes
<b>IEC timer</b>	
<ul style="list-style-type: none"> <li>Number</li> </ul>	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
<b>Data areas and their retentivity</b>	
Retentive data area (incl. timers, counters, flags), max.	410 kbyte; For storage in NVRAM; for storage in mass storage 5 242 020 bytes
<b>Flag</b>	
<ul style="list-style-type: none"> <li>Size, max.</li> </ul>	16 kbyte
<ul style="list-style-type: none"> <li>Number of clock memories</li> </ul>	8; 8 clock memory bit, grouped into one clock memory byte
<b>Data blocks</b>	

• Retentivity adjustable	Yes
• Retentivity preset	No
<b>Local data</b>	
• per priority class, max.	64 kbyte; max. 16 KB per block
<b>Address area</b>	
Number of IO modules	8 192
<b>I/O address area</b>	
• Inputs	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image
<b>Subprocess images</b>	
• Number of subprocess images, max.	32
<b>Hardware configuration</b>	
Integrated power supply	Yes
Number of distributed IO systems	20
<b>Number of DP masters</b>	
• Via CM	1
<b>Number of IO Controllers</b>	
• via PC interfaces	1
<b>Rack</b>	
• Modules per rack, max.	64; CPU 1515SP PC + 64 modules + server module
• Quantity of operable ET 200SP modules, max.	64
• Quantity of operable ET 200AL modules, max.	16
• Number of lines, max.	1
<b>PtP CM</b>	
• Number of PtP CMs	the number of connectable PtP CMs is only limited by the number of available slots
<b>Time of day</b>	
<b>Clock</b>	
• 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
<b>Clock synchronization</b>	
• supported	Yes
• to DP, master	Yes
• on Ethernet via NTP	Yes
• on Windows clock, device	Yes
<b>Interfaces</b>	
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
<b>Video interfaces</b>	
• Graphics interface	1x DisplayPort
<b>1. Interface</b>	
Interface type	PROFINET
automatic detection of transmission rate	Yes
Autonegotiation	Yes
Autocrossing	Yes
Number of connections	88
<b>Interface types</b>	
• 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	
• PROFINET IO Controller	Yes
• PROFINET IO Device	Yes
• SIMATIC communication	Yes
• Open IE communication	Yes
• Web server	Yes
PROFINET IO Controller	
Services	
— Isochronous mode	Yes
— shortest clock pulse	500 µs
— IRT	Yes
— 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 X205)
— 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
— 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

<b>Interface types</b>	
<ul style="list-style-type: none"> <li>● RJ 45 (Ethernet) <ul style="list-style-type: none"> <li>— Transmission rate, max. 1 000 Mbit/s</li> <li>— Industrial Ethernet status LED No</li> </ul> </li> <li>● Number of ports 1</li> </ul>	
<b>3. Interface</b>	
Interface type	PROFIBUS with CM DP
Number of connections	44
<b>Interface types</b>	
<ul style="list-style-type: none"> <li>● RS 485 Yes</li> </ul>	
<b>Protocols</b>	
<ul style="list-style-type: none"> <li>● PROFIBUS DP master Yes</li> <li>● PROFIBUS DP device Yes</li> <li>● SIMATIC communication Yes</li> </ul>	
<b>PROFIBUS DP master</b>	
<ul style="list-style-type: none"> <li>● max. number of DP devices 125</li> </ul>	
<b>Services</b>	
<ul style="list-style-type: none"> <li>— Equidistance No</li> <li>— Isochronous mode No</li> </ul>	
<b>Address area</b>	
<ul style="list-style-type: none"> <li>— Inputs, max. 8 kbyte</li> <li>— Outputs, max. 8 kbyte</li> </ul>	
<b>Interface types</b>	
<b>RS 485</b>	
<ul style="list-style-type: none"> <li>● Transmission rate, max. 12 Mbit/s</li> </ul>	
<b>Protocols</b>	
PROFIsafe	No
<b>Number of connections</b>	
<ul style="list-style-type: none"> <li>● Number of connections, max. 88</li> <li>● Number of connections reserved for ES/HMI/web 10</li> <li>● Number of S7 routing paths 16</li> </ul>	
<b>Redundancy mode</b>	
<b>Media redundancy</b>	
<ul style="list-style-type: none"> <li>— MRP Yes</li> <li>— MRPD Yes</li> <li>— Switchover time on line break, typ. 200 ms</li> <li>— Number of stations in the ring, max. 50</li> </ul>	
<b>SIMATIC communication</b>	
<ul style="list-style-type: none"> <li>● PG/OP communication Yes</li> <li>● S7 routing Yes</li> <li>● S7 communication, as server Yes</li> <li>● S7 communication, as client Yes</li> <li>● User data per job, max. 64 kbyte; BSEND/BRCV: 64 KB; PUT/GET: 960 bytes</li> </ul>	
<b>Open IE communication</b>	
<ul style="list-style-type: none"> <li>● TCP/IP Yes <ul style="list-style-type: none"> <li>— Data length, max. 64 kbyte</li> </ul> </li> <li>● ISO-on-TCP (RFC1006) Yes <ul style="list-style-type: none"> <li>— Data length, max. 64 kbyte</li> </ul> </li> <li>● UDP Yes <ul style="list-style-type: none"> <li>— Data length, max. 2 048 byte</li> </ul> </li> <li>● SNMP Yes</li> <li>● DCP Yes</li> <li>● LLDP Yes</li> </ul>	
<b>Web server</b>	
<ul style="list-style-type: none"> <li>● HTTP Yes; Via Windows and PROFINET interface</li> <li>● HTTPS Yes; Via Windows and PROFINET interface</li> </ul>	
<b>OPC UA</b>	
<ul style="list-style-type: none"> <li>● Runtime license required Yes; "Small" license required</li> <li>● OPC UA Client Yes; From SW CPU 1505SP V2.6</li> </ul>	

<ul style="list-style-type: none"> <li>• OPC UA Server <ul style="list-style-type: none"> <li>— Application authentication</li> <li>— Security policies</li> <li>— User authentication</li> </ul> </li> </ul>	<p>Yes; Data access (read, write, subscribe), runtime license required</p> <p>Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256</p> <p>Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256</p> <p>Yes; "anonymous" or by user name &amp; password</p>
<b>Further protocols</b>	
<ul style="list-style-type: none"> <li>• MODBUS</li> </ul>	Yes; MODBUS TCP
<b>S7 message functions</b>	
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"> <li>• Number of program alarms</li> <li>• Number of alarms for system diagnostics</li> <li>• Number of alarms for motion technology objects</li> </ul>	<p>1 000</p> <p>200</p> <p>160</p>
<b>Test commissioning functions</b>	
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
<b>Status/control</b>	
<ul style="list-style-type: none"> <li>• Status/control variable</li> <li>• Variables</li> <li>• Number of variables, max. <ul style="list-style-type: none"> <li>— of which status variables, max.</li> <li>— of which control variables, max.</li> </ul> </li> </ul>	<p>Yes</p> <p>Inputs, outputs, memory bits, DB, times, counters</p> <p>200</p> <p>200</p>
<b>Forcing</b>	
<ul style="list-style-type: none"> <li>• Forcing</li> <li>• Forcing, variables</li> <li>• Number of variables, max.</li> </ul>	<p>Yes</p> <p>Inputs, outputs</p> <p>200</p>
<b>Diagnostic buffer</b>	
<ul style="list-style-type: none"> <li>• present</li> <li>• Number of entries, max. <ul style="list-style-type: none"> <li>— of which powerfail-proof</li> </ul> </li> </ul>	<p>Yes</p> <p>1 000</p> <p>300</p>
<b>Traces</b>	
<ul style="list-style-type: none"> <li>• Number of configurable Traces</li> <li>• Memory size per trace, max.</li> </ul>	<p>4</p> <p>512 kbyte</p>
<b>Interrupts/diagnostics/status information</b>	
<b>Diagnostics indication LED</b>	
<ul style="list-style-type: none"> <li>• RUN/STOP LED</li> <li>• ERROR LED</li> <li>• MAINT LED</li> </ul>	<p>Yes</p> <p>Yes</p> <p>Yes</p>
<b>Supported technology objects</b>	
Motion Control	Yes
<ul style="list-style-type: none"> <li>• Number of available Motion Control resources for technology objects</li> <li>• Required Motion Control resources <ul style="list-style-type: none"> <li>— per speed-controlled axis</li> <li>— per positioning axis</li> <li>— per synchronous axis</li> <li>— per external encoder</li> <li>— per output cam</li> <li>— per cam track</li> <li>— per probe</li> </ul> </li> <li>• Positioning axis <ul style="list-style-type: none"> <li>— Number of positioning axes at motion control cycle of 4 ms (typical value)</li> <li>— Number of positioning axes at motion control cycle of 8 ms (typical value)</li> </ul> </li> </ul>	<p>2 400</p> <p>40; per axis</p> <p>80; per axis</p> <p>160; per axis</p> <p>80; per external encoder</p> <p>20; per cam</p> <p>160; per cam track</p> <p>40; per probe</p> <p>15</p> <p>30</p>

Controller	
<ul style="list-style-type: none"> <li>• PID_Compact</li> <li>• PID_3Step</li> <li>• PID-Temp</li> </ul>	<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"> <li>• High-speed counter</li> </ul>	Yes
<b>Standards, approvals, certificates</b>	
CE mark	Yes
CSA approval	Yes
cULus	Yes
FM approval	Yes
RCM (formerly C-TICK)	Yes
<b>Ambient conditions</b>	
Ambient temperature during operation	
<ul style="list-style-type: none"> <li>• min.</li> <li>• max.</li> </ul>	<p>-20 °C</p> <p>Up to 60 °C with max. 32 ET 200SP modules; up to 55 °C with max. 64 ET 200SP modules</p>
<ul style="list-style-type: none"> <li>• horizontal installation, min.</li> <li>• horizontal installation, max.</li> <li>• vertical installation, min.</li> <li>• vertical installation, max.</li> </ul>	<p>-20 °C</p> <p>60 °C</p> <p>-20 °C</p> <p>50 °C; With max. 32 ET 200SP modules</p>
Ambient temperature during storage/transportation	
<ul style="list-style-type: none"> <li>• min.</li> <li>• max.</li> </ul>	<p>-40 °C</p> <p>70 °C</p>
Vibrations	
<ul style="list-style-type: none"> <li>• Operation, tested according to IEC 60068-2-6</li> <li>• Transport, tested acc. to IEC 60068-2-6</li> </ul>	<p>Yes</p> <p>Yes</p>
Shock testing	
<ul style="list-style-type: none"> <li>• tested according to IEC 60068-2-6</li> <li>• tested according to IEC 60068-2-27</li> <li>• tested according to IEC 60068-2-29</li> <li>• Storage/transport, tested acc. to IEC 60068-2-27</li> </ul>	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>
<b>Operating systems</b>	
pre-installed operating system	Windows 10 IoT Enterprise 2016 LTSB, 64bit, MUI
<b>Configuration</b>	
Programming	
Programming language	
<ul style="list-style-type: none"> <li>— LAD</li> <li>— FBD</li> <li>— STL</li> <li>— SCL</li> <li>— CFC</li> <li>— GRAPH</li> </ul>	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>No</p> <p>Yes</p>
Know-how protection	
<ul style="list-style-type: none"> <li>• User program protection/password protection</li> <li>• Copy protection</li> <li>• Block protection</li> </ul>	<p>Yes</p> <p>Yes</p> <p>Yes</p>
Access protection	
<ul style="list-style-type: none"> <li>• Protection level: Write protection</li> <li>• Protection level: Read/write protection</li> <li>• Protection level: Complete protection</li> </ul>	<p>Yes</p> <p>Yes</p> <p>Yes</p>
Cycle time monitoring	
<ul style="list-style-type: none"> <li>• lower limit</li> <li>• upper limit</li> </ul>	<p>adjustable minimum cycle time</p> <p>adjustable maximum cycle time</p>
Open Development interfaces	
<ul style="list-style-type: none"> <li>• Size of ODK SO file, max.</li> </ul>	5.8 Mbyte
<b>Peripherals/Options</b>	
SD card	Optionally for additional mass storage
<b>Dimensions</b>	

Width	160 mm
Height	117 mm
Depth	75 mm
<b>Weights</b>	
Weight, approx.	0.83 kg
<b>Classifications</b>	

	Version	Classification
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**

[Miscellaneous](#)

[Manufacturer Declaration](#)



[Miscellaneous](#)



**General Product Approval**   **Maritime application**   **Environment**



[China RoHS](#)



last modified:

12/8/2024