



Figure similar

SIMATIC DP, CPU 1512SP-1 PN for ET 200SP, central processing unit with work memory 400 KB for program and 2 MB for data, 1st interface: PROFINET IRT with 3-port switch, 6 ns bit performance, SIMATIC Memory Card required, BusAdapter required for port 1 and 2

General information	
Product type designation	CPU 1512SP-1 PN
HW functional status	FS04
Firmware version	V4.0
<ul style="list-style-type: none"> <li>FW update possible</li> </ul>	Yes
Product function	
<ul style="list-style-type: none"> <li>I&amp;M data</li> </ul>	Yes; I&M0 to I&M3
<ul style="list-style-type: none"> <li>Module swapping during operation (hot swapping)</li> </ul>	Yes; Multi-hot swapping
<ul style="list-style-type: none"> <li>Isochronous mode</li> </ul>	Yes; only with PROFINET; with minimum OB 6x cycle of 500 µs
<ul style="list-style-type: none"> <li>SysLog</li> </ul>	Yes
Engineering with	
<ul style="list-style-type: none"> <li>STEP 7 TIA Portal configurable/integrated from version</li> </ul>	V20 (FW V4.0) / V18 (FW V3.0) or higher; configurable with older TIA Portal versions as 6ES7 512-1DK01-0AB0
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>	10 ms
Input current	
Current consumption (rated value)	0.48 A
Current consumption, max.	0.7 A
Inrush current, max.	1.34 A; Rated value
I <sup>2</sup> t	0.3 A <sup>2</sup> ·s
Power	
Infeed power to the backplane bus	8.05 W
Power loss	
Power loss, typ.	3.5 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	
<ul style="list-style-type: none"> <li>integrated (for program)</li> </ul>	400 kbyte
<ul style="list-style-type: none"> <li>integrated (for data)</li> </ul>	2 Mbyte

<b>Load memory</b>	
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte
<b>Backup</b>	
• maintenance-free	Yes
<b>CPU processing times</b>	
for bit operations, typ.	6 ns
for word operations, typ.	7 ns
for fixed point arithmetic, typ.	9 ns
for floating point arithmetic, typ.	37 ns
<b>CPU-blocks</b>	
Number of elements (total)	4 000; Blocks (OB, FB, FC, DB) and UDTs
<b>DB</b>	
• 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.	1 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
<b>FB</b>	
• Number range	0 ... 65 535
• Size, max.	400 kbyte
<b>FC</b>	
• Number range	0 ... 65 535
• Size, max.	400 kbyte
<b>OB</b>	
• Size, max.	400 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; With minimum OB 3x cycle of 250 µs
• 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
<b>Nesting depth</b>	
• per priority class	24
<b>Counters, timers and their retentivity</b>	
<b>S7 counter</b>	
• Number	2 048
Retentivity	
— adjustable	Yes
<b>IEC counter</b>	
• Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
<b>S7 times</b>	
• Number	2 048
Retentivity	
— adjustable	Yes
<b>IEC timer</b>	
• Number	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.	256 kbyte; in total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 216 KB
<b>Flag</b>	
• Size, max.	16 kbyte
• Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte
<b>Data blocks</b>	

<ul style="list-style-type: none"> <li>• Retentivity adjustable</li> <li>• Retentivity preset</li> </ul>	<p>Yes</p> <p>No</p>
<b>Local data</b>	
<ul style="list-style-type: none"> <li>• per priority class, max.</li> </ul>	64 kbyte; max. 16 KB per block
<b>Address area</b>	
Number of IO modules	2 048; max. number of modules / submodules
<b>I/O address area</b>	
<ul style="list-style-type: none"> <li>• Inputs</li> <li>• Outputs</li> </ul>	<p>32 kbyte; All inputs are in the process image</p> <p>32 kbyte; All outputs are in the process image</p>
<b>per integrated IO subsystem</b>	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
<b>per CM/CP</b>	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
<b>Subprocess images</b>	
<ul style="list-style-type: none"> <li>• Number of subprocess images, max.</li> </ul>	32
<b>Address space per module</b>	
<ul style="list-style-type: none"> <li>• Address space per module, max.</li> </ul>	288 byte; For input and output data respectively
<b>Address space per station</b>	
<ul style="list-style-type: none"> <li>• Address space per station, max.</li> </ul>	2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules
<b>Hardware configuration</b>	
Number of distributed IO systems	32; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET or PROFIBUS communication modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link)
<b>Number of DP masters</b>	
<ul style="list-style-type: none"> <li>• Via CM</li> </ul>	1
<b>Number of IO Controllers</b>	
<ul style="list-style-type: none"> <li>• integrated</li> <li>• Via CM</li> </ul>	<p>1</p> <p>0</p>
<b>Rack</b>	
<ul style="list-style-type: none"> <li>• Modules per rack, max.</li> <li>• Quantity of operable ET 200SP modules, max.</li> <li>• Quantity of operable ET 200AL modules, max.</li> <li>• Number of lines, max.</li> </ul>	<p>82; CPU + 64 modules + server module (mounting width max. 1 m) + 16 ET 200AL modules</p> <p>64</p> <p>16</p> <p>1</p>
<b>PtP CM</b>	
<ul style="list-style-type: none"> <li>• Number of PtP CMs</li> </ul>	the number of connectable PtP CMs is only limited by the number of available slots
<b>Time of day</b>	
<b>Clock</b>	
<ul style="list-style-type: none"> <li>• Type</li> <li>• Backup time</li> <li>• Deviation per day, max.</li> </ul>	<p>Hardware clock</p> <p>6 wk; At 40 °C ambient temperature, typically</p> <p>10 s; Typ.: 2 s</p>
<b>Operating hours counter</b>	
<ul style="list-style-type: none"> <li>• Number</li> </ul>	16
<b>Clock synchronization</b>	
<ul style="list-style-type: none"> <li>• supported</li> <li>• to DP, master</li> <li>• on DP, device</li> <li>• in AS, master</li> <li>• in AS, device</li> <li>• on Ethernet via NTP</li> </ul>	<p>Yes</p> <p>Yes; Via CM DP module</p> <p>Yes; Via CM DP module</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>
<b>Interfaces</b>	
Number of PROFINET interfaces	1
Number of PROFIBUS interfaces	1; Via CM DP module
Optical interface	Yes; Via SIMATIC BusAdapter
<b>1. Interface</b>	
<b>Interface types</b>	
<ul style="list-style-type: none"> <li>• RJ 45 (Ethernet)</li> <li>• Number of ports</li> </ul>	<p>Yes; X1 P3; opt. X1 P1 and X1 P2 via BusAdapter BA 2x RJ45</p> <p>3; 1. Integr. + 2. via BusAdapter</p>

<ul style="list-style-type: none"> <li>integrated switch</li> <li>BusAdapter (PROFINET)</li> </ul>	<p>Yes</p> <p>Yes; compatible BusAdapters: BA 2x RJ45, BA 2x M12, BA 2x FC, BA 2x LC, BA LC/RJ45, BA LC/FC, BA 2x SCRJ, BA SCRJ/RJ45, BA SCRJ/FC</p>
<b>Protocols</b>	
<ul style="list-style-type: none"> <li>IP protocol</li> <li>PROFINET IO Controller</li> <li>PROFINET IO Device</li> <li>SIMATIC communication</li> <li>Open IE communication</li> <li>Web server</li> <li>Media redundancy</li> </ul>	<p>Yes; IPv4</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes; Optionally also encrypted</p> <p>Yes</p> <p>Yes</p>
<b>PROFINET IO Controller</b>	
<b>Services</b>	
<ul style="list-style-type: none"> <li>Isochronous mode</li> <li>Direct data exchange</li> <li>IRT</li> <li>PROFInergy</li> <li>Prioritized startup</li> <li>Number of connectable IO Devices, max.</li> <li>Of which IO devices with IRT, max.</li> <li>Number of connectable IO Devices for RT, max.</li> <li>of which in line, max.</li> <li>Number of IO Devices that can be simultaneously activated/deactivated, max.</li> <li>Number of IO Devices per tool, max.</li> <li>Updating times</li> <li>PROFINET Security Class</li> </ul>	<p>Yes</p> <p>Yes; Requirement: IRT and isochronous mode (MRPD optional)</p> <p>Yes</p> <p>Yes; per user program</p> <p>Yes; Max. 32 PROFINET devices</p> <p>128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET</p> <p>64</p> <p>128</p> <p>128</p> <p>8; in total across all interfaces</p> <p>8</p> <p>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</p> <p>1</p>
<b>Update time for IRT</b>	
<ul style="list-style-type: none"> <li>for send cycle of 250 µs</li> <li>for send cycle of 500 µs</li> <li>for send cycle of 1 ms</li> <li>for send cycle of 2 ms</li> <li>for send cycle of 4 ms</li> <li>With IRT and parameterization of "odd" send cycles</li> </ul>	<p>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</p> <p>500 µs to 8 ms</p> <p>1 ms to 16 ms</p> <p>2 ms to 32 ms</p> <p>4 ms to 64 ms</p> <p>Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)</p>
<b>Update time for RT</b>	
<ul style="list-style-type: none"> <li>for send cycle of 250 µs</li> <li>for send cycle of 500 µs</li> <li>for send cycle of 1 ms</li> <li>for send cycle of 2 ms</li> <li>for send cycle of 4 ms</li> </ul>	<p>250 µs to 128 ms</p> <p>500 µs to 256 ms</p> <p>1 ms to 512 ms</p> <p>2 ms to 512 ms</p> <p>4 ms to 512 ms</p>
<b>PROFINET IO Device</b>	
<b>Services</b>	
<ul style="list-style-type: none"> <li>Isochronous mode</li> <li>IRT</li> <li>PROFInergy</li> <li>Shared device</li> <li>Number of IO Controllers with shared device, max.</li> <li>activation/deactivation of I-devices</li> <li>Asset management record</li> <li>PROFINET Security Class</li> </ul>	<p>No</p> <p>Yes</p> <p>Yes; per user program</p> <p>Yes</p> <p>4</p> <p>Yes; per user program</p> <p>Yes; per user program</p> <p>SNMP Configuration and DCP Read Only</p>
<b>2. Interface</b>	
<b>Interface types</b>	
<ul style="list-style-type: none"> <li>RS 485</li> <li>Number of ports</li> </ul>	<p>Yes; Via CM DP module</p> <p>1</p>
<b>Protocols</b>	
<ul style="list-style-type: none"> <li>PROFIBUS DP master</li> <li>PROFIBUS DP device</li> <li>SIMATIC communication</li> </ul>	<p>Yes</p> <p>Yes</p> <p>Yes</p>

<b>PROFIBUS DP master</b>	
<ul style="list-style-type: none"> <li>• Number of connections, max.</li> <li>• max. number of DP devices</li> </ul>	48; Of which 4 each reserved for ES and HMI 125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
<b>Services</b>	
<ul style="list-style-type: none"> <li>— Equidistance</li> <li>— Isochronous mode</li> <li>— activation/deactivation of DP devices</li> </ul>	No No Yes
<b>Interface types</b>	
<b>RJ 45 (Ethernet)</b>	
<ul style="list-style-type: none"> <li>• 100 Mbps</li> <li>• Autonegotiation</li> <li>• Autocrossing</li> <li>• Industrial Ethernet status LED</li> </ul>	Yes Yes Yes Yes
<b>RS 485</b>	
<ul style="list-style-type: none"> <li>• Transmission rate, max.</li> </ul>	12 Mbit/s
<b>Protocols</b>	
PROFIsafe	No
<b>Number of connections</b>	
<ul style="list-style-type: none"> <li>• Number of connections, max.</li> <li>• Number of connections reserved for ES/HMI/web</li> <li>• Number of connections via integrated interfaces</li> <li>• Number of connections per CP/CM</li> <li>• Number of S7 routing paths</li> </ul>	128; via integrated interfaces of the CPU and connected CPs / CMs 10 88 32 16
<b>Redundancy mode</b>	
<ul style="list-style-type: none"> <li>• H-Sync forwarding</li> </ul>	Yes
<b>Media redundancy</b>	
<ul style="list-style-type: none"> <li>— Media redundancy</li> <li>— MRP</li> <li>— MRP interconnection, supported</li> <li>— MRPD</li> <li>— Switchover time on line break, typ.</li> <li>— Number of stations in the ring, max.</li> </ul>	Yes; only via BusAdapter Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client Yes; as MRP ring node according to IEC 62439-2 Edition 3.0 Yes; Requirement: IRT 200 ms; For MRP, bumpless for MRPD 50
<b>SIMATIC communication</b>	
<ul style="list-style-type: none"> <li>• PG/OP communication</li> <li>• S7 routing</li> <li>• Data record routing</li> <li>• S7 communication, as server</li> <li>• S7 communication, as client</li> <li>• User data per job, max.</li> </ul>	Yes; encryption with TLS V1.3 pre-selected Yes Yes Yes Yes See online help (S7 communication, user data size)
<b>Open IE communication</b>	
<ul style="list-style-type: none"> <li>• TCP/IP               <ul style="list-style-type: none"> <li>— Data length, max.</li> <li>— several passive connections per port, supported</li> </ul> </li> <li>• ISO-on-TCP (RFC1006)               <ul style="list-style-type: none"> <li>— Data length, max.</li> </ul> </li> <li>• UDP               <ul style="list-style-type: none"> <li>— Data length, max.</li> <li>— UDP multicast</li> </ul> </li> <li>• DHCP</li> <li>• DNS</li> <li>• SNMP</li> <li>• DCP</li> <li>• LLDP</li> <li>• Encryption</li> </ul>	Yes 64 kbyte Yes Yes 64 kbyte Yes 2 kbyte; 1 472 bytes for UDP broadcast Yes; max. 78 multicast circuits Yes Yes Yes Yes Yes Yes Yes; Optional
<b>Web server</b>	
<ul style="list-style-type: none"> <li>• HTTP</li> <li>• HTTPS</li> <li>• web API               <ul style="list-style-type: none"> <li>— Number of sessions, max.</li> </ul> </li> </ul>	Yes; Standard and user pages Yes; Standard and user pages 50

— number of simultaneous HTTP calls, max.	4
— HTTP request body, max.	131 072 byte

#### OPC UA

• Runtime license required	Yes; "Small" license required
• OPC UA Client	Yes; Data Access (registered Read/Write), Method Call
— Application authentication	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
— User authentication	"anonymous" or by user name & password
— Number of connections, max.	4
— Number of nodes of the client interfaces, recommended max.	1 000
— Number of elements for one call of OPC-UA_NodeGetHandleList/OPC-UA_ReadList/OPC-UA_WriteList, max.	300
— Number of elements for one call of OPC-UA_NameSpaceGetIndexList, max.	20
— Number of elements for one call of OPC-UA_MethodGetHandleList, max.	100
— Number of simultaneous calls of the client instructions for session management, per connection, max.	1
— Number of simultaneous calls of the client instructions for data access, per connection, max.	5
— Number of registerable nodes, max.	5 000
— Number of registerable method calls of OPC-UA_MethodCall, max.	100
— Number of inputs/outputs when calling OPC-UA_MethodCall, max.	20
• OPC UA Server	Yes; data access (read, write, subscribe), method call, alarms & condition (A&C), custom address space, role-based access control
— 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)	Yes
— Number of sessions, max.	32
— Number of accessible variables, max.	50 000
— Number of registerable nodes, max.	10 000
— Number of subscriptions per session, max.	50
— Sampling interval, min.	100 ms
— Publishing interval, min.	200 ms
— Number of server methods, max.	20; max. 20 concurrently running jobs each for asynchronous instructions OPC-UA_ServerMethodPre and OPC-UA_ServerMethodPost
— Number of inputs/outputs per server method, max.	20
— Number of monitored items, recommended max.	4 000; 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.	15 000
• Alarms and Conditions	Yes
— Number of program alarms	100
— Number of alarms for system diagnostics	50

#### Further protocols

• MODBUS	Yes; MODBUS TCP
----------	-----------------

#### S7 message functions

Number of login stations for message functions, max.	32
number of subscriptions, max.	250
number of tags/attributes for subscriptions, max.	2 000
Program alarms	Yes
Number of configurable program messages, max.	5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	5 000
Number of simultaneously active program alarms	
• Number of program alarms	600
• Number of alarms for system diagnostics	100

• Number of alarms for motion technology objects	160
<b>Test commissioning functions</b>	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 5 engineering systems
Status block	Yes; Up to 8 simultaneously (in total across all ES clients)
Single step	Yes
Number of breakpoints	8
Profiling	Yes
<b>Status/control</b>	
• 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
<b>Forcing</b>	
• Forcing	Yes
• Forcing, variables	Peripheral inputs/outputs
• Number of variables, max.	200
<b>Diagnostic buffer</b>	
• present	Yes
• Number of entries, max.	1 000
— of which powerfail-proof	500
<b>Traces</b>	
• Number of configurable Traces	4
• Memory size per trace, max.	512 kbyte
<b>Interrupts/diagnostics/status information</b>	
<b>Diagnostics indication LED</b>	
• RUN/STOP LED	Yes
• ERROR LED	Yes
• MAINT LED	Yes
• Monitoring of the supply voltage (PWR-LED)	Yes
• Connection display LINK TX/RX	Yes
<b>Supported technology objects</b>	
Motion Control	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
• Number of available Motion Control resources for technology objects	1 120
• Required Motion Control resources	
— per speed-controlled axis	40
— per positioning axis	80
— per synchronous axis	160
— per external encoder	80
— per output cam	20
— per cam track	160
— per probe	40
• Positioning axis	
— Number of positioning axes at motion control cycle of 4 ms (typical value)	11
— Number of positioning axes at motion control cycle of 8 ms (typical value)	14
<b>Controller</b>	
• 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
<b>Counting and measuring</b>	
• High-speed counter	Yes
<b>Standards, approvals, certificates</b>	
<b>Ecological footprint</b>	
• environmental product declaration	Yes
<b>Global warming potential</b>	
— global warming potential, (total) [CO2 eq]	83.2 kg
— global warming potential, (during production) [CO2 eq]	22.3 kg

— global warming potential, (during operation) [CO2 eq]	61.8 kg
— global warming potential, (after end of life cycle) [CO2 eq]	-0.949 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
• vertical installation, min.	-30 °C; No condensation
• vertical installation, max.	50 °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	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: Write protection for Failsafe	No
• Protection level: Complete protection	Yes
• User administration	Yes; device-wide and centralized
• Number of users	100
• Number of groups	100
• Number of roles	50

#### programming / cycle time monitoring / header

• lower limit	adjustable minimum cycle time
• upper limit	adjustable maximum cycle time

#### Dimensions

Width	100 mm
Height	117 mm
Depth	75 mm

#### Weights

Weight, approx.	265 g
-----------------	-------

#### Classifications

	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	9	EC001603

ETIM	8	EC001603
ETIM	7	EC001603
IDEA	4	3565
UNSPSC	15	32-15-17-05

Approvals / Certificates

General Product Approval

[Manufacturer Declaration](#)



[Miscellaneous](#)



[Miscellaneous](#)

General Product Approval

For use in hazardous locations



[KC](#)



[FM](#)

[CCC-Ex](#)

For use in hazardous locations

Maritime application



[Miscellaneous](#)

[CCC-Ex](#)



Maritime application



[NK / Nippon Kaiji Kyokai](#)



[CCS \(China Classification Society\)](#)

other

Environment



[PROFINET](#)



last modified:

12/8/2024