



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
• FW update possible	Yes
Product function	
• I&M data	Yes; I&M0 to I&M3
• Module swapping during operation (hot swapping)	Yes; Multi-hot swapping
• Isochronous mode	Yes; only with PROFINET; with minimum OB 6x cycle of 500 µs
• 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 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	
• Mains/voltage failure stored energy time	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 ² t	0.3 A ² ·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	
• integrated (for program)	400 kbyte
• integrated (for data)	2 Mbyte

Load memory	
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	
• maintenance-free	Yes
CPU processing times	
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
CPU-blocks	
Number of elements (total)	4 000; 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.	1 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	
• Number range	0 ... 65 535
• Size, max.	400 kbyte
FC	
• Number range	0 ... 65 535
• Size, max.	400 kbyte
OB	
• 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
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.	256 kbyte; in total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 216 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	2 048; 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
Address space per module	
• Address space per module, max.	288 byte; For input and output data respectively
Address space per station	
• Address space per station, max.	2 560 byte; for central inputs and outputs; depending on configuration; 2 048 bytes for ET 200SP modules + 512 bytes for ET 200AL modules
Hardware configuration	
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)
Number of DP masters	
• Via CM	1
Number of IO Controllers	
• integrated	1
• Via CM	0
Rack	
• Modules per rack, max.	82; CPU + 64 modules + server module (mounting width max. 1 m) + 16 ET 200AL modules
• Quantity of operable ET 200SP modules, max.	64
• Quantity of operable ET 200AL modules, max.	16
• 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
• to DP, master	Yes; Via CM DP module
• on DP, device	Yes; Via CM DP module
• in AS, master	Yes
• in AS, device	Yes
• on Ethernet via NTP	Yes
Interfaces	
Number of PROFINET interfaces	1
Number of PROFIBUS interfaces	1; Via CM DP module
Optical interface	Yes; Via SIMATIC BusAdapter
1. Interface	
Interface types	
• RJ 45 (Ethernet)	Yes; X1 P3; opt. X1 P1 and X1 P2 via BusAdapter BA 2x RJ45
• Number of ports	3; 1. Integr. + 2. via BusAdapter

• integrated switch • BusAdapter (PROFINET)	Yes 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
Protocols	
• IP protocol • PROFINET IO Controller • PROFINET IO Device • SIMATIC communication • Open IE communication • Web server • Media redundancy	Yes; IPv4 Yes Yes Yes Yes; Optionally also encrypted Yes Yes
PROFINET IO Controller	
Services	
— Isochronous mode — Direct data exchange — IRT — PROFINergy — Prioritized startup — Number of connectable IO Devices, max. — Of which IO devices with IRT, max. — Number of connectable IO Devices for RT, max. — of which in line, max. — Number of IO Devices that can be simultaneously activated/deactivated, max. — Number of IO Devices per tool, max. — Updating times — PROFINET Security Class	Yes Yes; Requirement: IRT and isochronous mode (MRPD optional) Yes Yes; per user program Yes; Max. 32 PROFINET devices 128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET 64 128 128 8; in total across all interfaces 8 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 1
Update time for IRT	
— for send cycle of 250 µs — for send cycle of 500 µs — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms — With IRT and parameterization of "odd" send cycles	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 500 µs to 8 ms 1 ms to 16 ms 2 ms to 32 ms 4 ms to 64 ms 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 — for send cycle of 500 µs — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms	250 µs to 128 ms 500 µs to 256 ms 1 ms to 512 ms 2 ms to 512 ms 4 ms to 512 ms
PROFINET IO Device	
Services	
— Isochronous mode — IRT — PROFINergy — Shared device — Number of IO Controllers with shared device, max. — activation/deactivation of I-devices — Asset management record — PROFINET Security Class	No Yes Yes; per user program Yes 4 Yes; per user program Yes; per user program SNMP Configuration and DCP Read Only
2. Interface	
Interface types	
• RS 485 • Number of ports	Yes; Via CM DP module 1
Protocols	
• PROFIBUS DP master • PROFIBUS DP device • SIMATIC communication	Yes Yes Yes

PROFIBUS DP master	
• Number of connections, max.	48; Of which 4 each reserved for ES and HMI
• max. number of DP devices	125; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
Services	
— Equidistance	No
— Isochronous mode	No
— activation/deactivation of DP devices	Yes
Interface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
• Autonegotiation	Yes
• Autocrossing	Yes
• Industrial Ethernet status LED	Yes
RS 485	
• Transmission rate, max.	12 Mbit/s
Protocols	
PROFIsafe	No
Number of connections	
• Number of connections, max.	128; 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	88
• Number of connections per CP/CM	32
• Number of S7 routing paths	16
Redundancy mode	
• H-Sync forwarding	Yes
Media redundancy	
— Media redundancy	Yes; only via BusAdapter
— MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client
— MRP interconnection, supported	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0
— MRPD	Yes; Requirement: IRT
— Switchover time on line break, typ.	200 ms; For MRP, bumpless for MRPD
— Number of stations in the ring, max.	50
SIMATIC communication	
• PG/OP communication	Yes; encryption with TLS V1.3 pre-selected
• S7 routing	Yes
• Data record routing	Yes
• S7 communication, as server	Yes
• S7 communication, as client	Yes
• User data per job, max.	See online help (S7 communication, user data size)
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. 78 multicast circuits
• DHCP	Yes
• DNS	Yes
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
• Encryption	Yes; Optional
Web server	
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
OPC UA	
• Runtime license required	Yes; "Small" license required

- OPC UA Client

- Application authentication
- Security policies
- User authentication
- Number of connections, max.
- Number of nodes of the client interfaces, recommended max.
- Number of elements for one call of OPC-UA_NodeGetHandleList/OPC-UA_ReadList/OPC-UA_WriteList, max.
- Number of elements for one call of OPC-UA_NameSpaceGetIndexList, max.
- Number of elements for one call of OPC-UA_MethodGetHandleList, max.
- Number of simultaneous calls of the client instructions for session management, per connection, max.
- Number of simultaneous calls of the client instructions for data access, per connection, max.
- Number of registerable nodes, max.
- Number of registerable method calls of OPC-UA_MethodCall, max.
- Number of inputs/outputs when calling OPC-UA_MethodCall, max.

- OPC UA Server

- Application authentication
- Security policies
- User authentication
- GDS support (certificate management)
- Number of sessions, max.
- Number of accessible variables, max.
- Number of registerable nodes, 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

- Number of program alarms
- Number of alarms for system diagnostics

Yes; Data Access (registered Read/Write), Method Call

Yes

Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256

"anonymous" or by user name & password

4

1 000

300

20

100

1

5

5 000

100

20

Yes; data access (read, write, subscribe), method call, alarms & condition (A&C), custom address space, role-based access control

Yes

available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256, Aes128Sha256RsaOaep, Aes256Sha256RsaPss

"anonymous" or by user name & password

Yes

32

50 000

10 000

50

100 ms

200 ms

20; max. 20 concurrently running jobs each for asynchronous instructions OPC-UA_ServerMethodPre and OPC-UA_ServerMethodPost

20

4 000; 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"

15 000

Yes

100

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

Test commissioning functions

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

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 1 000 500
Traces	
• Number of configurable Traces • Memory size per trace, max.	4 512 kbyte
Interrupts/diagnostics/status information	
Diagnostics indication LED	
• RUN/STOP LED • ERROR LED • MAINT LED • Monitoring of the supply voltage (PWR-LED) • Connection display LINK TX/RX	Yes Yes Yes Yes Yes
Supported technology objects	
Motion Control • Number of available Motion Control resources for technology objects • Required Motion Control resources — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track — per probe • Positioning axis — Number of positioning axes at motion control cycle of 4 ms (typical value) — Number of positioning axes at motion control cycle of 8 ms (typical value)	Yes; Note: The number of technology objects affects the cycle time of the PLC program; selection guide via the TIA Selection Tool 1 120 40 80 160 80 20 160 40 11 14
Controller • 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 • High-speed counter	Yes
Standards, approvals, certificates	
Ecological footprint	
• environmental product declaration	Yes
Global warming potential	
— global warming potential, (total) [CO2 eq] — global warming potential, (during production) [CO2 eq] — global warming potential, (during operation) [CO2 eq] — global warming potential, (after end of life cycle) [CO2 eq]	83.2 kg 22.3 kg 61.8 kg -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](#)



General Product Approval

For use in hazardous locations

[KC](#)



[FM](#)

[CCC-Ex](#)



For use in hazardous locations

Marine / Shipping



[Miscellaneous](#)

[CCC-Ex](#)



Marine / Shipping

other



[NK / Nippon Kaiji Kyokai](#)



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



other

Environment

[PROFINET](#)



last modified:

12/8/2024