6ES7511-1AK00-0AB0





Spare part SIMATIC S7-1500, CPU 1511-1 PN, Central processing unit with Work memory 150 KB for program and 1 MB for data, 1st interface, PROFINET IRT with 2-port switch, 60 ns bit performance, SIMATIC Memory Card required

General information	
Product type designation	CPU 1511-1 PN
HW functional status	FS06
Firmware version	V1.8
Product function	
• Isochronous mode	Yes; With minimum OB 6x cycle of 625 µs
Engineering with	
STEP 7 TIA Portal configurable/integrated from version	V13 SP1 Update 4
Configuration control	
via dataset	Yes
Display	
Screen diagonal [cm]	3.45 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)	0.7 A
Inrush current, max.	1.9 A; Rated value
l²t	0.02 A ² ·s
Power	
Infeed power to the backplane bus	10 W
Power consumption from the backplane bus (balanced)	5.5 W
Power loss	
Power loss, typ.	5.7 W
Memory	
SIMATIC memory card required	Yes
Work memory	
integrated (for program)	150 kbyte
• integrated (for data)	1 Mbyte
Load memory	
Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	
maintenance-free	Yes

CPU processing times	
	60 pc
for bit operations, typ.	60 ns
for word operations, typ.	72 ns
for fixed point arithmetic, typ.	96 ns
for floating point arithmetic, typ.	384 ns
CPU-blocks	
Number of elements (total)	2 000; 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 non-optimized block accesses, the max. size of the DB is 64 KB
FB	.,,.,
Number range	0 65 535
• Size, max.	150 kbyte
FC	
Number range	0 65 535
• Size, max.	150 kbyte
OB	
• Size, max.	150 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.	128 kbyte; In total; available retentive memory for bit memories, timers,
Flor	counters, DBs, and technology data (axes): 88 KB
Flag	16 khuto
• Size, max.	16 kbyte
Number of clock memories Data blacks	8; 8 clock memory bit, grouped into one clock memory byte
Data blocks	Von
Retentivity adjustable Retentivity propert	Yes
Retentivity preset Local data	No
THE ALTIMAT	
• per priority class, max.	64 kbyte; max. 16 KB per block

Address area	
Number of IO modules	1 024; 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	4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Number of IO Controllers	
integrated	1
● Via CM	4; A maximum of 4 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, device	Yes
on Ethernet via NTP	Yes
Interfaces	
Number of PROFINET interfaces	1
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
	Yes
— IRT	165
— IRT — PROFlenergy	Yes

- Number of connectable (D Devices, max.) - Of which 10 devices with IRT, max. - Number of connectable (D Devices for RT, max.) - Number of connectable (D Devices for RT, max.) - Number of 10 Devices but can be simultaneously activated bleachowind, max. - Number of 10 Devices per foul, max. - Updating times - Updating times - Updating times - To read cycle of 250 µs - For send cycl		
- Of which ID devices with IRT. max Number of connectable IO Devices for RT. max Submitter of connectable IO Devices for RT. max Submitter of IO Devices per loof, max Number of IO Devices per loof, max Updating times - For send cycle of 250 µs - For send cycle of 250 µs - For send cycle of 250 µs - For send cycle of 350 µs - For send cycle of 350 µs - For send cycle of 4 ms - For send cycle of 4 ms - Will IRT and parameterization of "odd" send cycle - For send cycle of 250 µs - For send cycle of 250 µs - For send cycle of 250 µs - For send cycle of 350 µs - Will IRT and parameterization of "odd" send cycle - For send cycle of 250 µs - For send cycle of 250 µs - For send cycle of 150 µs - For send cycle of 250 µs - For send cycle of 150 µs - For send cycle of 250 µs - For send cycle of 250 µs - For send cycle of 150 µs	 Number of connectable IO Devices, max. 	
- Number of connectable ID Devices for RT, max Interface of ID Devices per tool, max Number of ID Devices per tool, max Number of ID Devices per tool, max Updating times - For send cycle of 250 us - For send cycle of 500 us - For send cycle of 500 us - For send cycle of 500 us - For send cycle of 1 ms - For send cycle of 2 ms - For send cycle of 2 ms - For send cycle of 2 ms - For send cycle of 300 us - For send cycle of 500 us - For send cycle of 500 us - For send cycle of 1 ms - For send cycle of 1 ms - For send cycle of 2 ms - With RT and parameterization of "Odd" send cycles - Update time of 022 us of the incotronous mode, the minimum update time of 622 us of the incotronous CB is decisive 1 ms to 162 - With RT and parameterization of "Odd" send cycles - For send cycle of 300 us - For send cycle of 500 us - For send cycle of 500 us - For send cycle of 1 ms - For send cycle of 1 ms - For send cycle of 200 us - For send cycle of 200 us - For send cycle of 1 ms - For send cycle of 1 ms - For send cycle of 1 ms - For send cycle of 2 ms - For send cycle of 300 us - For send cycle of 4 ms - For send cycle of 2 ms - For send cycle of 4 ms - For send cycle of 2 ms - For send cycle of 3 ms - For send cycle of 4 ms - For send cycle of 500 us -	— Of which IO devices with IRT may	
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Number of 10 Devices that can be simultaneously advolved/decidear/side. Min. Sec. 1 Post of the section of t		
activated/deactivated, max. Number of ID Devices per tool, max. - Updating times The minimum value of the update time also depends on communication share set for PROFINET ID, on the number of ID devices, and on the quantity of configured user data. - for send cycle of 250 µs - for send cycle of 250 µs - for send cycle of 150 µs - for send cycle of 11m - for send cycle of 1 ms - for send cycle of 4 ms - with IRT and parameterization of "odd" send cycle. - for send cycle of 250 µs - with IRT and parameterization of "odd" send cycle. - for send cycle of 250 µs - for send cycle of 350 µs - for send cycle of 150 µs - for send cycle o	•	
- Number of 10 Devices per tool, max. - Updating times - For send cycle of 250 µs - For send cycle of 250 µs - For send cycle of 1 ms - For send cycle of 1 ms - For send cycle of 2 ms - For send cycle of 2 ms - For send cycle of 3 ms - For send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 5 ms - For send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 5 ms - For send cycle of 7 ms - For send cycle of 8 ms - For send cycle of 1 ms -	•	8
Update time for IRT	•	8
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- for send cycle of 1 ms	•	
for send cycle of 2 ms	•	·
FROFINET IC Device Services	· ·	
PROFINET IO Device Services - PG/OP communication Yes No - Ischronous mode No - IRT Yes - PROFienergy Yes - Shared device Yes - Number of IO Controllers with shared device, max. Intorface typos R.1 45 (Ethernet) Yes - Autonegotiation Yes - Autonegotiation Yes - Autonegotiation Yes - Industrial Ethernet status LED Yes Protocols PROFlasfe No Number of connections, max. - Number of connections reserved for ES/HMI/web - Number of connections via integrated interfaces of the CPU and connected CPs / CMs - Number of s7 routing paths - Media redundancy - MRP Yes, as MRP redundancy manager and/or MRP client; max. number of devices in the ring, max. - Switchover time on line break, typ. 200 ms - Switchover time on line break, typ. 200 ms - SimbatTic communication, as server Yes - S7 routing Yes - S7 routing Yes - S7 routing Yes - S7 routing Yes - S8 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 - ICP/IP Yes - Data length, max. 64 kbyte	•	
Services - PG/OP communication Yes - Isochronous mode No - IRT Yes - PROF lenerry Yes - Shared device Yes - Number of IO Controllers with shared device, max. 4 Interface types R.45 (Ethernet) • 100 Mbps Yes • Autorossing Yes • Autorossing Yes • Industrial Ethernet status LED Yes Protocols PROFIsafe No Number of connections, max. • Number of connections, max. • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and connected CPs / CMs • Number of connections via integrated interfaces of the CPU and		4 1115 to 3 12 1116
- PG/OP communication - Isochronous mode - IRT - PROFlenergy - Shared device - Number of IO Controllers with shared device, max. **Interface types** R. 45 (Ethernet) • 100 Mbps • Autorogosing • Autorogosing • Industrial Ethernet status LED **Yes • Industrial Ethernet status LED **Yes • No **Number of connections, max. • Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of stations in the rings to the reserved for ES/HMI/web • Number of stations in the ring, max. 50 **Simatic communication** • S7 routing • S7 communication, as server • S8 communication, as server • S9 communication, as client • S7 communication, as client • S7 communication, as client • S8 communication • S7 communication, as client • S9 communication • S7 communication, as client • S9 communication • S1 communication • S7 communication, as client • S9 communication •		
- Isochronous mode - IRT - PROFlenergy - Shared device - Number of IO Controllers with shared device, max. Interface types RJ 45 (Ehrenet) - 100 Mbps - Autonegotiation - Autocrossing - Industrial Ethernet status LED - Yes - Autocrossing - Industrial Ethernet status LED - Yes Protocols PROFIsafe - No Number of connections - Number of connections, max Number of connections reserved for ES/HMI/web - Number of connections reserved for ES/HMI/web - Number of connections in tiegrated interfaces - Number of S7 routing paths - Switchover time on line break, typ Switchover time on line break, typ Number of stations in the ring, max SiMATIC communication - S7 communication, as server - S7 communication, as server - S7 communication, as client - SF communication - TCP/P - Data length, max Ves - Open IE communication - TCP/P - Data length, max Ves - State Stat		G .
- IRT	— PG/OP communication	
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• 100 Mbps • Autonegotiation • Autocrossing • Autocrossing • Industrial Ethernet status LED Protocols PROFIsafe No Number of connections • Number of connections, max. • Number of connections reserved for ES/HMI/web • Number of connections reserved for ES/HMI/web • Number of stations in the ing, max. • Number of S7 routing paths Redundancy mode Media redundancy — MRP	Interface types	
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Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode Media redundancy — MRP MRP Yes; as MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 — Switchover time on line break, typ. — Number of stations in the ring, max. SIMATIC communication S7 routing S7 routing S7 communication, as server S7 communication, as client S8 ce online help (S7 communication, user data size) Open IE communication TCP/IP — Data length, max. 16 Yes 64 Yes 64 S4 See online help (S7 communication, user data size)		
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 Number of S7 routing paths Media redundancy — MRP — Switchover time on line break, typ. — Number of stations in the ring, max. SIMATIC communication • S7 routing • S7 communication, as server • S7 communication, as client • User data per job, max. Open IE communication • TCP/IP — Data length, max. 16 Redundancy manager and/or MRP client; max. number of devices in the ring; 50 Yes; as MRP redundancy manager and/or MRP client; max. number of devices in the ring; 50 Yes S0 SIMATIC communication Yes See online help (S7 communication, user data size) 		10
Redundancy mode Media redundancy - MRP Switchover time on line break, typ. Number of stations in the ring, max. SIMATIC communication S7 routing S7 communication, as server S7 communication, as client User data per job, max. See online help (S7 communication, user data size) Pes TCP/IP Data length, max.	 Number of connections via integrated interfaces 	64
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. - Number of stations in the ring, max. 50 SIMATIC communication • \$7 routing • \$7 communication, as server • \$7 communication, as client • User data per job, max. Open IE communication • TCP/IP - Data length, max. Yes; as MRP redundancy manager and/or MRP client; max. number of devices in the ring; 50 200 ms 50 Yes • \$7 communication Yes • \$7 communication, user data size) Yes • TCP/IP - Data length, max. 64 kbyte	Number of S7 routing paths	16
- MRP - Switchover time on line break, typ Switchover time on line break, typ Number of stations in the ring, max. SIMATIC communication • S7 routing • S7 communication, as server • S7 communication, as client • User data per job, max. Open IE communication • TCP/IP - Data length, max. Yes; as MRP redundancy manager and/or MRP client; max. number of devices in the ring; 50 200 ms 50 Yes Yes Yes • S7 routing Yes • S7 communication, as server Yes • User data per job, max. See online help (S7 communication, user data size)	Redundancy mode	
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SIMATIC communication Strouting Str	•	
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 S7 communication, as server S7 communication, as client User data per job, max. Open IE communication TCP/IP Data length, max. Yes Yes G4 kbyte 		Yes
 S7 communication, as client User data per job, max. Open IE communication TCP/IP — Data length, max. Yes 64 kbyte 	•	
 User data per job, max. Open IE communication TCP/IP — Data length, max. See online help (S7 communication, user data size) Yes 64 kbyte 		
Open IE communication ● TCP/IP — Data length, max. 64 kbyte		
TCP/IP Data length, max. Yes 64 kbyte		See online neip (S7 communication, user data size)
— Data length, max. 64 kbyte	·	
— several passive connections per port, supported Yes	•	64 kbyte
	— several passive connections per port, supported	Yes

• ISO-on-TCP (RFC1006)	Yes
— Data length, max.	64 kbyte
• UDP	Yes
— Data length, max.	1 472 byte
• DHCP	No
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Web server	
• HTTP	Yes; Standard and user-defined pages
• HTTPS	Yes; Standard and user-defined pages
Further protocols	
• MODBUS	Yes; MODBUS TCP
Isochronous mode	
Equidistance	Yes
S7 message functions	130
Number of login stations for message functions, max.	32
Program alarms	Yes
Number of configurable program messages, max.	5 000
Number of simultaneously active program alarms	200
Number of program alarms	300
Number of alarms for system diagnostics	100
Number of alarms for motion technology objects	80
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	No
Status/control	
 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
Forcing	
Forcing, variables	Peripheral inputs/outputs
Number of variables, max.	200
Diagnostic buffer	
• present	Yes
Number of entries, max.	1 000
— of which powerfail-proof	500
Traces	300
Number of configurable Traces	4; Up to 512 KB of data per trace are possible
Interrupts/diagnostics/status information	4, Op to 512 No of data per trace are possible
Diagnostics indication LED	· ·
RUN/STOP LED	Yes
• ERROR LED	Yes
MAINT LED	Yes
Connection display LINK TX/RX	Yes
Supported technology objects	
Motion Control	Yes
Speed-controlled axis	
 Number of speed-controlled axes, max. 	6; 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
Positioning axis	
— Number of positioning axes, max.	6; 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
 Synchronized axes (relative gear synchronization) — Number of axes, max. 	3; 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

External encoders	
Number of external encoders, max.	6; Requirement: There must be no other motion technology objects created;
— Number of external encoders, max.	note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool
Controller	
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
Counting and measuring	
High-speed counter	Yes
Ambient conditions	
Ambient temperature during operation	
horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
configuration / header	
configuration / programming / header	
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— GRAPH	Yes
Know-how protection	
 User program protection/password protection 	Yes
 Copy protection 	Yes
Block protection	Yes
Access protection	
 Password for display 	Yes
 Protection level: Write protection 	Yes
 Protection level: Read/write protection 	Yes
Protection level: Complete protection	Yes
programming / cycle time monitoring / header	
• lower limit	adjustable minimum cycle time
upper limit	adjustable maximum cycle time
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	430 g

last modified:

7/13/2024