SIEMENS

Data sheet

6ES7511-1TK01-0AB0



SIMATIC S7-1500T, CPU 1511T-1 PN, Central processing unit with Work memory 225 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 1511T-1 PN
HW functional status	FS04
Firmware version	V2.9
Product function	
● I&M data	Yes; I&M0 to I&M3
• Isochronous mode	Yes; Distributed and central; with minimum OB 6x cycle of 625 μs (distributed) and 1 ms (central)
Engineering with	
 STEP 7 TIA Portal configurable/integrated from version 	V17 (FW V2.9) / V14 (FW V2.0) or higher
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
Repeat rate, min.	1/s
Input current	
Current consumption (rated value)	0.7 A
Inrush current, max.	1.9 A; Rated value
l²t	0.02 A²-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	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	
integrated (for program)	225 kbyte
• integrated (for data)	1 Mbyte

Pulsan (SIMATIC Memory Card), max 32 Gbyte	Load moment	
Backup.	Load memory • Plug in (SIMATIC Memory Card) may	32 Chyta
maintenance-free		oz Guyte
CPU processing times	·	Voc
For its operations, typ.		Tes
for word operations, typ.		60 no
Marchae Marc	·	
for healing point arithmetic, typ. OPU-blocks Number of elements (total) A 0000, Blocks (OB, FB, FC, DB) and UDTs **Number range** **Size, max.** **Number of tectopic OBs **Size, max.** **Number of tectopic OBs **Number of discipnous model OBs **Number of discipnous oblined OBs **Number of disprocious oblined OBs *		
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FC	Number range	0 65 535
• Number range • Size, max. 150 kbyte • Number of free cycle OBs • Number of delay alarm OBs • Number of orgetic interrupt OBs • Number of orgetic interrupt OBs • Number of process alarm OBs • Number of process alarm OBs • Number of process alarm OBs • Number of Interrupt OBs • Number of Sacript OBs • Number of startup OBs • Number of startup OBs • Number of startup OBs • Number of synchronous error OBs • Number of diagnostic alarm OBs • Number • Num	• Size, max.	150 kbyte
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counters, DBs, and technology data (axes): 88 KB Extended retentive data area (incl. timers, counters, flags), max. 1 Mbyte; When using PS 6 0W 24/48/60 V DC HF Flag Size, max. 16 kbyte		128 kbyte; In total; available retentive memory for bit memories, timers.
Flag ◆ Size, max. 16 kbyte	, , ,	
• Size, max. 16 kbyte	Extended retentive data area (incl. timers, counters, flags), max.	1 Mbyte; When using PS 6 0W 24/48/60 V DC HF
	Flag	
Number of clock memories 8; 8 clock memory bit, grouped into one clock memory byte	• Size, max.	16 kbyte
	Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte

Deta blastic	
Data blocks	Von
Retentivity adjustable	Yes
Retentivity preset	No
Local data	64 khyto: may 16 KD ass black
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	00. A distributed 1/0 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -
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	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	Ilisertea III total
Modules per rack, max.	32; CPU + 31 modules
Number of lines, max. 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
• Number of the Givis	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	
• 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
Media redundancy	Yes

PROFINET IO Controller	
Services	
— PG/OP communication	Yes
— Isochronous mode	Yes
Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)
— IRT	Yes
— PROFlenergy	Yes; per user program
— Prioritized startup	Yes; Max. 32 PROFINET devices
 Number of connectable IO Devices, max. 	128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
 Of which IO devices with IRT, 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; in total across all interfaces
 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 250 μs	250 μs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum
— for send cycle of 500 μs	update time of 625 µs of the isochronous OB is decisive 500 µs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum
,	update time of 625 µs of the isochronous OB is decisive
— 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 $\mu s.$ 375 $\mu s.$ 625 μs 3 875 $\mu s)$
Update time for RT	
— for send cycle of 250 μs	250 µs to 128 ms
— 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
PROFINET IO Device	
Services	
— PG/OP communication	Yes
— Isochronous mode	No
— IRT	Yes
— PROFlenergy	Yes; per user program
— Shared device	Yes
 Number of IO Controllers with shared device, max. 	4
 activation/deactivation of I-devices 	Yes; per user program
 Asset management record 	Yes; per user program
nterface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
Autonegotiation	Yes
Autocrossing	Yes
Industrial Ethernet status LED	Yes
	100
Protocols	No
PROFIsafe	No
Number of connections	
 Number of connections, max. 	96; 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 	64
 Number of S7 routing paths 	16
Redundancy mode	
H-Sync forwarding	Yes
Media redundancy	
— Media redundancy	only via 1st interface (X1)
-	
— 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.— Number of stations in the ring, max.	200 ms; For MRP, bumpless for MRPD 50
— Number of stations in the ring, max. SIMATIC communication	50
PG/OP communication	Yes; encryption with TLS V1.3 pre-selected
• S7 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. 5 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	Vac IIO a IIII Baaraa aa saisaad
Runtime license required ORG HA Client	Yes; "Small" license required
OPC UA Client Application outbontication	Yes
— Application authentication— Security policies	Yes Available cognity policies: None Pagin129Pag15, Pagin256Pag15
— 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_I 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, custom address space
 Application authentication 	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
 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, may	10 000
— Number of registerable nodes, max.— Number of subscriptions per session, max.	20
— Number of subscriptions per session, max. — Sampling interval, min.	100 ms
— Publishing interval, min.	500 ms
Number of server methods, max.	20
Number of inputs/outputs per server method, max.	20
Number of monitored items, recommended max.	1 000; 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. 	1 000
Alarms and Conditions	Yes
 Number of program alarms 	100
Number of alarms for system diagnostics	50
Further protocols	
• MODBUS	Yes; MODBUS TCP
Isochronous mode	
Equidistance	Yes
S7 message functions	
Number of login stations for message functions, max.	32
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.	2 500
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	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
Number of breakpoints	8
Status/control	
Status/control variable	Yes
Variables	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
Number of variables, max.	inputs/outputs, memory bits, DDs, distributed #0s, timers, counters
	200: por job
— of which status variables, max.	200; per job
— of which control variables, max.	200; per job
Forcing	v.
• Forcing	Yes
• 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	
Number of configurable Traces	4; Up to 512 KB of data per trace are possible
Interrupts/diagnostics/status information	
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; 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 	800
 Required Motion Control resources 	
— per speed-controlled axis	40

— per positioning axis	80
— per positioning axis — per synchronous axis	160
	80
— per external encoder	
— per output cam	20
— per cam track	160
— per probe	40
 Number of available Extended Motion Control resources for technology objects 	40
 Required Extended Motion Control resources 	
— per cam (1 000 points and 50 segments)	2
per cam (10 000 points and 50 segments)	20
 for each set of kinematics 	30
 Per leading axis proxy 	3
 Positioning axis 	
 Number of positioning axes at motion control cycle of 4 ms (typical value) 	5
 Number of positioning axes at motion control cycle of 8 ms (typical value) 	10
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
	alopia) is sintened on
Ambient temperature during storage/transportation	alepha) to cities out
Ambient temperature during storage/transportation • min.	-40 °C
• min.	-40 °C
min. max.	-40 °C
min.max.Altitude during operation relating to sea level	-40 °C 70 °C
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. 	-40 °C 70 °C
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header 	-40 °C 70 °C
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header 	-40 °C 70 °C
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language 	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language — LAD	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD 	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL 	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL 	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes Yes
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH 	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes Yes
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection 	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes Yes Yes Yes
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection User program protection/password protection 	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes Yes Yes Yes
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection User program protection/password protection Copy protection 	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes Yes Yes Yes Yes
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection User program protection/password protection Copy protection Block protection 	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes Yes Yes Yes Yes
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection User program protection/password protection Copy protection Block protection Access protection 	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display 	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data 	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection 	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection 	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection programming / cycle time monitoring / header 	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection programming / cycle time monitoring / header lower limit 	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
 min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language — LAD — FBD — STL — SCL — GRAPH Know-how protection User program protection/password protection Copy protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection programming / cycle time monitoring / header lower limit upper limit 	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection User program protection/password protection Copy protection Block protection Block protection Protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection programming / cycle time monitoring / header lower limit upper limit Dimensions	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection User program protection/password protection Copy protection Block protection Block protection Access protection protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection programming / cycle time monitoring / header lower limit upper limit Dimensions Width	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye
min. max. Altitude during operation relating to sea level Installation altitude above sea level, max. configuration / header configuration / programming / header Programming language LAD FBD STL SCL GRAPH Know-how protection User program protection/password protection Copy protection Block protection Block protection Protection of confidential configuration data Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection programming / cycle time monitoring / header lower limit upper limit Dimensions	-40 °C 70 °C 5 000 m; Restrictions for installation altitudes > 2 000 m, see manual Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye

Weights	
Weight, approx.	430 g
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