Data sheet



SIPLUS S7-1500 CPU 1511F-1 PN -25...+60°C start up -20°C with conformal coating based on 6ES7511-1FK01-0AB0 . 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

Figure similar

General information	
Product type designation	CPU 1511F-1 PN
HW functional status	FS01
Firmware version	V1.8
Engineering with	
 STEP 7 TIA Portal configurable/integrated as of version 	V13 SP1 Update 4
Display	
Screen diagonal [cm]	3.45 cm
Control elements	
Number of keys	6
Mode selector switch	1
Supply voltage	
Type of supply voltage	24 V DC
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	0.7.4
Current consumption (rated value)	0.7 A
Inrush current, max.	1.9 A; Rated value 0.02 A²·s
T t	0.02 A 'S
Power	
Infeed power to the backplane bus	10 W
Power consumption from the backplane bus	5.5 W
(balanced)	
Power loss	
Power loss, typ.	5.7 W
Memory	
SIMATIC memory card required	Yes
Work memory	
• integrated (for program)	225 kbyte
• integrated (for data)	1 Mbyte
Load memory	.,
Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	02 03,0
maintenance-free	Yes
- maintenance nee	. 66
CPU processing times	
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 blocks (total)	2 000
DB	
Number, max.	2 000; Number range: 1 to 65535
• Size, max.	1 Mbyte; For non-optimized block accesses, the max. size of the DB is 64 KB
FB	0 0 1 ND
• Number, max.	1 998; Number range: 1 to 65535
• Size, max.	225 kbyte
FC	
• Number, max.	1 999; Number range: 1 to 65535
ramon, max.	
Size, max.	225 kbyte

• Size, max.	225 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; Up to 8 possible for F-blocks
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),	128 kbyte; In total; available retentive memory for bit memories,
max.	timers, counters, DBs, and technology data (axes): 88 KB
Flag	
• Number, 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
ddress 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
ardware configuration	
Number of distributed IO systems	5
Number of DP masters	4.4
● 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
ime 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	8
Clock synchronization	
• supported	Yes
supportedin AS, master	Yes Yes

Interfaces Number of PROFINET interfaces 1 Interface types Number of ports 2 Integrated switch Yes PROFINET IO Controller Yes; X1 PROFINET IO Device Yes SIMATIC communication Yes Open IE communication Yes Media redundancy Yes Interface types RJ 45 (Ethernet) Ves Yes Simulation Yes Simulation Yes Media redundancy Yes Interface types RJ 45 (Ethernet) Number of connections Yes Simulation Yes Simulation Yes Autocrossing Yes Industrial Ethernet status LED Yes Protocols Number of connections, max. Number of connections yes integrated interfaces of the CPU and connected CPs / CMs Number of connections Yes Number of connectation Yes Number of connect	• on Ethernet via NTP	Yes
Number of PROFINET interfaces 1 1. Interface Interface types • Number of ports • Number of ports • PROFINET IO Controller • PROFINET IO Controller • PROFINET IO Controller • Matter of the status LED Protocols Interface types • PROFINET IO Device • PROFINET IO Controller • PROFINET IO Device • PROFINET IO Device • SIMATIC communication • Yes • Web server • Media redundancy • Yes Interface types RJ 45 (Ethernet) • 100 Mbps • Autoregotiation • Autocrossing • Industrial Ethernet status LED Protocols Number of connections, max. • Number of connections, max. • Number of connections via integrated interfaces • Number of son connections via integrated interfaces • Number of S7 routing paths PROFINET IO Controller Services — PG/OP communication — S7 routing — Isochronous mode — Open IE communication — Yes — PROFInerry — Prioritized startup — Prioritized startup — Prioritized startup — Prioritized startup — Number of connectable IO Devices, max. 128. In total, up to 256 distributed I/O devices can be connected via PROFIBUS or PROFINET Ves PROFIBUS or PROFINET	Interfaces	
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Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via PROFIBUS or PROFINET	— PROFlenergy	Yes
 Number of connectable IO Devices, max. 128; In total, up to 256 distributed I/O devices can be connected via PROFIBUS or PROFINET 	— Prioritized startup	Yes; Max. 32 PROFINET devices
	— Number of connectable IO Devices, max.	
	— 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
 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	$250~\mu s$ to 4 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 500 μs	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"	Update time = set "odd" send clock (any multiple of 125 μ s: 375
send cycles	μs, 625 μs 3 875 μs)
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	Voo
— PG/OP communication	Yes Yes
— S7 routing	No
— Isochronous mode	Yes
— Open IE communication — IRT	Yes
— PROFlenergy	Yes
— Shared device	Yes
Number of IO Controllers with shared	4
device, max.	
Redundancy mode	
• MRP	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
SIMATIC communication	
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.	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	, 10
• MODBUS	Yes; MODBUS TCP
Media redundancy	
Switchover time on line break, typ.	200 ms
Number of stations in the ring, max.	50
Isochronous mode	
Isochronous operation (application synchronized up	Yes
to terminal)	
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
Number of simultaneously active program alarms	
 Number of program alarms 	300
 Number of alarms for system diagnostics 	100
 Number of alarms for motion technology 	80
objects	
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 3 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, DB, times, counters
 Number of variables, max. 	
— of which status variables, max.	200; per job
— of which control variables, max.	200; per job
Forcing	***************************************
• Forcing, variables	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
ga.az.oaooo	,
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
 Speed-controlled axis 	
 Number of speed-controlled axes, max. 	6; Max. number of speed-controlled axes (requirement: there must be no other motion technology objects created)
Positioning axis	
 Number of positioning axes, max. 	6; Max. number of positioning axes (requirement: there must be no other motion technology objects created)
 Synchronized axes (relative gear synchronization) 	
— Number of axes, max.	3; Max. number of synchronous axes (requirement: there must be no other motion technology objects created)
External encoders	
— Number of external encoders, max.	6; Max. number of external encoders (requirement: there must be no other motion technology objects created)
Controller	
PID_Compact	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves
Counting and measuring	
High-speed counter	Yes

riighest salety class achievable in salety mode	
 Performance level according to ISO 13849-1 	PLe
• SIL acc. to IEC 61508	SIL 3
Ambient conditions	
Ambient temperature during operation	
horizontal installation, min.	-25 °C; = Tmin; startup @ -25 °C; startup display @ -20 °C
horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50
- Honzontal installation, max.	°C, the display is switched off
 vertical installation, min. 	-25 °C; = Tmin; startup @ -25 °C; startup display @ -20 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Altitude during operation relating to sea level	
Installation altitude above sea level, max.	2 000 m
 Ambient air temperature-barometric pressure- altitude 	Tmin Tmax at 1 140 hPa 795 hPa (-1 000 m +2 000 m)
Relative humidity	
 With condensation, tested in accordance with IEC 60068-2-38, max. 	100 %; RH incl. condensation / frost (no commissioning in bedewed state), horizontal installation
Resistance	
Coolants and lubricants	
 Resistant to commercially available coolants and lubricants 	Yes; Incl. diesel and oil droplets in the air
Use in stationary industrial systems	
 to biologically active substances according to EN 60721-3-3 	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
 to chemically active substances according to EN 60721-3-3 	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
 to mechanically active substances according to EN 60721-3-3 	Yes; Class 3S4 incl. sand, dust, *
Use on ships/at sea	
 to biologically active substances according to EN 60721-3-6 	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request
 to chemically active substances according to EN 60721-3-6 	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
 to mechanically active substances according to EN 60721-3-6 	Yes; Class 6S3 incl. sand, dust; *
Remark	
 Note regarding classification of environmental conditions acc. to EN 60721 	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	

Highest safety class achievable in safety mode

 Coatings for printed circuit board assemblies acc. to EN 61086

 Military testing according to MIL-I-46058C, Amendment 7

 Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A Yes; Class 2 for high availability

Yes; Discoloration of coating possible during service life

Yes; Conformal coating, Class A

Configuration	
Programming	
Programming language	
— LAD	Yes; incl. failsafe
— FBD	Yes; incl. failsafe
— 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
Cycle time monitoring	
• 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
Other	
Note:	At temperatures below 0 °C legibility may be restricted and
	representation of dynamic contents may be slower
last modified:	04/06/2019