



SIMATIC S7-1500 Failsafe Software Controller CPU 1507S F Single License f. 1 install., R-SW, SW and docum. on DVD, license key on USB flash drive, R-SW Class A, 6 languages (de,en,it,fr,es,zh), executable in Windows 7 and Windows 10; reference HW: SIMATIC IPC2x7E, IPC4x7E, IPC4x7D, IPC6x7E, IPC8x7E, IPC627D, IPC677D, IPC827D

General information	
Product type designation	CPU 1507S F
Software version	V21.9
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	V17
Configuration control	
via dataset	Yes
Memory	
SIMATIC memory card required	No; Use of the PC mass storage
Work memory	
• integrated (for program)	7.5 Mbyte
• integrated (for data)	20 Mbyte
• integrated (for CPU function library of CPU Runtime)	50 Mbyte
Load memory	
• integrated (on PC mass storage)	320 Mbyte
Backup	
• with UPS	Yes; all memory areas declared retentive
• with non-volatile memory	Yes; Depending on PC hardware
CPU processing times	
for bit operations, typ.	1 ns; On IPC427E, Intel Xeon processor
for word operations, typ.	2 ns; On IPC427E, Intel Xeon processor
for fixed point arithmetic, typ.	2 ns; On IPC427E, Intel Xeon processor
for floating point arithmetic, typ.	2 ns; On IPC427E, Intel Xeon processor
CPU-blocks	
Number of elements (total)	6 000; In addition to blocks such as DBs, FBs and FCs, UDTs, global constants, etc. are also regarded as elements
DB	
• Number, max.	5 999; Number range: 1 to 65535
• Size, max.	16 Mbyte
FB	
• Number, max.	5 998; Number range: 1 to 65535
• Size, max.	1 024 kbyte
FC	
• Number, max.	5 999; Number range: 1 to 65535
• Size, max.	1 024 kbyte
OB	
• Size, max.	1 024 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), max.	135 kbyte; on SIMATIC IPC227E, IPC277E, IPC427D, IPC477D, IPC427E, IPC477E, IPC627E, IPC677E; 35 KB on SIMATIC IPC627D, IPC677D and IPC827D
Extended retentive data area (incl. timers, counters, flags), max.	20 Mbyte; When using PC mass storage for retentive data
Flag	
• Size, max.	16 kbyte
• Number of clock memories	8; in 1 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	8 192
I/O address area	
• Inputs	32 kbyte
• Outputs	32 kbyte
Subprocess images	
• Number of subprocess images, max.	32
Hardware configuration	
Number of distributed IO systems	20
Number of DP masters	
• via PC interfaces	1
Number of IO Controllers	
• via PC interfaces	1; any combination of RT or IRT interfaces
Time of day	
Clock	

• Type	Software clock, synchronizable, no battery backup
• Deviation per day, max.	Depending on PC hardware
Operating hours counter	
• Number	16
Clock synchronization	
• supported	Yes
• to DP, master	No
• on Ethernet via NTP	Yes
• on Windows clock, device	Yes
Interfaces	
Number of interfaces	3
Number of PROFINET interfaces	2; In case of I-Device configuration, only one PROFINET interface is supported
Number of PROFIBUS interfaces	1
1. Interface	
Interface type	CP 1625
Number of connections	128
Interface types	
• RJ 45 (Ethernet)	Yes
— Transmission rate, max.	100 Mbit/s
— Industrial Ethernet status LED	Yes
• 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
PROFINET IO Controller	
Services	
— Isochronous mode	Yes
— Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)
— shortest clock pulse	500 µs
— IRT	Yes
— PROFIenergy	Yes
— Prioritized startup	Yes; max. 32 PROFINET devices; if you want to use the "Prioritized startup" functionality in STEP 7 for the PROFINET interface of the CPU, the CPU and the device must be separated by means of a switch (e.g. SCALANCE X205) or CP1625
— Number of connectable IO Devices, max.	256
— Of which IO devices with IRT, max.	64
— Number of connectable IO Devices for RT, max.	256
— of which in line, max.	256
— Number of IO Devices that can be simultaneously activated/deactivated, max.	8
— IO Devices changing during operation (partner ports), supported	Yes; the CPU and changing IO devices must be separated by a switch (e.g. SCALANCE X205)
— 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
— for send cycle of 500 µs	500 µs to 8 ms
— 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 µs: 375 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
Address area	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
PROFINET IO Device	
Services	
— PG/OP communication	Yes
— Isochronous mode	No
— IRT	Yes
— PROFlenergy	Yes
— Prioritized startup	Yes; if you want to use the "Prioritized startup" functionality in STEP 7 for the PROFINET interface of the CPU, the CPU and the device must be separated by means of a switch (e.g. SCALANCE X205)
— Shared device	Yes
— Number of IO Controllers with shared device, max.	4
— Asset management record	Yes
2. Interface	
Interface type	Onboard PROFINET / IE interface X2/X3 of the SIMATIC IPC, Intel Springville i210T
Number of connections	128
Interface types	
• RJ 45 (Ethernet)	Yes
— Transmission rate, max.	100 Mbit/s
— Industrial Ethernet status LED	Yes
• Number of ports	1
• integrated switch	No
Protocols	
• PROFINET IO Controller	Yes
• PROFINET IO Device	Yes
• SIMATIC communication	Yes
• Open IE communication	Yes
• Web server	Yes
• Media redundancy	No
PROFINET IO Controller	
Services	
— Isochronous mode	No
— IRT	No
— PROFlenergy	Yes
— Prioritized startup	Yes; max. 32 PROFINET devices; if you want to use the "Prioritized startup" functionality in STEP 7 for the PROFINET interface of the CPU, the CPU and the device must be separated by means of a switch (e.g. SCALANCE X205)
— 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
Address area	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
PROFINET IO Device	
Services	
— Isochronous mode	No
— IRT	No
— PROFlenergy	Yes
— Shared device	Yes

— Number of IO Controllers with shared device, max.

4

— Asset management record

Yes

3. Interface

Interface type PROFIBUS with CP 5622, CP 5622 onboard

Number of connections 44

Interface types

• RS 485 Yes

Protocols

• PROFIBUS DP master Yes

• PROFIBUS DP device No

• SIMATIC communication Yes; no PG/STEP 7 connection possible

PROFIBUS DP master

• max. number of DP devices 64

Services

— Equidistance No

— Isochronous mode No

Address area

— Inputs, max. 8 kbyte

— Outputs, max. 8 kbyte

4. Interface

Interface type PROFIBUS with CP 5623

Number of connections 44

Interface types

• RS 485 Yes

Protocols

• PROFIBUS DP master Yes

• PROFIBUS DP device No

• SIMATIC communication Yes; no PG/STEP 7 connection possible

PROFIBUS DP master

• max. number of DP devices 125

Services

— Equidistance No

— Isochronous mode No

Address area

— Inputs, max. 8 kbyte

— Outputs, max. 8 kbyte

Protocols

PROFIsafe Yes

Number of connections

• Number of connections, max. 128

• Number of connections reserved for ES/HMI/web 10

• Number of S7 routing paths 16

Redundancy mode

Media redundancy

— MRP Yes

— 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

• S7 routing Yes

• S7 communication, as server Yes

• S7 communication, as client Yes

• User data per job, max. 64 kbyte; BSEND/BRCV: 64 KB; PUT/GET: 960 bytes

Open IE communication

• TCP/IP Yes

— Data length, max. 64 kbyte

• ISO-on-TCP (RFC1006) Yes

— Data length, max. 64 kbyte

• UDP — Data length, max. — UDP multicast • DHCP • DNS • SNMP • DCP • LLDP	Yes 2 kbyte Yes; 128 multicast circuits (of which max. 5 via CP 1625) Yes Yes Yes Yes Yes
Web server	
• HTTP • HTTPS	Yes Yes
OPC UA	
• Runtime 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 — 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.	Yes; "Medium" license required Yes; Data access (read, write), method call Yes Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 Yes; "anonymous" or by user name & password 40 5 000 300 20 100 1 5 5 000 100 20 Yes; Data access (read, write, subscribe), method call, custom address space Yes Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 Yes; "anonymous" or by user name & password 64 200 000 50 000 20 10 ms 10 ms 100 20 10 000; for 1 s sampling interval and 1 s send interval 10 30 000
Further protocols	
• MODBUS	Yes; MODBUS TCP
S7 message functions	
Number of login stations for message functions, max.	32
Program alarms	Yes
Number of configurable program messages, max.	10 000
Number of loadable program messages in RUN, max.	5 000
Number of simultaneously active program alarms	1 000

• Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects	1 000 200 160
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 10 engineering systems
Status block	Yes; up to 8 simultaneously
Single step	Yes
Number of breakpoints	8
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, DB, times, counters 200 200
Forcing	
• Forcing • Forcing, variables • Number of variables, max.	Yes Inputs, outputs 200
Diagnostic buffer	
• present • Number of entries, max. — of which powerfail-proof	Yes 1 000 300
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	Yes; HW LED of SIMATIC IPC227E, IPC427D/E, IPC627D/E, IPC827D, IPC677D/E Yes; HW LED of SIMATIC IPC227E, IPC427D/E, IPC627D/E, IPC826D, IPC677D/E Yes; HW LED of SIMATIC IPC227E, IPC427D/E, IPC627D/E, IPC826D, IPC677D/E
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 or SIZER 4 800 40 80 160 80 20 160 40 30; On IPC427E, Intel Xeon processor 60; On IPC427E, Intel Xeon processor
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	
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1 • SIL acc. to IEC 61508	PLe SIL 3

Probability of failure (for service life of 20 years and repair time of 100 hours)			
— Low demand mode: PFDavg in accordance with SIL3	< 2.00E-05		
— High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09		
Hardware requirement			
Hardware required	SIMATIC IPC2x7E, IPC4x7D/E, IPC627D, IPC677D, IPC827D: configurations with NVRAM required; IPC6x7E, IPC8x7E		
Processor			
• Single-core processor	No		
• Single-core processor with hyper-threading	No		
• Multi-core processor	Yes		
• Multi-core processor with hyper-threading	Yes		
• occupied cores	1; For multicore processors with activated Hyper-Threading, one complete physical core is reserved for the CPU 1507S		
Memory			
• Work memory, min.	4 Gbyte		
• Hard disk memory required for installation	720 Mbyte		
• Temporary hard disk memory for installation	230 Mbyte		
• Hard disk memory required at runtime	400 Mbyte		
Operating systems			
Runs under operating system			
• Windows 7	Yes; Professional, Enterprise, Ultimate (32 bit and 64 bit); Windows Embedded Standard 7 with delivery image of the SIMATIC IPC		
• Windows 10	Yes; Windows 10 Enterprise 2016 LTSB, 64-bit, MUI on IPC2x7E, IPC4x7E, IPC6x7D, IPC8x7D; Windows 10 Enterprise 2019 LTSC 64-bit, MUI on IPC2x7E, IPC4x7E, IPC6x7E, IPC8x7E		
Configuration			
Programming			
Programming language			
— LAD	Yes; incl. failsafe		
— FBD	Yes; incl. failsafe		
— STL	Yes		
— SCL	Yes		
— CFC	No		
— GRAPH	Yes		
Know-how protection			
• User program protection/password protection	Yes		
• Copy protection	Yes		
• Block protection	Yes		
Access protection			
• Protection level: Write protection	Yes		
• Protection level: Read/write protection	Yes		
• Protection level: Write protection for Failsafe	Yes		
• Protection level: Complete protection	Yes		
Cycle time monitoring			
• lower limit	adjustable minimum cycle time		
• upper limit	adjustable maximum cycle time		
Open Development interfaces			
• Size of ODK SO file, max.	9.8 Mbyte		
Classifications			
		Version	Classification
	eClass	14	27-24-06-03
	eClass	12	27-24-06-03
	eClass	9.1	27-24-06-03
	eClass	9	27-24-06-03
	eClass	8	27-24-06-03
	eClass	7.1	27-24-06-03
	eClass	6	27-24-06-03

ETIM	10	EC002633
ETIM	9	EC002633
ETIM	8	EC002633
ETIM	7	EC002633
IDEA	4	3580
UNSPSC	15	32-15-17-07

Approvals / Certificates

General Product Approval	Functional Safety
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[Type Examination Certificate](#)

Test Certificates	other
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[Miscellaneous](#)

[Type Test Certificates/Test Report](#)

[Special Test Certificate](#)

[Miscellaneous](#)



[Confirmation](#)

Railway	Environment
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[Special Test Certificate](#)

[Environmental Confirmations](#)

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