

SIMATIC S7-1500 Fail-safe Software controller CPU 1507S F Version 2.1, Single license f. 1 install., R-SW, sw and docu. on DVD, license key on USB stick, RT-SW class A, 6 languages (Ge,En,It,Fr,Sp,Cn) executable under Windows 7 reference HW: SIMATIC IPC2x7E, IPC4x/E, IPC4x7D, IPC627D, IPC677D, IPC827D



General information	
Product type designation	CPU 1507S F
Software version	V2.1
Engineering with	
• STEP 7 TIA Portal configurable/integrated as of version	V14 SP1
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)	20 Mbyte
Load memory	
• integrated (on PC mass storage)	320 Mbyte
Backup	

- with UPS
- with non-volatile memory

Yes; all memory areas declared retentive

Yes; Depending on PC hardware

CPU processing times

for bit operations, typ.	1 ns; on SIMATIC IPC427D, Intel Core i7 processor, 1.7 GHz
for word operations, typ.	2 ns; on SIMATIC IPC427D, Intel Core i7 processor, 1.7 GHz
for fixed point arithmetic, typ.	2 ns; on SIMATIC IPC427D, Intel Core i7 processor, 1.7 GHz
for floating point arithmetic, typ.	2 ns; on SIMATIC IPC427D, Intel Core i7 processor, 1.7 GHz

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.	512 kbyte
FC	
• Number, max.	5 999; Number range: 1 to 65535
• Size, max.	512 kbyte
OB	
• Size, max.	512 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	0
• 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 and IPC427E, IPC477E; 35 KB on SIMATIC IPC627D, IPC677D and IPC827D
Flag	
• Number, max.	16 kbyte
• Number of clock memories	8; 8 clock memory bits, 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	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
Time of day	
Clock	
• Type	Software clock, synchronizable, no battery backup
• Deviation per day, max.	Depending on PC hardware
Clock synchronization	

- supported
- to DP, master
- on Ethernet via NTP
- on Windows clock, slave

Yes
No
Yes
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	Onboard PROFINET / IE interfaces of SIMATIC IPC (X2, IPC4x7E: X3), Intel Springville i210T
Interface types	
• Number of ports	1
• integrated switch	No
• RJ 45 (Ethernet)	Yes
— Transmission rate, max.	100 Mbit/s
— Industrial Ethernet status LED	Yes
Functionality	
• Number of connections via this interface	128
• PROFINET IO Controller	Yes
• PROFINET IO Device	Yes
• SIMATIC communication	Yes
• Open IE communication	Yes
• Web server	Yes
PROFINET IO Controller	
Services	
— Isochronous mode	No
— IRT	No
— MRP	No
— MRPD	No
— PROFINergy	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
— 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 RT	
— for send cycle of 1 ms	1 ms to 512 ms
Address area	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
PROFINET IO Device	
Services	
— Isochronous mode	No
— IRT	No
— MRP	No
— PROFIenergy	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

2. Interface

Interface type	PROFIBUS with CP 5622, CP 5622 onboard
Interface types	
• RS 485	Yes
Functionality	
• Number of connections via this interface	44
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	No
• SIMATIC communication	Yes; no PG/STEP 7 connection possible
DP master	
• Number of DP slaves, max.	64
Services	
— Equidistance	No
— Isochronous mode	No
Address area	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte

3. Interface

Interface type	PROFIBUS with CP 5623
Interface types	

• RS 485	Yes
Functionality	
• Number of connections via this interface	44
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	No
• SIMATIC communication	Yes; no PG/STEP 7 connection possible
DP master	
• Number of DP slaves, max.	125
Services	
— Equidistance	No
— Isochronous mode	No
Address area	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
Protocols	
Number of connections	
• Number of connections, max.	128
• Number of connections reserved for ES/HMI/web	10
• Number of S7 routing paths	16
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	Yes
— Data length, max.	1 472 byte
• DHCP	No
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Web server	
• HTTP	Yes; Via Windows and PROFINET interface
• HTTPS	Yes; Via Windows and PROFINET interface
OPC UA	

<ul style="list-style-type: none"> • OPC UA Server <ul style="list-style-type: none"> — Application authentication — Security policies — User authentication 	<p>Yes; Accessible via PROFINET interfaces; functionality: data access (read, write, subscribe), runtime license required</p> <p>Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256</p> <p>Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256</p> <p>Yes; "anonymous" or by user name & password</p>
Further protocols	
<ul style="list-style-type: none"> • MODBUS 	Yes; MODBUS TCP
S7 message functions	
Number of login stations for message functions, max.	32
Program alarms	Yes
Number of configurable program alarms	10 000
Number of simultaneously active program alarms	1 000
<ul style="list-style-type: none"> • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects 	<p>1 000</p> <p>200</p> <p>160</p>
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 8 engineering systems
Status block	Yes; up to 8 simultaneously
Single step	No
Status/control	
<ul style="list-style-type: none"> • Status/control variable • Variables • Number of variables, max. <ul style="list-style-type: none"> — of which status variables, max. — of which control variables, max. 	<p>Yes</p> <p>Inputs, outputs, memory bits, DB, times, counters</p> <p>200</p> <p>200</p>
Forcing	
<ul style="list-style-type: none"> • Forcing • Forcing, variables • Number of variables, max. 	<p>Yes</p> <p>Inputs, outputs</p> <p>200</p>
Diagnostic buffer	
<ul style="list-style-type: none"> • present • Number of entries, max. <ul style="list-style-type: none"> — of which powerfail-proof 	<p>Yes</p> <p>1 000</p> <p>300</p>
Traces	
<ul style="list-style-type: none"> • Number of configurable Traces • Memory size per trace, max. 	<p>4</p> <p>512 kbyte</p>
Interrupts/diagnostics/status information	
Diagnostics indication LED	

• RUN/STOP LED	Yes; HW LED of SIMATIC IPC227E, IPC427D/E and IPC627D/677D
• ERROR LED	Yes; HW LED of SIMATIC IPC227E, IPC427D/E and IPC627D/677D
• MAINT LED	Yes; HW LED of SIMATIC IPC227E, IPC427D/E and IPC627D/677D

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 or SIZER
• Number of available Motion Control resources for technology objects (except cam disks)	4 800
• Required Motion Control resources	
— per speed-controlled axis	40; per axis
— per positioning axis	80; per axis
— per synchronous axis	160; per axis
— per external encoder	80; per external encoder
— per output cam	20; per cam
— per cam track	160; per cam track
— per probe	40; per probe
• Positioning axis	
— Number of positioning axes at motion control cycle of 4 ms (typical value)	15; on SIMATIC IPC427D, Intel Core i7 processor, 1.7 GHz
— Number of positioning axes at motion control cycle of 8 ms (typical value)	30; on SIMATIC IPC427D, Intel Core i7 processor, 1.7 GHz
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

Standards, approvals, certificates

Highest safety class achievable in safety mode	
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 1/h

Hardware requirement

Hardware required	SIMATIC IPC2x7E, IPC4x7D/E, IPC627D, IPC677D, IPC827D
Processor	
• Single-core processor	No

<ul style="list-style-type: none"> • Single-core processor with hyper-threading • Multi-core processor • Multi-core processor with hyper-threading • occupied cores 	No Yes Yes 1; For multicore processors with activated Hyper-Threading, one complete physical core is reserved for the CPU 1507S
Lifetime of module	
<ul style="list-style-type: none"> • Work memory, min. • Hard disk memory required for installation • Temporary hard disk memory for installation • Hard disk memory required at runtime 	4 Gbyte 720 Mbyte 230 Mbyte 400 Mbyte
Operating systems	
pre-installed operating system	
<ul style="list-style-type: none"> • Windows XP • Windows 7 • Windows Embedded Standard 7 • Windows 8 • Windows Embedded Standard 8 • Windows 10 	No Yes; Professional, Enterprise, Ultimate (32 bits and 64 bits); Windows installation in Legacy mode (MBR volume) required Yes; With the delivery image of the SIMATIC PC No No No
Configuration	
Programming	
Programming language	
— LAD	Yes; incl. failsafe
— FBD	Yes; incl. failsafe
— STL	Yes
— SCL	Yes
— CFC	No
— GRAPH	Yes
Know-how protection	
<ul style="list-style-type: none"> • User program protection/password protection • Copy protection • Block protection 	Yes Yes Yes
Access protection	
<ul style="list-style-type: none"> • Protection level: Write protection • Protection level: Read/write protection • Protection level: Complete protection 	Yes Yes Yes
Cycle time monitoring	
<ul style="list-style-type: none"> • lower limit • upper limit 	adjustable minimum cycle time adjustable maximum cycle time
Open Development interfaces	
<ul style="list-style-type: none"> • Size of ODK SO file, max. 	5.8 Mbyte

Dimensions	
Width	18.2 cm; Packaging
Height	26.5 cm
Depth	3 cm

Weights	
Weight, approx.	200 g

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