# SIEMENS
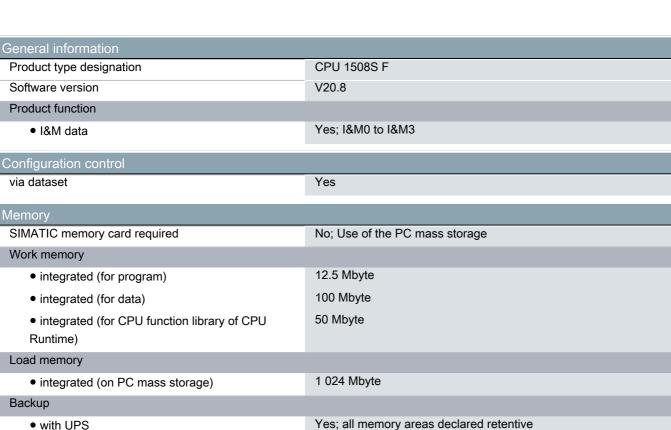
SIMATIC S7-1500, Fail-safe Software Controller CPU 1508S F Single license f. 1 install., R-SW, software, documentation and license key download, R-SW Class A, 6 languages (de,en,it,fr,es,zh), executable under Windows 7/10, reference HW: IPC4x7E, IPC627D, IPC827D, IPC677D ****************************** E-mail address required for delivery



| General information | |
| --- | --- |
| Product type designation | CPU 1508S F |
| Software version | V20.8 |
| Product function | |
| • I&M data | Yes; I&M0 to I&M3 |

| Configuration control | |
| --- | --- |
| via dataset | Yes |

| Memory | |
| --- | --- |
| SIMATIC memory card required | No; Use of the PC mass storage |
| Work memory | |
| • integrated (for program) | 12.5 Mbyte |
| • integrated (for data) | 100 Mbyte |
| • integrated (for CPU function library of CPU Runtime) | 50 Mbyte |
| Load memory | |
| • integrated (on PC mass storage) | 1 024 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) |

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| 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 IPC427D, IPC477D and IPC427E, IPC477E; 35 KB on SIMATIC IPC627D, IPC677D and IPC827D |
| Extended retentive data area (incl. timers, counters, flags), max. | 100 Mbyte; When using PC mass storage for retentive data |
| **Flag** | |
| ● Number, 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, slave | Yes |

| Interfaces | |
|---|---|
| Number of interfaces | 3 |
| Number of PROFINET interfaces | 2; Of which one interface can be used as an IO Controller or I-Device |
| Number of PROFIBUS interfaces | 1 |

| 1. Interface | |
|---|---|
| Interface type | CP 1625 |
| Number of connections | 192 |

| 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 |
| — MRP | Yes |
| — MRPD | 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) |
| — 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. | 16 kbyte |
| — Outputs, max. | 16 kbyte |
| **PROFINET IO Device** | |
| **Services** | |
| — Isochronous mode | No |
| — IRT | Yes |
| — MRP | Yes |
| — MRPD | Yes |
| — PROFIenergy | Yes |
| — Prioritized startup | Yes |
| — Shared device | Yes |
| — Number of IO Controllers with shared device, max. | 4 |
| — Asset management record | Yes |

**2. Interface**

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| | |
|---|---|
| Interface type | Onboard PROFINET / IE interface X2 of the SIMATIC IPC, Intel Springville i210T |
| Number of connections via this interface | 192 |
| **Interface types** | |
| • RJ 45 (Ethernet) | Yes |
| — Transmission rate, max. | 100 Mbit/s |
| • 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 |
| — MRP | No |
| — MRPD | No |
| — 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) |
| — 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 |
| — MRP | No |

| | |
|---|---|
| — MRPD | No |
| — PROFIenergy | 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 via this interface | 44 |

### Protocols

| | |
|---|---|
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | No |
| • SIMATIC communication | Yes |

### PROFIBUS DP master

| | |
|---|---|
| • Number of DP slaves, max. | 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 via this interface | 44 |

### Interface types

| | |
|---|---|
| • RS 485 | Yes |

### Protocols

| | |
|---|---|
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | No |
| • SIMATIC communication | Yes; no PG/STEP 7 connection possible |

### PROFIBUS 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. | 192 |

| | |
|---|---|
| • Number of connections reserved for ES/HMI/web | 10 |
| • Number of S7 routing paths | 16 |
| **Redundancy mode** | |
| **Media redundancy** | |
| — 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 | Yes |
| — Data length, max. | 2 kbyte |
| — UDP multicast | Yes |
| • DHCP | No |
| • SNMP | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| **Web server** | |
| • HTTP | Yes |
| • HTTPS | Yes |
| **OPC UA** | |
| • Runtime license required | Yes; "Large" license required |
| • OPC UA Client | Yes; Data access (read, write), method call |
| — Security policies | Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 |
| — User authentication | Yes; "anonymous" or by user name & password |
| — Number of connections, max. | 40 |
| — Number of nodes of the client interfaces, max. | 5 000 |
| — Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_UA_WriteList, 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 per connection (except OPC_UA_ReadList,OPC_UA_WriteList,OPC_UA_MethodCall), max. | 1 |
| — Number of simultaneous calls of the client instructions OPC_UA_ReadList,OPC_UA_WriteList and OPC_UA_MethodCall, 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 | Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 |
| — User authentication | Yes; "anonymous" or by user name & password |
| — Number of sessions, max. | 64 |
| — Number of accessible variables, max. | 200 000 |
| — Number of registerable nodes, max. | 50 000 |
| — Number of subscriptions per session, max. | 20 |
| — Sampling interval, min. | 10 ms |
| — Publishing interval, min. | 10 ms |
| — Number of server methods, max. | 100 |
| — Number of inputs/outputs per server method, max. | 20 |
| — Number of monitored items, max. | 10 000; for 1 s sampling interval and 1 s send interval |
| — Number of server interfaces, max. | 10 |
| — Number of nodes for user-defined server interfaces, max. | 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 | 1 000 |

| | |
|---|---|
| • Number of alarms for system diagnostics | 200 |
| • Number of alarms for motion technology objects | 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 | Yes |
| • Variables | Inputs, outputs, memory bits, DB, times, counters |
| • Number of variables, max. | |
| — of which status variables, max. | 200 |
| — of which control variables, max. | 200 |
| **Forcing** | |
| • Forcing | Yes |
| • Forcing, variables | Inputs, outputs |
| • Number of variables, max. | 200 |
| **Diagnostic buffer** | |
| • present | Yes |
| • Number of entries, max. | 1 000 |
| — of which powerfail-proof | 300 |
| **Traces** | |
| • Number of configurable Traces | 4 |
| • Memory size per trace, max. | 512 kbyte |

| Interrupts/diagnostics/status information | |
|---|---|
| **Diagnostics indication LED** | |
| • RUN/STOP LED | Yes; HW LED of SIMATIC IPC427D/E and IPC627D |
| • ERROR LED | Yes; HW LED of SIMATIC IPC427D/E and IPC627D |
| • MAINT LED | Yes; HW LED of SIMATIC IPC427D/E and IPC627D |

| 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 | 4 800 |
| • Required Motion Control resources | |
| — per speed-controlled axis | 40 |
| — per positioning axis | 80 |
| — per synchronous axis | 160 |

| | |
|---|---|
| — per external encoder | 80 |
| — per output cam | 20 |
| — per cam track | 160 |
| — per probe | 40 |
| • Positioning axis | |
| — Number of positioning axes at motion control cycle of 4 ms (typical value) | 30; On IPC427E, Intel Xeon processor |
| — Number of positioning axes at motion control cycle of 8 ms (typical value) | 30; On IPC427E, Intel Xeon processor |
| **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

| | |
|---|---|
| • Performance level according to ISO 13849-1 | PLe |
| • SIL acc. to IEC 61508 | 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

### 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. | 8 Gbyte |
| • Hard disk memory required for installation | 720 Mbyte |
| • Temporary hard disk memory for installation | 230 Mbyte |
| • Hard disk memory required at runtime | 1 000 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 |

| 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: 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 |
| **last modified:** | 10/05/2020 |