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## Data sheet 6ES7672-8UC02-0YA0



SIMATIC S7-1500TF, Software Controller CPU 1508S TF single license for 1 installation, runtime software class A; runtime software, software and documentation on DVD, license key on USB flash drive; 6 languages (de,en,it,fr,es,zh), executable in Windows 10 reference hardware: IPC627E (i7)

| | |
|---|---|
| **General information** | |
| Product type designation | CPU 1508S TF |
| Software version | V31.1 |
| Product function | |
| ● I&M data | Yes; I&M0 to I&M3 |
| ● SysLog | Yes |
| Engineering with | |
| ● STEP 7 TIA Portal configurable/integrated from version | V20 |
| **Configuration control** | |
| via dataset | Yes |
| **Storage** | |
| SIMATIC memory card required | No; Use of the PC mass storage |
| Work memory | |
| ● integrated (for program) | 12.5 Mbyte |
| ● integrated (for data) | 32 Mbyte |
| ● integrated (for CPU function library of CPU Runtime) | 50 Mbyte; Note: The "CPU function library of the CPU" are C/C++ blocks for the user program that were created using the SIMATIC ODK 1500S or Target 1500S. |
| 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) | 20 000; In addition to blocks such as DBs, FBs and FCs, UDTs, global constants, etc. are also regarded as elements |
| DB | |
| ● Number, max. | 19 999; Number range: 1 to 65535 |
| ● Size, max. | 16 Mbyte |
| FB | |
| ● Number, max. | 19 998; Number range: 1 to 65535 |
| ● Size, max. | 1 024 kbyte |
| FC | |
| ● Number, max. | 19 999; Number range: 1 to 65535 |
| ● Size, max. | 1 024 kbyte |


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| 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 timer | |
| ● 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 |
| Extended retentive data area (incl. timers, counters, flags), max. | 32 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 IO Controllers | |
| ● via PC interfaces | 2; 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 |


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| 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 |
| Number of PROFIBUS interfaces | 0 |
| **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 | |
| ● 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; MRP Automanager according to IEC 62439-2 Edition 2.0 |
| PROFINET IO Controller | |
| Services | |
| — Isochronous mode | Yes |
| — Direct data exchange | Yes; Requirement: IRT and isochronous mode (MRPD optional) |
| — IRT | Yes |
| — Dynamic Frame Packing (DFP) | 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 seperated by means of a switch (e.g SCALANCE X205) or CP1625 |
| — Number of connectable IO Devices, max. | 256; the maximal amount of supported devices on all interfaces (PN/PB) is 384 (256+128) in total; theoretically it should be 509 (256+128+125), but it is accepted to be limited to 384 |
| — Of which IO devices with IRT, max. | 256; over CP1625 with DFP |
| — 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 |
| — PROFINET Security Class | 1 |
| 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 | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) |
| — With IRT and parameterization of "odd" send cycles | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 |


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| | 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 |
| — Dynamic Frame Packing (DFP) | No |
| — PROFIenergy | Yes |
| — Prioritized startup | Yes |
| — Shared device | Yes |
| — Number of IO Controllers with shared device, max. | 4 |
| — Asset management record | Yes |
| — PROFINET Security Class | SNMP Configuration and DCP Read Only |
| **2. Interface** | |
| Interface type | Onboard PROFINET / IE interface X2 of the SIMATIC IPC, Intel Springville i210T |
| Number of connections | 192 |
| 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 | |
| ● IP protocol | Yes; IPv4 |
| ● PROFINET IO Controller | Yes |
| ● PROFINET IO Device | Yes |
| ● PROFIBUS DP master | No |
| ● PROFIBUS DP device | No |
| ● SIMATIC communication | Yes |
| ● Open IE communication | Yes |
| ● Web server | Yes |
| ● Media redundancy | No |
| PROFINET IO Controller | |
| Services | |
| — Isochronous mode | No |
| — IRT | No |
| — Dynamic Frame Packing (DFP) | 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; the maximal amount of supported devices on all interfaces (PN/PB) is 384 (256+128) in total; theoretically it should be 509 (256+128+125), but it is accepted to be limited to 384 |
| — of which in line, max. | 128 |
| — Number of IO Devices that can be simultaneously activated/deactivated, max. | 8 |
| — IO Devices changing during operation (partner ports), supported | Yes |
| — 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 |


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| | configured user data |
| — PROFINET Security Class | 1 |
| Address area | |
| — Inputs, max. | 8 kbyte |
| — Outputs, max. | 8 kbyte |
| PROFINET IO Device | |
| Services | |
| — Isochronous mode | No |
| — IRT | No |
| — Dynamic Frame Packing (DFP) | No |
| — PROFIenergy | Yes |
| — Prioritized startup | Yes |
| — Shared device | Yes |
| — Number of IO Controllers with shared device, max. | 4 |
| — Asset management record | Yes |
| — PROFINET Security Class | SNMP Configuration and DCP Read Only |
| **Protocols** | |
| PROFIsafe | Yes; V2.4 / V2.6 |
| 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 | |
| ● PROFINET system redundancy (S2) | No |
| ● PROFINET system redundancy (R1) | No |
| Media redundancy | |
| — MRP | Yes |
| — MRP interconnection, supported | 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 | Yes |
| — Data length, max. | 2 kbyte |
| — UDP multicast | Yes; 128 multicast circuits (of which max. 5 via CP 1625) |
| ● DHCP | Yes |
| ● DNS | Yes |
| ● 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 |


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| — Number of connections, max. | 40 |
| — Number of nodes of the client interfaces, recommended max. | 5 000 |
| — Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_U 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 | Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 |
| — User authentication | Yes; "anonymous" or by user name & password |
| — GDS support (certificate management) | Yes |
| — 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. | 50 |
| — 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, recommended 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 |
| ● Alarms and Conditions | |
| — Number of program alarms | 400 |
| — Number of alarms for system diagnostics | 200 |
| — Number of alarms for motion technology objects | 780 |
| 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. | |


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| — of which status variables, max. | 200; per job |
| — of which control variables, max. | 200; per job |
| Forcing | |
| ● Forcing | Yes |
| ● Forcing, variables | peripheral inputs/outputs (without fail-safe) |
| ● 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 IPC627E |
| ● ERROR LED | Yes; HW LED of SIMATIC IPC627E |
| ● MAINT LED | Yes; HW LED of SIMATIC IPC627E |
| **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 | 26 800 |
| ● 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 |
| ● Number of available Extended Motion Control resources for technology objects | 768 |
| ● 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 |
| ● kinematics functions | |
| — kinematics with up to 4 interpolating axes | Yes |
| — kinematics with 5 or more interpolating axes | No |
| ● Positioning axis | |
| — Number of positioning axes, max. | 310 |
| — Number of positioning axes at motion control cycle of 4 ms (typical value) | 310; on IPC 627E (Intel Core i7-8700) |
| — Number of positioning axes at motion control cycle of 8 ms (typical value) | 310; on IPC 627E (Intel Core i7-8700) |
| 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 |


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| — High demand/continuous mode: PFH in accordance with SIL3 | < 1.00E-09 |
| **Hardware requirement** | |
| Hardware required | SIMATIC IPC627E, IPC677E (with Intel i7-8700 and NVRAM) |
| 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 |
| Storage | |
| ● 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 | 1 661 Mbyte |
| **Operating systems** | |
| Runs under operating system | |
| ● Windows 10 | Yes; Windows 10 Enterprise 2019 LTSC and 2021 LTSC |
| **Configuration** | |
| Programming | |
| Programming language | |
| — LAD | Yes; incl. failsafe |
| — FBD | Yes; incl. failsafe |
| — STL | Yes |
| — SCL | Yes |
| — CFC | Yes; either CFC or failsafe functionality |
| — GRAPH | Yes |
| Know-how protection | |
| ● User program protection/password protection | Yes |
| ● Copy protection | Yes |
| ● Block protection | Yes |
| Access protection | |
| ● protection of confidential configuration data | Yes |
| ● Protection level: Write protection | Yes |
| ● Protection level: Read/write protection | Yes |
| ● Protection level: Write protection for Failsafe | Yes |
| ● Protection level: Complete protection | Yes |
| ● User administration | Yes |
| ● Number of users | 100 |
| 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 | 16 | 27-24-06-03 |
| 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 |


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| ETIM | 8 | EC002633 |
| ETIM | 7 | EC002633 |

## Approvals / Certificates

| General Product Approval | | Functional Saftey | | | |
|---|---|---|---|---|---|
| TUEV | Manufacturer Declaration | Type Examination Certificate | TUEV | Type Examination Certificate | TUEV |

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