

SIMATIC S7-1500, CPU 1518-4 PN/DP MFP, inclusive C/C++ Runtime and OPC UA Runtime license working memory 4 MB for program and 20 MB for data, 1. interface: PROFINET IRT with 2 port switch, 2. interface: PROFINET RT, 3. interface: Ethernet, 4. interface: PROFIBUS, 1 ns bit-performance, SIMATIC memory card (min. 2 GB) necessary



| General information | |
|---|---|
| Product type designation | CPU 1518-4 PN/DP MFP |
| HW functional status | FS01 |
| Firmware version | V2.6 |
| Product function | |
| • I&M data | Yes; I&M0 to I&M3 |
| Engineering with | |
| • STEP 7 TIA Portal configurable/integrated as of version | V15.1 (FW V2.6) / V15 (FW V2.5) or higher |
| Configuration control | |
| via dataset | Yes |
| Display | |
| Screen diagonal [cm] | 6.1 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 | |
| <ul style="list-style-type: none"> • Mains/voltage failure stored energy time | 5 ms |
| <ul style="list-style-type: none"> • Repeat rate, min. | 1/s |
| Input current | |
| Current consumption (rated value) | 1.7 A |
| Current consumption, max. | 2 A |
| Inrush current, max. | 2.7 A; Rated value |
| I^2t | 0.02 A ² ·s |
| Power | |
| Infeed power to the backplane bus | 12 W |
| Power consumption from the backplane bus (balanced) | 35 W |
| Power loss | |
| Power loss, typ. | 29 W |
| Memory | |
| Number of slots for SIMATIC memory card | 1 |
| SIMATIC memory card required | Yes |
| Work memory | |
| <ul style="list-style-type: none"> • integrated (for program) | 4 Mbyte |
| <ul style="list-style-type: none"> • integrated (for data) | 20 Mbyte |
| <ul style="list-style-type: none"> • 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. |
| Working memory for additional functions | |
| <ul style="list-style-type: none"> • Integrated (for C/C++ Runtime application) | 512 Mbyte |
| Load memory | |
| <ul style="list-style-type: none"> • Plug-in (SIMATIC Memory Card), max. | 32 Gbyte; The memory card must have at least 2 GB of space on it |
| Backup | |
| <ul style="list-style-type: none"> • maintenance-free | Yes |
| CPU processing times | |
| for bit operations, typ. | 1 ns |
| for word operations, typ. | 2 ns |
| for fixed point arithmetic, typ. | 2 ns |
| for floating point arithmetic, typ. | 6 ns |
| CPU-blocks | |
| Number of elements (total) | 12 000; Blocks (OB, FB, FC, DB) and UDTs |

| | |
|---|---|
| DB | |
| • Number range | 1 ... 60 999; subdivided into: number range that can be used by the user: 1 ... 59 999, and number range of DBs created via SFC 86: 60 000 ... 60 999 |
| • Size, max. | 16 Mbyte; For DBs with absolute addressing, the max. size is 64 KB |
| FB | |
| • Number range | 0 ... 65 535 |
| • Size, max. | 1 Mbyte |
| FC | |
| • Number range | 0 ... 65 535 |
| • Size, max. | 1 Mbyte |
| OB | |
| • Size, max. | 1 Mbyte |
| • Number of free cycle OBs | 100 |
| • Number of time alarm OBs | 20 |
| • Number of delay alarm OBs | 20 |
| • Number of cyclic interrupt OBs | 20; with minimum OB 3x cycle of 100 µs |
| • Number of process alarm OBs | 50 |
| • Number of DPV1 alarm OBs | 3 |
| • Number of isochronous mode OBs | 3 |
| • 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 |
| 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. | 768 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 700 KB |
| Extended retentive data area (incl. timers, counters, flags), max. | 20 Mbyte; When using PS 6 0W 24/48/60 V DC HF |
| 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 |
| Address area | |
| Number of IO modules | 16 384; 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) | 16 kbyte; 16 KB via the integrated PROFINET IO interface X1, 8 KB via the integrated PROFINET IO interface X2 and via the integrated PROFIBUS DP interface |
| — Outputs (volume) | 16 kbyte; 16 KB via the integrated PROFINET IO interface X1, 8 KB via the integrated PROFINET IO interface X2 and via the integrated PROFIBUS DP interface |
| per CM/CP | |
| — Inputs (volume) | 8 kbyte |
| — Outputs (volume) | 8 kbyte |
| Subprocess images | |
| • Number of subprocess images, max. | 32 |
| Hardware configuration | |
| Number of distributed IO systems | 64; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET or PROFIBUS communication modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link) |
| Number of DP masters | |
| • integrated | 1 |
| • Via CM | 8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total |
| Number of IO Controllers | |

| | |
|---|---|
| <ul style="list-style-type: none"> integrated Via CM | 2 8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total |
| Rack | |
| <ul style="list-style-type: none"> Modules per rack, max. Number of lines, max. | 32; CPU + 31 modules 1 |
| PtP CM | |
| <ul style="list-style-type: none"> Number of PtP CMs | the number of connectable PtP CMs is only limited by the number of available slots |
| Time of day | |
| Clock | |
| <ul style="list-style-type: none"> Type Backup time Deviation per day, max. | Hardware clock 6 wk; At 40 °C ambient temperature, typically 10 s; Typ.: 2 s |
| Operating hours counter | |
| <ul style="list-style-type: none"> Number | 16 |
| Clock synchronization | |
| <ul style="list-style-type: none"> supported to DP, master in AS, master in AS, slave on Ethernet via NTP | Yes Yes Yes Yes Yes |
| Interfaces | |
| Number of PROFINET interfaces | 3 |
| Number of PROFIBUS interfaces | 1 |
| 1. Interface | |
| Interface types | |
| <ul style="list-style-type: none"> Number of ports integrated switch RJ 45 (Ethernet) | 2 Yes Yes; X1 |
| Protocols | |
| <ul style="list-style-type: none"> IP protocol PROFINET IO Controller PROFINET IO Device SIMATIC communication Open IE communication Web server Media redundancy | Yes; IPv4 Yes Yes Yes Yes Yes Yes; MRP Automanager according to IEC 62439-2 Edition 2.0 |
| PROFINET IO Controller | |
| Services | |
| — PG/OP communication | Yes |

| | |
|---|--|
| — S7 routing | Yes |
| — Isochronous mode | Yes |
| — Open IE communication | Yes |
| — IRT | Yes |
| — MRP | Yes; as MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 |
| — MRPD | Yes; Requirement: IRT |
| — PROFINergy | Yes |
| — Prioritized startup | Yes; Max. 32 PROFINET devices |
| — Number of connectable IO Devices, max. | 512; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| — Of which IO devices with IRT, max. | 64 |
| — Number of connectable IO Devices for RT, max. | 512 |
| — of which in line, max. | 512 |
| — Number of IO Devices that can be simultaneously activated/deactivated, max. | 8; in total across all interfaces |
| — 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 125 μ s | 125 μ s |
| — for send cycle of 187.5 μ s | 187.5 μ s |
| — for send cycle of 250 μ s | 250 μ s to 4 ms |
| — for send cycle of 500 μ s | 500 μ s 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 μ s: 375 μ s, 625 μ s ... 3 875 μ s) |

Update time for RT

| | |
|---------------------------------|-----------------------|
| — for send cycle of 250 μ s | 250 μ s to 128 ms |
| — for send cycle of 500 μ s | 500 μ s 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

| | |
|-------------------------|-----|
| — PG/OP communication | Yes |
| — S7 routing | Yes |
| — Isochronous mode | No |
| — Open IE communication | Yes |

| | |
|---|--|
| — IRT | Yes |
| — MRP | Yes; as MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50 |
| — MRPD | Yes; Requirement: IRT |
| — PROFinergy | Yes; per user program |
| — Shared device | Yes |
| — Number of IO Controllers with shared device, max. | 4 |
| — Asset management record | Yes; per user program |

2. Interface

| | |
|---|--|
| Interface types | |
| • Number of ports | 1 |
| • integrated switch | No |
| • RJ 45 (Ethernet) | Yes; X2 |
| Protocols | |
| • IP protocol | Yes; IPv4 |
| • 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 | |
| — PG/OP communication | Yes |
| — S7 routing | Yes |
| — Isochronous mode | No |
| — Open IE communication | Yes |
| — IRT | No |
| — MRP | No |
| — MRPD | No |
| — PROFinergy | Yes |
| — Prioritized startup | No |
| — Number of connectable IO Devices, max. | 128; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| — 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; in total across all interfaces |
| — 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

PROFINET IO Device

Services

— PG/OP communication

Yes

— S7 routing

Yes

— Isochronous mode

No

— Open IE communication

Yes

— IRT

No

— MRP

No

— MRPD

No

— PROFinergy

Yes; per user program

— Prioritized startup

No

— Shared device

Yes

— Number of IO Controllers with shared device, max.

4

— Asset management record

Yes; per user program

3. Interface

Interface types

• Number of ports

1; C/C++ Runtime can also be reached via this port

• integrated switch

No

• RJ 45 (Ethernet)

Yes; X3

Protocols

• IP protocol

Yes; IPv4

• PROFINET IO Controller

No

• PROFINET IO Device

No

• SIMATIC communication

Yes

• Open IE communication

Yes

• Web server

Yes

4. Interface

Interface types

• Number of ports

1

• RS 485

Yes; X4

Protocols

• PROFIBUS DP master

Yes

• PROFIBUS DP slave

No

• SIMATIC communication

Yes

Interface types

| | |
|---|---|
| RJ 45 (Ethernet) | |
| • 100 Mbps | Yes |
| • 1000 Mbps | Yes; Only possible at the X3 interface of the CPU 1518 |
| • Autonegotiation | Yes |
| • Autocrossing | Yes |
| • Industrial Ethernet status LED | Yes |
| RS 485 | |
| • Transmission rate, max. | 12 Mbit/s |
| Protocols | |
| Number of connections | |
| • Number of connections, max. | 384; via integrated interfaces of the CPU and connected CPs / CMs |
| • Number of connections reserved for ES/HMI/web | 10 |
| • Number of connections via integrated interfaces | 192 |
| • Number of S7 routing paths | 64; in total, only 16 S7-Routing connections are supported via PROFIBUS |
| Redundancy mode | |
| • H-Sync forwarding | Yes |
| 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. | 2 kbyte; 1 472 bytes for UDP broadcast |
| — UDP multicast | Yes; Max. 5 multicast circuits |
| • DHCP | No |
| • SNMP | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| Web server | |
| • HTTP | Yes; Standard and user pages |
| • HTTPS | Yes; Standard and user pages |
| PROFIBUS DP master | |

| | |
|--|--|
| • Number of connections, max. | 48; for the integrated PROFIBUS DP interface |
| Services | |
| — PG/OP communication | Yes |
| — S7 routing | Yes |
| — Data record routing | Yes |
| — Isochronous mode | Yes |
| — Equidistance | Yes |
| — Number of DP slaves | 125; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET |
| — Activation/deactivation of DP slaves | Yes |
| OPC UA | |
| • Runtime license required | Yes |
| • OPC UA client | Yes |
| — Application authentication | Yes |
| — Security policies | Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 |
| — User authentication | "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 | Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 |

| | |
|---|---|
| — User authentication | "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 |
| Media redundancy | |
| • Switchover time on line break, typ. | 200 ms; For MRP, bumpless for MRPD |
| • Number of stations in the ring, max. | 50 |
| Isochronous mode | |
| Isochronous operation (application synchronized up to terminal) | Yes; Distributed and central; with minimum OB 6x cycle of 125 µs (distributed) and 1 ms (central) |
| Equidistance | Yes |
| S7 message functions | |
| Number of login stations for message functions, max. | 32 |
| Program alarms | Yes |
| Number of configurable program messages, max. | 10 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH |
| Number of loadable program messages in RUN, max. | 5 000 |
| Number of simultaneously active program alarms | |
| • Number of program alarms | 1 000 |
| • Number of alarms for system diagnostics | 1 000 |
| • 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 16 simultaneously (in total across all ES clients) |
| Single step | No |
| Number of breakpoints | 20 |
| 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, DBs, distributed I/Os, timers, counters</p> <p>200; per job</p> <p>200; per job</p> |
| Forcing | |
| <ul style="list-style-type: none"> • Forcing, variables • Number of variables, max. | <p>Peripheral 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>3 200</p> <p>1 000</p> |
| Traces | |
| <ul style="list-style-type: none"> • Number of configurable Traces | <p>8; Up to 512 KB of data per trace are possible</p> |
| Interrupts/diagnostics/status information | |
| Diagnostics indication LED | |
| <ul style="list-style-type: none"> • RUN/STOP LED • ERROR LED • MAINT LED • Connection display LINK TX/RX | <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> |
| Supported technology objects | |
| Motion Control | <p>Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER</p> |
| <ul style="list-style-type: none"> • Number of available Motion Control resources for technology objects (except cam disks) • Required Motion Control resources <ul style="list-style-type: none"> — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track — per probe • Positioning axis <ul style="list-style-type: none"> — 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) | <p>10 240</p> <p>40</p> <p>80</p> <p>160</p> <p>80</p> <p>20</p> <p>160</p> <p>40</p> <p>128</p> <p>128</p> |
| Controller | |
| <ul style="list-style-type: none"> • PID_Compact • PID_3Step | <p>Yes; Universal PID controller with integrated optimization</p> <p>Yes; PID controller with integrated optimization for valves</p> |

| | |
|------------------------|--|
| • PID-Temp | Yes; PID controller with integrated optimization for temperature |
| Counting and measuring | |
| • High-speed counter | Yes |

Ambient conditions

| | |
|---|--|
| Ambient temperature during operation | |
| • horizontal installation, min. | 0 °C |
| • horizontal installation, max. | 60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off |
| • vertical installation, min. | 0 °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 |

Configuration

| | |
|---|-------------------------------|
| Programming | |
| Programming language | |
| — LAD | Yes |
| — FBD | Yes |
| — 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 |
| Open Development interfaces | |
| • Size of ODK SO file, max. | 9.8 Mbyte |

Dimensions

| | |
|--------|--------|
| Width | 175 mm |
| Height | 147 mm |
| Depth | 129 mm |

Weights

Weight, approx.

2 117 g

last modified:

08/30/2019