

SIPLUS S7-1500 CPU 1518F-4 PN/DP WITH CONFORMAL COATING BASED ON 6ES7518-4FP00-0AB0 . CENTRAL PROCESSING UNIT WITH WORKING MEMORY 4,5 MB FOR PROGRAM AND 10 MB FOR DATA, 1. INTERFACE, PROFINET IRT WITH 2 PORT SWITCH, 2. INTERFACE, ETHERNET, 3. INTERFACE, ETHERNET, 4. INTERFACE, PROFIBUS, 1 NS BIT-PERFORMANCE, SIMATIC MEMORY CARD NECESSARY



General information	
Product type designation	CPU 1518F-4PN/DP
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	
• Mains/voltage failure stored energy time	5 ms
Input current	
Current consumption (rated value)	1.55 A
Inrush current, max.	2.4 A; Rated value

I ² t	0.02 A ² ·s
Power	
Power consumption from the backplane bus (balanced)	30 W
Infeed power to the backplane bus	12 W
Power loss	
Power loss, typ.	24 W
Memory	
SIMATIC memory card required	Yes
Work memory	
• integrated (for program)	6 Mbyte
• integrated (for data)	20 Mbyte
Load memory	
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	
• 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 blocks (total)	10 000
DB	
• Number, max.	10 000; Number range: 1 to 65535
• Size, max.	10 Mbyte; For non-optimized block accesses, the max. size of the DB is 64 KB
FB	
• Number, max.	9 998; Number range: 1 to 65535
• Size, max.	512 kbyte
FC	
• Number, max.	9 999; 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	2
• 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
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Retentivity

— adjustable	Yes
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IEC counter

• Number	Any (only limited by the main memory)
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Retentivity

— adjustable	Yes
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S7 times

• Number	2 048
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Retentivity

— adjustable	Yes
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IEC timer

• Number	Any (only limited by the main memory)
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Retentivity

— adjustable	Yes
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Data areas and their retentivity

retentive data area in total (incl. times, counters, flags), max.	768 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 700 KB
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Flag

• Number, max.	16 kbyte
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• Number of clock memories	8; 8 clock memory bits, grouped into one clock memory byte
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Data blocks

• Retentivity adjustable	Yes
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• Retentivity preset	No
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Local data

• per priority class, max.	64 kbyte; max. 16 KB per block
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Address area

Number of IO modules	16 384; max. number of modules / submodules
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I/O address area

• Inputs	32 kbyte; All inputs are in the process image
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• Outputs	32 kbyte; All outputs are in the process image
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per integrated IO subsystem	
— Inputs (volume)	16 kbyte; 16 KB via the integrated PROFINET IO interface, 8 KB via the integrated DP interface
— Outputs (volume)	16 kbyte; 16 KB via the integrated PROFINET IO interface, 8 KB via the integrated 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	20
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	
• integrated	1
• Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Rack	
• Modules per rack, max.	32; CPU + 31 modules
• Number of lines, max.	1
PtP CM	
• Number of PtP CMs	the number of connectable PtP CMs is only limited by the number of available slots
Time of day	
Clock	
• Type	Hardware clock
• Backup time	6 wk; At 40 °C ambient temperature, typically
• Deviation per day, max.	10 s; Typ.: 2 s
Operating hours counter	
• Number	16
Clock synchronization	
• supported	Yes
• to DP, master	Yes
• in AS, master	Yes
• in AS, slave	Yes
• on Ethernet via NTP	Yes
Interfaces	
Number of PROFINET interfaces	3
Number of PROFIBUS interfaces	1

1. Interface

Interface types	
• Number of ports	2
• integrated switch	Yes
• RJ 45 (Ethernet)	Yes; X1

Functionality	
• PROFINET IO Controller	Yes
• PROFINET IO Device	Yes
• SIMATIC communication	Yes
• Open IE communication	Yes
• Web server	Yes
• Media redundancy	Yes

2. Interface

Interface types	
• Number of ports	1
• integrated switch	No
• RJ 45 (Ethernet)	Yes; X2

Functionality	
• PROFINET IO Controller	No
• PROFINET IO Device	No
• SIMATIC communication	Yes
• Open IE communication	Yes
• Web server	Yes

3. Interface

Interface types	
• Number of ports	1
• integrated switch	No
• RJ 45 (Ethernet)	Yes; X3

Functionality	
• 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

Functionality	
• PROFIBUS DP master	Yes

- PROFIBUS DP slave
- SIMATIC communication

No

Yes

Interface types

RJ 45 (Ethernet)

- 100 Mbps Yes
- 1000 Mbps Yes; Only possible at the 3rd PROFINET 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

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
- PROFINergy Yes
- Prioritized startup Yes; Max. 32 PROFINET devices
- Number of connectable IO Devices, max. 512; In total, up to 1000 distributed I/O devices can be connected via 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
- 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 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
— PROFinergy	Yes
— Shared device	Yes
— Number of IO Controllers with shared device, max.	4

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.	1 472 byte

• DHCP	No
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Web server	
• HTTP	Yes; Standard and user-defined pages
• HTTPS	Yes; Standard and user-defined 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 1000 distributed I/O devices can be connected via PROFIBUS or PROFINET
— Activation/deactivation of DP slaves	Yes
Further protocols	
• MODBUS	Yes; MODBUS TCP
Media redundancy	
• Switchover time on line break, typ.	200 ms
• Number of stations in the ring, max.	50
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes
Equidistance	Yes
S7 message functions	
Number of login stations for message functions, max.	32
Block related messages	Yes
Number of configurable alarms, max.	10 000
Number of simultaneously active alarms in alarm pool	
• Number of reserved user alarms	1 000
• Number of reserved alarms for system diagnostics	200
• Number of reserved alarms for Motion Control 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
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. 	Yes Inputs, outputs, memory bits, DB, times, counters 200; per job 200; per job
Forcing	
<ul style="list-style-type: none"> • Forcing, variables • Number of variables, max. 	Inputs, outputs 200
Diagnostic buffer	
<ul style="list-style-type: none"> • present • Number of entries, max. <ul style="list-style-type: none"> — of which powerfail-proof 	Yes 3 200 1 000
Traces	
<ul style="list-style-type: none"> • Number of configurable Traces 	8; Up to 512 KB of data per trace are possible
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 	Yes Yes Yes Yes
Supported technology objects	
Motion Control	
<ul style="list-style-type: none"> • Speed-controlled axis <ul style="list-style-type: none"> — Number of speed-controlled axes, max. • Positioning axis <ul style="list-style-type: none"> — Number of positioning axes, max. • Synchronized axes (relative gear synchronization) <ul style="list-style-type: none"> — Number of axes, max. • External encoders <ul style="list-style-type: none"> — Number of external encoders, max. 	Yes 128; Requirement: There must be no other motion technology objects created 128; Requirement: There must be no other motion technology objects created 64; Requirement: There must be no other motion technology objects created 128; Requirement: There must be no other motion technology objects created
Controller	
<ul style="list-style-type: none"> • 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

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 |

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 |

Extended ambient conditions

- | | |
|--|---|
| • relative to ambient temperature-atmospheric pressure-installation altitude | Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) |
|--|---|

Relative humidity

- | | |
|---|---|
| — With condensation, tested in accordance with IEC 60068-2-38, max. | 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) |
|---|---|

Resistance

- | | |
|---|--|
| — against biologically active substances / conformity with EN 60721-3-3 | Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation! |
| — against chemically active substances / conformity with EN 60721-3-3 | Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation! |
| — against mechanically active substances / conformity with EN 60721-3-3 | Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation! |

Configuration

Programming

Programming language

- | | |
|---------|---------------------|
| — LAD | Yes; incl. failsafe |
| — FBD | Yes; incl. failsafe |
| — STL | Yes |
| — SCL | Yes |
| — GRAPH | Yes |

Know-how protection

- | | |
|---------------------------|-----|
| • User program 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 |

Dimensions

Width	175 mm
Height	147 mm
Depth	129 mm

Weights

Weight, approx.	1 988 g
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last modified: 10/14/2016