

MANUFACTURER DOCUMENT PACKAGE

# Manufacturer's Manual

Reference package for engineering and maintenance review

SIEMENS SIMATIC

## 6ES7518-4FP00-0AB0

CPU 1518F-4 PN/DP

The following original Siemens data-sheet pages apply to this exact article and retain their original content, color and aspect ratio.



SIMATIC S7-1500F, CPU 1518F-4 PN/DP, CENTRAL PROCESSING UNIT WITH WORKING MEMORY 6 MB FOR PROGRAM AND 20 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 |
| HW functional status                                      | FS01             |
| Firmware version                                          | V1.5             |
| Engineering with                                          |                  |
| • STEP 7 TIA Portal configurable/integrated as of version | V13              |
| 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              |

|                                                     |                                  |
|-----------------------------------------------------|----------------------------------|
| <b>Input current</b>                                |                                  |
| Current consumption (rated value)                   | 1.55 A                           |
| Inrush current, max.                                | 2.4 A; Rated value               |
| $I^2t$                                              | 0.45 A <sup>2</sup> ·s           |
| <b>Power</b>                                        |                                  |
| Power consumption from the backplane bus (balanced) | 30 W                             |
| Infed power to the backplane bus                    | 12 W                             |
| <b>Power loss</b>                                   |                                  |
| Power loss, typ.                                    | 24 W                             |
| <b>Memory</b>                                       |                                  |
| SIMATIC Memory Card required                        | Yes                              |
| <b>Work memory</b>                                  |                                  |
| • integrated (for program)                          | 4.5 Mbyte                        |
| • integrated (for data)                             | 10 Mbyte                         |
| <b>Load memory</b>                                  |                                  |
| • Plug-in (SIMATIC Memory Card), max.               | 32 Gbyte                         |
| <b>Backup</b>                                       |                                  |
| • maintenance-free                                  | Yes                              |
| <b>CPU processing times</b>                         |                                  |
| 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                             |
| <b>CPU-blocks</b>                                   |                                  |
| Number of blocks (total)                            | 10 000                           |
| <b>DB</b>                                           |                                  |
| • Number, max.                                      | 10 000; Number range: 1 to 65535 |
| • Size, max.                                        | 10 Mbyte                         |
| <b>FB</b>                                           |                                  |
| • Number, max.                                      | 9 998; Number range: 1 to 65535  |
| • Size, max.                                        | 512 kbyte                        |
| <b>FC</b>                                           |                                  |
| • Number, max.                                      | 9 999; Number range: 1 to 65535  |
| • Size, max.                                        | 512 kbyte                        |
| <b>OB</b>                                           |                                  |
| • 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                                                                                                                 |
| <b>Nesting depth</b>                                              |                                                                                                                   |
| • per priority class                                              | 24; only 8 for F-blocks                                                                                           |
| <b>Counters, timers and their retentivity</b>                     |                                                                                                                   |
| <b>S7 counter</b>                                                 |                                                                                                                   |
| • Number                                                          | 2 048                                                                                                             |
| <b>Retentivity</b>                                                |                                                                                                                   |
| — adjustable                                                      | Yes                                                                                                               |
| <b>IEC counter</b>                                                |                                                                                                                   |
| • Number                                                          | Any (only limited by the main memory)                                                                             |
| <b>Retentivity</b>                                                |                                                                                                                   |
| — adjustable                                                      | Yes                                                                                                               |
| <b>S7 times</b>                                                   |                                                                                                                   |
| • Number                                                          | 2 048                                                                                                             |
| <b>Retentivity</b>                                                |                                                                                                                   |
| — adjustable                                                      | Yes                                                                                                               |
| <b>IEC timer</b>                                                  |                                                                                                                   |
| • Number                                                          | Any (only limited by the main memory)                                                                             |
| <b>Retentivity</b>                                                |                                                                                                                   |
| — adjustable                                                      | Yes                                                                                                               |
| <b>Data areas and their retentivity</b>                           |                                                                                                                   |
| retentive data area in total (incl. times, counters, flags), max. | 768 kbyte; Available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 700 KB |
| <b>Flag</b>                                                       |                                                                                                                   |
| • Number, max.                                                    | 16 kbyte                                                                                                          |
| • Number of clock memories                                        | 8; 8 clock memory bits, grouped into one clock memory byte                                                        |
| <b>Data blocks</b>                                                |                                                                                                                   |
| • Retentivity adjustable                                          | Yes                                                                                                               |
| • Retentivity preset                                              | No                                                                                                                |
| <b>Local data</b>                                                 |                                                                                                                   |
| • per priority class, max.                                        | 64 kbyte; max. 16 KB per block                                                                                    |
| <b>Address area</b>                                               |                                                                                                                   |
| Number of IO modules                                              | 8 192                                                                                                             |

|                                     |                                                                                                |
|-------------------------------------|------------------------------------------------------------------------------------------------|
| 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, 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 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                                                                           |
| • Rack, number of rows, 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                            | 8                                                                                              |
| 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 |
| 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 |
| 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 |
| 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                                                                 |                                                                                             |
|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| • SIMATIC communication                                                       | Yes                                                                                         |
| • PROFIBUS DP master                                                          | Yes                                                                                         |
| • PROFIBUS DP slave                                                           | No                                                                                          |
| Interface types                                                               |                                                                                             |
| RJ 45 (Ethernet)                                                              |                                                                                             |
| • 100 Mbps                                                                    | Yes                                                                                         |
| • 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 |
| <b>Update time for IRT</b>                           |                                                                                                                                                                        |
| — 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)                                                                               |
| <b>Update time for RT</b>                            |                                                                                                                                                                        |
| — 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                                                                                                                                                         |
| <b>PROFINET IO Device</b>                            |                                                                                                                                                                        |
| <b>Services</b>                                      |                                                                                                                                                                        |
| — PG/OP communication                                | Yes                                                                                                                                                                    |
| — S7 routing                                         | Yes                                                                                                                                                                    |
| — Isochronous mode                                   | No                                                                                                                                                                     |
| — Open IE communication                              | Yes                                                                                                                                                                    |
| — IRT                                                | Yes                                                                                                                                                                    |
| — MRP                                                | Yes                                                                                                                                                                    |
| — PROFIenergy                                        | Yes                                                                                                                                                                    |
| — Shared device                                      | Yes                                                                                                                                                                    |
| — Number of IO Controllers with shared device, max.  | 4                                                                                                                                                                      |
| <b>SIMATIC communication</b>                         |                                                                                                                                                                        |
| • S7 communication, as server                        | Yes                                                                                                                                                                    |
| • S7 communication, as client                        | Yes                                                                                                                                                                    |
| • User data per job, max.                            | See online help (S7 communication, user data size)                                                                                                                     |
| <b>Open IE communication</b>                         |                                                                                                                                                                        |
| • 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                                                                                         |
| <b>Web server</b>                                               |                                                                                             |
| • HTTP                                                          | Yes; Standard and user-defined pages                                                        |
| • HTTPS                                                         | Yes; Standard and user-defined pages                                                        |
| <b>PROFIBUS DP master</b>                                       |                                                                                             |
| • Number of connections, max.                                   | 48; for the integrated PROFIBUS DP interface                                                |
| <b>Services</b>                                                 |                                                                                             |
| — PG/OP communication                                           | Yes                                                                                         |
| — S7 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                                                                                         |
| <b>Further protocols</b>                                        |                                                                                             |
| • MODBUS                                                        | Yes; MODBUS TCP                                                                             |
| <b>Media redundancy</b>                                         |                                                                                             |
| • Switchover time on line break, typ.                           | 200 ms                                                                                      |
| • Number of stations in the ring, max.                          | 50                                                                                          |
| <b>Isochronous mode</b>                                         |                                                                                             |
| Isochronous operation (application synchronized up to terminal) | Yes                                                                                         |
| Equidistance                                                    | Yes                                                                                         |
| <b>S7 message functions</b>                                     |                                                                                             |
| 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            | 1 000                                                                                       |
| <b>Test commissioning functions</b>                             |                                                                                             |
| Status block                                                    | Yes; Up to 16 simultaneously                                                                |
| Single step                                                     | No                                                                                          |
| <b>Status/control</b>                                           |                                                                                             |
| • Status/control variable                                       | Yes                                                                                         |
| • Variables                                                     | Inputs, outputs, memory bits, DB, times, counters                                           |
| • Number of variables, max.                                     |                                                                                             |
| — of which status variables, max.                               | 200; per job                                                                                |
| — of which control variables, max.                              | 200; per job                                                                                |

|                                                            |                                                                                                    |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Forcing                                                    |                                                                                                    |
| • Forcing, variables                                       | Inputs, outputs                                                                                    |
| • Number of variables, max.                                | 200                                                                                                |
| Diagnostic buffer                                          |                                                                                                    |
| • present                                                  | Yes                                                                                                |
| • Number of entries, max.                                  | 3 200                                                                                              |
| — of which powerfail-proof                                 | 1 000                                                                                              |
| Traces                                                     |                                                                                                    |
| • Number of configurable Traces                            | 8                                                                                                  |
| Interrupts/diagnostics/status information                  |                                                                                                    |
| Diagnostics indication LED                                 |                                                                                                    |
| • RUN/STOP LED                                             | Yes                                                                                                |
| • ERROR LED                                                | Yes                                                                                                |
| • MAINT LED                                                | Yes                                                                                                |
| • Connection display LINK TX/RX                            | Yes                                                                                                |
| Supported technology objects                               |                                                                                                    |
| Controller                                                 |                                                                                                    |
| • PID_Compact                                              | Yes; Universal PID controller with integrated optimization                                         |
| • PID_3Step                                                | Yes; PID controller with integrated optimization for valves                                        |
| Counting and measuring                                     |                                                                                                    |
| • High-speed counter                                       | Yes                                                                                                |
| Standards, approvals, certificates                         |                                                                                                    |
| Highest safety class achievable in safety mode             |                                                                                                    |
| • 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                                                                                     |
| 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 |
| Configuration                                              |                                                                                                    |
| Programming                                                |                                                                                                    |
| Programming language                                       |                                                                                                    |
| — LAD                                                      | Yes; incl. failsafe                                                                                |
| — FBD                                                      | Yes; incl. failsafe                                                                                |
| — STL                                                      | Yes                                                                                                |

|                                           |                                                                     |
|-------------------------------------------|---------------------------------------------------------------------|
| — SCL                                     | Yes                                                                 |
| — GRAPH                                   | Yes                                                                 |
| <b>Know-how protection</b>                |                                                                     |
| • User program protection                 | Yes                                                                 |
| • Copy protection                         | Yes                                                                 |
| • Block protection                        | Yes                                                                 |
| <b>Access protection</b>                  |                                                                     |
| • Password for display                    | Yes                                                                 |
| • Protection level: Write protection      | Yes; additional stage of protection for F-blocks (write protection) |
| • Protection level: Read/write protection | Yes                                                                 |
| • Protection level: Complete protection   | Yes                                                                 |
| <b>Cycle time monitoring</b>              |                                                                     |
| • lower limit                             | adjustable minimum cycle time                                       |
| • upper limit                             | adjustable maximum cycle time                                       |
| <b>Dimensions</b>                         |                                                                     |
| Width                                     | 175 mm                                                              |
| Height                                    | 147 mm                                                              |
| Depth                                     | 129 mm                                                              |
| <b>Weights</b>                            |                                                                     |
| Weight, approx.                           | 1 988 g                                                             |
| <b>last modified:</b>                     | 04.02.2016                                                          |