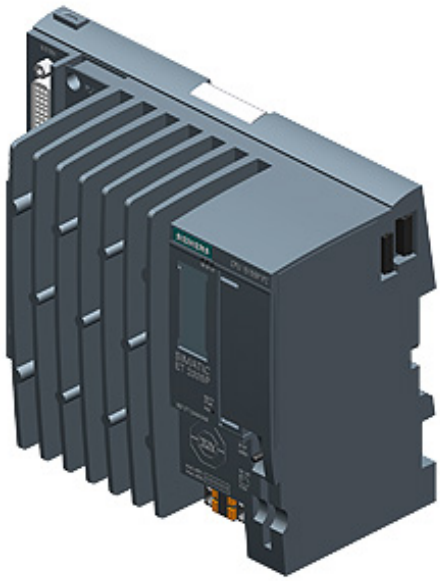
SIEMENS

## Data sheet 6ES7677-2FA41-0FB0



SIMATIC ET 200SP Open Controllers, CPU 1515SP PC F. 4 GB RAM, 30 GB CFAST with WES 7 P 64 bit pre-installed, mit S7-1500 Fail-safe SWC CPU 1505SP F pre-installed Interfaces: 1x slot CFAST, 1x slot SD/MMC, 1x connection for ET 200SP bus adapter PROFINET 1x 10/100/1000 Mbit/s Ethernet, 3x USB, 1x DVI-I graphics card connection, Documentation on DVD, Restore DVD

| | |
|---|---|
| **General information** | |
| Product type designation | CPU 1515SP PC F |
| HW functional status | FS02 |
| Firmware version | V2.1 |
| Engineering with | |
| • STEP 7 TIA Portal configurable/integrated from version | V14 SP1 |
| Installed software | |
| • Visualization | No |
| • Control | S7-1500 Software Controller CPU 1505SP F |
| **Configuration control** | |
| via dataset | Yes |
| **Control elements** | |
| 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) | 1.5 A; Full processor load, incl. ET 200SP modules and using USB |
| Current consumption (in no-load operation), typ. | 0.6 A |
| Inrush current, max. | 4.7 A; Rated value |

| Power | |
|---|---|
| Active power input, max. | 36 W; incl. ET 200SP modules and using USB |
| Infeed power to the backplane bus | 8.75 W |

| Power loss | |
|---|---|
| Power loss, typ. | 15 W; without ET 200SP modules and without using USB |

| Processor | |
|---|---|
| Processor type | Dual-Core 1 GHz, AMD G Series APU T40E |

| Memory | |
|---|---|
| Type of memory | DDR3-SDRAM |
| Main memory | 4 GB RAM |
| CFast memory card | Yes; 30 GB flash memory |
| SIMATIC memory card required | No |
| Work memory | |
| • integrated (for program) | 1.5 Mbyte |
| • integrated (for data) | 5 Mbyte |
| • integrated (for CPU function library of CPU Runtime) | 10 Mbyte |
| Load memory | |
| • integrated (on PC mass storage) | 320 Mbyte |
| Backup | |
| • with UPS | Yes; all memory areas declared retentive |
| • with non-volatile memory | Yes |

| CPU processing times | |
|---|---|
| for bit operations, typ. | 10 ns |
| for word operations, typ. | 12 ns |
| for fixed point arithmetic, typ. | 16 ns |
| for floating point arithmetic, typ. | 64 ns |

| CPU-blocks | |
|---|---|
| Number of elements (total) | 6 000; In addition to blocks such as DBs, FBs and FCs, UDTs, global constants, etc. are also regarded as elements |
| DB | |
| • Number, max. | 5 999; Number range: 1 to 65535 |

| | |
|---|---|
| • Size, max. | 5 Mbyte |
| FB | |
| • Number, max. | 5 998; Number range: 1 to 65535 |
| • Size, max. | 512 kbyte |
| FC | |
| • Number, max. | 5 999; 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 | 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 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. | 410 kbyte; For storage in NVRAM; for storage in mass storage 5 242 020 bytes |
| 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 |
| **Address area** | |
| 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 |
| of which per assigned PC interface | |
| — Inputs (volume) | 8 kbyte |
| — Outputs (volume) | 8 kbyte |
| Subprocess images | |
| • Number of subprocess images, max. | 32 |
| **Hardware configuration** | |
| Integrated power supply | Yes |
| Number of distributed IO systems | 20 |
| Number of DP masters | |
| • Via CM | 1 |
| Rack | |
| • Modules per rack, max. | 64; CPU 1515SP PC + 64 modules + server module |
| • 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 |
| • Hardware clock (real-time) | Yes; Resolution: 1 s |
| • Backup time | 6 wk; At 40 °C ambient temperature, typically |
| • Deviation per day, max. | 10 s; Typ.: 2 s |
| Clock synchronization | |
| • supported | Yes |
| • on Windows clock, slave | Yes |
| **Interfaces** | |
| Number of industrial Ethernet interfaces | 2 |
| Number of PROFINET interfaces | 1 |

| | |
|---|---|
| Number of PROFIBUS interfaces | 1 |
| Number of RS 485 interfaces | 1; Via CM DP module |
| Number of USB interfaces | 3; 3x USB 2.0 on the front, 500 mA each - of which 2x 500 mA and 1x 100 mA simultaneously |
| Number of SD card slots | 1 |
| Video interfaces | |
| • Graphics interface | 1x DVI-I |

| 1. Interface | |
|---|---|
| Interface type | PROFINET |
| automatic detection of transmission rate | Yes |
| Autonegotiation | Yes |
| Autocrossing | Yes |
| Number of connections | 88 |
| Interface types | |
| • Number of ports | 2 |
| • integrated switch | Yes |
| • RJ 45 (Ethernet) | Yes; Via BusAdapter BA 2x RJ45 |
| — Transmission rate, max. | 100 Mbit/s |
| — Industrial Ethernet status LED | Yes |
| • BusAdapter (PROFINET) | Yes; Applicable BusAdapter: BA 2x RJ45, BA 2x FC |
| Protocols | |
| • PROFINET IO Controller | Yes |
| • PROFINET IO Device | Yes |
| • SIMATIC communication | Yes |
| • Open IE communication | Yes |
| • Web server | Yes |
| PROFINET IO Controller | |
| Services | |
| — Isochronous mode | Yes |
| — shortest clock pulse | 500 µs |
| — IRT | Yes |
| — MRP | Yes |
| — MRPD | Yes |
| — Prioritized startup | Yes; Max. 32 PROFINET devices |
| — Number of connectable IO Devices, max. | 128 |
| — Of which IO devices with IRT, max. | 64 |
| — of which in line, max. | 64 |
| — 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 |

| | |
|---|---|
| — 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 configured user data |
| Update time for IRT | |
| — for send cycle of 500 µs | 500 µs to 8 ms |
| — for send cycle of 1 ms | 1 ms to 16 ms |
| — for send cycle of 2 ms | 2 ms to 32 ms |
| — for send cycle of 4 ms | 4 ms to 64 ms |
| — With IRT and parameterization of "odd" send cycles | Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs) |
| Update time for RT | |
| — for send cycle of 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 |
| PROFINET IO Device | |
| Services | |
| — Isochronous mode | No |
| — IRT | Yes |
| — MRP | Yes |
| — MRPD | Yes |
| — Prioritized startup | Yes |
| — Shared device | Yes |
| — Number of IO Controllers with shared device, max. | 4 |
| **2. Interface** | |
| Interface type | Integrated Ethernet interface |
| automatic detection of transmission rate | Yes |
| Autonegotiation | Yes |
| Autocrossing | Yes |
| Interface types | |
| • Number of ports | 1 |
| • RJ 45 (Ethernet) | Yes; Integrated |
| — Transmission rate, max. | 1 000 Mbit/s |
| — Industrial Ethernet status LED | No |
| **3. Interface** | |
| Interface type | PROFIBUS with CM DP |
| Number of connections via this interface | 44 |
| Interface types | |

| | |
|---|---|
| • RS 485 | Yes |
| Protocols | |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | Yes |
| • SIMATIC communication | Yes |
| PROFIBUS DP master | |
| • Number of DP slaves, max. | 125 |
| Services | |
| — Equidistance | No |
| — Isochronous mode | No |

| Interface types | |
|---|---|
| RS 485 | |
| • Transmission rate, max. | 12 Mbit/s |

| Protocols | |
|---|---|
| Number of connections | |
| • Number of connections, max. | 88 |
| • Number of connections reserved for ES/HMI/web | 10 |
| • Number of S7 routing paths | 16 |
| Redundancy mode | |
| Media redundancy | |
| — Switchover time on line break, typ. | 200 ms |
| — 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 |
| 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. | 1 472 kbyte |
| • SNMP | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| Web server | |
| • HTTP | Yes; Via Windows and PROFINET interface |

| | |
|---|---|
| • HTTPS | Yes; Only via PROFINET interface |
| OPC UA | |
| • OPC UA Client | No |
| • OPC UA Server | Yes; Data access (read, write, subscribe), runtime license required |
| — Application authentication | Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 |
| — Security policies | Yes; Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 |
| — User authentication | Yes; "anonymous" or by user name & password |
| 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 simultaneously active program alarms | |
| • 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 8 engineering systems |
| Status block | Yes; up to 8 simultaneously |
| Single step | No |
| Status/control | |
| • Status/control variable | Yes |
| • Variables | Inputs, outputs, memory bits, DB, times, counters |
| • Number of variables, max. | |
| — of which status variables, max. | 200 |
| — of which control variables, max. | 200 |
| Forcing | |
| • Forcing | Yes |
| • Forcing, variables | Inputs, outputs |
| • Number of variables, max. | 200 |
| Diagnostic buffer | |
| • present | Yes |
| • Number of entries, max. | 1 000 |
| — of which powerfail-proof | 300 |
| Traces | |
| • Number of configurable Traces | 4 |

| | |
|---|---|
| • Memory size per trace, max. | 512 kbyte |
| **Interrupts/diagnostics/status information** | |
| Diagnostics indication LED | |
| • RUN/STOP LED | Yes |
| • ERROR LED | Yes |
| • MAINT LED | Yes |
| **Supported technology objects** | |
| Motion Control | Yes |
| • Number of available Motion Control resources for technology objects | 2 400 |
| • Required Motion Control resources | |
| — per speed-controlled axis | 40; per axis |
| — per positioning axis | 80; per axis |
| — per synchronous axis | 160; per axis |
| — per external encoder | 80; per external encoder |
| — per output cam | 20; per cam |
| — per cam track | 160; per cam track |
| — per probe | 40; per probe |
| • Positioning axis | |
| — Number of positioning axes at motion control cycle of 4 ms (typical value) | 5 |
| — Number of positioning axes at motion control cycle of 8 ms (typical value) | 12 |
| 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** | |
| CE mark | Yes |
| CSA approval | Yes |
| cULus | Yes |
| FM approval | Yes |
| RCM (formerly C-TICK) | Yes |
| Highest safety class achievable in safety mode | |
| • Performance level according to ISO 13849-1 | PLe |
| • SIL acc. to IEC 61508 | SIL 3 |
| Probability of failure (for service life of 20 years and repair time of 100 hours) | |
| — Low demand mode: PFDavg in accordance with SIL3 | < 2.00E-05 |

| | |
|---|---|
| — High demand/continuous mode: PFH in accordance with SIL3 | < 1.00E-09 1/h |
| **Ambient conditions** | |
| Ambient temperature during operation | |
| • min. | 0 °C |
| • max. | Up to 60 °C with max. 32 ET 200SP modules and 3x 100 mA USB load; up to 55 °C with max. 64 ET 200SP modules and 2x max. 500 mA and 1x max. 100 mA USB load |
| • horizontal installation, min. | 0 °C |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | 0 °C |
| • vertical installation, max. | 50 °C; With max. 32 ET 200SP modules and 3x 100 mA USB load |
| Ambient temperature during storage/transportation | |
| • min. | -40 °C |
| • max. | 70 °C |
| Vibrations | |
| • Operation, tested according to IEC 60068-2-6 | Yes |
| • Transport, tested acc. to IEC 60068-2-6 | Yes |
| Shock testing | |
| • tested according to IEC 60068-2-6 | Yes |
| • tested according to IEC 60068-2-27 | Yes |
| • tested according to IEC 60068-2-29 | Yes |
| • Storage/transport, tested acc. to IEC 60068-2-27 | Yes |
| **Operating systems** | |
| pre-installed operating system | Windows Embedded Standard 7 P 64-bit |
| **Configuration** | |
| Programming | |
| Programming language | |
| — LAD | Yes; incl. failsafe |
| — FBD | Yes; incl. failsafe |
| — STL | Yes |
| — SCL | Yes |
| — CFC | No |
| — GRAPH | Yes |
| Know-how protection | |
| • User program protection/password protection | Yes |
| • Copy protection | Yes |
| • Block protection | Yes |
| Access protection | |
| • Protection level: Write protection | Yes |

| | |
|---|---|
| • Protection level: Read/write protection | Yes |
| • Protection level: Complete protection | Yes |
| Cycle time monitoring | |
| • lower limit | adjustable minimum cycle time |
| • upper limit | adjustable maximum cycle time |
| Open Development interfaces | |
| • Size of ODK SO file, max. | 3.8 Mbyte |

| Peripherals/Options | |
|---|---|
| SD card | Optionally for additional mass storage |

| Dimensions | |
|---|---|
| Width | 160 mm |
| Height | 117 mm |
| Depth | 75 mm |

| Weights | |
|---|---|
| Weight, approx. | 0.83 kg |

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