SIEMENS

## Data sheet 6ES7412-2XG00-0AB0

SIMATIC S7-400, CPU 412-2 144 KB WORKING MEMORY (72 KB CODE, 72 KB DATA) 1. INTERFACE MPI/DP 12 MBIT/S 2. INTERFACE DP

| | |
|---|---|
| **CiR – Configuration in RUN** | |
| CiR synchronization time, basic load | 100 ms |
| CiR synchronization time, time per I/O byte | 120 µs |
| **Supply voltage** | |
| Rated value (DC) | |
| • 24 V DC | Yes |
| **Input current** | |
| from backplane bus 5 V DC, typ. | 1.5 A |
| from backplane bus 5 V DC, max. | 1.6 A |
| from backplane bus 24 V DC, max. | 300 mA; Total current consumption of the components connected to the MPI/DP interfaces, but no more than 150 mA per interface |
| **Power loss** | |
| Power loss, typ. | 7.5 W |
| **Memory** | |
| Work memory | |
| • integrated | 144 kbyte |
| • integrated (for program) | 72 kbyte |
| • integrated (for data) | 72 kbyte |
| • expandable | No |
| Load memory | |
| • expandable FEPROM | Yes; with Memory Card (FLASH) |
| • expandable FEPROM, max. | 64 Mbyte |
| • integrated RAM, max. | 256 kbyte |
| • expandable RAM | Yes; with Memory Card (RAM) |
| • expandable RAM, max. | 64 Mbyte |
| Backup | |
| • present | Yes |
| • with battery | Yes; all data |
| • without battery | No |
| **Battery** | |
| Backup battery | |
| • Backup current, typ. | 40 µA |
| • Backup current, max. | 320 µA |

| | |
|---|---|
| • Feeding of external backup voltage to CPU | 5 V DC to 15 V DC |
| **CPU processing times** | |
| for bit operations, typ. | 0.2 µs |
| for word operations, typ. | 0.2 µs |
| for fixed point arithmetic, typ. | 0.2 µs |
| for floating point arithmetic, typ. | 0.6 µs |
| **CPU-blocks** | |
| DB | |
| • Number, max. | 512; DB 0 reserved |
| • Size, max. | 64 kbyte |
| FB | |
| • Number, max. | 256 |
| • Size, max. | 64 kbyte |
| FC | |
| • Number, max. | 256 |
| • Size, max. | 64 kbyte |
| OB | |
| • Number, max. | see instruction list |
| • Size, max. | 64 kbyte |
| • Number of time alarm OBs | 2 |
| • Number of delay alarm OBs | 2 |
| • Number of cyclic interrupt OBs | 2 |
| • Number of process alarm OBs | 2 |
| Nesting depth | |
| • per priority class | 24 |
| • additional within an error OB | 2 |
| **Counters, timers and their retentivity** | |
| S7 counter | |
| • Number | 256 |
| Retentivity | |
| — adjustable | Yes |
| — lower limit | 0 |
| — upper limit | 255 |
| — preset | Z 0 to Z 7 |
| Counting range | |
| — lower limit | 1 |
| — upper limit | 999 |
| S7 times | |
| • Number | 256 |
| Retentivity | |
| — adjustable | Yes |

| | |
|---|---|
| — lower limit | 0 |
| — upper limit | 255 |
| — preset | No retentivity |
| Time range | |
| — lower limit | 10 ms |
| — upper limit | 9 990 s |
| IEC timer | |
| • present | Yes |
| • Type | SFB |

| Data areas and their retentivity | |
|---|---|
| retentive data area in total | Total working and load memory (with backup battery) |
| Flag | |
| • Number, max. | 4 kbyte |
| • Retentivity available | Yes; From MB 0 to MB 4095 |
| • Retentivity preset | MB 0 to MB 15 |
| • Number of clock memories | 8; 1 memory byte |

| Address area | |
|---|---|
| I/O address area | |
| • Inputs | 4 kbyte |
| • Outputs | 4 kbyte |
| of which distributed | |
| — MPI/DP interface, inputs | 2 kbyte |
| — MPI/DP interface, outputs | 2 kbyte |
| — DP interface, inputs | 4 kbyte |
| — DP interface, outputs | 4 kbyte |
| Process image | |
| • Inputs, adjustable | 4 kbyte; adjustable at the expense of the code area of the RAM |
| • Outputs, adjustable | 4 kbyte; adjustable at the expense of the code area of the RAM |
| • Inputs, default | 128 byte |
| • Outputs, default | 128 byte |
| • consistent data, max. | 244 byte |
| • Access to consistent data in process image | Yes |
| Subprocess images | |
| • Number of subprocess images, max. | 8 |
| Digital channels | |
| • Inputs | 32 768 |
| — of which central | 32 768 |
| • Outputs | 32 768 |
| — of which central | 32 768 |
| Analog channels | |
| • Inputs | 2 048 |

| | |
|---|---|
| — of which central | 2 048 |
| • Outputs | 2 048 |
| — of which central | 2 048 |

| Hardware configuration | |
|---|---|
| Number of expansion units, max. | 21; of which 6 ER with K-bus |
| connectable OPs | 16 without message processing, 8 with message processing |
| Multicomputing | Yes; 4 CPUs max. (with UR1 or UR2) |
| Interface modules | |
| • Number of connectable IMs (total), max. | 6 |
| • Number of connectable IM 460s, max. | 6 |
| • Number of connectable IM 463s, max. | 3; IM 463-2 |
| Number of DP masters | |
| • integrated | 2 |
| • via CP | 10 |
| • via IM 467 | 4 |
| • Mixed mode IM + CP permitted | No; IM 467 cannot be used jointly with CP 443-5 Ext. |
| • via interface module | 0 |
| • Number of pluggable S5 modules (via adapter capsule in central device), max. | 6 |
| Number of operable FMs and CPs (recommended) | |
| • FM | 16; Limited by number of slots and number of connections |
| • CP, PtP | 16; limited by number of slots |
| • CP, LAN | 16; limited by number of slots and number of connections; for S5-compatible communication max. 4 |
| • PROFIBUS and Ethernet CPs | 14; incl. CP 443-5 Ext. and IM 467 |
| Slots | |
| • required slots | 1 |

| Time of day | |
|---|---|
| Clock | |
| • Hardware clock (real-time) | Yes |
| • retentive and synchronizable | Yes |
| • Resolution | 1 ms |
| Operating hours counter | |
| • Number | 8 |
| Clock synchronization | |
| • supported | Yes |
| • to MPI, master | Yes |
| • to MPI, slave | Yes |
| • to DP, master | Yes |
| • to DP, slave | Yes |
| • in AS, master | Yes |

| | |
|---|---|
| • in AS, slave | Yes |

| 1. Interface | |
|---|---|
| Physics | RS 485 / PROFIBUS |
| Isolated | Yes |
| Number of connection resources | MPI: 16, DP: 16 |
| Functionality | |
| • MPI | Yes |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | Yes |
| MPI | |
| • Number of connections | 16 |
| • Transmission rate, max. | 12 Mbit/s |
| Services | |
| — PG/OP communication | Yes |
| — Routing | Yes |
| — Global data communication | Yes |
| — S7 basic communication | Yes |
| — S7 communication | Yes |
| DP master | |
| • Number of connections, max. | 16 |
| • Transmission rate, max. | 12 Mbit/s |
| • Number of DP slaves, max. | 32 |
| Services | |
| — PG/OP communication | Yes |
| — Global data communication | No |
| — S7 basic communication | No |
| — S7 communication | Yes |
| — Equidistance | Yes |
| — SYNC/FREEZE | Yes |
| — Activation/deactivation of DP slaves | Yes |
| — Direct data exchange (slave-to-slave communication) | Yes |
| Address area | |
| — Inputs, max. | 2 kbyte |
| — Outputs, max. | 2 kbyte |
| User data per DP slave | |
| — Inputs, max. | 244 byte |
| — Outputs, max. | 244 byte |
| — Slots, max. | 244 |
| — per slot, max. | 128 byte |
| DP slave | |

| | |
|---|---|
| • Transmission rate, max. | 12 Mbit/s |
| • Address area, max. | 32 |
| • User data per address area, max. | 32 byte |
| — of which consistent, max. | 32 byte |
| Services | |
| — PG/OP communication | Yes; with interface active |
| — Routing | Yes; with interface active |
| Transfer memory | |
| — Inputs | 244 byte |
| — Outputs | 244 byte |
| **2. Interface** | |
| Physics | RS 485 / PROFIBUS |
| Isolated | Yes |
| Number of connection resources | 16 |
| Functionality | |
| • PROFIBUS DP master | Yes |
| • PROFIBUS DP slave | Yes |
| • Point-to-point connection | No |
| DP master | |
| • Number of connections, max. | 16 |
| • Transmission rate, max. | 12 Mbit/s |
| • Number of DP slaves, max. | 64 |
| Services | |
| — PG/OP communication | Yes |
| — Routing | Yes |
| — Global data communication | No |
| — S7 basic communication | No |
| — S7 communication | Yes |
| — Equidistance | Yes |
| — SYNC/FREEZE | Yes |
| — Activation/deactivation of DP slaves | Yes |
| — Direct data exchange (slave-to-slave communication) | Yes |
| Address area | |
| — Inputs, max. | 4 kbyte |
| — Outputs, max. | 4 kbyte |
| User data per DP slave | |
| — Inputs, max. | 244 byte |
| — Outputs, max. | 244 byte |
| **Isochronous mode** | |

| | |
|---|---|
| Isochronous operation (application synchronized up to terminal) | Yes |
| Equidistance | Yes |
| User data per isochronous slave, max. | 128 byte |
| shortest clock pulse | 5 ms; 2.5 ms without using the SFCs 126 / 127 |

| Communication functions | |
|---|---|
| PG/OP communication | Yes |
| Global data communication | |
| • supported | Yes |
| • Number of GD packets, transmitter, max. | 8 |
| • Number of GD packets, receiver, max. | 16 |
| • Size of GD packets, max. | 64 byte |
| S7 basic communication | |
| • supported | Yes |
| • User data per job, max. | 76 byte |
| S7 communication | |
| • supported | Yes |
| • as server | Yes |
| • as client | Yes |
| • User data per job, max. | 64 kbyte |
| S5 compatible communication | |
| • supported | Yes; via CP and FC AG_SEND and FC AG_RECV |
| • User data per job, max. | 8 kbyte |
| Standard communication (FMS) | |
| • supported | Yes; Via CP and loadable FB |
| Number of connections | |
| • overall | 16; of which one is reserved for PG and OP |
| • usable for PG communication | |
| — reserved for PG communication | 1 |
| — adjustable for PG communication, max. | 0 |
| • usable for OP communication | |
| — reserved for OP communication | 1 |
| — adjustable for OP communication, max. | 0 |
| • usable for S7 basic communication | |
| — reserved for S7 basic communication | 0 |
| — adjustable for S7 basic communication, max. | 0 |
| • usable for S7 communication | |
| — reserved for S7 communication | 0 |
| — adjustable for S7 communication, max. | 0 |
| • usable for routing | |
| — reserved for routing | 0 |

| | |
|---|---|
| — adjustable for routing, max. | 0 |

| S7 message functions | |
|---|---|
| Number of login stations for message functions, max. | 8 |
| Symbol-related messages | Yes |
| Program alarms | Yes |
| Alarm 8-blocks | Yes |
| Process control messages | Yes |

| Test commissioning functions | |
|---|---|
| Status block | Yes |
| Single step | Yes |
| Number of breakpoints | 4 |
| Status/control | |
| • Status/control variable | Yes |
| Forcing | |
| • Forcing | Yes |
| Diagnostic buffer | |
| • present | Yes |
| • Number of entries, max. | 400 |
| — adjustable | Yes |

| Configuration | |
|---|---|
| Configuration software | |
| • STEP 7 | Yes |
| Programming | |
| • Nesting levels | 8 |
| Programming language | |
| — LAD | Yes |
| — FBD | Yes |
| — STL | Yes |
| — SCL | Yes |
| — CFC | Yes |
| — GRAPH | Yes |
| — HiGraph® | Yes |
| Know-how protection | |
| • User program protection/password protection | Yes |

| Dimensions | |
|---|---|
| Width | 25 mm |
| Height | 290 mm |
| Depth | 219 mm |

| Weights | |
|---|---|
| Weight, approx. | 720 g |

**last modified:** 03/16/2018