SIEMENS

## Data sheet 6ES7151-8AB01-0AB0

Figure similar

*** spare part *** SIMATIC DP, IM151-8 PN/DP CPU for ET200S, 192 KB work memory, int. PROFINET interface (with three RJ45 ports) as IO Controller,without battery MMC required

| | |
|---|---|
| **General information** | |
| HW functional status | 01 |
| Firmware version | V3.2 |
| Product function | |
| ● Isochronous mode | No |
| Engineering with | |
| ● Programming package | as of STEP 7 V5.5 or as of STEP 7 TIA Portal V11 |
| **Supply voltage** | |
| Rated value (DC) | 24 V |
| permissible range, lower limit (DC) | 20.4 V |
| permissible range, upper limit (DC) | 28.8 V |
| Reverse polarity protection | Yes; against destruction |
| external protection for power supply lines (recommendation) | 2 A min. |
| Mains buffering | |
| ● Mains/voltage failure stored energy time | 5 ms |
| **Input current** | |
| Inrush current, typ. | 1.8 A |
| $I^2t$ | 0.13 $A^2 \cdot s$ |
| from supply voltage 1L+, max. | 352 mA; 426 mA with DP master module |
| **Output current** | |
| for backplane bus (5 V DC), max. | 700 mA |
| **Power loss** | |
| Power loss, typ. | 5.5 W |
| **Memory** | |
| Work memory | |
| ● integrated | 192 kbyte |
| ● expandable | No |
| Load memory | |
| ● Plug-in (MMC) | Yes |
| ● Plug-in (MMC), max. | 8 Mbyte |
| ● Data management on MMC (after last programming), min. | 10 a |
| Backup | |
| ● present | Yes; Ensured by SIMATIC Micro Memory Card (maintenance-free) |
| **CPU processing times** | |
| for bit operations, typ. | 0.06 µs |
| for word operations, typ. | 0.12 µs |
| for fixed point arithmetic, typ. | 0.16 µs |
| for floating point arithmetic, typ. | 0.59 µs |

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| **CPU-blocks** | |
| Number of blocks (total) | 1 024; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used. |
| DB | |
| ● Number, max. | 1 024; Number range: 1 to 16000 |
| ● Size, max. | 64 kbyte |
| FB | |
| ● Number, max. | 1 024; Number range: 0 to 7999 |
| ● Size, max. | 64 kbyte |
| FC | |
| ● Number, max. | 1 024; Number range: 0 to 7999 |
| ● Size, max. | 64 kbyte |
| OB | |
| ● Number, max. | See S7-300 operation list |
| ● Size, max. | 64 kbyte |
| ● Number of free cycle OBs | 1; OB 1 |
| ● Number of time alarm OBs | 1; OB 10 |
| ● Number of delay alarm OBs | 2; OB 20, 21 |
| ● Number of cyclic interrupt OBs | 4; OB 32, 33, 34, 35 |
| ● Number of process alarm OBs | 1; OB 40 |
| ● Number of DPV1 alarm OBs | 3; OB 55, 56, 57 |
| ● Number of isochronous mode OBs | 1; OB 61; only for PROFINET |
| ● Number of startup OBs | 1; OB 100 |
| ● Number of asynchronous error OBs | 6; OB 80, 82, 83, 85, 86, 87 (OB83 only for centralized I/O and PROFINET IO) |
| ● Number of synchronous error OBs | 2; OB 121, 122 |
| Nesting depth | |
| ● per priority class | 16 |
| ● additional within an error OB | 4 |
| **Counters, timers and their retentivity** | |
| S7 counter | |
| ● Number | 256 |
| Retentivity | |
| — adjustable | Yes |
| — preset | Z 0 to Z 7 |
| Counting range | |
| — adjustable | Yes |
| — lower limit | 0 |
| — upper limit | 999 |
| IEC counter | |
| ● present | Yes |
| ● Type | SFB |
| ● Number | Unlimited (limited only by RAM capacity) |
| S7 times | |
| ● Number | 256 |
| Retentivity | |
| — adjustable | Yes |
| — preset | No retentivity |
| Time range | |
| — lower limit | 10 ms |
| — upper limit | 9 990 s |
| IEC timer | |
| ● present | Yes |
| ● Type | SFB |
| ● Number | Unlimited (limited only by RAM capacity) |
| **Data areas and their retentivity** | |
| Retentive data area (incl. timers, counters, flags), max. | 64 kbyte |
| Flag | |
| ● Size, max. | 256 byte |
| ● Retentivity available | Yes |
| ● Retentivity preset | MB 0 to MB 15 |
| ● Number of clock memories | 8; 1 memory byte |

| | |
|---|---|
| Data blocks | |
| ● Retentivity adjustable | Yes; via non-retain property on DB |
| ● Retentivity preset | Yes |
| Local data | |
| ● per priority class, max. | 32 768 byte; Max. 2048 bytes per block |
| **Address area** | |
| I/O address area | |
| ● Inputs | 2 048 byte |
| ● Outputs | 2 048 byte |
| of which distributed | |
| — Inputs | 2 048 byte |
| — Outputs | 2 048 byte |
| Process image | |
| ● Inputs, adjustable | 2 048 byte |
| ● Outputs, adjustable | 2 048 byte |
| ● Inputs, default | 128 byte |
| ● Outputs, default | 128 byte |
| Subprocess images | |
| ● Number of subprocess images, max. | 1; With PROFINET IO, the length of the user data is limited to 1600 bytes |
| Digital channels | |
| ● Inputs | 16 336 |
| — of which central | 496 |
| ● Outputs | 16 336 |
| — of which central | 496 |
| Analog channels | |
| ● Inputs | 1 021 |
| — of which central | 124 |
| ● Outputs | 1 021 |
| — of which central | 124 |
| **Hardware configuration** | |
| Number of modules per system, max. | 63; Centralized |
| Mounting rail | |
| ● Number of mounting rails that can be used | 1 |
| ● Length of mounting rail, max. | Station width: ≤ 1 m or < 2 m |
| **Time of day** | |
| Clock | |
| ● Hardware clock (real-time) | Yes |
| ● retentive and synchronizable | Yes |
| ● Backup time | 6 wk; At 40 °C ambient temperature, typically |
| ● Deviation per day, max. | 10 s; Typ.: 2 s |
| ● Behavior of the clock following POWER-ON | Clock continues running after POWER OFF |
| ● Behavior of the clock following expiry of backup period | the clock continues at the time of day it had when power was switched off |
| Operating hours counter | |
| ● Number | 1 |
| ● Number/Number range | 0 |
| ● Range of values | 0 to 2^31 hours (when using SFC 101) |
| ● Granularity | 1 h |
| ● retentive | Yes; Must be restarted at each restart |
| Clock synchronization | |
| ● supported | Yes |
| ● to MPI, master | No |
| ● on MPI, device | No |
| ● to DP, master | Yes; With DP master module |
| ● on DP, device | Yes; With DP master module |
| ● in AS, master | No |
| ● in AS, device | No |
| ● on Ethernet via NTP | Yes; As client |
| **Interfaces** | |
| Interfaces/bus type | 1x PROFINET (3 RJ45 ports) |
| **1. Interface** | |

| | |
|---|---|
| Interface type | PROFINET |
| Isolated | Yes |
| automatic detection of transmission rate | Yes |
| Autonegotiation | Yes |
| Autocrossing | Yes |
| Change of IP address at runtime, supported | Yes |
| Interface types | |
| ● RJ 45 (Ethernet) | Yes |
| ● Number of ports | 3; RJ45 |
| ● integrated switch | Yes |
| Protocols | |
| ● MPI | No |
| ● PROFINET IO Controller | Yes; Also simultaneously with IO-Device functionality |
| ● PROFINET IO Device | Yes; Also simultaneously with IO Controller functionality |
| ● PROFINET CBA | Yes |
| ● PROFIBUS DP master | No |
| ● PROFIBUS DP device | No |
| ● Open IE communication | Yes; Via TCP/IP, ISO on TCP, and UDP |
| ● Web server | Yes |
| ● Point-to-point connection | No |
| PROFINET IO Controller | |
| ● Transmission rate, max. | 100 Mbit/s; full duplex |
| Services | |
| — PG/OP communication | Yes |
| — Routing | Yes; With DP master module |
| — S7 communication | Yes; with loadable FBs |
| — Isochronous mode | Yes; OB 61; only for PROFINET IO |
| — IRT | Yes |
| — Shared device | Yes |
| — Prioritized startup | Yes |
| — Number of IO devices with prioritized startup, max. | 32 |
| — Number of connectable IO Devices, max. | 128 |
| — Of which IO devices with IRT, max. | 64 |
| — of which in line, max. | 64 |
| — Number of IO Devices with IRT and the option "high flexibility" | 128 |
| — of which in line, max. | 61 |
| — Number of connectable IO Devices for RT, max. | 128 |
| — of which in line, max. | 128 |
| — Activation/deactivation of IO Devices | Yes |
| — 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 |
| — Device replacement without swap medium | Yes |
| — Send cycles | 250 µs, 500 µs,1 ms; 2 ms, 4 ms (not in the case of IRT with "high flexibility" option) |
| — Updating time | Minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices, and on the number of configured user data items. |
| — Updating times | 250 µs to 512 ms (depends on operating mode; for more details, refer to Operating Instructions, "Interface Module IM151-8 PN/DP CPU") |
| Address area | |
| — Inputs, max. | 2 kbyte |
| — Outputs, max. | 2 kbyte |
| — User data consistency, max. | 1 024 byte; with PROFINET I/O |
| PROFINET IO Device | |
| Services | |
| — PG/OP communication | Yes |
| — Routing | Yes |
| — S7 communication | Yes; with loadable FBs |
| — Isochronous mode | No |

| | |
|---|---|
| — IRT | Yes |
| — PROFIenergy | Yes; With SFB 73 / 74 prepared for loadable PROFIenergy standard FB for I-Device |
| — Shared device | Yes |
| — Number of IO Controllers with shared device, max. | 2 |
| Transfer memory | |
| — Inputs, max. | 1 440 byte; Per IO Controller with shared device |
| — Outputs, max. | 1 440 byte; Per IO Controller with shared device |
| Submodules | |
| — number of submodules / at the 1st interface / as PROFINET IO device / maximum | 64 |
| — User data per submodule, max. | 1 024 byte |
| PROFINET CBA | |
| ● acyclic transmission | Yes |
| ● cyclic transmission | Yes |
| Open IE communication | |
| ● Number of connections, max. | 8 |
| ● Local port numbers used at the system end | 0, 20, 21, 23, 25, 80, 102, 135, 161, 443, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535 |
| **2. Interface** | |
| Interface type | External interface via master module 6ES7138-4HA00-0AB0 |
| Isolated | Yes |
| Interface types | |
| ● RS 485 | Yes |
| ● Output current of the interface, max. | No |
| Protocols | |
| ● MPI | No |
| ● PROFINET IO Controller | No |
| ● PROFINET IO Device | No |
| ● PROFINET CBA | No |
| ● PROFIBUS DP master | Yes |
| ● PROFIBUS DP device | No |
| ● Open IE communication | No |
| ● Web server | No |
| PROFIBUS DP master | |
| ● Transmission rate, max. | 12 Mbit/s |
| ● max. number of DP devices | 32; Per station |
| Services | |
| — PG/OP communication | Yes |
| — Routing | Yes |
| — Global data communication | No |
| — S7 basic communication | Yes; I blocks only |
| — S7 communication | Yes |
| — S7 communication, as client | No |
| — S7 communication, as server | Yes |
| — Equidistance | Yes |
| — Isochronous mode | No |
| — SYNC/FREEZE | Yes |
| — activation/deactivation of DP devices | Yes |
| — max. number of DP devices that can be activated/deactivated at the same time | 8 |
| — Direct data exchange (slave-to-slave communication) | Yes |
| — DPV1 | Yes |
| Address area | |
| — Inputs, max. | 2 048 byte |
| — Outputs, max. | 2 048 byte |
| User data per DP device | |
| — Inputs, max. | 244 byte |
| — Outputs, max. | 244 byte |
| **Protocols** | |
| Redundancy mode | |

| | |
|---|---|
| Media redundancy | |
| — MRP | Yes |
| — Switchover time on line break, typ. | 200 ms; PROFINET MRP |
| — Number of stations in the ring, max. | 50 |
| Open IE communication | |
| ● TCP/IP | Yes; via integrated PROFINET interface and loadable FBs |
| — Number of connections, max. | 8 |
| — Data length for connection type 01H, max. | 1 460 byte |
| — Data length for connection type 11H, max. | 32 768 byte |
| — several passive connections per port, supported | Yes |
| ● ISO-on-TCP (RFC1006) | Yes; via integrated PROFINET interface and loadable FBs |
| — Number of connections, max. | 8 |
| — Data length, max. | 32 768 byte |
| ● UDP | Yes; via integrated PROFINET interface and loadable FBs |
| — Number of connections, max. | 8 |
| — Data length, max. | 1 472 byte |
| Web server | |
| ● supported | Yes |
| ● User-defined websites | Yes |
| ● Number of HTTP clients | 5 |
| **communication functions / header** | |
| PG/OP communication | Yes |
| Data record routing | Yes; With DP master module |
| Global data communication | |
| ● supported | No |
| S7 basic communication | |
| ● supported | Yes; I blocks |
| ● User data per job, max. | 76 byte |
| ● User data per job (of which consistent), max. | 76 byte |
| S7 communication | |
| ● supported | Yes |
| ● as server | Yes |
| ● as client | Yes; via integrated PROFINET interface and loadable FBs |
| ● User data per job, max. | See online help of STEP 7 (shared parameters of the SFBs/FBs and of the SFCs/FCs of S7 Communication) |
| communication functions / PROFINET CBA (with set target communication load) / header | |
| ● Setpoint for the CPU communication load | 50 % |
| ● Number of remote interconnection partners | 32 |
| ● number of master/device functions | 30 |
| ● total of all master/device connections | 1 000 |
| ● data length of all incoming master/device connections, max. | 4 000 byte |
| ● data length of all outgoing master/device connections, max. | 4 000 byte |
| ● Number of device-internal and PROFIBUS interconnections | 500 |
| ● Data length of device-internal und PROFIBUS interconnections, max. | 4 000 byte |
| ● Data length per connection, max. | 1 400 byte |
| performance data / PROFINET CBA / remote interconnection / with acyclic transfer / header | |
| — Sampling interval, min. | 500 ms |
| — Number of incoming interconnections | 100 |
| — Number of outgoing interconnections | 100 |
| — Data length of all incoming interconnections, max. | 2 000 byte |
| — Data length of all outgoing interconnections, max. | 2 000 byte |
| — Data length per connection, max. | 1 400 byte |
| performance data / PROFINET CBA / remote interconnection / with cyclic transfer / header | |
| — Transmission frequency: Transmission interval, min. | 1 ms |
| — Number of incoming interconnections | 200 |
| — Number of outgoing interconnections | 200 |
| — Data length of all incoming interconnections, max. | 2 000 byte |
| — Data length of all outgoing interconnections, max. | 2 000 byte |

| | |
|---|---|
| — Data length per connection, max. | 450 byte |
| performance data / PROFINET CBA / HMI variables via PROFINET / acyclic / header | |
| — Number of stations that can log on for HMI variables (PN OPC/iMap) | 3; 2x PN OPC/1x iMap |
| — HMI variable updating | 500 ms |
| — Number of HMI variables | 200 |
| — Data length of all HMI variables, max. | 2 000 byte |
| performance data / PROFINET CBA / PROFIBUS proxy functionality / header | |
| — supported | Yes |
| — Number of linked PROFIBUS devices | 16 |
| — Data length per connection, max. | 240 byte; Slave-dependent |
| iPAR server | |
| ● supported | Yes |
| Number of connections | |
| ● overall | 12 |
| ● usable for PG communication | 11 |
| — reserved for PG communication | 1 |
| — adjustable for PG communication, min. | 1 |
| — adjustable for PG communication, max. | 11 |
| ● usable for OP communication | 11 |
| — reserved for OP communication | 1 |
| — adjustable for OP communication, min. | 1 |
| — adjustable for OP communication, max. | 11 |
| ● usable for S7 basic communication | 10 |
| — reserved for S7 basic communication | 0 |
| — adjustable for S7 basic communication, min. | 0 |
| — adjustable for S7 basic communication, max. | 10 |
| ● usable for S7 communication | 10; with loadable FBs |
| — adjustable for S7 communication, max. | 10 |
| ● total number of instances, max. | 32 |
| ● usable for routing | 4; With DP master module |
| **S7 message functions** | |
| Number of login stations for message functions, max. | 12; Depending on the configured connections for PG/OP and S7 basic communication |
| Process diagnostic messages | Yes; ALARM_S, ALARM_SC, ALARM_SQ, ALARM_D, ALARM_DQ |
| simultaneously active Alarm_S blocks, max. | 300 |
| **Test commissioning functions** | |
| Status block | Yes; Up to 2 simultaneously |
| Single step | Yes |
| Number of breakpoints | 4 |
| Status/control | |
| ● Status/control variable | Yes |
| ● Variables | Inputs, outputs, memory bits, DB, times, counters |
| ● Number of variables, max. | 30 |
| — of which status variables, max. | 30 |
| — of which control variables, max. | 14 |
| Forcing | |
| ● Forcing | Yes |
| ● Forcing, variables | I/O |
| ● Number of variables, max. | 10 |
| Diagnostic buffer | |
| ● present | Yes |
| ● Number of entries, max. | 500 |
| — adjustable | No |
| — of which powerfail-proof | 100; Only the last 100 entries are retained |
| **Interrupts/diagnostics/status information** | |
| Alarms | Yes |
| Diagnostics function | Yes |
| Diagnostics indication LED | |
| ● for maintenance | Yes; MT |
| ● Bus fault BF (red) | Yes; BF-PN |

| | |
|---|---|
| ● Group error SF (red) | Yes |
| ● Monitoring 24 V voltage supply ON (green) | Yes |
| ● Bus activity PROFINET (green) | Yes; P1-/P2-/P3-Link |
| **Potential separation** | |
| between PROFIBUS DP and all other circuit components | Yes |
| **Isolation** | |
| Isolation tested with | 500 V DC |
| **Degree and class of protection** | |
| IP degree of protection | IP20 |
| **configuration / header** | |
| Configuration software | |
| ● STEP 7 | Yes; V5.5 or higher |
| configuration / programming / header | |
| ● Command set | see instruction list |
| ● Nesting levels | 8 |
| ● System functions (SFC) | see instruction list |
| ● System function blocks (SFB) | see instruction list |
| Programming language | |
| — LAD | Yes |
| — FBD | Yes |
| — STL | Yes |
| — SCL | Yes; Optional |
| — CFC | Yes; Optional |
| — GRAPH | Yes; Optional |
| — HiGraph® | Yes; Optional |
| Know-how protection | |
| ● User program protection/password protection | Yes |
| ● Block encryption | Yes; With S7 block Privacy |
| programming / cycle time monitoring / header | |
| ● lower limit | 1 ms |
| ● upper limit | 6 000 ms |
| ● adjustable | Yes |
| ● preset | 150 ms |
| **Dimensions** | |
| Width | 120 mm; DP master module: 35 mm |
| Height | 119.5 mm |
| Depth | 75 mm |
| **Weights** | |
| Weight, approx. | 320 g; DP master module: Approx. 100 g |

**Classifications**

| | Version | Classification |
|---|---|---|
| eClass | 14 | 27-24-26-07 |
| eClass | 12 | 27-24-26-07 |
| eClass | 9.1 | 27-24-26-07 |
| eClass | 9 | 27-24-26-07 |
| eClass | 8 | 27-24-26-07 |
| eClass | 7.1 | 27-24-26-07 |
| eClass | 6 | 27-24-26-07 |
| ETIM | 9 | EC001603 |
| ETIM | 8 | EC001603 |
| ETIM | 7 | EC001603 |
| IDEA | 4 | 3565 |
| UNSPSC | 15 | 32-15-17-05 |

**Approvals / Certificates**

**General Product Approval**

Manufacturer Declaration

Miscellaneous

| EMV | For use in hazardous locations |
|---|---|

FM

| For use in hazardous locations | Marine / Shipping |
|---|---|

Miscellaneous

CCC-Ex

| Marine / Shipping | other |
|---|---|

NK / Nippon Kaiji Kyokai

CCS (China Classification Society)

PROFINET

| Industrial Communication |
|---|

PROFINET

**last modified:** 4/4/2025