

SIMATIC DP, IM151-7 CPU for ET200S, 128 KB work memory with integrated PROFIBUS DP interface (9-pole D-sub socket) as DP slave, without battery SIMATIC MMC required



General information	
HW functional status	01
Firmware version	V3.3
Engineering with	
<ul style="list-style-type: none"> <li>Programming package</li> </ul>	V5.5 + SP1 or higher or V5.2 + SP1 or higher + HSP 219
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 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	
<ul style="list-style-type: none"> <li>Mains/voltage failure stored energy time</li> </ul>	5 ms
Input current	
Inrush current, max.	1.8 A; Typical
$I^2t$	0.09 A <sup>2</sup> ·s
from supply voltage 1L+, max.	320 mA; 410 mA with DP master module

Output current	
for backplane bus (5 V DC), max.	700 mA
Power loss	
Power loss, typ.	4.2 W
Memory	
Work memory	
<ul style="list-style-type: none"> <li>integrated</li> </ul>	128 kbyte
<ul style="list-style-type: none"> <li>expandable</li> </ul>	No
<ul style="list-style-type: none"> <li>Size of retentive memory for retentive data blocks</li> </ul>	64 kbyte
Load memory	
<ul style="list-style-type: none"> <li>Plug-in (MMC)</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Plug-in (MMC), max.</li> </ul>	8 Mbyte
<ul style="list-style-type: none"> <li>Data management on MMC (after last programming), min.</li> </ul>	10 y
Backup	
<ul style="list-style-type: none"> <li>present</li> </ul>	Yes; Ensured by SIMATIC Micro Memory Card (maintenance-free)
CPU processing times	
for bit operations, typ.	0.06 $\mu$ s
for word operations, typ.	0.12 $\mu$ s
for fixed point arithmetic, typ.	0.16 $\mu$ s
for floating point arithmetic, typ.	0.59 $\mu$ s
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	
<ul style="list-style-type: none"> <li>Number, max.</li> </ul>	1 024; Number range: 1 to 16000
<ul style="list-style-type: none"> <li>Size, max.</li> </ul>	64 kbyte
FB	
<ul style="list-style-type: none"> <li>Number, max.</li> </ul>	1 024; Number range: 0 to 7999
<ul style="list-style-type: none"> <li>Size, max.</li> </ul>	64 kbyte
FC	
<ul style="list-style-type: none"> <li>Number, max.</li> </ul>	1 024; Number range: 0 to 7999
<ul style="list-style-type: none"> <li>Size, max.</li> </ul>	64 kbyte
OB	
<ul style="list-style-type: none"> <li>Description</li> </ul>	See S7-300 operation list
<ul style="list-style-type: none"> <li>Size, max.</li> </ul>	64 kbyte
<ul style="list-style-type: none"> <li>Number of free cycle OBs</li> </ul>	1; OB 1
<ul style="list-style-type: none"> <li>Number of time alarm OBs</li> </ul>	1; OB 10
<ul style="list-style-type: none"> <li>Number of delay alarm OBs</li> </ul>	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 startup OBs 1; OB 100
- Number of asynchronous error OBs 6; OB 80, 82, 83 (for centralized I/O only, not for distributed I/O), 85, 86, 87
- 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
- lower limit 0
- upper limit 255
- preset Z 0 to Z 7

#### Counting range

- 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
- 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
- Number Unlimited (limited only by RAM capacity)

### Data areas and their retentivity

#### Flag

• Number, max.	256 byte
• Retentivity available	Yes; MB 0 to MB 255
• Retentivity preset	MB 0 to MB 15
• Number of clock memories	8; 1 memory byte
<b>Data blocks</b>	
• Retentivity adjustable	Yes; via non-retain property on DB
• Retentivity preset	Yes
<b>Local data</b>	
• per priority class, max.	32 kbyte; Max. 2048 bytes per block
<b>Address area</b>	
<b>I/O address area</b>	
• Inputs	2 048 byte
• Outputs	2 048 byte
<b>of which distributed</b>	
— Inputs	2 048 byte
— Outputs	2 048 byte
<b>Process image</b>	
• Inputs	2 048 byte
• Outputs	2 048 byte
• Inputs, adjustable	2 048 byte
• Outputs, adjustable	2 048 byte
• Inputs, default	128 byte
• Outputs, default	128 byte
<b>Digital channels</b>	
• Inputs	16 336
— of which central	496
• Outputs	16 336
— of which central	496
<b>Analog channels</b>	
• Inputs	1 021
— of which central	124
• Outputs	1 021
— of which central	124
<b>Hardware configuration</b>	
Number of modules per system, max.	63; Centralized
<b>Mounting rail</b>	
• Number of mounting rails that can be used	1
• Length of mounting rail, max.	Station width: ≤ 1 m or < 2 m
<b>Time of day</b>	
<b>Clock</b>	

<ul style="list-style-type: none"> <li>• Hardware clock (real-time)</li> <li>• retentive and synchronizable</li> <li>• Backup time</li> <li>• Deviation per day, max.</li> <li>• Behavior of the clock following POWER-ON</li> <li>• Behavior of the clock following expiry of backup period</li> </ul>	<p>Yes</p> <p>Yes</p> <p>6 wk; At 40 °C ambient temperature, typically</p> <p>10 s; Typ.: 2 s</p> <p>Clock continues running after POWER OFF</p> <p>Clock continues to run with the time at which the power failure occurred</p>
<b>Operating hours counter</b>	
<ul style="list-style-type: none"> <li>• Number</li> <li>• Number/Number range</li> <li>• Range of values</li> <li>• Granularity</li> <li>• retentive</li> </ul>	<p>1</p> <p>0</p> <p>0 to 2<sup>31</sup> hours (when using SFC 101)</p> <p>1 h</p> <p>Yes; Must be restarted at each restart</p>
<b>Clock synchronization</b>	
<ul style="list-style-type: none"> <li>• supported</li> <li>• to MPI, master</li> <li>• to MPI, slave</li> <li>• to DP, master</li> <li>• to DP, slave</li> <li>• in AS, master</li> <li>• in AS, slave</li> </ul>	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes; With DP slave only slave clock</p> <p>Yes</p> <p>No</p> <p>No</p>
<b>Interfaces</b>	
Interfaces/bus type	1 x MPI/PROFIBUS DP
Number of industrial Ethernet interfaces	0
Number of PROFINET interfaces	0
Number of wireless interfaces	0
<b>1. Interface</b>	
Interface type	Integrated RS 485 interface
Physics	RS 485
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	80 mA
<b>Protocols</b>	
<ul style="list-style-type: none"> <li>• MPI</li> <li>• PROFIBUS DP master</li> <li>• PROFIBUS DP slave</li> <li>• Point-to-point connection</li> </ul>	<p>Yes</p> <p>No</p> <p>Yes; active / passive</p> <p>No</p>
<b>MPI</b>	
<ul style="list-style-type: none"> <li>• Transmission rate, max.</li> </ul>	12 Mbit/s
<b>Services</b>	
— PG/OP communication	Yes
— Routing	Yes; With master module

— Global data communication	Yes
— S7 basic communication	Yes
— S7 communication	Yes; Only server, configured on one side
— S7 communication, as client	No
— S7 communication, as server	Yes

### PROFIBUS DP slave

• GSD file	The latest GSD file is available on the Internet ( <a href="http://www.siemens.com/profibus-gsd">http://www.siemens.com/profibus-gsd</a> )
• Transmission rate, max.	12 Mbit/s
• automatic baud rate search	Yes; only with passive interface
• Address area, max.	32
• User data per address area, max.	32 byte; Up to max. size of the transfer memory

### Services

— PG/OP communication	Yes
— Routing	Yes; Only with active, integrated DP slave interface and inserted DP master module in DP master mode
— Global data communication	No
— S7 basic communication	No
— S7 communication	Yes; Only server, configured on one side
— S7 communication, as client	No
— S7 communication, as server	Yes
— Direct data exchange (slave-to-slave communication)	Yes
— DPV1	No

### Transfer memory

— Inputs	244 byte
— Outputs	244 byte

## 2. Interface

Interface type	External interface via master module 6ES7138-4HA00-0AB0
Physics	RS 485
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	No

### Protocols

• MPI	No
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	No

### PROFIBUS DP master

• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	32; Per station

### Services

— PG/OP communication	Yes
— Routing	Yes

— Global data communication	No
— S7 basic communication	Yes; I blocks only
— S7 communication	Yes; Only server, configured on one side
— S7 communication, as client	No
— S7 communication, as server	Yes
— Equidistance	Yes
— Isochronous mode	No
— SYNC/FREEZE	Yes
— Activation/deactivation of DP slaves	Yes
— Number of DP slaves that can be simultaneously activated/deactivated, max.	8
— Direct data exchange (slave-to-slave communication)	Yes
— DPV1	Yes
<b>Address area</b>	
— Inputs, max.	2 kbyte
— Outputs, max.	2 kbyte
<b>User data per DP slave</b>	
— Inputs, max.	244 byte
— Outputs, max.	244 byte
<b>Isochronous mode</b>	
Isochronous operation (application synchronized up to terminal)	No
<b>Communication functions</b>	
PG/OP communication	Yes
Data record routing	Yes; With DP master module
<b>Global data communication</b>	
• supported	Yes
• Number of GD loops, max.	8
• Number of GD packets, max.	8
• Number of GD packets, transmitter, max.	8
• Number of GD packets, receiver, max.	8
• Size of GD packets, max.	22 byte
• Size of GD packet (of which consistent), max.	22 byte
<b>S7 basic communication</b>	
• supported	Yes
• User data per job, max.	76 byte
• User data per job (of which consistent), max.	76 byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)
<b>S7 communication</b>	
• supported	Yes

<ul style="list-style-type: none"> <li>• as server</li> <li>• as client</li> <li>• User data per job, max.</li> <li>• User data per job (of which consistent), max.</li> </ul>	<p>Yes</p> <p>No</p> <p>See online help of STEP 7 (shared parameters of the SFBs/FBs and of the SFCs/FCs of S7 Communication)</p> <p>See online help of STEP 7 (shared parameters of the SFBs/FBs and of the SFCs/FCs of S7 Communication)</p>
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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 routing	4; As slave only with active interface, with IM 151-7 CPU as DP master

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



<ul style="list-style-type: none"> <li>• Forcing, variables</li> <li>• Number of variables, max.</li> </ul>	Inputs, outputs 10
<b>Diagnostic buffer</b>	
<ul style="list-style-type: none"> <li>• present</li> <li>• Number of entries, max.               <ul style="list-style-type: none"> <li>— adjustable</li> <li>— of which powerfail-proof</li> </ul> </li> <li>• Number of entries readable in RUN, max.               <ul style="list-style-type: none"> <li>— adjustable</li> <li>— preset</li> </ul> </li> </ul>	Yes 500 No 100; Only the last 100 entries are retained 499 Yes; From 10 to 499 10
<b>Service data</b>	
<ul style="list-style-type: none"> <li>• can be read out</li> </ul>	Yes
<b>Interrupts/diagnostics/status information</b>	
Alarms	Yes
Diagnostics function	Yes
<b>Diagnostics indication LED</b>	
<ul style="list-style-type: none"> <li>• Group error SF (red)</li> <li>• Monitoring 24 V voltage supply ON (green)</li> </ul>	Yes Yes
<b>Potential separation</b>	
between PROFIBUS DP and all other circuit components	Yes
<b>Permissible potential difference</b>	
between different circuits	75 V DC/60 V AC
<b>Isolation</b>	
Isolation tested with	500 V DC
<b>Degree and class of protection</b>	
IP degree of protection	IP20
<b>Configuration</b>	
Configuration rules	max. 63 peripheral modules per station; station width < 1 m or < 2 m; max. 10 A per load group (power module); master interface module on right next to IM 151-7 CPU (X2 interface)
<b>Configuration software</b>	
<ul style="list-style-type: none"> <li>• STEP 7 Lite</li> </ul>	No
<b>Programming</b>	
<ul style="list-style-type: none"> <li>• Command set</li> <li>• Nesting levels</li> <li>• System functions (SFC)</li> <li>• System function blocks (SFB)</li> </ul>	see instruction list 8 see instruction list see instruction list
<b>Programming language</b>	
— 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

#### Cycle time monitoring

• lower limit	1 ms
• upper limit	6 000 ms
• adjustable	Yes
• preset	150 ms

#### Dimensions

Width	60 mm; DP master module: 35 mm
Height	119.5 mm
Depth	75 mm

#### Weights

Weight, approx.	200 g; DP master module: Approx. 100 g
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**last modified:** 11/28/2018