

# SIEMENS

## Data sheet

## 6ES7151-7AA21-0AB0



\*\*\* spare part \*\*\* 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
Product function	
• Isochronous mode	No
Engineering with	
• Programming package	as of STEP 7 V5.5 + SP1 or as of V5.2 + SP1 + HSP 219 or as of STEP 7 TIA Portal V11
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	
• Mains/voltage failure stored energy time	5 ms
Input current	
Inrush current, typ.	1.8 A
I <sup>2</sup> t	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	
• integrated	128 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 $\mu$ s
<b>CPU-blocks</b>	
Number of blocks (total)	1 024; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used.
<b>DB</b>	
• Number, max.	1 024; Number range: 1 to 16000
• Size, max.	64 kbyte
<b>FB</b>	
• Number, max.	1 024; Number range: 0 to 7999
• Size, max.	64 kbyte
<b>FC</b>	
• Number, max.	1 024; Number range: 0 to 7999
• Size, max.	64 kbyte
<b>OB</b>	
• 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 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
<b>Nesting depth</b>	
• per priority class	16
• additional within an error OB	4
<b>Counters, timers and their retentivity</b>	
<b>S7 counter</b>	
• Number	256
<b>Retentivity</b>	
— adjustable	Yes
— preset	Z 0 to Z 7
<b>Counting range</b>	
— lower limit	0
— upper limit	999
<b>IEC counter</b>	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
<b>S7 times</b>	
• Number	256
<b>Retentivity</b>	
— adjustable	Yes
— preset	No retentivity
<b>Time range</b>	
— lower limit	10 ms
— upper limit	9 990 s
<b>IEC timer</b>	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
<b>Data areas and their retentivity</b>	
Retentive data area (incl. timers, counters, flags), max.	64 kbyte
<b>Flag</b>	
• Size, 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
of which distributed	
— 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>	
• 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
<b>Operating hours counter</b>	
• Number	1
• Number/Number range	0
• Range of values	0 to 2 <sup>31</sup> hours (when using SFC 101)
• Granularity	1 h
• retentive	Yes; Must be restarted at each restart
<b>Clock synchronization</b>	
• supported	Yes
• to MPI, master	Yes
• on MPI, device	Yes
• to DP, master	Yes; With DP slave only slave clock
• on DP, device	Yes
• in AS, master	No
• in AS, device	No
<b>Interfaces</b>	
Interfaces/bus type	1 x MPI/PROFIBUS DP

1. Interface	
Interface type	Integrated RS 485 interface
Isolated	Yes
Interface types	
<ul style="list-style-type: none"> <li>• RS 485</li> <li>• Output current of the interface, max.</li> </ul>	Yes 80 mA
Protocols	
<ul style="list-style-type: none"> <li>• MPI</li> <li>• PROFIBUS DP master</li> <li>• PROFIBUS DP device</li> <li>• Point-to-point connection</li> </ul>	Yes No Yes; active / passive No
MPI	
<ul style="list-style-type: none"> <li>• Transmission rate, max.</li> </ul>	12 Mbit/s
Services	
<ul style="list-style-type: none"> <li>— PG/OP communication</li> <li>— Routing</li> <li>— Global data communication</li> <li>— S7 basic communication</li> <li>— S7 communication</li> <li>— S7 communication, as client</li> <li>— S7 communication, as server</li> </ul>	Yes Yes; With master module Yes Yes Yes; Only server, configured on one side No Yes
PROFIBUS DP device	
<ul style="list-style-type: none"> <li>• GSD file</li> <li>• Transmission rate, max.</li> <li>• automatic baud rate search</li> <li>• Address area, max.</li> <li>• User data per address area, max.</li> </ul>	The latest GSD file is available on the Internet ( <a href="http://www.siemens.com/profibus-gsd">http://www.siemens.com/profibus-gsd</a> ) 12 Mbit/s Yes; only with passive interface 32 32 byte; Up to max. size of the transfer memory
Services	
<ul style="list-style-type: none"> <li>— PG/OP communication</li> <li>— Routing</li> <li>— Global data communication</li> <li>— S7 basic communication</li> <li>— S7 communication</li> <li>— S7 communication, as client</li> <li>— S7 communication, as server</li> <li>— Direct data exchange (slave-to-slave communication)</li> <li>— DPV1</li> </ul>	Yes Yes; Only with active, integrated DP slave interface and inserted DP master module in DP master mode No No Yes; Only server, configured on one side No Yes Yes No
Transfer memory	
<ul style="list-style-type: none"> <li>— Inputs</li> <li>— Outputs</li> </ul>	244 byte 244 byte
2. Interface	
Interface type	External interface via master module 6ES7138-4HA00-0AB0
Isolated	Yes
Interface types	
<ul style="list-style-type: none"> <li>• RS 485</li> <li>• Output current of the interface, max.</li> </ul>	Yes No
Protocols	
<ul style="list-style-type: none"> <li>• MPI</li> <li>• PROFIBUS DP master</li> <li>• PROFIBUS DP device</li> </ul>	No Yes No
PROFIBUS DP master	
<ul style="list-style-type: none"> <li>• Transmission rate, max.</li> <li>• max. number of DP devices</li> </ul>	12 Mbit/s 32; Per station
Services	
<ul style="list-style-type: none"> <li>— PG/OP communication</li> <li>— Routing</li> <li>— Global data communication</li> </ul>	Yes Yes 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 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
<b>Address area</b>	
— Inputs, max.	2 kbyte
— Outputs, max.	2 kbyte
<b>User data per DP device</b>	
— Inputs, max.	244 byte
— Outputs, max.	244 byte
<b>Protocols</b>	
<b>Open IE communication</b>	
• TCP/IP	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
• as server	Yes
• as client	No
• 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)
• User data per job (of which consistent), max.	See online help of STEP 7 (shared parameters of the SFBs/FBs and of the SFCs/FCs of S7 Communication)
<b>Number of connections</b>	
• 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

<ul style="list-style-type: none"> <li>• usable for routing</li> </ul>	4; As slave only with active interface, with IM 151-7 CPU as DP master
<b>S7 message functions</b>	
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
<b>Test commissioning functions</b>	
Status block	Yes; Up to 2 simultaneously
Single step	Yes
Number of breakpoints	4
<b>Status/control</b>	
<ul style="list-style-type: none"> <li>• Status/control variable</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Variables</li> </ul>	Inputs, outputs, memory bits, DB, times, counters
<ul style="list-style-type: none"> <li>• Number of variables, max.</li> </ul>	30
<ul style="list-style-type: none"> <li>— of which status variables, max.</li> </ul>	30
<ul style="list-style-type: none"> <li>— of which control variables, max.</li> </ul>	14
<b>Forcing</b>	
<ul style="list-style-type: none"> <li>• Forcing</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Forcing, variables</li> </ul>	Inputs, outputs
<ul style="list-style-type: none"> <li>• Number of variables, max.</li> </ul>	10
<b>Diagnostic buffer</b>	
<ul style="list-style-type: none"> <li>• present</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Number of entries, max.</li> </ul>	500
<ul style="list-style-type: none"> <li>— adjustable</li> </ul>	No
<ul style="list-style-type: none"> <li>— of which powerfail-proof</li> </ul>	100; Only the last 100 entries are retained
<ul style="list-style-type: none"> <li>• Number of entries readable in RUN, max.</li> </ul>	499
<ul style="list-style-type: none"> <li>— adjustable</li> </ul>	Yes; From 10 to 499
<ul style="list-style-type: none"> <li>— preset</li> </ul>	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> </ul>	Yes
<ul style="list-style-type: none"> <li>• Monitoring 24 V voltage supply ON (green)</li> </ul>	Yes
<b>Potential separation</b>	
between PROFIBUS DP and all other circuit components	Yes
<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> </ul>	see instruction list
<ul style="list-style-type: none"> <li>• Nesting levels</li> </ul>	8
<ul style="list-style-type: none"> <li>• System functions (SFC)</li> </ul>	see instruction list
<ul style="list-style-type: none"> <li>• System function blocks (SFB)</li> </ul>	see instruction list
<b>Programming language</b>	
<ul style="list-style-type: none"> <li>— LAD</li> </ul>	Yes
<ul style="list-style-type: none"> <li>— FBD</li> </ul>	Yes
<ul style="list-style-type: none"> <li>— STL</li> </ul>	Yes
<ul style="list-style-type: none"> <li>— SCL</li> </ul>	Yes; Optional
<ul style="list-style-type: none"> <li>— CFC</li> </ul>	Yes; Optional

— GRAPH	Yes; Optional
— HiGraph®	Yes; Optional
<b>Know-how protection</b>	
• User program protection/password protection	Yes
• Block encryption	Yes; With S7 block Privacy
<b>Cycle time monitoring</b>	
• lower limit	1 ms
• upper limit	6 000 ms
• adjustable	Yes
• preset	150 ms
<b>Dimensions</b>	
Width	60 mm; DP master module: 35 mm
Height	119.5 mm
Depth	75 mm
<b>Weights</b>	
Weight, approx.	200 g; DP master module: Approx. 100 g
<b>Classifications</b>	

	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	10	EC001603
ETIM	9	EC001603
ETIM	8	EC001603
ETIM	7	EC001603
IDEA	4	3565
UNSPSC	15	32-15-17-05

**Approvals / Certificates**

**General Product Approval**



[Confirmation](#)



[Miscellaneous](#)

General Product Approval	Test Certificates	Maritime application
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[Type Test Certificates/Test Report](#)

[Miscellaneous](#)



Maritime application	other	Environment
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