SIEMENS

Data sheet 6ES7151-7AA13-0AB0

SIMATIC DP, IM151-7 CPU FOR ET200S, 96 KB WORKING MEMORY INTEGR. PROFIBUS DP INTERFACE (9 PIN SUB-D, FEMALE) AS DP SLAVE, W/O BATTERY

General information	
Hardware product version	01
Firmware version	V2.1.10
Engineering with	
• Programming package	STEP 7 V5.3 or higher with HW update
Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
• Short-circuit protection	Yes
• Reverse polarity protection	Yes
Input current	
from supply voltage 1L+, max.	250 mA; 280 mA with DP master module
Output current	
for backplane bus (5 V DC), max.	700 mA
Power loss	
Power loss, typ.	3.3 W
Memory	
Work memory	
• integrated	96 kbyte; For program and data
• expandable	No
Load memory	
• Plug-in (MMC)	Yes
• Plug-in (MMC), max.	8 Mbyte
• Data management on MMC (after last programming), min.	10 y
Backup	
• present	Yes; Guaranteed by MMC (maintenance-free)
CPU processing times	
for bit operations, typ.	0.1 µs
for word operations, typ.	0.2 µs

for fixed point arithmetic, typ.	2 µs
for floating point arithmetic, typ.	3 µs

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.	511; from DB1 to DB511
• Size, max.	16 kbyte
FB	
• Number, max.	1 024; In number range from FB 0 to FB 2047
• Size, max.	16 kbyte
FC	
• Number, max.	1 024; In number band of FC0 to FC2047
• Size, max.	16 kbyte
OB	
• Number, max.	see instruction list
• Size, max.	16 kbyte
• Number of free cycle OBs	1; OB 1
• Number of time alarm OBs	1; OB 10
• Number of delay alarm OBs	1; OB 20
• Number of cyclic interrupt OBs	1; OB 35
• Number of process alarm OBs	1; OB 40
• Number of startup OBs	1; OB 100
• Number of asynchronous error OBs	6; OB 80, 82, 83, 85, 86, 87
Nesting depth	
• per priority class	8
• 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	
— can be set	Yes
— lower limit	0
— upper limit	999
IEC counter	
• Number	Unlimited (limited only by RAM capacity)

S7 times	
• Number	256
Retentivity	
— adjustable	Yes
— lower limit	0
— upper limit	255
— preset	No times retentive
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	
• Number, max.	256 byte
• Retentivity available	Yes
• Retentivity preset	MB 0 to MB 15
• Number of clock memories	8; 1 memory byte
Data blocks	
• Number, max.	511; DB 0 reserved
• Size, max.	16 kbyte
Local data	
• per priority class, max.	510 byte

Address area	
I/O address area	
• Inputs	2 048 kbyte
• Outputs	2 048 kbyte
Process image	
• Inputs	128 byte; Not adjustable
• Outputs	128 byte; Not adjustable
Digital channels	
• Inputs	16 336
— of which central	248
• Outputs	16 336
— of which central	248
Analog channels	
• Inputs	1 021

— of which central	124
• Outputs	1 021
— of which central	124

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
Operating hours counter	
• Number	1
• Number/Number range	0
• Range of values	0 to 2^31 hours (when using SFC 101)
• Granularity	1 hour
• retentive	Yes; Must be restarted at each restart
Clock synchronization	
• supported	Yes
• to MPI, master	Yes
• to MPI, slave	Yes
• in AS, master	No
• in AS, slave	No

1. Interface	
Interface type	Integrated RS 485 interface
Physics	RS 485
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	80 mA
Functionality	
• MPI	Yes
• PROFIBUS DP master	No
• PROFIBUS DP slave	Yes; active / passive
• Point-to-point connection	No
MPI	
• Number of connections	12; Notice: 12 connections per CPU, not per interface
• Transmission rate, max.	12 Mbit/s
Services	
— PG/OP communication	Yes
— Routing	Yes; With master module
— Global data communication	Yes
— S7 basic communication	Yes
— S7 communication	Yes
— S7 communication, as client	No

— S7 communication, as server	Yes
DP slave	
• Number of connections	12; Notice: 12 connections per CPU, not per interface
• GSD file	http://www.siemens.com/profibus-gsd
• 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	
— Routing	Yes; Only when interface active and in master mode
— 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
Functionality	
• MPI	No
• PROFIBUS DP master	Yes
• Point-to-point connection	No
DP master	
• Number of connections, max.	12; Notice: 12 connections per CPU, not per interface
• 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
— S7 communication	Yes
— S7 communication, as client	No
— S7 communication, as server	Yes
— Equidistance	Yes
— SYNC/FREEZE	Yes

— Activation/deactivation of DP slaves	Yes
— Direct data exchange (slave-to-slave communication)	Yes
— DPV1	Yes
Address area	
— Inputs, max.	2 kbyte
— Outputs, max.	2 kbyte
User data per DP slave	
— Inputs, max.	244 byte
— Outputs, max.	244 byte

Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No

Communication functions	
PG/OP communication	Yes
Global data communication	
• supported	Yes
• Number of GD packets, max.	4
• Number of GD packets, transmitter, max.	4
• Number of GD packets, receiver, max.	4
• Size of GD packets, max.	22 byte
• Size of GD packet (of which consistent), max.	22 byte
S7 basic communication	
• 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)
S7 communication	
• supported	Yes
• as server	Yes
• as client	No
• User data per job, max.	180 byte
• User data per job (of which consistent), max.	64 byte
S5 compatible communication	
• supported	No
Standard communication (FMS)	
• supported	No
Number of connections	
• overall	12
• usable for PG communication	11
— reserved for PG communication	1

• usable for OP communication	11
— reserved for OP communication	1
• usable for S7 basic communication	10
— reserved for S7 basic communication	0
• 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
simultaneously active Alarm-S blocks, max.	40
Test commissioning functions	
Status block	Yes
Single step	Yes
Number of breakpoints	2
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	Inputs, outputs
• Number of variables, max.	10
Diagnostic buffer	
• present	Yes
• Number of entries, max.	100
— adjustable	No
Potential separation	
between load voltage and all other switching components	Yes
between PROFIBUS DP and all other circuit components	Yes
Permissible potential difference	
between different circuits	75 V DC/60 V AC
Isolation	
Isolation tested with	500 V DC
Configuration	

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)
Configuration software	
• STEP 7	Yes
Programming	
• 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
— GRAPH	Yes; Optional
Know-how protection	
• User program protection/password protection	Yes
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

last modified: 08/25/2017