SIEMENS

Data sheet   6ES7151-7FA21-0AB0

SIMATIC DP, IM151-7 F-CPU for ET200S, 192 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	
• Programming package	V5.5 + SP1 or higher or V5.2 + SP1 or higher + HSP 219 + Distributed Safety

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, max.	1.8 A; Typical
I²t	0.09 A²·s

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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	192 kbyte
• expandable	No
• Size of retentive memory for retentive data blocks	64 kbyte

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; 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

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

• Description	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

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• 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
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

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Flag	
● Number, max.	256 byte
● 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

Address area

I/O address area	
● Inputs	2 048 byte
● Outputs	2 048 byte
Process image	
● 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
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

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• Behavior of the clock following expiry of backup period	Clock continues to run with the time at which the power failure occurred

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	Yes
• to MPI, slave	Yes
• in AS, master	No
• in AS, slave	No

Interfaces

Interfaces/bus type	1x PROFIBUS DP

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

Protocols

• MPI	Yes
• PROFIBUS DP master	No
• PROFIBUS DP slave	Yes; active / passive
• Point-to-point connection	No

MPI

• 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; 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 (http://www.siemens.com/profibus-gsd)
• Transmission rate, max.	12 Mbit/s
• automatic baud rate search	Yes; only with passive interface

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● 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

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— Number of DP slaves that can be simultaneously activated/deactivated, max.	8
— 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
Communication functions	
PG/OP communication	Yes
Data record routing	Yes; With DP master module
Global data communication	
• 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
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.	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)
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

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— 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
• Forcing, variables	Inputs, outputs
• 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
• Number of entries readable in RUN, max.	499
— adjustable	Yes; From 10 to 499
— preset	10

Service data

• can be read out	Yes

Interrupts/diagnostics/status information	
Alarms	Yes
Diagnostics function	Yes
Diagnostics indication LED	
• Group error SF (red)	Yes
• Monitoring 24 V voltage supply ON (green)	Yes

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	
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 Lite	No
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
— 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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