SIEMENS

Data sheet

6ES7412-1XJ07-0AB0



SIMATIC S7-400, CPU 412-1 Central processing unit with: Work memory 512 KB, (256 KB code, 256 KB data), interface MPI/DP 12 Mbit/s,

General information	
Product type designation	CPU 412-1
HW functional status	01
Firmware version	V7.0
Product function	
 Isochronous mode 	Yes; For PROFIBUS only
Engineering with	
 Programming package 	STEP 7 V5.4 or higher with HSP 261
CiR - Configuration in RUN	
CiR synchronization time, basic load	100 ms
CiR synchronization time, time per I/O byte	30 μs
Supply voltage	
Rated value (DC)	Power supply via system power supply
Input current	
from backplane bus 5 V DC, typ.	0.7 A
from backplane bus 5 V DC, max.	0.8 A
from backplane bus 24 V DC, max.	150 mA; 150 mA per DP interface
from interface 5 V DC, max.	90 mA; At the DP interface
Power loss	
Power loss, typ.	3.5 W
Power loss, max.	4 W
Memory	
Type of memory	RAM
Work memory	
• integrated	512 kbyte
integrated (for program)	256 kbyte
integrated (for data)	256 kbyte
expandable	No
Load memory	
expandable FEPROM	Yes; with Memory Card (FLASH)
 expandable FEPROM, max. 	64 Mbyte
integrated RAM, max.	512 kbyte
expandable RAM	Yes; with Memory Card (RAM)
expandable RAM, max.	64 Mbyte
Backup	
• present	Yes
with battery	Yes; all data
without battery	No
Battery	
Backup battery	

 Backup current, typ. 	180 μA; up to 40 °C
Backup current, max.	850 µA
Backup time, max.	Dealt with in the module data manual with the secondary conditions and the factors of influence
 Feeding of external backup voltage to CPU 	5 V DC to 15 V DC
CPU processing times	
for bit operations, typ.	31.25 ns
for word operations, typ.	31.25 ns
for fixed point arithmetic, typ.	31.25 ns
for floating point arithmetic, typ.	62.5 ns
CPU-blocks	
DB	
Number, max.	3 000; Number range: 1 to 16000
• Size, max.	64 kbyte
FB	
Number, max.	1 500; Number range: 0 to 7999
• Size, max.	64 kbyte
FC	
Number, max.	1 500; Number range: 0 to 7999
• Size, max.	64 kbyte
ОВ	
Number, max.	see instruction list
• Size, max.	64 kbyte
Number of free cycle OBs	1; OB 1
Number of time alarm OBs	2; OB 10, 11
Number of delay alarm OBs	2; OB 20, 21
Number of cyclic interrupt OBs	2; OB 32, 35 (shortest cycle that can be set = 500 µs)
Number of process alarm OBs	2; OB 40, 41
 Number of DPV1 alarm OBs 	3; OB 55-57
 Number of isochronous mode OBs 	2; OB 61-62
 Number of multicomputing OBs 	1; OB 60
Number of background OBs	1; OB 90
Number of startup OBs	3; OB 100-102
Number of asynchronous error OBs	9; OB 80-88
 Number of synchronous error OBs 	2; OB 121, 122
Nesting depth	
per priority class	24
additional within an error OB	1
Counters, timers and their retentivity	
S7 counter	
Number	2 048
Retentivity	
— adjustable	Yes
— lower limit	0
— upper limit	2 047
— preset	Z 0 to Z 7
Counting range	
— lower limit	0
— upper limit	999
IEC counter	
• present	
• Type	Yes
Турс	Yes SFB
• Number	
	SFB
Number	SFB
Number S7 times	SFB Unlimited (limited only by RAM capacity)
Number S7 times Number	SFB Unlimited (limited only by RAM capacity)
NumberS7 timesNumberRetentivity	SFB Unlimited (limited only by RAM capacity) 2 048
 Number S7 times Number Retentivity adjustable 	SFB Unlimited (limited only by RAM capacity) 2 048 Yes
 Number S7 times Number Retentivity — adjustable — lower limit 	SFB Unlimited (limited only by RAM capacity) 2 048 Yes 0

— 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.	Total working and load memory (with backup battery)
Flag	
• Size, max.	4 kbyte; Size of bit memory address area
Retentivity available	Yes
Retentivity preset	MB 0 to MB 15
Number of clock memories	8; in 1 memory byte
Local data	
 adjustable, max. 	8 kbyte
• preset	4 kbyte
Address area	
I/O address area	
• Inputs	4 kbyte
Outputs	4 kbyte
Process image	
 Inputs, adjustable 	4 kbyte
 Outputs, adjustable 	4 kbyte
 Inputs, default 	128 byte
Outputs, default	128 byte
 consistent data, max. 	244 byte
 Access to consistent data in process image 	Yes
Subprocess images	
 Number of subprocess images, max. 	15
Digital channels	
Inputs	32 768
— of which central	32 768
Outputs	32 768
— of which central	32 768
Analog channels	
• Inputs	2 048
— of which central	2 048
 Outputs 	2 048
— of which central	2 048
Hardware configuration	
Number of expansion units, max.	21
connectable OPs	47
Multicomputing	Yes; 4 CPUs max. (with UR1 or UR2)
Interface modules	
Number of connectable IMs (total), max.	6
Number of connectable IM 460s, max.	6
Number of connectable IM 463s, max.	4; IM 463-2
Number of DP masters	
• integrated	1
• via CP	10; CP 443-5 Extended
• via IM 467	4
Mixed mode IM + CP permitted	No; IM 467 cannot be used jointly with CP 443-5 Ext. or CP 443-1 in
	PROFINET IO mode
• via interface module	0
 Number of pluggable S5 modules (via adapter capsule in central device), max. 	6
Number of IO Controllers	
integrated	0
• via CP	4; Max. 4 in the central controller; no mixed operation of different CP 443-1
	types in PROFINET IO mode
Number of operable FMs and CPs (recommended)	

• FM	Limited by number of slots and number of connections
• CP, PtP	CP 440: Limited by number of slots; CP 441: Limited by number of slots and number of connections
PROFIBUS and Ethernet CPs	14; In total max. 10 CPs as DP master and PROFINET controller, of which up to 10 IMs or CPs as DP master and up to 4 CPs as PROFINET controller
Slots	
required slots	1
ime of day	
Clock	
 Hardware clock (real-time) 	Yes
 retentive and synchronizable 	Yes
 Resolution 	1 ms
 Deviation per day (buffered), max. 	1.7 s; Power off
Deviation per day (unbuffered), max.	8.6 s; For power On
Operating hours counter	
• Number	16
 Number/Number range 	0 to 15
 Range of values 	SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours
Granularity	1 h
retentive	Yes
Clock synchronization	
• supported	Yes
• to MPI, master	Yes
• to MPI, slave	Yes
• to DP, master	Yes
• to DP, slave	Yes
• in AS, master	Yes
• in AS, slave	Yes
• on Ethernet via NTP	No; Via CP
• to IF 964 DP	No
Time difference in system when synchronizing via	000
MPI, max. nterfaces	200 ms
	A MPUPPOSIDUO PP
Interfaces/bus type Number of RS 485 interfaces	1 x MPI/PROFIBUS DP 1; Combined MPI / PROFIBUS DP
. Interface	I, Combined MF17 FROFIBOS DF
	MPI/PROFIBUS DP
Interface type Isolated	Yes
Interface types	165
• RS 485	Yes
Output current of the interface, max.	150 mA
Output current of the interface, max. Protocols	100 IIIA
• MPI	Yes
PROFIBUS DP master	Yes
PROFIBUS DF Illastel PROFIBUS DP slave	Yes
MPI	100
Number of connections	32; If a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1
Transmission rate, max.	12 Mbit/s
Services	
— PG/OP communication	Yes
— Routing	Yes
Global data communication	Yes
— S7 basic communication	Yes
	Yes Yes
— S7 basic communication	
— S7 basic communication— S7 communication	Yes
— S7 basic communication— S7 communication— S7 communication, as client	Yes Yes
 — S7 basic communication — S7 communication — S7 communication, as client — S7 communication, as server 	Yes Yes
S7 basic communication S7 communication S7 communication, as client S7 communication, as server PROFIBUS DP master	Yes Yes Yes 16; If a diagnostics repeater is used on the line, the number of connection

PROCES PR	Conject	
- Routing - Clobal data communication No - S7 basic communication Yes - S7 communication Yes - S7 communication select Yes - S7 communication, as server Yes - Equidistance Yes - S7 communication, as server Yes - Laschronous mode Yes - S7 communication of DP staves Yes - Direct data exchange (slave to-slave Yes - Direct data per DP slave Max. 2 kloyle - DPV1 Yes - Duport, max. 2 kloyle - Duport, max. 3 kloyle - Dup	Services PG/OP communication	Voc
- Global data communication - S7 base communication - S7 communication - S7 communication, as client - S7 communication, as client - S7 communication, as server - S2 communication - S7 communication - S7 communication - S7 communication - S7 communication - S8 communication - S8 communication - S8 communication - Direct data exchange (slave-to-slave communication) - DIPV1 - Ven - DIPV1 - Ven - DIPV1 - Ven - DIPV1 - Ven - V		
- 97 basic communication - 97 communication - 180 c	<u> </u>	
- \$7 communication, as client - \$7 communication, as client - \$7 communication, as client - \$7 communication, as server - Equidistance - Inactronous mode - Inscription of DP slaves - Incord data exchange (slave-to-slave communication) - DPV1 - PVP - DPV1 - Yes - Direct data exchange (slave-to-slave communication) - DPV1 - PVP - County, max Cutputs, max Cutputs, max Cutputs, max Use data per DP slave User data per DP slave Slave Port slave Slave Port slave Slave Port slave Number of connections - 12 Motifs - 17 mannission rate, max 12 Motifs - 12 Motifs - 13 Motifs - 14 Motifs - User data per address area, max of which consistent, max Slave POROP communication - Routing - ST communication - ST com		
- S7 communication, as client - S7 communication, as server - Equidistance - Isochronous mode - SYNOPREEZE - Activation/deachystion of DP slaves - Diver data exchange (slave-to-slave communication) - DPV1 - DPV1 - Address area - Inputs, max Outputs, max Outputs, max User data pr DP slave Slots, max L28 byte - Slots, max L28 byte - Number of connections - (SSD file - Number of connections - (SSD file - Transmission rate, max 12 kVpts User data pre address area, max 22 Virtual slots - User data pre address area, max Of which consistent, max Sorvices - PGCPD communication - ST basis communication - ST outputs - ST communication, as client - ST communication - ST outputs - User data exchange (slave-to-slave communication - Inputs - User data exchange (slave-to-slave communication - ST outputs - User data exchange (slave-to-slave communication - ST outputs - User data exchange (slave-to-slave communication - ST outputs - User data exchange (slave-to-slave communication - ST outputs - User data exchange (slave-to-slave communication - ST outputs - User data exchange (slave-to-slave communication - ST outputs - User data exchange (slave-to-slave communication - ST outputs - User data exchange (slave-to-slave communication - ST outputs - User data exchange (slave-to-slave communication - ST outputs - User data exchange (slave-to-slave communication - ST outputs - User data exchange (slave-to-slave commu		
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- SYNCFREEZE - Activation/deactivation of DP slaves - Direct data exchange (slave-to-slave communication) - DPV1 - Address area - Inputs, max. 2 kbyte - User data per DP slave - Slots, max. 244 byte - Slots, max. 244 byte - Slots, max. 244 - Dep slave - Per Slot max. 128 byte - PROFIBUS DP slave - Number of connections 16 - Transmission rate, max. 12 bbyte - Transmission rate, max. 12 bbyte - Transmission rate, max. 12 bbyte - Valdress area, max. 12 bbyte - Valdress area, max. 12 byte - User data per address area, max. 12 byte - PGOP communication - PGOP communication - SF basic communication - SF basic communication - SF basic communication - SF com		
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— Direct data exchange (slave-to-slave communication) — DPV1 Address area — Inputs, max. 2 kbyte — User data per DP slave — User data per DP slave, max. 244 byte — Unputs, max. 244 byte — Drate, max. 245 byte PROFIBUS DP slave • Number of connections 16 • Into //support automation slemens.com///Writew/enr/113652 • Transmission rate, max. 12 byte • Defore communication No • Address area, max. 32 byte • Defore communication Yes, with interface active — Routing Yes, with interface active — Routing Yes, with interface active — S7 communication Yes — Drate date exchange (slave-to-slave communication No — DPV1 No Transfer memory — Inputs — Outputs — Unputs — Unputs — Unputs — Unputs — Unputs — Vac P 443-1 Adv. and loadable F8 — Outputs — Outputs — Vac P 443-1 Adv. Web server — supported — No Drate for P masters with isochronous mode Equidistance — Yes Unmed of DP masters with isochronous mode Equidistance — S7 communication • Insochronous mode Equidistance — Yes United at per isochronous slave, max. — 1452 bytes via CP 443-1 Adv. Web server — supported No Sommunication Innotions / header PSOP communication — Yes		
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User data per DP slave		014-4-
User data per DP slave	·	
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- Inputs, max.	·	
Outputs, max Siots, max Siots, max per slot, max 128 byte PROFIBUS DP slave • Number of connections • GSD file • Transmission rate, max. • automatic baud rate search • Address area, max. • 21 Mbit/s • Address area, max. • User data per address area, max of which consistent, max. Sa'z lyirtual slots of which consistent, max. Sa'z byte Services PG/OP communication Routing Global data communication S7 communication S7 communication S7 communication S7 communication, as client S7 communication, as server Direct data exchange (slave-to-slave communication) DPV1 DPV1 No DPV1 Transfer memory Inputs Uniquis Outputs Uniquis Outputs Uniquis Outputs -	·	
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Number of connections	•	
Number of connections GSD file Transmission rate, max. 12 Mbit/s automatic baud rate search Address area, max. 23; Virtual slots User data per address area, max. 32; Virtual slots User data per address area, max. 32; Virtual slots Services PG/OP communication Routing R	— per slot, max.	128 byte
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automatic baud rate search Address area, max. Juser data per isochronous slave, max. Juser da	GSD file	http://support.automation.siemens.com/WW/view/en/113652
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Services - PG/OP communication	 User data per address area, max. 	32 byte
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- Routing Yes; with interface active - Global data communication	— PG/OP communication	Yes; with interface active
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Web server		
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Number of DP masters with isochronous mode User data per isochronous slave, max. shortest clock pulse 1.5 ms; 0.5 ms without use of SFC 126, 127 max. cycle 32 ms communication functions / header PG/OP communication Yes		Von
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max. cycle 32 ms communication functions / header PG/OP communication Yes		·
communication functions / header PG/OP communication Yes	i	
PG/OP communication Yes		32 ms
Number of connectable OPs without message processing 47		
	 Number of connectable OPs without message processing 	g 47

Number of connectable OPs with message processing	47; When using Alarm_S/SQ and Alarm_D/DQ
Data record routing	Yes
Global data communication	
supported	Yes
Number of GD loops, max.	8
Number of GD packets, transmitter, max.	8
Number of GD packets, receiver, max.	16
Size of GD packets, max.	54 byte
Size of GD packet (of which consistent), max.	1 variable
S7 basic communication	TAINANG
communication function / S7 basic communication	Yes
User data per job, max.	76 byte
 User data per job (of which consistent), max. 	1 variable
S7 communication	TAINANG
• supported	Yes
as server	Yes
• as client	Yes
User data per job, max.	64 kbyte
 User data per job, max. User data per job (of which consistent), max. 	462 byte
S5 compatible communication	102 0310
supported	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
User data per job, max.User data per job (of which consistent), max.	8 kbyte 240 byte
Number of simultaneous AG-SEND/AG-RECV orders per	24/24
CPU, max.	24/24
Standard communication (FMS)	
• supported	Yes; Via CP and loadable FB
Number of connections	
overall	48
 usable for PG communication 	47
 reserved for PG communication 	1
 adjustable for PG communication, max. 	0
usable for OP communication	47
 reserved for OP communication 	1
 adjustable for OP communication, max. 	0
usable for S7 basic communication	46
 reserved for S7 basic communication 	0
 adjustable for S7 basic communication, max. 	0
usable for S7 communication	46
 reserved for S7 communication 	0
 adjustable for S7 communication, max. 	0
usable for routing	23
— reserved for routing	0
— adjustable for routing, max.	0
S7 message functions	
Number of login stations for message functions, max.	47; Max. 47 with Alarm_S/SQ and Alarm_D/DQ (OPs); max. 8 with Alarm,
Symbol-related massages	Alarm_8, Alarm_8P, Notify and Notify_8 (e.g. WinCC) Yes
Symbol-related messages	Yes
SCAN procedure Program alarms	Yes
	Yes
Process diagnostic messages simultaneously active Alarm-S blocks, max.	
Alarm 8-blocks	250; Simultaneously active alarm_S/SQ blocks or alarm_D/DQ blocks Yes
Number of instances for alarm 8 and S7 communication	300
blocks, max.	
• preset, max.	150
Process control messages	Yes
Number of archives that can log on simultaneously (SFB 37 AR_SEND)	4
Number of messages	
• overall, max.	256
• in 100 ms grid, max.	0
<u> </u>	

a in E00 ma grid, may	256
• in 500 ms grid, max.	
 in 1000 ms grid, max. Number of additional values 	256
• with 100 ms grid, max.	0
• with 500, 1000 ms grid, max.	1
Test commissioning functions	
Status block	Yes; Up to 16 simultaneously
Single step	Yes
Number of breakpoints	16
Status/control	
 Status/control variable 	Yes; Up to 16 variable tables
 Variables 	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
Number of variables, max.	70; Status/control
Forcing	
Forcing	Yes
Forcing, variables	Inputs/outputs, bit memories, distributed I/Os
Number of variables, max.	64
Diagnostic buffer	
• present	Yes
 Number of entries, max. 	3 200
— adjustable	Yes
— preset	120
Service data	
• can be read out	Yes
Standards, approvals, certificates	
CE mark	Yes
CSA approval	Yes
UL approval	Yes
cULus	Yes
FM approval	Yes
RCM (formerly C-TICK)	Yes
KC approval	Yes
EAC (formerly Gost-R)	Yes
Use in hazardous areas	
• ATEX	ATEX II 3G Ex nA IIC T4 Gc
Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	60 °C
configuration / header Configuration software	
-	V
STEP 7 configuration / programming / bonder	Yes
configuration / programming / header	
Command set	see instruction list
Nesting levels	7
 Access to consistent data in process image 	Yes
System functions (SFC)	see instruction list
System function blocks (SFB)	see instruction list
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— CFC	Yes
— GRAPH	Yes
— HiGraph®	Yes
configuration / programming / number of simultaneously act	ive SFC / header
— DPSYC_FR	2; SFC 11; per interface
— D_ACT_DP	8; SFC 12; per interface
— RD_REC	8; SFC 59; per interface
- •	,,

— WR_REC	8; SFC 58; per interface
— WR_PARM	8; SFC 55; per interface
— PARM_MOD	1; SFC 57; per interface
— WR_DPARM	2; SFC 56; per interface
— DPNRM_DG	8; SFC 13; per interface
— RDSYSST	8; SFC 51
— DP_TOPOL	1; SFC 103; per interface
configuration / programming / number of simultaneously active	SFB / header
— RDREC	8; SFB 52; per interface, but not more than 32 across all external interfaces
— WRREC	8; SFB 53; per interface, but not more than 32 across all external interfaces
Know-how protection	
 User program protection/password protection 	Yes
Block encryption	Yes; With S7 block Privacy
Dimensions	
Width	25 mm
Height	290 mm
Depth	219 mm
Weights	
Weight, approx.	700 g

last modified:

9/7/2023