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,

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
iR - Configuration in RUN	
CiR synchronization time, basic load	100 ms
CiR synchronization time, time per I/O byte	30 µs
upply voltage	
Rated value (DC)	Power supply via system power supply
nput 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
ower loss	
Power loss, typ.	3.5 W
Power loss, max.	4 W
lemory	
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
attery	

 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
Type	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	9 990 9
	Yes
• present	SFB
• Type	
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
	32 768
Outputs of which control	
— of which central	32 768
Analog channels	0.040
• 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

Sanicas	
Services — PG/OP communication	Yes
— Routing	Yes; S7 routing
— Global data communication	No
— S7 basic communication	Yes
— S7 communication	Yes
— S7 communication, as client	Yes
— S7 communication, as server	Yes
— Equidistance	Yes
 Isochronous mode 	Yes
— SYNC/FREEZE	Yes
 Activation/deactivation of DP slaves 	Yes
Direct data exchange (slave-to-slave	Yes
communication)	Voc
— DPV1	Yes
Address area	
— Inputs, max.	2 kbyte
— Outputs, max.	2 kbyte
User data per DP slave	
— User data per DP slave, max.	244 byte
— Inputs, max.	244 byte
— Outputs, max.	244 byte
— Slots, max.	244
— per slot, max.	128 byte
PROFIBUS DP slave	
 Number of connections 	16
GSD file	http://support.automation.siemens.com/WW/view/en/113652
 Transmission rate, max. 	12 Mbit/s
 automatic baud rate search 	No
 Address area, max. 	32; Virtual slots
 User data per address area, max. 	32 byte
— of which consistent, max.	32 byte
Services	
— PG/OP communication	Yes; with interface active
— Routing	Yes; with interface active
Global data communication	No
— S7 basic communication	No
— S7 communication	Yes
S7 communication, as client	Yes
S7 communication, as server	Yes
Direct data exchange (slave-to-slave	No
communication)	110
— DPV1	No
Transfer memory	
— Inputs	244 byte
— Outputs	244 byte
Protocols	
Open IE communication	
• ISO-on-TCP (RFC1006)	Via CP 443-1 Adv. and loadable FB
— Data length, max.	1 452 bytes via CP 443-1 Adv.
Web server	
supported	No
Isochronous mode	
	Voc
Equidistance	Yes
Number of DP masters with isochronous mode	1
User data per isochronous slave, max.	244 byte
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
 Number of connectable OPs without message processing 	ng 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	
supported	Yes
User data per job, max.	76 byte
User data per job (of which consistent), max.	1 variable
S7 communication	
• supported	Yes
as server	Yes
• as client	Yes
 User data per job, max. 	64 kbyte
User data per job (of which consistent), max.	462 byte
S5 compatible communication	
• supported	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
User data per job, max.	8 kbyte
User data per job (of which consistent), max.	240 byte
Number of simultaneous AG-SEND/AG-RECV orders per	24/24
CPU, max.	
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, Alarm_8, Alarm_8P, Notify and Notify_8 (e.g. WinCC)
Symbol-related messages	Yes
SCAN procedure	Yes
Program alarms	Yes
Process diagnostic messages	Yes
simultaneously active Alarm-S blocks, max.	250; Simultaneously active alarm_S/SQ blocks or alarm_D/DQ blocks
Alarm 8-blocks	Yes
Number of instances for alarm 8 and S7 communication blocks, max.	300
• preset, max.	150
Process control messages	Yes
Number of archives that can log on simultaneously (SFB 37	4
AR_SEND)	
Number of messages	
• overall, max.	256
● in 100 ms grid, max.	0

**In 1000 ms girl. max. 256 **Wittener of additional values **Wittener of additional values **With 500, 1000 ms girl. max. 1 **With 500, 1000 ms girl. max. 2 **With 500, 1000 ms girl. max. 1 **Status block **Yes, Up to 16 simultaneously **Single step Yes **Number of broakpoints **Status block **Number of variables **Variables **Variables **Variables **Variables **Variables **Number of variables, max. 70, Status/scontrol variable **Forcing Yes **Forcing Yes **Forcing Yes **Proving Yes **Number of variables, max. 64 **Diagnoss buffer **Proving Versional variables **Number of variables, max. 3, 200 **Proving Yes **Number of variables, max. 3, 200 **Proving Yes *	• in 500 ms grid, max.	256
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Number of variables, max. Yes	-	
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Present Number of entries, max.		64
Number of entries, max.	-	
— adjustable — preset 120 Service data • can be read out Yes Standards, approvals, certificates CE mark Yes CSA approval Yes CULus Yes CULus Yes CKO approval Yes CKO approval Yes CKO (formerly C-TICK) Yes EAC (formerly Gost-R) Yes EAC (formerly Gost-R) Yes EAC (formerly Gost-R) Yes ATEX ATEX ATEX ATEX II 3G Ex n\(A\) IIC T4 GC Ambient temperature during operation • min. 0 °C • max. 60 °C Configuration / header • STEP 7 Yes Configuration / programming / header • Command set see instruction list • Nesting levels • Access to consistent data in process image • System function blocks (SFB) see instruction list Programming language — LAD Yes — FBD Yes — STL Yes — GRAPH — HiGraph® configuration / programming / number of simultaneously active SFC / header — number of simultaneously active system functions (SFC) / with DPSYC_FR — number of simultaneously active system functions 8, SFC 12; per interface	·	
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ATEX II 3G Ex nA IIC T4 Gc Ambient conditions Ambient temperature during operation	EAC (formerly Gost-R)	Yes
Ambient temperature during operation • min. • min. • max. • 60 °C configuration / header Configuration software • STEP 7 • Command set • Nesting levels • Access to consistent data in process image • System function slocks (SFB) • System function blocks (SFB) Programming language — LAD — FBD — STL — SCL — CFC — GRAPH — HiGraph® configuration / programming / number of simultaneously active SPC / header — number of simultaneously active system functions • SFC 12; per interface	Use in hazardous areas	
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Configuration software • STEP 7 Configuration / programming / header • Command set • Nesting levels • Access to consistent data in process image • System functions (SFC) • System function blocks (SFB) Programming language — LAD — LAD — FBD — STL — SCL — SCL — CFC — GRAPH — HiGraph® configuration / programming / number of simultaneously active system functions (SFC) / with DPSYC_FR — number of simultaneously active system functions (SFC) / with DPSYC_FR — number of simultaneously active system functions (SFC 1/2; per interface	• max.	60 °C
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configuration / programming / header Command set See instruction list Nesting levels Consistent data in process image System functions (SFC) See instruction list System function blocks (SFB) See instruction list Programming language LAD Yes FBD Yes STL Yes STL Yes SCL Yes CFC GRAPH HiGraph® Configuration / programming / number of simultaneously active SFC / header number of simultaneously active system functions (SFC) / with DPSYC_FR number of simultaneously active system functions 8; SFC 12; per interface	· ·	Yes
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 Access to consistent data in process image System functions (SFC) see instruction list System function blocks (SFB) regramming language LAD FBD Yes STL Yes SCL Yes CFC GRAPH HiGraph® Configuration / programming / number of simultaneously active system functions (SFC) / with DPSYC_FR number of simultaneously active system functions 8; SFC 12; per interface 		
System functions (SFC) System function blocks (SFB) Programming language — LAD — FBD — Yes — STL — SCL — CFC — GRAPH — HiGraph® configuration / programming / number of simultaneously active SFC / header — number of simultaneously active system functions (SFC) / with DPSYC_FR — number of simultaneously active system functions (SFC) / with DPSYC_FR — number of simultaneously active system functions 8; SFC 12; per interface		
● System function blocks (SFB) Programming language — LAD — FBD — Yes — STL — SCL — SCL — CFC — CFC — GRAPH — HiGraph® Configuration / programming / number of simultaneously active SFC / header — number of simultaneously active system functions (SFC) / with DPSYC_FR — number of simultaneously active system functions 8; SFC 12; per interface		
Programming language — LAD — FBD — FBD — STL — SCL — CFC — GRAPH — HiGraph® configuration / programming / number of simultaneously active — number of simultaneously active system functions (SFC) / with DPSYC_FR — number of simultaneously active system functions (SFC) / simultaneously active system functions (SFC) / simultaneously active system functions (SFC) / simultaneously active system functions 8; SFC 12; per interface		
- LAD Yes - FBD Yes - STL Yes - SCL Yes - CFC Yes - GRAPH Yes - HiGraph® Yes configuration / programming / number of simultaneously active SFC / header - number of simultaneously active system functions (SFC) / with DPSYC_FR - number of simultaneously active system functions 8; SFC 12; per interface		
- FBD Yes - STL Yes - SCL Yes - CFC Yes - GRAPH Yes - HiGraph® Yes configuration / programming / number of simultaneously active SFC / header - number of simultaneously active system functions (SFC) / with DPSYC_FR - number of simultaneously active system functions 8; SFC 12; per interface		Yes
- STL Yes - SCL Yes - CFC Yes - GRAPH Yes - HiGraph® Yes configuration / programming / number of simultaneously active SFC / header - number of simultaneously active system functions (SFC) / with DPSYC_FR - number of simultaneously active system functions 8; SFC 12; per interface		
- SCL - CFC - GRAPH - HiGraph® Yes configuration / programming / number of simultaneously active SFC / header - number of simultaneously active system functions (SFC) / with DPSYC_FR - number of simultaneously active system functions (SFC) / simultaneously active system functions 8; SFC 12; per interface		
- CFC - GRAPH - HiGraph® Yes configuration / programming / number of simultaneously active SFC / header - number of simultaneously active system functions (SFC) / with DPSYC_FR - number of simultaneously active system functions 8; SFC 12; per interface		
- GRAPH - HiGraph® Yes configuration / programming / number of simultaneously active SFC / header - number of simultaneously active system functions (SFC) / with DPSYC_FR - number of simultaneously active system functions 8; SFC 12; per interface		
 — HiGraph® configuration / programming / number of simultaneously active — number of simultaneously active system functions (SFC) / with DPSYC_FR — number of simultaneously active system functions 8; SFC 12; per interface 		
configuration / programming / number of simultaneously active SFC / header — number of simultaneously active system functions (SFC) / with DPSYC_FR — number of simultaneously active system functions 8; SFC 12; per interface		
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— number of simultaneously active system functions 8; SFC 12; per interface	number of simultaneously active system functions	
	— number of simultaneously active system functions	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:

4/1/2022