



***** Replacement part ***** SIMATIC S7-400, CPU 414-3 PN/DP
Central processing unit with: work memory 2.8 MB, (1.4 MB code, 1.4 MB data), Interfaces: 1st interface MPI/DP 12 Mbit/s,(X1), 2nd interface Ethernet/PROFINET (X5), 3rd interface IF 964-DP plug-in (IF1)

General information	
Product type designation	CPU 414-3 PN/DP
HW functional status	05
Firmware version	V5.3
Product function	
• Isochronous mode	Yes; For PROFIBUS only
Engineering with	
• Programming package	STEP 7 V5.4 SP5 or higher
CiR - Configuration in RUN	
CiR synchronization time, basic load	100 ms
CiR synchronization time, time per I/O byte	15 µs; Time per I/O byte
Supply voltage	
Rated value (DC)	Power supply via system power supply
Input current	
from backplane bus 5 V DC, typ.	1.2 A
from backplane bus 5 V DC, max.	1.4 A
from backplane bus 24 V DC, max.	300 mA; 150 mA per DP interface
from interface 5 V DC, max.	90 mA; At each DP interface
Power loss	
Power loss, typ.	6 W
Power loss, max.	6.5 W
Memory	
Type of memory	RAM
Work memory	
• integrated	2.8 Mbyte
• integrated (for program)	1.4 Mbyte
• integrated (for data)	1.4 Mbyte
• expandable	No
Load memory	
• expandable FEPRM	Yes; with Memory Card (FLASH)
• expandable FEPRM, 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. • Backup current, max. • Backup time, max. • Feeding of external backup voltage to CPU	125 μ A; up to 40 °C 550 μ A See reference manual, module data, Chapter 3.3 5 V DC to 15 V DC
CPU processing times	
for bit operations, typ.	45 ns
for word operations, typ.	45 ns
for fixed point arithmetic, typ.	45 ns
for floating point arithmetic, typ.	135 ns
CPU-blocks	
DB	
• Number, max. • Size, max.	6 000; Number range: 1 to 16000 64 kbyte
FB	
• Number, max. • Size, max.	3 000; Number range: 0 to 7999 64 kbyte
FC	
• Number, max. • Size, max.	3 000; Number range: 0 to 7999 64 kbyte
OB	
• Size, max. • Number of free cycle OBs • Number of time alarm OBs • Number of delay alarm OBs • Number of cyclic interrupt OBs • Number of process alarm OBs • Number of DPV1 alarm OBs • Number of isochronous mode OBs • Number of multicomputing OBs • Number of background OBs • Number of startup OBs • Number of asynchronous error OBs • Number of synchronous error OBs	64 kbyte 1; OB 1 4; OB 10-13 4; OB 20-23 4; OB 32-35 (shortest cycle that can be set = 500 μ s) 4; OB 40-43 3; OB 55-57 3; OB 61-63 1; OB 60 1; OB 90 3; OB 100-102 9; OB 80-88 2; OB 121, 122
Nesting depth	
• per priority class • additional within an error OB	24 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 • Number	Yes SFB Unlimited (limited only by RAM capacity)
S7 times	
• Number	2 048
Retentivity	
— adjustable	Yes
— lower limit	0
— upper limit	2 047
— preset	No times retentive
Time range	
— lower limit	10 ms
— upper limit	9 990 s
IEC timer	
• present	Yes

• Type • Number	SFB 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. • Retentivity available • Retentivity preset • Number of clock memories	8 kbyte; Size of bit memory address area Yes MB 0 to MB 15 8; in 1 memory byte
Local data	
• adjustable, max. • preset	16 kbyte 8 kbyte
Address area	
I/O address area	
• Inputs • Outputs	8 kbyte 8 kbyte
Process image	
• Inputs, adjustable • Outputs, adjustable • Inputs, default • Outputs, default • consistent data, max. • Access to consistent data in process image	8 kbyte 8 kbyte 256 byte 256 byte 244 byte Yes
Subprocess images	
• Number of subprocess images, max.	15
Digital channels	
• Inputs — of which central • Outputs — of which central	65 536 65 536 65 536 65 536
Analog channels	
• Inputs — of which central • Outputs — of which central	4 096 4 096 4 096 4 096
Hardware configuration	
Number of expansion units, max.	21
connectable OPs	31
Multicomputing	Yes; 4 CPUs max. (with UR1 or UR2)
Interface modules	
• Number of connectable IMs (total), max. • Number of connectable IM 460s, max. • Number of connectable IM 463s, max.	6 6 4; IM 463-2
Number of DP masters	
• integrated • via CP • via IM 467 • Mixed mode IM + CP permitted • via interface module • Number of pluggable S5 modules (via adapter capsule in central device), max.	1 10; CP 443-5 Extended 4 No; IM 467 not suitable for use with CP 443-5 Ext. and CP 443-1 EX4x, EX20, GX20 (in PROFINET IO mode) 1; IF 964-DP 6
Number of IO Controllers	
• integrated • via CP	1 4; No mixed operation of CP443-1 EX40 and CP443-1 EX 41/EX20/GX20, max. 4 in central controller
Number of operable FMs and CPs (recommended)	
• FM • CP, PiP • PROFIBUS and Ethernet CPs	Limited by number of slots or number of connections CP 440: Limited by number of slots; CP 441: Limited by number of slots and number of connections 14; Of which 10 CPs max. or IMs as DP master, 4 PROFINET controller maximum
Slots	
• required slots	2

Time 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	Yes; As client
• to IF 964 DP	Yes
Time difference in system when synchronizing via	
• Ethernet, max.	10 ms
• MPI, max.	200 ms
Interfaces	
Number of other interfaces	0
Optical interface	No
1. Interface	
Interface type	MPI/PROFIBUS DP
Isolated	Yes
Interface types	
• RS 485	Yes
• Output current of the interface, max.	150 mA
Protocols	
• MPI	Yes
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	Yes
MPI	
• 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
— S7 communication	Yes
— S7 communication, as client	Yes
— S7 communication, as server	Yes
PROFIBUS DP master	
• Number of connections, max.	16; 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
• Number of DP slaves, max.	32
Services	
— PG/OP communication	Yes
— Routing	Yes
— 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 communication)	Yes
— 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 communication)	No
— DPV1	No
Transfer memory	
— Inputs	244 byte
— Outputs	244 byte
2. Interface	
Interface type	PROFINET
Isolated	Yes
automatic detection of transmission rate	Yes
Autonegotiation	Yes
Autocrossing	Yes
Number of connection resources	32
Interface types	
• RJ 45 (Ethernet)	Yes
• Number of ports	2
• integrated switch	Yes
• Output current of the interface, max.	No
Protocols	
• PROFINET IO Controller	Yes
• PROFINET IO Device	No
• PROFINET CBA	Yes
• PROFIBUS DP master	No
• PROFIBUS DP slave	No
• Open IE communication	Yes
• Web server	Yes; only read function
• Point-to-point connection	No
PROFINET IO Controller	
• Transmission rate, max.	100 Mbit/s
Services	
— PG/OP communication	Yes
— Routing	Yes; Routing of PG functions

— S7 communication	Yes
— Isochronous mode	No
— Prioritized startup	Yes
— Number of IO devices with prioritized startup, max.	32
— Number of connectable IO Devices, max.	256
— Of which IO devices with IRT, max.	0
— of which in line, max.	0
— Number of IO Devices with IRT and the option "high flexibility"	256
— of which in line, max.	61
— Activation/deactivation of IO Devices	Yes
— Number of IO Devices that can be simultaneously activated/deactivated, max.	8
— IO Devices changing during operation (partner ports), supported	Yes
— Device replacement without swap medium	Yes
— Send cycles	250 µs, 500 µs, 1 ms
— Updating time	250 µs to 512 ms; minimum value dependent on preset communication share for PROFINET I/O, of number of I/O devices and number of configured user data
Address area	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
— User data consistency, max.	255 byte; Including user data attendant
PROFINET CBA	
• acyclic transmission	Yes
• cyclic transmission	Yes
Open IE communication	
• Number of connections, max.	32
• Local port numbers used at the system end	0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535
3. Interface	
Interface type	Pluggable interface module (IF)
Plug-in interface modules	IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
Isolated	Yes
automatic detection of transmission rate	No
Number of connection resources	16
Interface types	
• RS 485	Yes
• Output current of the interface, max.	150 mA
Protocols	
• MPI	No
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	Yes
PROFIBUS DP master	
• Number of connections, max.	16
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	96
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 communication)	Yes
— DPV0	Yes
— DPV1	Yes

Address area	
— Inputs, max.	6 kbyte
— Outputs, max.	6 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
• User data per address area, max.	32 byte
— of which consistent, max.	32 byte
Services	
— PG/OP communication	Yes
— 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 communication)	No
— DPV1	No
Transfer memory	
— Inputs	244 byte
— Outputs	244 byte
Protocols	
SIMATIC communication	
• S7 routing	Yes
Open IE communication	
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
— Number of connections, max.	30
— Data length, max.	32 kbyte
• ISO-on-TCP (RFC1006)	Yes; Via integrated PROFINET interface or CP 443-1 Adv. and loadable FBs
— Number of connections, max.	30
— Data length, max.	32 kbyte; 1 452 bytes via CP 443-1 Adv.
• UDP	Yes; via integrated PROFINET interface and loadable FBs
— Number of connections, max.	30
— Data length, max.	1 472 byte
Web server	
• supported	Yes
• Number of HTTP clients	5
Isochronous mode	
Equidistance	Yes
Number of DP masters with isochronous mode	2
User data per isochronous slave, max.	244 byte
shortest clock pulse	1 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	31
• Number of connectable OPs with message processing	31; When using alarm_S and alarm_D
Data record routing	Yes
Global data communication	
• supported	Yes
• Number of GD loops, max.	8

• Number of GD packets, transmitter, max. • Number of GD packets, receiver, max. • Size of GD packets, max. • Size of GD packet (of which consistent), max.	8 16 54 byte 1 variable
S7 basic communication	
• supported • User data per job, max. • User data per job (of which consistent), max.	Yes 76 byte 1 variable
S7 communication	
• supported • as server • as client • User data per job, max. • User data per job (of which consistent), max.	Yes Yes Yes 64 kbyte 462 byte; 1 variable
S5 compatible communication	
• supported • User data per job, max. • User data per job (of which consistent), max. • Number of simultaneous AG-SEND/AG-RECV orders per CPU, max.	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5 8 kbyte 240 byte 24/24
Standard communication (FMS)	
• supported	Yes; Via CP and loadable FB
communication functions / PROFINET CBA (with set target communication load) / header	
• Setpoint for the CPU communication load • number of remote connection partners / with PROFINET CBA • number of technological functions / with PROFINET CBA / for master or slave • number of connections / with PROFINET CBA / for master or slave / total • data volume / of the input variables / with PROFINET CBA / for master or slave • data volume / of the output variables / with PROFINET CBA / for master or slave • number of internal and PROFIBUS interconnections / with PROFINET CBA / maximum • data volume / of internal and PROFIBUS interconnections / with PROFINET CBA / for master or slave • data volume / with PROFINET CBA / per connection / maximum	20 % 32 150 4 500 45 000 byte 45 000 byte 1 000 16 000 byte 2 000 byte
performance data / PROFINET CBA / remote interconnection / with acyclic transfer / header	
— update time / of the remote interconnections / in the case of acyclic transmission / with PROFINET CBA — number of remote connections to input variables / in the case of acyclic transmission / with PROFINET CBA / maximum — number of remote connections to output variables / in the case of acyclic transmission / with PROFINET CBA / maximum — data volume / as user data for remote interconnections with input variables / in the case of acyclic transmission / with PROFINET CBA — data volume / as user data for remote interconnections with output variables / in the case of acyclic transmission / with PROFINET CBA — data volume / as user data for remote interconnections / in the case of acyclic transmission / with PROFINET CBA / per connection / maximum	200 ms; Depending on preset communication load, number of interconnections and data length used 250 250 8 000 byte 8 000 byte 2 000 byte
performance data / PROFINET CBA / remote interconnection / with cyclic transfer / header	
— update time / of the remote interconnections / with cyclical transfer / with PROFINET CBA — number of remote connections to input variables / with PROFINET CBA / with cyclic transfer / maximum — number of remote connections to output	1 ms; Depending on preset communication load, number of interconnections and data length used 300 300

variables / with cyclical transfer / with PROFINET CBA / maximum	
— data volume / as user data for remote interconnections with input variables / with cyclical transfer / with PROFINET CBA / maximum	4 800 byte
— data volume / as user data for remote interconnections with output variables / with cyclical transfer / with PROFINET CBA / maximum	4 800 byte
— data volume / as user data for remote interconnections / with cyclical transfer / with PROFINET CBA / per connection / maximum	250 byte
performance data / PROFINET CBA / HMI variables via PROFINET / acyclic / header	
— number of connectable HMI stations / for HMI variables / in the case of acyclic transmission / with PROFINET CBA	2x PN OPC/1x iMap
— update time / of the HMI variables / in the case of acyclic transmission / with PROFINET CBA	500 ms
— number of HMI variables / in the case of acyclic transmission / with PROFINET CBA / maximum	1 000
— data volume / as user data for HMI variables / in the case of acyclic transmission / with PROFINET CBA / maximum	32 000 byte
performance data / PROFINET CBA / PROFIBUS proxy functionality / header	
— product function / with PROFINET CBA / PROFIBUS proxy functionality	Yes; 32 PROFIBUS slaves max. connectable
— data volume / with PROFIBUS proxy functionality / with PROFINET CBA / per connection / maximum	240 byte; Slave-dependent
Number of connections	
• overall	32
• usable for PG communication	
— reserved for PG communication	1
— adjustable for PG communication, max.	0
• usable for OP communication	
— reserved for OP communication	1
— adjustable for OP communication, max.	0
• usable for S7 basic communication	
— reserved for S7 basic communication	0
— adjustable for S7 basic communication, max.	0
• usable for S7 communication	
— reserved for S7 communication	0
— adjustable for S7 communication, max.	0
• usable for routing	
— reserved for routing	0
— adjustable for routing, max.	0
S7 message functions	
Number of login stations for message functions, max.	31; Max. 31 with alarm_S and alarm_D (OP's); max. 8 with alarm_8 and alarm_P (e.g. WinCC)
Symbol-related messages	Yes
SCAN procedure	Yes
Program alarms	Yes
Process diagnostic messages	Yes
simultaneously active Alarm-S blocks, max.	400; 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.	1 200
• preset, max.	300
Process control messages	Yes
Number of archives that can log on simultaneously (SFB 37 AR_SEND)	16
Number of messages	
• overall, max.	512
• in 100 ms grid, max.	128
• in 500 ms grid, max.	256
• in 1000 ms grid, max.	512
Number of additional values	
• with 100 ms grid, max.	1

- with 500, 1000 ms grid, max.

10

Test commissioning functions

Status block	Yes; Up to 2 simultaneously
Single step	Yes
Number of breakpoints	4

Status/control

- Status/control variable
- Variables
- Number of variables, max.

Yes; Up to 16 variable tables
Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
70; Status/control

Forcing

- Forcing
- Forcing, variables
- Number of variables, max.

Yes
Inputs/outputs, bit memories, distributed I/Os
256

Diagnostic buffer

- present
- Number of entries, max.
 - adjustable
 - preset

Yes
3 200
Yes
120

EMC

Emission of radio interference acc. to EN 55 011

- Limit class A, for use in industrial areas
- Limit class B, for use in residential areas

Yes
No

configuration / header

Configuration software

- STEP 7

Yes

configuration / programming / header

- Command set
- Nesting levels
- Access to consistent data in process image
- System functions (SFC)
- System function blocks (SFB)

see instruction list
7
Yes
see instruction list
see instruction list

Programming language

- LAD
- FBD
- STL
- SCL
- CFC
- GRAPH
- HiGraph®

Yes
Yes
Yes
Yes
Yes
Yes
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) / with D_ACT_DP
- RD_REC
- WR_REC
- WR_PARM
- PARM_MOD
- WR_DPARM
- DPNRM_DG
- RDSYSST
- DP_TOPO

2
8
8
8
8
1
2
8
8
1

configuration / programming / number of simultaneously active SFB / header

- RDREC
- WRREC

8
8

Know-how protection

- User program protection/password protection

Yes

Dimensions

Width	50 mm
Height	290 mm
Depth	219 mm

Weights

Weight, approx.	0.9 kg
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last modified:

4/1/2022 