



Figure similar

***** Replacement part ***** SIMATIC S7-400, CPU 414-3 PN/DP
Central processing unit with: work memory 4 MB, (2 MB code, 2 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	01
Firmware version	V6.0
Product function	
• Isochronous mode	Yes; Via PROFIBUS DP or PROFINET interface
Engineering with	
• Programming package	STEP 7 V5.5 or higher/iMap V3.0 + iMap STEP 7 Add-on V3.0 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.	1.3 A
from backplane bus 5 V DC, max.	1.5 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.	6.5 W
Power loss, max.	7.5 W
Memory	
Type of memory	RAM
Work memory	
• integrated	4 Mbyte
• integrated (for program)	2 Mbyte
• integrated (for data)	2 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.	125 µA; up to 40 °C 450 µA 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.	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	
• Number, max. • 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	see instruction list 64 kbyte 1; OB 1 4; OB 10-13 4; OB 20-23 4; OB 32, 33, 34, 35 (shortest cycle that can be set = 500 µs) 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	Yes
• Type	SFB
• Number	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	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.	8 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.	16 kbyte
• preset	8 kbyte
Address area	
I/O address area	
• Inputs	8 kbyte
• Outputs	8 kbyte
Process image	
• Inputs, adjustable	8 kbyte
• Outputs, adjustable	8 kbyte
• Inputs, default	256 byte
• Outputs, default	256 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	65 536
— of which central	65 536
• Outputs	65 536
— of which central	65 536
Analog channels	
• Inputs	4 096
— of which central	4 096
• Outputs	4 096
— of which central	4 096
Hardware configuration	
Integrated power supply	No
Number of expansion units, max.	21
connectable OPs	63
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 not suitable for use with CP 443-5 Ext. and CP 443-1 EX4x, EX20, GX20 (in PROFINET IO mode)
• via interface module	1; IF 964-DP
• Number of pluggable S5 modules (via adapter capsule in central device), max.	6
Number of IO Controllers	
• integrated	1
• via CP	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	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

• PROFIBUS and Ethernet CPs	and number of connections 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	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	
Interfaces/bus type	1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports), 1 x PROFIBUS DP (optionally pluggable)
Number of RS 485 interfaces	2
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; Autosensing
Autonegotiation	Yes
Autocrossing	Yes
Change of IP address at runtime, supported	Yes; Assignment by higher-level IO-Controller or by the user program with SFB104 "IP_CONF"
Number of connection resources	64
Interface types	
• RJ 45 (Ethernet)	Yes
• Number of ports	2
• integrated switch	Yes
Protocols	
• PROFINET IO Controller	Yes
• PROFINET IO Device	Yes
• PROFINET CBA	Yes

• PROFIBUS DP master	No
• PROFIBUS DP slave	No
• Open IE communication	Yes
• Web server	Yes
• Point-to-point connection	No
• Media redundancy	Yes
PROFINET IO Controller	
• Transmission rate, max.	100 Mbit/s
Services	
— PG/OP communication	Yes
— S7 communication	Yes
— Isochronous mode	Yes; Only with IRT and the High Performance option
— Shared device	Yes
— 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.	64
— of which in line, max.	64
— Number of IO Devices with IRT and the option "high flexibility"	256
— of which in line, max.	61
— Number of connectable IO Devices for RT, max.	256
— of which in line, max.	256
— 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
— Number of IO Devices per tool, max.	8; 8 parallel calls of the SFC 12 "D_ACT_DP" possible per line. Max. 32 IO Devices changing during operation (partner ports) are supported
— Device replacement without swap medium	Yes
— Send cycles	250 µs, 500 µs, 1 ms, 2 ms, 4 ms additionally with IRT with high performance: 250 µs to 4 ms in 125 µs frame
— Updating time	250 µs to 512 ms; minimum value depends on preset communication share for PROFINET IO, on the number of IO Devices and on the amount of configured user data, see PROFINET system description
Address area	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
— User data consistency, max.	1 024 byte
PROFINET IO Device	
Services	
— PG/OP communication	Yes
— S7 communication	Yes
— Isochronous mode	No
— IRT	Yes
— Prioritized startup	Yes
— Shared device	Yes
— Number of IO Controllers with shared device, max.	2
Transfer memory	
— Inputs, max.	1 440 byte; Per IO Controller with shared device
— Outputs, max.	1 440 byte; Per IO Controller with shared device
Submodules	
— Number, max.	64
— User data per submodule, max.	1 024 byte
PROFINET CBA	
• acyclic transmission	Yes
• cyclic transmission	Yes
Open IE communication	
• Number of connections, max.	62
• Local port numbers used at the system end	0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported	Yes

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; Virtual slots
• 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	
Redundancy mode	
Media redundancy	
— Switchover time on line break, typ.	200 ms
— Number of stations in the ring, max.	50
SIMATIC communication	
• S7 routing	Yes
Open IE communication	
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
— Number of connections, max.	62
— Data length, max.	32 kbyte
— several passive connections per port, supported	Yes
• ISO-on-TCP (RFC1006)	Yes; Via integrated PROFINET interface or CP 443-1 Adv. and loadable FBs
— Number of connections, max.	62
— 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.	62
— Data length, max.	1 472 byte
Web server	
• supported	Yes
• User-defined websites	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	63
• Number of connectable OPs with message processing	63; 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; 1 variable
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 CPU, max.	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	20 %

• number of remote connection partners / with PROFINET CBA	32
• number of technological functions / with PROFINET CBA / for master or slave	150
• number of connections / with PROFINET CBA / for master or slave / total	4 500
• data volume / of the input variables / with PROFINET CBA / for master or slave	45 000 byte
• data volume / of the output variables / with PROFINET CBA / for master or slave	45 000 byte
• number of internal and PROFIBUS interconnections / with PROFINET CBA / maximum	1 000
• data volume / of internal and PROFIBUS interconnections / with PROFINET CBA / for master or slave	16 000 byte
• data volume / with PROFINET CBA / per connection / maximum	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	200 ms; Depending on preset communication load, number of interconnections and data length used
— number of remote connections to input variables / in the case of acyclic transmission / with PROFINET CBA / maximum	250
— number of remote connections to output variables / in the case of acyclic transmission / with PROFINET CBA / maximum	250
— data volume / as user data for remote interconnections with input variables / in the case of acyclic transmission / with PROFINET CBA	8 000 byte
— data volume / as user data for remote interconnections with output variables / in the case of acyclic transmission / with PROFINET CBA	8 000 byte
— data volume / as user data for remote interconnections / in the case of acyclic transmission / with PROFINET CBA / per connection / maximum	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	1 ms; Depending on preset communication load, number of interconnections and data length used
— number of remote connections to input variables / with PROFINET CBA / with cyclic transfer / maximum	300
— number of remote connections to output variables / with cyclical transfer / with PROFINET CBA / maximum	300
— 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	450 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	240 byte; Slave-dependent

functionality / with PROFINET CBA / per connection / maximum	
Number of connections	
• overall	64
• 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.	63; Max. 63 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.	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 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.	256
Diagnostic buffer	
• present	Yes
• Number of entries, max.	3 200
— adjustable	Yes
— preset	120
Service data	
• can be read out	Yes
EMC	
Emission of radio interference acc. to EN 55 011	
• Limit class A, for use in industrial areas	Yes

• Limit class B, for use in residential areas	No
configuration / header	
Configuration software	
• STEP 7	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 active SFC / header	
— number of simultaneously active system functions (SFC) / with DPSYC_FR	2
— number of simultaneously active system functions (SFC) / with D_ACT_DP	8
— RD_REC	8
— WR_REC	8
— WR_PARM	8
— PARM_MOD	1
— WR_DPARM	2
— DPNRM_DG	8
— RDSYSST	8
— DP_TOPOLOG	1
configuration / programming / number of simultaneously active SFB / header	
— RDREC	8
— WRREC	8
Know-how protection	
• User program protection/password protection	Yes
• Block encryption	Yes; With S7 block Privacy
Dimensions	
Width	50 mm
Height	290 mm
Depth	219 mm
Weights	
Weight, approx.	900 g
last modified:	4/1/2022 