



SIMATIC S7-400,  
 CPU 414-3 CENTRAL PROCESSING UNIT WITH: 2.8 MB  
 WORKING MEMORY,  
 (1.4 MB CODE, 1.4 MB DATA),  
 1. INTERFACE MPI/DP 12 MBIT/S,  
 2. INTERFACE PROFIBUS DP,  
 3. IF IFM MODULES PLUGGABLE

### General information

<b>Hardware product version</b>	03
<b>Firmware version</b>	V5.3

### Engineering with

<b>Programming package</b>	STEP7 V 5.3 SP2 or higher with HW update
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### CiR - Configuration in RUN

<b>CiR synchronization time, basic load</b>	100 ms
<b>CiR synchronization time, time per I/O slave</b>	15 µs

### Supply voltage

<b>24 V DC</b>	No ; Power supply via system power supply
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### Input current

<b>from backplane bus 5 V DC, typ.</b>	1.1 A
<b>from backplane bus 5 V DC, max.</b>	1.3 A
<b>from backplane bus 24 V DC, max.</b>	450 mA ; 150 mA per DP interface
<b>from interface 5 V DC, max.</b>	90 mA ; At each DP interface

### Power losses

<b>Power loss, typ.</b>	5.5 W
<b>Power loss, max.</b>	6 W

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Backup battery	
Battery operation	Not relevant
Backup current, typ.	125 µA
Backup current, max.	550 µA
Backup time, max.	See reference manual, module data, Chapter 3.3
Feeding of external backup voltage to CPU	5 to 15 VDC
Feeding of external backup voltage to CPU	5 to 15 VDC
Memory	
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
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.	6000 ; Number range: 1 to 16000
Size, max.	64 kbyte
FB	
Number, max.	3000 ; Number range: 0 to 7999
Size, max.	64 kbyte
FC	
Number, max.	3000 ; Number range: 0 to 7999

<b>Size, max.</b>	64 kbyte
<b>OB</b>	
<b>Number, max.</b>	see instruction list
<b>Size, max.</b>	64 kbyte
<b>Number of free cycle OBs</b>	1 ; OB 1
<b>Number of time alarm OBs</b>	4 ; OB 10-13
<b>Number of delay alarm OBs</b>	4 ; OB 20-23
<b>Number of time interrupt OBs</b>	4 ; OB 32-35 (shortest cycle that can be set = 500 µs)
<b>Number of process alarm OBs</b>	4 ; OB 40-43
<b>Number of DPV1 alarm OBs</b>	3 ; OB 55-57
<b>Number isochronous mode OBs</b>	3 ; OB 61-63
<b>Number of multicomputing OBs</b>	1 ; OB 60
<b>Number of background OBs</b>	1 ; OB 90
<b>Number of startup OBs</b>	3 ; OB 100-102
<b>Number of asynchronous error OBs</b>	9 ; OB 80-88
<b>Number of synchronous error OBs</b>	2 ; OB 121, 122
<b>Nesting depth</b>	
<b>per priority class</b>	24
<b>additional within an error OB</b>	1
<b>Counters, timers and their retentivity</b>	
<b>S7 counter</b>	
<b>Number</b>	2048
<b>Retentivity</b>	
<b>adjustable</b>	Yes
<b>lower limit</b>	0
<b>upper limit</b>	2047
<b>preset</b>	Z 0 to Z 7
<b>Counting range</b>	
<b>lower limit</b>	0
<b>upper limit</b>	999
<b>IEC counter</b>	
<b>present</b>	Yes
<b>Type</b>	SFB
<b>Number</b>	Unlimited (limited only by RAM capacity)
<b>S7 times</b>	
<b>Number</b>	2048
<b>Retentivity</b>	
<b>adjustable</b>	Yes

<b>lower limit</b>	0
<b>upper limit</b>	2047
<b>preset</b>	No times retentive
<b>Time range</b>	
<b>lower limit</b>	10 ms
<b>upper limit</b>	9990 s
<b>IEC timer</b>	
<b>present</b>	Yes
<b>Type</b>	SFB
<b>Number</b>	Unlimited (limited only by RAM capacity)
<b>Data areas and their retentivity</b>	
<b>retentive data area, total</b>	Total working and load memory (with backup battery)
<b>Flag</b>	
<b>Number, max.</b>	8 kbyte ; Size of bit memory address area
<b>Retentivity available</b>	Yes
<b>Retentivity preset</b>	MB 0 to MB 15
<b>Number of clock memories</b>	8 ; (in 1 memory byte)
<b>Data blocks</b>	
<b>Number, max.</b>	6000 ; Number range: 1 to 16000
<b>Size, max.</b>	64 kbyte
<b>Local data</b>	
<b>adjustable, max.</b>	16 kbyte
<b>preset</b>	8 kbyte
<b>Address area</b>	
<b>I/O address area</b>	
<b>Inputs</b>	8 kbyte
<b>Outputs</b>	8 kbyte
<b>of which, distributed</b>	
<b>MPI/DP interface, inputs</b>	2 kbyte
<b>MPI/DP interface, outputs</b>	2 kbyte
<b>DP interface, inputs</b>	6 kbyte
<b>DP interface, outputs</b>	6 kbyte
<b>Process image</b>	
<b>Inputs, adjustable</b>	8 kbyte
<b>Outputs, adjustable</b>	8 kbyte
<b>Inputs, default</b>	256 byte
<b>Outputs, default</b>	256 byte
<b>consistent data, max.</b>	244 byte

<b>Access to consistent data in process image</b>	Yes
<b>Subprocess images</b>	
<b>Number of subprocess images, max.</b>	15
<b>Digital channels</b>	
<b>Inputs</b>	65536
<b>Outputs</b>	65536
<b>Inputs, of which central</b>	65536
<b>Outputs, of which central</b>	65536
<b>Analog channels</b>	
<b>Inputs</b>	4096
<b>Outputs</b>	4096
<b>Inputs, of which central</b>	4096
<b>Outputs, of which central</b>	4096
<b>Hardware configuration</b>	
<b>Expansion devices, max.</b>	21
<b>connectable OPs</b>	31
<b>Multicomputing</b>	Yes ; 4 CPUs
<b>Interface modules</b>	
<b>Number of connectable IMs (total), max.</b>	6
<b>Number of connectable IM 460s, max.</b>	6
<b>Number of connectable IM 463s, max.</b>	4 ; IM 463-2
<b>Number of DP masters</b>	
<b>integrated</b>	2
<b>via IM 467</b>	4
<b>via CP</b>	10 ; CP 443-5 Extended
<b>Mixed mode IM + CP permitted</b>	No ; IM 467 not suitable for use with CP 443-5 Ext. and CP443-1 EX4x, EX20, GX20 (in PNIO mode)
<b>via interface module</b>	1
<b>Number of pluggable S5 modules (via adapter capsule in central device), max.</b>	6
<b>Number of IO Controllers</b>	
<b>integrated</b>	0
<b>via CP</b>	4 ; No mixed operation of CP443-1 EX40 and CP443-1 EX 41/EX20/GX20, max. 4 in central controller
<b>Number of operable FMs and CPs (recommended)</b>	
<b>FM</b>	Limited by number of slots and number of connections
<b>CP, point-to-point</b>	CP 440: Limited by number of slots; CP 441: limited by number of connections
<b>PROFIBUS and Ethernet CPs</b>	14 ; Of which 10 CPs max. or IMs as DP master, 4 PN controller maximum

Time of day	
<b>Clock</b>	
Hardware clock (real-time clock)	Yes
battery-backed 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
<b>Operating hours counter</b>	
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 <sup>31</sup> - 1 hours
Granularity	1 hour
retentive	Yes
<b>Clock synchronization</b>	
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	Yes
<b>Time difference in system when synchronizing via</b>	
MPI, max.	200 ms
<b>Digital outputs</b>	
integrated channels (DO)	0
<b>Analog inputs</b>	
Integrated channels (AI)	0
<b>Interfaces</b>	
Interfaces	1 x MPI/PROFIBUS DP, 1 x PROFIBUS DP, 1 x PROFIBUS DP (optionally pluggable)
Number of USB interfaces	0
Number of parallel interfaces	0
Number of 20 mA interfaces (TTY)	0
Number of RS 232 interfaces	0
Number of RS 422 interfaces	0
Number of other interfaces	0
<b>1st interface</b>	

<b>Type of interface</b>	integrated
<b>Physics</b>	RS 485 / PROFIBUS + MPI
<b>Isolated</b>	Yes
<b>Power supply to interface (15 to 30 V DC), max.</b>	150 mA
<b>Number of connection resources</b>	MPI: 32, DP: 16
<b>Functionality</b>	
<b>MPI</b>	Yes
<b>DP master</b>	Yes
<b>DP slave</b>	Yes
<b>MPI</b>	
<b>Number of connections</b>	32 ; If a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1
<b>Transmission rate, max.</b>	12 Mbit/s
<b>Services</b>	
<b>PG/OP communication</b>	Yes
<b>Routing</b>	Yes
<b>Global data communication</b>	Yes
<b>S7 basic communication</b>	Yes
<b>S7 communication</b>	Yes
<b>S7 communication, as client</b>	Yes
<b>S7 communication, as server</b>	Yes
<b>DP master</b>	
<b>Number of connections, max.</b>	16 ; If a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1
<b>Transmission rate, max.</b>	12 Mbit/s
<b>Number of DP slaves, max.</b>	32
<b>Services</b>	
<b>PG/OP communication</b>	Yes
<b>Routing</b>	Yes
<b>Global data communication</b>	No
<b>S7 basic communication</b>	Yes
<b>S7 communication</b>	Yes
<b>S7 communication, as client</b>	Yes
<b>S7 communication, as server</b>	Yes
<b>Equidistance mode support</b>	Yes
<b>Isochronous mode</b>	Yes
<b>SYNC/FREEZE</b>	Yes
<b>Activation/deactivation of DP slaves</b>	Yes
<b>Direct data exchange (slave-to-slave communication)</b>	Yes

<b>DPV1</b>	Yes
<b>Address area</b>	
<b>Inputs, max.</b>	2 kbyte
<b>Outputs, max.</b>	2 kbyte
<b>User data per DP slave</b>	
<b>User data per DP slave, max.</b>	244 byte
<b>Inputs, max.</b>	244 byte
<b>Outputs, max.</b>	244 byte
<b>Slots, max.</b>	244
<b>per slot, max.</b>	128 byte
<b>DP slave</b>	
<b>Number of connections</b>	16
<b>GSD file</b>	<a href="http://support.automation.siemens.com/WWW/view/de/113652">http://support.automation.siemens.com/WWW/view/de/113652</a>
<b>Transmission rate, max.</b>	12 Mbit/s
<b>Automatic baud rate search</b>	No
<b>Address area, max.</b>	32 ; Virtual slots
<b>User data per address area, max.</b>	32 byte
<b>User data per address area, of which consistent, max.</b>	32 byte
<b>Services</b>	
<b>PG/OP communication</b>	Yes ; with interface active
<b>S7 routing</b>	Yes ; with interface active
<b>Global data communication</b>	No
<b>S7 basic communication</b>	No
<b>S7 communication</b>	Yes
<b>S7 communication, as client</b>	Yes
<b>S7 communication, as server</b>	Yes
<b>Direct data exchange (slave-to-slave communication)</b>	No
<b>DPV1</b>	No
<b>Transfer memory</b>	
<b>Inputs</b>	244 byte
<b>Outputs</b>	244 byte
<b>2nd interface</b>	
<b>Type of interface</b>	integrated
<b>Physics</b>	RS 485 / PROFIBUS
<b>Isolated</b>	Yes
<b>Power supply to interface (15 to 30 V DC), max.</b>	150 mA
<b>Number of connection resources</b>	16
<b>Functionality</b>	



<b>DP master</b>	Yes
<b>DP slave</b>	Yes
<b>DP master</b>	
<b>Number of connections, max.</b>	16
<b>Transmission rate, max.</b>	12 Mbit/s
<b>Number of DP slaves, max.</b>	96
<b>Services</b>	
<b>PG/OP communication</b>	Yes
<b>Routing</b>	Yes
<b>Global data communication</b>	No
<b>S7 basic communication</b>	Yes
<b>S7 communication</b>	Yes
<b>S7 communication, as client</b>	Yes
<b>S7 communication, as server</b>	Yes
<b>Equidistance mode support</b>	Yes
<b>Isochronous mode</b>	Yes
<b>SYNC/FREEZE</b>	Yes
<b>Activation/deactivation of DP slaves</b>	Yes
<b>Direct data exchange (slave-to-slave communication)</b>	Yes
<b>DPV1</b>	Yes
<b>Address area</b>	
<b>Inputs, max.</b>	6 kbyte
<b>Outputs, max.</b>	6 kbyte
<b>User data per DP slave</b>	
<b>User data per DP slave, max.</b>	244 byte
<b>Inputs, max.</b>	244 byte
<b>Outputs, max.</b>	244 byte
<b>Slots, max.</b>	244
<b>per slot, max.</b>	128 byte
<b>DP slave</b>	
<b>Number of connections</b>	16
<b>GSD file</b>	<a href="http://support.automation.siemens.com/WW/view/de/113652">http://support.automation.siemens.com/WW/view/de/113652</a>
<b>Transmission rate, max.</b>	12 Mbit/s
<b>Address area, max.</b>	32
<b>User data per address area, max.</b>	32 byte
<b>User data per address area, of which consistent, max.</b>	32 byte
<b>Services</b>	
<b>Routing</b>	Yes

Transfer memory	
<b>Inputs</b>	244 byte
<b>Outputs</b>	244 byte
3rd interface	
<b>Type of interface</b>	Pluggable interface module (IF), technical data as for 2nd interface
<b>Plug-in interface modules</b>	IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
<b>Physics</b>	RS 485 / PROFIBUS
<b>Isolated</b>	Yes
<b>Power supply to interface (15 to 30 V DC), max.</b>	150 mA
<b>Automatic detection of transmission speed</b>	No
<b>Number of connection resources</b>	16
Functionality	
<b>MPI</b>	No
<b>DP master</b>	Yes
<b>DP slave</b>	Yes
DP master	
<b>Number of connections, max.</b>	16
<b>Transmission rate, max.</b>	12 Mbit/s
<b>Transmission rate, min.</b>	9.6 kbit/s
<b>Number of DP slaves, max.</b>	96
Services	
<b>PG/OP communication</b>	Yes
<b>Routing</b>	Yes ; S7 routing
<b>Global data communication</b>	No
<b>S7 basic communication</b>	No
<b>S7 communication</b>	Yes
<b>S7 communication, as client</b>	Yes
<b>S7 communication, as server</b>	Yes
<b>Equidistance mode support</b>	Yes
<b>Isochronous mode</b>	Yes
<b>SYNC/FREEZE</b>	Yes
<b>Activation/deactivation of DP slaves</b>	Yes
<b>Direct data exchange (slave-to-slave communication)</b>	Yes
<b>DPV0</b>	Yes
<b>DPV1</b>	Yes
Address area	
<b>Inputs, max.</b>	6 kbyte
<b>Outputs, max.</b>	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
DP slave	
Number of connections	16
GSD file	<a href="http://support.automation.siemens.com/WWW/view/de/113652">http://support.automation.siemens.com/WWW/view/de/113652</a>
Transmission rate, max.	12 Mbit/s
Automatic baud rate search	No
Address area, max.	32
User data per address area, max.	32 byte
User data per address area, of which consistent, max.	32 byte
Services	
PG/OP communication	Yes
S7 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
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes ; For PROFIBUS only
Number of DP masters with isochronous mode	3
User data per isochronous slave, max.	244 byte
equidistance	Yes
shortest clock pulse	1 ms ; 0.5 ms without use of SFC 126, 127
max. cycle	32 ms
Communication functions	
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

<b>Data record routing</b>	Yes
<b>Global data communication</b>	
<b>supported</b>	Yes
<b>Number of GD loops, max.</b>	8
<b>Number of GD packets, transmitter, max.</b>	8
<b>Number of GD packets, receiver, max.</b>	16
<b>Size of GD packets, max.</b>	54 byte
<b>Size of GD packet (of which consistent), max.</b>	1 variable
<b>S7 basic communication</b>	
<b>supported</b>	Yes
<b>User data per job, max.</b>	76 byte
<b>User data per job (of which consistent), max.</b>	1 variable
<b>S7 communication</b>	
<b>supported</b>	Yes
<b>as server</b>	Yes
<b>as client</b>	Yes
<b>User data per job, max.</b>	64 kbyte
<b>User data per job (of which consistent), max.</b>	462 byte ; 1 variable
<b>S5-compatible communication</b>	
<b>supported</b>	Yes ; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
<b>User data per job, max.</b>	8 kbyte
<b>User data per job (of which consistent), max.</b>	240 byte
<b>Number of simultaneous AG-SEND/AG-RECV orders per CPU, max.</b>	24/24
<b>Standard communication (FMS)</b>	
<b>supported</b>	Yes ; Via CP and loadable FB
<b>Open IE communication</b>	
<b>ISO-on-TCP (RFC1006)</b>	Via CP 443-1 and loadable FB
<b>Data length, max.</b>	1452 bytes via CP 443-1 Adv.
<b>Web server</b>	
<b>supported</b>	No
<b>Number of connections</b>	
<b>overall</b>	32
<b>usable for PG communication</b>	
<b>reserved for PG communication</b>	1
<b>Adjustable for PG communication, max.</b>	0
<b>usable for OP communication</b>	
<b>reserved for OP communication</b>	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
<b>S7 message functions</b>	
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
Block related messages	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.	1200
preset, max.	300
Process control messages	Yes
Number of archives that can log on simultaneously (SFB 37 AR_SEND)	16
<b>Number of messages</b>	
overall, max.	512
in 100 ms grid, max.	128
in 500 ms grid, max.	256
in 1000 ms grid, max.	512
<b>Number of additional values</b>	
with 100 ms grid, max.	1
with 500, 1000 ms grid, max.	10
<b>Test commissioning functions</b>	
Status block	Yes ; Up to 2 simultaneously
Single step	Yes
Number of breakpoints	4
<b>Status/control</b>	
Status/control variable	Yes ; Up to 16 variable tables

<b>Variables</b>	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
<b>Number of variables, max.</b>	70 ; Status/control
<b>Forcing</b>	
<b>Forcing</b>	Yes
<b>Force, variables</b>	Inputs, outputs, bit memories, peripheral inputs, peripheral outputs
<b>Number of variables, max.</b>	256
<b>Diagnostic buffer</b>	
<b>present</b>	Yes
<b>Number of entries, max.</b>	3200
<b>adjustable</b>	Yes
<b>preset</b>	120
<b>EMC</b>	
<b>Emission of radio interference acc. to EN 55 011</b>	
<b>Limit class A, for use in industrial areas</b>	Yes
<b>Limit class B, for use in residential areas</b>	No
<b>Configuration</b>	
<b>Configuration software</b>	
<b>STEP 7</b>	Yes
<b>programming</b>	
<b>Command set</b>	see instruction list
<b>Nesting levels</b>	7
<b>Access to consistent data in process image</b>	Yes
<b>Programming language</b>	
<b>LAD</b>	Yes
<b>FBD</b>	Yes
<b>STL</b>	Yes
<b>SCL</b>	Yes
<b>CFC</b>	Yes
<b>GRAPH</b>	Yes
<b>HiGraph®</b>	Yes
<b>System functions (SFC)</b>	see instruction list
<b>Number of simultaneously active SFCs</b>	
<b>DPSYC_FR</b>	2
<b>D_ACT_DP</b>	8
<b>RD_REC</b>	8
<b>WR_REC</b>	8
<b>WR_PARM</b>	8
<b>PARM_MOD</b>	1

<b>WR_DPARM</b>	2
<b>DPNRM_DG</b>	8
<b>RDSYSST</b>	8
<b>DP_TOPOL</b>	1
<b>System function blocks (SFB)</b>	see instruction list
<b>Number of simultaneously active SFBs</b>	
<b>RD_REC</b>	8
<b>WR_REC</b>	8
<b>Know-how protection</b>	
<b>User program protection/password protection</b>	Yes
<b>Dimensions</b>	
<b>Width</b>	50 mm
<b>Height</b>	290 mm
<b>Depth</b>	219 mm
<b>Required slots</b>	2
<b>Weight</b>	
<b>Weight, approx.</b>	0.9 kg
Status	Feb 25, 2013