

SIMATIC S7-400, CPU 417-4 Central processing unit with: Work memory 30 MB, (15 MB code; 15 MB data) 1st interface MPI 12 Mbit/s; 2nd interface PROFIBUS DP, 3rd/4th interface plug-in IFM module



Figure similar

General information	
Product type designation	CPU 417-4
HW functional status	04
Firmware version	V5.3
Engineering with	
<ul style="list-style-type: none"> <li>Programming package</li> </ul>	STEP 7 V5.3 SP2 or higher with HW update
CiR – Configuration in RUN	
CiR synchronization time, basic load	60 ms
CiR synchronization time, time per I/O byte	7 $\mu$ s
Supply voltage	
Rated value (DC)	
<ul style="list-style-type: none"> <li>24 V DC</li> </ul>	No; Power supply via system power supply
Input current	
from backplane bus 5 V DC, typ.	1.5 A
from backplane bus 5 V DC, max.	1.8 A
from backplane bus 24 V DC, max.	600 mA; 150 mA per DP interface

from interface 5 V DC, max.	90 mA; At each DP interface
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### Power loss

Power loss, typ.	7.5 W
Power loss, max.	8 W

### Memory

Type of memory	RAM
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#### Work memory

<ul style="list-style-type: none"> <li>integrated</li> </ul>	30 Mbyte
<ul style="list-style-type: none"> <li>integrated (for program)</li> </ul>	15 Mbyte
<ul style="list-style-type: none"> <li>integrated (for data)</li> </ul>	15 Mbyte
<ul style="list-style-type: none"> <li>expandable</li> </ul>	No

#### Load memory

<ul style="list-style-type: none"> <li>expandable FEPR0M</li> </ul>	Yes; with Memory Card (FLASH)
<ul style="list-style-type: none"> <li>expandable FEPR0M, max.</li> </ul>	64 Mbyte
<ul style="list-style-type: none"> <li>integrated RAM, max.</li> </ul>	1 Mbyte
<ul style="list-style-type: none"> <li>expandable RAM</li> </ul>	Yes; with Memory Card (RAM)
<ul style="list-style-type: none"> <li>expandable RAM, max.</li> </ul>	64 Mbyte

#### Backup

<ul style="list-style-type: none"> <li>present</li> </ul>	Yes
<ul style="list-style-type: none"> <li>with battery</li> </ul>	Yes; all data
<ul style="list-style-type: none"> <li>without battery</li> </ul>	No

### Battery

#### Backup battery

<ul style="list-style-type: none"> <li>Backup current, typ.</li> </ul>	225 $\mu$ A; up to 40 °C
<ul style="list-style-type: none"> <li>Backup current, max.</li> </ul>	750 $\mu$ A
<ul style="list-style-type: none"> <li>Backup time, max.</li> </ul>	See reference manual, module data, Chapter 3.3
<ul style="list-style-type: none"> <li>Feeding of external backup voltage to CPU</li> </ul>	5 V DC to 15 V DC

### CPU processing times

for bit operations, typ.	18 ns
for word operations, typ.	18 ns
for fixed point arithmetic, typ.	18 ns
for floating point arithmetic, typ.	54 ns

### CPU-blocks

#### DB

<ul style="list-style-type: none"> <li>Number, max.</li> </ul>	16 000; Number range: 1 to 16000
<ul style="list-style-type: none"> <li>Size, max.</li> </ul>	64 kbyte

#### FB

<ul style="list-style-type: none"> <li>Number, max.</li> </ul>	8 000; Number range: 0 to 7999
<ul style="list-style-type: none"> <li>Size, max.</li> </ul>	64 kbyte

#### FC

• Number, max.	8 000; Number range: 0 to 7999
• Size, max.	64 kbyte
<b>OB</b>	
• Number, max.	see instruction list
• Size, max.	64 kbyte
• Number of free cycle OBs	1; OB 1
• Number of time alarm OBs	8; OB 10-17
• Number of delay alarm OBs	4; OB 20-23
• Number of cyclic interrupt OBs	9; OB 30-38 (shortest cycle that can be set = 500 µs)
• Number of process alarm OBs	8; OB 40-47
• Number of DPV1 alarm OBs	3; OB 55-57
• Number of isochronous mode OBs	4; OB 61-64
• 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
<b>Nesting depth</b>	
• per priority class	24
• additional within an error OB	2
<b>Counters, timers and their retentivity</b>	
<b>S7 counter</b>	
• Number	2 048
<b>Retentivity</b>	
— adjustable	Yes
— lower limit	0
— upper limit	2 047
— preset	Z 0 to Z 7
<b>Counting range</b>	
— lower limit	0
— upper limit	999
<b>IEC counter</b>	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
<b>S7 times</b>	
• Number	2 048
<b>Retentivity</b>	
— adjustable	Yes
— lower limit	0
— upper limit	2 047

— preset	No times retentive
<b>Time range</b>	
— lower limit	10 ms
— upper limit	9 990 s
<b>IEC timer</b>	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
<b>Data areas and their retentivity</b>	
retentive data area in total	Total working and load memory (with backup battery)
<b>Flag</b>	
• Number, max.	16 kbyte; Size of bit memory address area
• Retentivity preset	MB 0 to MB 15
• Number of clock memories	8; in 1 memory byte
<b>Local data</b>	
• adjustable, max.	64 kbyte
• preset	32 kbyte
<b>Address area</b>	
<b>I/O address area</b>	
• Inputs	16 kbyte
• Outputs	16 kbyte
<b>Process image</b>	
• Inputs, adjustable	16 kbyte
• Outputs, adjustable	16 kbyte
• Inputs, default	1 024 byte
• Outputs, default	1 024 byte
• consistent data, max.	244 byte
• Access to consistent data in process image	Yes
<b>Subprocess images</b>	
• Number of subprocess images, max.	15
<b>Digital channels</b>	
• Inputs	131 072
— of which central	131 072
• Outputs	131 072
— of which central	131 072
<b>Analog channels</b>	
• Inputs	8 192
— of which central	8 192
• Outputs	8 192
— of which central	8 192

Hardware configuration	
Number of expansion units, max.	21
connectable OPs	63
Multicomputing	Yes; 4 CPUs max. (with UR1 or UR2)
Interface modules	
<ul style="list-style-type: none"> <li>Number of connectable IMs (total), max.</li> </ul>	6
<ul style="list-style-type: none"> <li>Number of connectable IM 460s, max.</li> </ul>	6
<ul style="list-style-type: none"> <li>Number of connectable IM 463s, max.</li> </ul>	4; IM 463-2
Number of DP masters	
<ul style="list-style-type: none"> <li>integrated</li> </ul>	2
<ul style="list-style-type: none"> <li>via CP</li> </ul>	10; CP 443-5 Extended
<ul style="list-style-type: none"> <li>via IM 467</li> </ul>	4
<ul style="list-style-type: none"> <li>Mixed mode IM + CP permitted</li> </ul>	No; IM 467 not suitable for use with CP 443-5 Ext. and CP 443-1 EX4x, EX20, GX20 (in PROFINET IO mode)
<ul style="list-style-type: none"> <li>via interface module</li> </ul>	2
<ul style="list-style-type: none"> <li>Number of pluggable S5 modules (via adapter capsule in central device), max.</li> </ul>	6
Number of IO Controllers	
<ul style="list-style-type: none"> <li>integrated</li> </ul>	0
<ul style="list-style-type: none"> <li>via CP</li> </ul>	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)	
<ul style="list-style-type: none"> <li>FM</li> </ul>	Limited by number of slots and number of connections
<ul style="list-style-type: none"> <li>CP, PtP</li> </ul>	CP 440: Limited by number of slots; CP 441: limited by number of connections
<ul style="list-style-type: none"> <li>PROFIBUS and Ethernet CPs</li> </ul>	14; Of which 10 CPs max. or IMs as DP master, 4 PROFINET controller maximum
Slots	
<ul style="list-style-type: none"> <li>required slots</li> </ul>	2
Time of day	
Clock	
<ul style="list-style-type: none"> <li>Hardware clock (real-time)</li> </ul>	Yes
<ul style="list-style-type: none"> <li>retentive and synchronizable</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Resolution</li> </ul>	1 ms
<ul style="list-style-type: none"> <li>Deviation per day (buffered), max.</li> </ul>	1.7 s; Power off
<ul style="list-style-type: none"> <li>Deviation per day (unbuffered), max.</li> </ul>	8.6 s; For power On
Operating hours counter	
<ul style="list-style-type: none"> <li>Number</li> </ul>	16
<ul style="list-style-type: none"> <li>Number/Number range</li> </ul>	0 to 15
<ul style="list-style-type: none"> <li>Range of values</li> </ul>	SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2 <sup>31</sup> - 1 hours
<ul style="list-style-type: none"> <li>Granularity</li> </ul>	1 h
<ul style="list-style-type: none"> <li>retentive</li> </ul>	Yes

Clock synchronization	
• supported	Yes
• to MPI, master	Yes
• to MPI, slave	Yes
• in AS, master	Yes
• in AS, slave	Yes
• to IF 964 DP	Yes
Time difference in system when synchronizing via	
• MPI, max.	200 ms
Interfaces	
Interfaces/bus type	1 x MPI/PROFIBUS DP, 1 x PROFIBUS DP, 2 x PROFIBUS DP (optionally pluggable)
Number of RS 485 interfaces	2
Number of other interfaces	0
1. Interface	
Interface type	Integrated
Physics	RS 485 / PROFIBUS + MPI
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	150 mA
Number of connection resources	MPI: 44, DP: 32
Protocols	
• MPI	Yes
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	Yes
MPI	
• Number of connections	44; 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.	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
• 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
<b>Address area</b>	
— Inputs, max.	2 kbyte
— Outputs, max.	2 kbyte
<b>User data per DP slave</b>	
— User data per DP slave, max.	244 byte
— Inputs, max.	244 byte
— Outputs, max.	244 byte
— Slots, max.	244
— per slot, max.	128 byte
<b>PROFIBUS DP slave</b>	
• Number of connections	32
• GSD file	<a href="http://support.automation.siemens.com/WW/view/en/113652">http://support.automation.siemens.com/WW/view/en/113652</a>
• 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
<b>Services</b>	
— PG/OP communication	Yes; with interface active
— Routing	Yes; with interface active
— 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
<b>Transfer memory</b>	
— Inputs	244 byte
— Outputs	244 byte
<b>2. Interface</b>	
Interface type	Integrated
Physics	RS 485 / PROFIBUS
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	150 mA
Number of connection resources	32
<b>Protocols</b>	
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	Yes
<b>PROFIBUS DP master</b>	
• Number of connections, max.	32
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	125
<b>Services</b>	
— 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
<b>Address area</b>	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
<b>User data per DP slave</b>	
— User data per DP slave, max.	244 byte
— Inputs, max.	244 byte
— Outputs, max.	244 byte



— Slots, max.	244
— per slot, max.	128 byte
<b>PROFIBUS DP slave</b>	
• Number of connections	32
• GSD file	<a href="http://support.automation.siemens.com/WW/view/en/113652">http://support.automation.siemens.com/WW/view/en/113652</a>
• Transmission rate, max.	12 Mbit/s
• Address area, max.	32
• User data per address area, max.	32 byte
— of which consistent, max.	32 byte
<b>Services</b>	
— Routing	Yes
<b>Transfer memory</b>	
— Inputs	244 byte
— Outputs	244 byte

### 3. Interface

Interface type	Pluggable interface module (IF), technical data as for 2nd interface
Plug-in interface modules	IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
Physics	RS 485 / PROFIBUS
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	150 mA
automatic detection of transmission rate	No
Number of connection resources	32
<b>Protocols</b>	
• MPI	No
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	Yes
<b>PROFIBUS DP master</b>	
• Number of connections, max.	32
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	125
<b>Services</b>	
— PG/OP communication	Yes
— Routing	Yes; S7 routing
— Global data communication	No
— S7 basic communication	No
— 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
<b>Address area</b>	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
<b>User data per DP slave</b>	
— User data per DP slave, max.	244 byte
— Inputs, max.	244 byte
— Outputs, max.	244 byte
— Slots, max.	244
— per slot, max.	128 byte
<b>PROFIBUS DP slave</b>	
• Number of connections	32
• GSD file	<a href="http://support.automation.siemens.com/WW/view/en/113652">http://support.automation.siemens.com/WW/view/en/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
— of which consistent, max.	32 byte
<b>Services</b>	
— PG/OP communication	Yes
— Routing	Yes; with interface active
— 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
<b>Transfer memory</b>	
— Inputs	244 byte
— Outputs	244 byte
<b>4. Interface</b>	
Interface type	Pluggable interface module (IF), technical data as for 2nd interface

Plug-in interface modules	IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
<b>Protocols</b>	
<b>Open IE communication</b>	
<ul style="list-style-type: none"> <li>• ISO-on-TCP (RFC1006) <ul style="list-style-type: none"> <li>— Data length, max.</li> </ul> </li> </ul>	Via CP 443-1 and loadable FB 1452 bytes via CP 443-1 Adv.
<b>Web server</b>	
<ul style="list-style-type: none"> <li>• supported</li> </ul>	No
<b>Isochronous mode</b>	
Isochronous operation (application synchronized up to terminal)	Yes; For PROFIBUS only
Equidistance	Yes
Number of DP masters with isochronous mode	4
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
<b>Communication functions</b>	
PG/OP communication	Yes
<ul style="list-style-type: none"> <li>• Number of connectable OPs without message processing</li> </ul>	63
<ul style="list-style-type: none"> <li>• Number of connectable OPs with message processing</li> </ul>	63; When using alarm_S and alarm_D
Data record routing	Yes
<b>Global data communication</b>	
<ul style="list-style-type: none"> <li>• supported</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Number of GD loops, max.</li> </ul>	16
<ul style="list-style-type: none"> <li>• Number of GD packets, transmitter, max.</li> </ul>	16
<ul style="list-style-type: none"> <li>• Number of GD packets, receiver, max.</li> </ul>	32
<ul style="list-style-type: none"> <li>• Size of GD packets, max.</li> </ul>	54 byte
<ul style="list-style-type: none"> <li>• Size of GD packet (of which consistent), max.</li> </ul>	1 variable
<b>S7 basic communication</b>	
<ul style="list-style-type: none"> <li>• supported</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• User data per job, max.</li> </ul>	76 byte
<ul style="list-style-type: none"> <li>• User data per job (of which consistent), max.</li> </ul>	1 variable
<b>S7 communication</b>	
<ul style="list-style-type: none"> <li>• supported</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• as server</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• as client</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• User data per job, max.</li> </ul>	64 kbyte
<ul style="list-style-type: none"> <li>• User data per job (of which consistent), max.</li> </ul>	462 byte; 1 variable
<b>S5 compatible communication</b>	
<ul style="list-style-type: none"> <li>• supported</li> </ul>	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.	64/64
<b>Standard communication (FMS)</b>	
• supported	Yes; Via CP and loadable FB
<b>Number of connections</b>	
• 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
<b>S7 message functions</b>	
Number of login stations for message functions, max.	63; Max. 63 with ALARM_S and ALARM_D (OPs); max. 12 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.	1 000; 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.	10 000
• preset, max.	1 200
Process control messages	Yes
Number of archives that can log on simultaneously (SFB 37 AR_SEND)	64
<b>Number of messages</b>	
• overall, max.	1 024

• in 100 ms grid, max.	128
• in 500 ms grid, max.	512
• in 1000 ms grid, max.	1 024
<b>Number of additional values</b>	
• 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
<b>Status/control</b>	
• 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
<b>Forcing</b>	
• Forcing	Yes
• Forcing, variables	Inputs, outputs, bit memories, peripheral inputs, peripheral outputs
• Number of variables, max.	512
<b>Diagnostic buffer</b>	
• present	Yes
• Number of entries, max.	3 200
— adjustable	Yes
— preset	120

### EMC

<b>Emission of radio interference acc. to EN 55 011</b>	
• Limit class A, for use in industrial areas	Yes
• Limit class B, for use in residential areas	No

### Configuration

<b>Configuration software</b>	
• STEP 7	Yes
<b>Programming</b>	
• 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
<b>Programming language</b>	
— LAD	Yes
— FBD	Yes
— STL	Yes

— SCL	Yes
— CFC	Yes
— GRAPH	Yes
— HiGraph®	Yes

#### Number of simultaneously active SFCs

— DPSYC_FR	2
— 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_TOPOL	1

#### Number of simultaneously active SFBs

— RDREC	8
— WRREC	8

#### Know-how protection

• User program protection/password protection	Yes
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#### Dimensions

Width	50 mm
Height	290 mm
Depth	219 mm

#### Weights

Weight, approx.	0.9 kg
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**last modified:** 11/19/2019