

Spare part SIMATIC C7-636 keys, Complete unit with integrated components: S7-300 CPU 315-2 DP and OP270B, 24 DI, 16 DO, 5 AI, 2 AO; Micro Memory Card and connector set required



Operator control and monitoring	
Password protection	Yes
• Password levels	10
Text elements	Yes
Info texts	Yes
Graphics object	Yes
Process images	Yes
Alarms	Yes; Fault messages, operating messages
Graphics object	
• Character graphics	Yes
• Pixel graphics	Yes
Process images	
• Number of process images	300
• Number of variables per image, max.	200
• Number of variables in message text, max.	8
Operating-/fault messages	
• Number of entries in operational log, max.	Message archive limited by storage medium
• Number of entries in fault message buffer, max.	Message archive limited by storage medium
Recipes	

- Number, max. 300
- Data records per recipe, max. 500
- Entries per data record, max. 1 000

Display

Design of display CSTN, CCFL backlit; 5.7" color (256 colors)

Resolution (pixels)

- Horizontal image resolution 320 Pixel
- Vertical image resolution 240 Pixel

Backlighting

- MTBF backlighting (at 25 °C) 40 000 h

Control elements

Keyboard fonts

- Membrane keyboard Yes
- Function keys
 - Number of function keys 24; 18 with LED
 - Number of softkeys 14

Supply voltage

Rated value (DC)

- 24 V DC Yes

permissible range, lower limit (DC) 20.4 V

permissible range, upper limit (DC) 28.8 V

Load voltage L+

- Rated value (DC) 24 V
- permissible range, lower limit (DC) 20.4 V
- permissible range, upper limit (DC) 28.8 V

Input current

Current consumption, typ. 450 mA; idling

Current consumption, max. 1.3 A

Inrush current, max. 3 A; 3 A for 10 ms, then 2 A for 70 ms

Power loss

Power loss, typ. 19 W

Memory

Micro Memory Card Yes

Work memory

- integrated 128 kbyte
- expandable No

Load memory

- Plug-in (MMC) Yes
- Plug-in (MMC), max. 8 Mbyte

Backup

- present
- with battery
- without battery

Yes; Guaranteed by MMC (maintenance-free)

Yes; Option for the panel

Yes; Program and data of the CPU

Battery

Backup battery

- Backup battery (optional) Yes

CPU processing times

for bit operations, typ. 0.1 μ s

for word operations, typ. 0.2 μ s

for fixed point arithmetic, typ. 2 μ s

for floating point arithmetic, typ. 3 μ s

CPU-blocks

DB

- Number, max. 1 023; DB 0 reserved
- Size, max. 16 kbyte

FB

- Number, max. 2 048; see instruction list
- Size, max. 16 kbyte

FC

- Number, max. 2 048; see instruction list
- Size, max. 16 kbyte

OB

- Number, max. see instruction list
- Size, max. 16 kbyte

Nesting depth

- per priority class 8
- additional within an error OB 4

Counters, timers and their retentivity

S7 counter

- Number 256

Retentivity

- adjustable Yes
- lower limit 0
- upper limit 256
- 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	256
Retentivity	
— adjustable	Yes
— lower limit	0
— upper limit	256
— preset	No retentivity
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.	all
Flag	
• Number, max.	2 048 byte
• Retentivity available	Yes; MB 0 to MB 255
• Retentivity preset	MB 0 to MB 15
• Number of clock memories	8; 1 memory byte
Local data	
• per priority class, max.	1 024 byte; max. 510 bytes per block
Address area	
I/O address area	
• Inputs	2 kbyte
• Outputs	2 kbyte
of which distributed	
— Inputs	2 000 byte
— Outputs	2 000 byte
Process image	
• Inputs	128 byte
• Outputs	128 byte
Default addresses of the integrated channels	
— Digital inputs	124.0 to 126.7
— Digital outputs	124.0 to 125.7
— Analog inputs	752
— Analog outputs	761

Digital channels	
• Inputs	16 384
— of which central	992
• Outputs	16 384
— of which central	992
Analog channels	
• Inputs	1 024
— of which central	248
• Outputs	1 024
— of which central	248
Hardware configuration	
Number of modules per system, max.	23
Number of DP masters	
• integrated	1
• via CP	1
Number of operable FMs and CPs (recommended)	
• FM	8
• CP, PtP	8
• CP, LAN	10
Expansion modules	
• Number of expansion modules, max.	4; max. 2 flat structure, max. 4 deep structure
Rack	
• Racks, max.	4
• Modules per rack, max.	8; Modules in subrack 0: 4 max.; modules in subracks 1 and 2: 8 max.; modules in subrack 3: 7 max.
• Number of lines, max.	4
Time of day	
Clock	
• Hardware clock (real-time)	Yes
• retentive and synchronizable	Yes
• Backup time	6 wk; At 40 °C ambient temperature
• Deviation per day, max.	10 s
Operating hours counter	
• Number	1
• Number/Number range	0
• Range of values	0 to 2 ³¹ hours (when using SFC 101)
• Granularity	1 h
• retentive	Yes; Must be restarted at each restart
Clock synchronization	
• supported	Yes
• to MPI, master	Yes

- to MPI, slave
- in AS, master

Yes
Yes

Digital inputs

Number of digital inputs	24
<ul style="list-style-type: none"> • of which inputs usable for technological functions 	16
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Number of simultaneously controllable inputs	
horizontal installation	
— up to 40 °C, max.	12
vertical installation	
— up to 40 °C, max.	18
Input voltage	
<ul style="list-style-type: none"> • Rated value (DC) • for signal "0" • for signal "1" 	24 V -3 to +5V +15 to +30V
Input current	
<ul style="list-style-type: none"> • for signal "1", typ. 	7 mA
Input delay (for rated value of input voltage)	
for standard inputs	
— parameterizable	Yes; 0.1 / 0.3 / 3 / 15 ms
— Rated value	3 ms
for technological functions	
— at "0" to "1", max.	8 µs
Cable length	
<ul style="list-style-type: none"> • shielded, max. • unshielded, max. 	1 000 m; 100 m for technological functions 600 m
for technological functions	
— shielded, max.	50 m; at maximum count frequency
— unshielded, max.	not allowed

Digital outputs

Number of digital outputs	16
<ul style="list-style-type: none"> • of which high-speed outputs 	4
Short-circuit protection	Yes; Clocked electronically
<ul style="list-style-type: none"> • Response threshold, typ. 	1 A
Limitation of inductive shutdown voltage to	L+ (-48 V)
Controlling a digital input	Yes
Switching capacity of the outputs	
<ul style="list-style-type: none"> • on lamp load, max. 	5 W
Load resistance range	

• lower limit	48 Ω
• upper limit	4 kΩ
Output voltage	
• for signal "1", min.	L+ (-0.8 V)
Output current	
• for signal "1" rated value	0.5 A
• for signal "1" permissible range, min.	5 mA
• for signal "1" permissible range, max.	0.6 A
• for signal "1" permissible range for 0 to 40 °C, max.	0.5 A
• for signal "1" permissible range for 40 to 60 °C, max.	0.5 A; Up to 50 °C
• for signal "1" minimum load current	5 mA
• for signal "0" residual current, max.	0.5 mA
Parallel switching of two outputs	
• for uprating	No
• for redundant control of a load	Yes
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.5 Hz
• on lamp load, max.	100 Hz
• of the pulse outputs, with resistive load, max.	2.5 kHz
Total current of the outputs (per group)	
all mounting positions	
— up to 40 °C, max.	3 A
— up to 60 °C, max.	2 A; Up to 50 °C
horizontal installation	
— up to 40 °C, max.	2 A
vertical installation	
— up to 40 °C, max.	3 A
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m
Analog inputs	
Number of analog inputs	4
• For voltage/current measurement	4
• For resistance/resistance thermometer measurement	1
integrated channels (AI)	4; + 1 AI
permissible input voltage for current input (destruction limit), max.	2.5 V; max. 2.5 V permanent; max. 24 V for short time

permissible input voltage for voltage input (destruction limit), max.	30 V; Permanent
permissible input current for voltage input (destruction limit), max.	0.5 mA; Permanent
permissible input current for current input (destruction limit), max.	50 mA; Permanent
No-load voltage for resistance-type transmitter, typ.	2.5 V
Constant measurement current for resistance-type transmitter, typ.	1.8 to 3.3 mA
Technical unit for temperature measurement adjustable	Yes; Degrees Celsius / degrees Fahrenheit / Kelvin
Input ranges	
• Voltage	Yes
• Current	Yes
• Resistance thermometer	Yes
• Resistance	Yes
Input ranges (rated values), voltages	
• 0 to +10 V	Yes
• -10 V to +10 V	Yes
• Input resistance (-10 V to +10 V)	100 k Ω
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• Input resistance (0 to 20 mA)	50 Ω
• -20 mA to +20 mA	Yes
• Input resistance (-20 mA to +20 mA)	50 Ω
• 4 mA to 20 mA	Yes
• Input resistance (4 mA to 20 mA)	50 Ω
Input ranges (rated values), resistance thermometer	
• Pt 100	Yes
• Input resistance (Pt 100)	10 M Ω
Input ranges (rated values), resistors	
• 0 to 600 ohms	Yes
• Input resistance (0 to 600 ohms)	10 M Ω
Thermocouple (TC)	
Temperature compensation	
— parameterizable	No
Characteristic linearization	
• parameterizable	Yes; by software
— for resistance thermometer	Pt 100
Cable length	
• shielded, max.	100 m

Analog outputs

Number of analog outputs	2
Voltage output, short-circuit protection	Yes
Voltage output, short-circuit current, max.	55 mA
Current output, no-load voltage, max.	17 V
Output ranges, voltage	
• 0 to 10 V	Yes
• -10 V to +10 V	Yes
Output ranges, current	
• 0 to 20 mA	Yes
• -20 mA to +20 mA	Yes
• 4 mA to 20 mA	Yes
Connection of actuators	
• for voltage output two-wire connection	Yes; Without compensation of the line resistances
• for voltage output four-wire connection	No
• for current output two-wire connection	Yes
Load impedance (in rated range of output)	
• with voltage outputs, min.	1 k Ω
• with voltage outputs, capacitive load, max.	0.1 μ F
• with current outputs, max.	300 Ω
• with current outputs, inductive load, max.	0.1 mH
Destruction limits against externally applied voltages and currents	
• Voltages at the outputs towards MANA	16 V; Permanent
• Current, max.	50 mA; Permanent
Cable length	
• shielded, max.	200 m
Analog value generation for the inputs	
Measurement principle	Measurement principle momentary value encoding (successive approximation)
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	12 bit
• Integration time, parameterizable	Yes; 2,5 / 16,6 / 20 ms
• Interference voltage suppression for interference frequency f1 in Hz	400 / 60 / 50 Hz
• permissible input frequency, max.	400 Hz
• Time constant of the input filter	0.38 ms
• Basic execution time of the module (all channels released)	1 ms
Analog value generation for the outputs	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	12 bit

• Conversion time (per channel)	1 ms
Settling time	
• for resistive load	0.6 ms
• for capacitive load	1 ms
• for inductive load	0.5 ms

Encoder	
Connectable encoders	
• 2-wire sensor	Yes
— permissible quiescent current (2-wire sensor), max.	1.5 mA

Errors/accuracies	
Linearity error (relative to input range), (+/-)	0.06 %
Temperature error (relative to input range), (+/-)	0.006 %/K
Crosstalk between the inputs, min.	50 dB; at $U_{cm} = 0$ V
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.06 %
Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-)	0.1 %
Linearity error (relative to output range), (+/-)	0.15 %
Temperature error (relative to output range), (+/-)	0.01 %/K
Crosstalk between the outputs, min.	60 dB
Repeat accuracy in steady state at 25 °C (relative to output range), (+/-)	0.06 %
Operational error limit in overall temperature range	
• Voltage, relative to input range, (+/-)	1 %
• Current, relative to input range, (+/-)	1 %
• Resistance, relative to input range, (+/-)	5 %
• Voltage, relative to output range, (+/-)	1 %
• Current, relative to output range, (+/-)	1 %
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.7 %
• Current, relative to input range, (+/-)	0.7 %
• Resistance, relative to input range, (+/-)	3 %
• Resistance thermometer, relative to input range, (+/-)	3 %
• Voltage, relative to output range, (+/-)	0.7 %
• Current, relative to output range, (+/-)	0.7 %
Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$, f_1 = interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	30 dB
• Common mode interference, min.	40 dB

Interfaces

Number of printer interfaces	1; serial
MPI	
• Cable length, max.	50 m; without repeater

1. Interface

Interface type	Integrated RS 485 interface
Physics	RS 485
Isolated	No
Power supply to interface (15 to 30 V DC), max.	200 mA

Protocols	
• MPI	Yes
• PROFIBUS DP master	No
• PROFIBUS DP slave	No

MPI	
• Number of connections	16
• Transmission rate, max.	187.5 kbit/s

Services	
— PG/OP communication	Yes
— Routing	Yes
— Global data communication	Yes
— S7 basic communication	Yes
— S7 communication	Yes
— S7 communication, as client	Yes; Via CP and loadable FB
— S7 communication, as server	Yes

2. Interface

Interface type	Integrated RS 485 interface
Physics	RS 485
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA
Number of connection resources	16

Protocols	
• MPI	No
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	Yes

PROFIBUS DP master	
• Number of connections, max.	16; For PG/OP communication
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	125

Services	
— PG/OP communication	Yes
— Routing	Yes
— Global data communication	No

— S7 basic communication	No
— S7 communication	No
— S7 communication, as client	No
— S7 communication, as server	No
— Equidistance	Yes
— SYNC/FREEZE	Yes
— Activation/deactivation of DP slaves	Yes
— Direct data exchange (slave-to-slave communication)	Yes
Address area	
— Inputs, max.	244 byte
— Outputs, max.	244 byte
PROFIBUS DP slave	
• Number of connections	16
• Transmission rate, max.	12 Mbit/s
• Address area, max.	32
• User data per address area, max.	32 byte
Services	
— PG/OP communication	Yes
— Routing	Yes
— Global data communication	No
— S7 basic communication	No
— S7 communication	No
— Direct data exchange (slave-to-slave communication)	Yes
Transfer memory	
— Inputs	244 byte
— Outputs	244 byte
Communication functions	
Global data communication	
• Number of GD packets, max.	8
• Number of GD packets, transmitter, max.	8
• Number of GD packets, receiver, max.	8
• Size of GD packets, max.	22 byte
• Size of GD packet (of which consistent), max.	22 byte
S7 basic communication	
• User data per job, max.	76 byte
• User data per job (of which consistent), max.	76 byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)
S7 communication	
• as server	Yes

<ul style="list-style-type: none"> • as client 	Yes; Via CP and loadable FB
<ul style="list-style-type: none"> • User data per job, max. 	180 byte; With PUT/GET
<ul style="list-style-type: none"> • User data per job (of which consistent), max. 	64 byte
S5 compatible communication	
<ul style="list-style-type: none"> • supported 	Yes; via CP and loadable FC
Standard communication (FMS)	
<ul style="list-style-type: none"> • supported 	No
Number of connections	
<ul style="list-style-type: none"> • overall 	16
<ul style="list-style-type: none"> • usable for PG communication <ul style="list-style-type: none"> — reserved for PG communication — adjustable for PG communication, min. — adjustable for PG communication, max. 	15
<ul style="list-style-type: none"> • usable for OP communication <ul style="list-style-type: none"> — reserved for OP communication — adjustable for OP communication, min. — adjustable for OP communication, max. 	15
<ul style="list-style-type: none"> • usable for S7 basic communication <ul style="list-style-type: none"> — reserved for S7 basic communication — adjustable for S7 basic communication, min. — adjustable for S7 basic communication, max. 	12
<ul style="list-style-type: none"> • usable for S7 basic communication <ul style="list-style-type: none"> — reserved for S7 basic communication — adjustable for S7 basic communication, min. 	12
<ul style="list-style-type: none"> • usable for S7 basic communication <ul style="list-style-type: none"> — adjustable for S7 basic communication, min. — adjustable for S7 basic communication, max. 	0
<ul style="list-style-type: none"> • usable for S7 basic communication <ul style="list-style-type: none"> — adjustable for S7 basic communication, max. 	12
S7 message functions	
Process diagnostic messages	Yes
simultaneously active Alarm-S blocks, max.	40
Test commissioning functions	
Status block	Yes
Single step	Yes
Number of breakpoints	2
Status/control	
<ul style="list-style-type: none"> • Status/control variable 	Yes
<ul style="list-style-type: none"> • Variables 	Inputs, outputs, memory bits, DB, times, counters
<ul style="list-style-type: none"> • Number of variables, max. 	30
<ul style="list-style-type: none"> — of which status variables, max. 	30
<ul style="list-style-type: none"> — of which control variables, max. 	14
Forcing	
<ul style="list-style-type: none"> • Forcing 	Yes
<ul style="list-style-type: none"> • Forcing, variables 	Inputs, outputs
<ul style="list-style-type: none"> • Number of variables, max. 	10
Diagnostic buffer	

• present	Yes
• Number of entries, max.	100
— adjustable	No

Interrupts/diagnostics/status information

Alarms	Yes; No interrupts when used as standard I/O; when using the technological functions, see the manual S7-300 Programmable Controller, CPU31xC Technological Functions
Diagnostics function	No; No interrupts when used as standard I/O; when using the technological functions, see the manual S7-300 Programmable Controller, CPU31xC Technological Functions

Integrated Functions

Number of counters	4; 4 channels in total
Counting frequency (counter) max.	60 kHz
Frequency measurement	Yes
Number of frequency meters	4; 4 channels in total
controlled positioning	Yes
integrated function blocks (closed-loop control)	Yes
PID controller	Yes
Number of pulse outputs	4; 4 channels in total
Limit frequency (pulse)	2.5 kHz

Potential separation

Potential separation digital inputs	
• Potential separation digital inputs	Yes
• between the channels	No
• between the channels and backplane bus	Yes
Potential separation digital outputs	
• Potential separation digital outputs	Yes
• between the channels	Yes
• between the channels, in groups of	8
• between the channels and backplane bus	Yes
Potential separation analog inputs	
• Potential separation analog inputs	Yes
• between the channels	No
• between the channels and backplane bus	Yes
Potential separation analog outputs	
• Potential separation analog outputs	Yes
• between the channels	No
• between the channels and backplane bus	Yes

Permissible potential difference

between different circuits	75 V DC/60 V AC
Between the inputs and MANA (UCM)	8 V DC

between MANA and M internally (UISO)	75 V DC/60 V AC
Isolation	
Isolation tested with	500 V DC
EMC	
Interference immunity against discharge of static electricity	
<ul style="list-style-type: none"> Interference immunity against discharge of static electricity acc. to IEC 61000-4-2 	Yes; ± 6 kV contact discharge acc. to IEC 61000-4-2, ESD; ± 8 kV air discharge acc. to IEC 61000-4-2, ESD
Interference immunity against high-frequency electromagnetic fields	
<ul style="list-style-type: none"> Interference immunity against high-frequency radiation acc. to IEC 61000-4-3 	Yes; 10 V/m, with 80% amplitude modulation at 1 kHz, 80 MHz to 1 GHz (to IEC 61000-4-3); 10 V/m, pulse-modulated 50% duty cycle at 900 MHz and 1.89 GHz (to IEC61000-4-3)
Interference immunity to cable-borne interference	
<ul style="list-style-type: none"> Interference immunity on supply lines acc. to IEC 61000-4-4 Interference immunity on signal cables acc. to IEC 61000-4-4 	Yes; ± 2 kV acc. to IEC 61000-4-4, burst; surge measurements with additional protective elements Yes
Interference immunity against voltage surge	
<ul style="list-style-type: none"> on the supply lines acc. to IEC 61000-4-5 	Yes; ± 1 kV acc. to IEC 61000-4-5, μ s pulse/line to line; ± 2 kV acc. to IEC 61000-4-5, μ s pulse/line to ground
Interference immunity against conducted variable disturbance induced by high-frequency fields	
<ul style="list-style-type: none"> Interference immunity against high-frequency radiation acc. to IEC 61000-4-6 	Yes; 10 V/m, with 80% amplitude modulation at 1 kHz
Emission of radio interference acc. to EN 55 011	
<ul style="list-style-type: none"> Limit class A, for use in industrial areas 	Yes
Degree and class of protection	
Degree of protection acc. to EN 60529	
<ul style="list-style-type: none"> IP20 IP65 	Yes; Housing Yes; Front
Standards, approvals, certificates	
CSA approval	Yes
UL approval	Yes
FM approval	Yes
Ambient conditions	
Suited for outdoor use	No
Ambient temperature during operation	
<ul style="list-style-type: none"> horizontal installation, min. horizontal installation, max. vertical installation, min. vertical installation, max. 	0 °C 40 °C 0 °C 50 °C
Air pressure acc. to IEC 60068-2-13	
<ul style="list-style-type: none"> Operation, min. Operation, max. 	795 hPa 1 080 hPa

• Storage/transport, min.	660 hPa
• Storage/transport, max.	1 080 hPa
• permissible range, lower limit	795 hPa
• permissible range, upper limit	1 080 hPa
Relative humidity	
• Operation, min.	5 %
• Operation, max.	85 %; at <40 °C (no condensation)
• Storage, max.	85 %; at <40 °C (no condensation)
• Transportation, max.	85 %; at <40 °C (no condensation)
Vibrations	
• Operation, tested according to IEC 60068-2-6	Yes; Operation 10 Hz to 58 Hz, amplitude 0.075 mm; 58 Hz to 150 Hz, acceleration 9.8 m/s ²
• Transport, tested acc. to IEC 60068-2-6	Yes; 5 to 9 Hz: Amplitude 3.5 mm; 9 to 500 Hz: Acceleration 9.8 m/s ²
Shock testing	
• tested according to IEC 60068-2-29	Yes; Half-sine: 150 m/s ² (15 g), 11 ms, 18 shocks
Operating systems	
pre-installed operating system	
• Windows CE	Yes
Configuration	
Configuration software	
• STEP 7	Yes; V5.2 SP1 HSP or higher
• ProTool	Yes; as of V6.0 SP2 with Setup C7-636
• ProTool/Lite	Yes; Version 6.0 SP2 or higher and Setup C7-636
• ProTool/Pro	Yes; Version 6.0 SP2 or higher and Setup C7-636
• WinCC flexible Compact	Yes
• WinCC flexible Standard	Yes
• WinCC flexible Advanced	Yes
Programming	
• Command set	see instruction list
• Nesting levels	8
• 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

Know-how protection

• User program protection/password protection	Yes
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Languages

Online languages

• Number of online/runtime languages	5
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Dimensions

Width	260 mm
Height	274 mm
Depth	80 mm
Mounting cutout, width	231 mm; Tolerance: +1 mm
Mounting cutout, height	257 mm; Tolerance: +1 mm

Weights

Weight, approx.	1 750 g
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