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Interrupt Handling

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SIMATICS7 provides the following interrupt events (interrupts):

- Time-of-day interrupt

An interrupt generated by the operating system at a specific time of day, either once only or periodically.

- Time-delay interrupt

An interrupt generated after aspecific amount of time has passed: a system function call determines the instant at which this time period begins.

- Watchdog interrupt

An interrupt generated by the operating system at periodic intervals.

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SIMATICS7 provides the following interrupt events (interrupts):

- Hardware interrupt

Interrupt from a module, either via an input derived from a process signal or generated on the module itself.

- DPV1 interrupt

Interrupt from a PROFIBUSDPV1 slave.

- Multiprocessor interrupt

An interrupt generated by another CPU in a multiprocessor network.

- Synchronous cycle interrupt

An interrupt from the PROFIBUSDP master during the DP cycle.

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SFCs for Handling Time-of-Day Interrupts

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Time-of-Day Interrupts

System functions SFC	
SFC 28 "SET_TINT"	set time-of-day interrupts
SFC 29 "CAN_TINT"	cancel time-of-day interrupts
SFC 30 "ACT_TINT"	activate time-of-day interrupts
SFC 31 "QRY_TINT"	query time-of-day interrupts

A time-of-day interrupt results in one of the time-of-day interrupt OBs (OB10 to OB17) being called

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Time-of-Day Interrupts

- To start a time-of-day interrupt, must first set the start time, then activate the interrupt.
- Can perform the two activities separately via the Hardware Configuration data or using SFCs.
- A time-of-day interrupt can be started in two ways :
  - ✓ Single-shot: the relevant OB is called once only at the specified time, or
  - ✓ Periodically: depending on the parameter assignments, the relevant OB is started every minute, hourly, daily, weekly, monthly or yearly.

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Setting a Time-of-Day Interrupt with SFC 28 "SET_TINT"

Parameter	Declaration	Data Type	Memory Area	Description
OB_NR	INPUT	INT	I, Q, M, D, L, constant	Number of the OB started at the time SDT + multiple of PERIOD (OB10 to OB17).
SDT	INPUT	DT	D, L, constant	Start date and time: The seconds and milliseconds of the specified start time are ignored and set to 0. If you want to set a monthly start of a time-of-day interrupt OB, you can only use the days 1, 2, ... 28 as a start date.
PERIOD	INPUT	WORD	I, Q, M, D, L, constant	Periods from start point SDT onwards: W#16#0000 = once W#16#0201 = every minute W#16#0401 = hourly W#16#1001 = daily W#16#1202 = weekly W#16#1401 = monthly W#16#1801 = yearly W#16#2001 = at month's end
RET_VAL	OUTPUT	INT	I, Q, M, D, L	If an error occurs while the function is active, the actual parameter of RET_VAL contains an error code.

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Setting a Time-of-Day Interrupt with SFC 28 "SET_TINT"

Error Information

Error Code (W#16#...)	Explanation
0000	No error occurred
8090	Incorrect parameter OB_NR
8091	Incorrect parameter SDT
8092	Incorrect parameter PERIOD
80A1	The set start time is in the past. (This error code occurs only when PERIOD = W#16#0000.)
8xyy	General error information, see Evaluating Errors with the Output Parameter RET_VAL

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DATE_AND_TIME (date and time of day)

Length (bytes)	Format	Value range	Example of value input
8	Date and time (year-month-day-hour:minute:second)	Min.: DT#1990-1-1-0:0:0 Max.: DT#2089-12-31-23:59:59.999	DT#2008-10-25-8:12:34 DATE_AND_TIME#2008-10-25-8:12:34.567

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Structure of the DT data type

Byte	Contents	Value range
0	Year	0 to 99 (Years 1990 to 2089) BCD#90 = 1990 ... BCD#0 = 2000 ... BCD#89 = 2089
1	Month	BCD#0 to BCD#12
2	Day	BCD#1 to BCD# 31
3	Hour	BCD#0 to BCD#23
4	Minute	BCD#0 to BCD#59
5	Second	BCD#0 to BCD#59
6	The two most significant digits of MSEC	BCD#0 to BCD#999
7 (4MSB)	The least significant digit of MSEC	BCD#0 to BCD#9
7 (4LSB)	Weekday	BCD#1 to BCD#7 BCD#1 = Sunday ... BCD#7 = Saturday

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T_COMBINE (FC3)

The "T_COMBINE" instruction combines the DATE and TIME_OF_DAY (TOD) data formats and converts these formats into the ATE_AND_TIME (DT) data format.

Parameters	Declaration	Data type	Memory area	Description
IN1	Input	DATE	D, L	Input tag in the DATE format.
IN2	Input	TOD	D, L	Input tag in the TOD format.
OUT	Return	DT	D, L	Return value in the DT format.

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RD_SYS_T : Read time-of-day

Use the "RD_SYS_T" instruction to read the current date and current time-of-day of the CPU clock

Parameters	Declaration	Data type	Memory area	Description
RET_VAL	Return	INT	I, Q, M, D, L	If an error occurs while the instruction is being executed, the return value contains an error code.
OUT	Output	DT	D,L	Date and time of CPU

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WR_SYS_T : Set time-of-day

Set the time and the date of the CPU clock with the "WR_SYS_T" instruction

Parameters	Declaration	Data type	Memory area	Description
IN	Input	DT	D, L	Date and time
RET_VAL	Return	INT	I, Q, M, D, L	Status of the instruction

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SFCs for Handling Time-Delay Interrupts

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Time-Delay Interrupts

System functions SFC	
SFC 32 "SRT_DINT"	**start time-delay interrupts**
SFC 33 "CAN_DINT"	**cancel time-delay interrupts**
SFC 34 "QRY_DINT"	**query time-delay interrupts**

A time-delay interrupt results in one of the time-delay interrupt OBs (OB20 to OB23) being called