ModuleStates: Read module status information of a module

Description

You can use the "ModuleStates" instruction to read the status information of the modules of a PROFINET IO device or PROFIBUS DP slave.

The Boolean value that is output indicates the modules to which the selected status applies. You can, for example, read which modules are currently disabled in a PROFINET IO device.

Information is also displayed as to whether the status information to be read applies to at least one of the modules.

The instruction can be called in a cyclic OB as well as in an interrupt OB (e.g. OB82 - diagnostic interrupt).

Parameters

The following table shows the parameters of the "ModuleStates" instruction:

Parameter	Declaration	Data type	Memory area	Description
LADDR	Input	HW_DE-VICE	I, Q, M, D, L or constant	Hardware identifier of the station (see description below)
MODE	Input	UINT	I, Q, M, D, L or constant	Selection of module status information to be read (see description below)
RET_VAL	Return	INT	I, Q, M, D, L	Status of instruction (see description below)
STATE	InOut	VARIANT	I, Q, M, D, L	Buffer for the module status (see description below)

You can find additional information on valid data types under "**Overview of the valid data types**".

Parameter LADDR

You select the IO device or the DP slave at the LADDR parameter by means of the hardware identifier of the station.

The hardware identifier is available:

- Either in the network view of the properties of the IO device station or DP slave station.

- Or in the PLC tag table for the listed system constants with the data type HW_DEVICE (for an IO device) or with the data type HW_DPSLAVE (for a DP slave).

Parameter MODE

You use the MODE parameter to read out status information. One of the following status information items can be read for the modules:

- 1: Modules are configured

- 2: Modules are faulty

- 3: Modules are disabled

- 4: Modules exist

- 5: There is a problem in the modules. For example:
    - Maintenance demanded or recommended
    - Not accessible
    - Not available
    - Error occurred

Parameter STATE

The STATE parameter outputs the status of the modules selected with the MODE parameter.

If the status selected using MODE applies to a module, the following bits are set to "1":

- Bit 0 = 1: Group display. The bit n of at least one module was set to "1".

- Bit n = 1: The status selected with MODE applies to the module in slot n-1 (example: bit 3 = slot 2).

Use "BOOL" or "Array of BOOL" as data type:

- To only output the bit for group display of the status information, use the BOOL data type at the STATE parameter.

- To output the status information for all modules, use Array of BOOL with a length of 128 bits.

Parameter RET_VAL

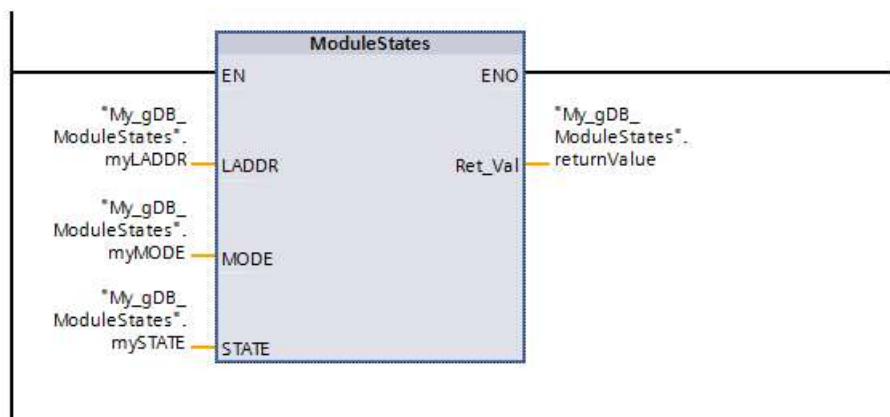| Error code* (W#16#...)	Description
0	No error
8091	Hardware identifier of the LADDR parameter does not exist. Check (for example, in the system constants) whether the value for LADDR exists in the project.
8092	LADDR does not address an IO device or DP slave.
8093	Invalid data type at the STATE parameter.
80B1	The instruction "ModuleStates" is not supported by the CPU.
80B2	The selected MODE parameter is not supported by the used CPU for the IO device/the DP slave in the LADDR parameter.
8452	The complete status information does not fit in the tag configured in the STATE parameter. Note: When the tag configured at STATE is checked for adequate field length, the CountOfElements instruction is called. This counts the fill elements when the data type VARIANT points to an Array of BOOL; with an Array [0...120] of BOOL e.g. 128 is determined as the field length. This has the consequence that the error code W#16#8452 is only returned by ModuleStates when the number of field elements you have set plus the number of fill elements created by the CPU falls below the value 128
* The error codes in the program editor are displayed as integer or hexadecimal values. For information on switching the display formats, refer to "See also".	

Example

In the following example, you query the existence of modules of a PROFINET IO device. The IO system consists of two CPUs of the S7-1500 series. The "PLC_14" CPU will contain the program, including the "ModuleStates" instruction. The "PLC_13" CPU will be configured as an IO device.
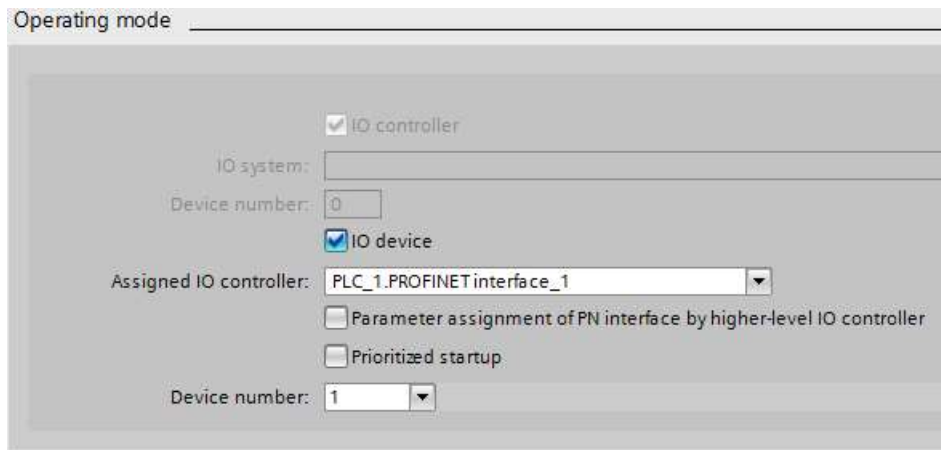
In the "PLC_14" CPU: Create three tags and a "mySTATE" structure (with the Array of BOOL data type) in a global data block for storing the data.

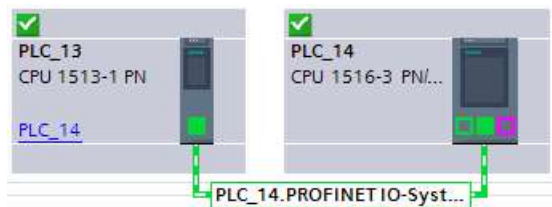|		Name	Data type	Start value
		My_gDB_ModuleStates		
1		Static		
2		myLADDR	HW_DEVICE	260
3		myMODE	UInt	4
4		returnValue	Int	0
5		mySTATE	Array[0..127] of Bool	
6		mySTATE[0]	Bool	false
7		mySTATE[1]	Bool	false
8		mySTATE[2]	Bool	false
9		mySTATE[3]	Bool	false
10		mySTATE[4]	Bool	false
11		mySTATE[5]	Bool	false
12		mySTATE[6]	Bool	false

In the "PLC_14" CPU: The instruction is called in a cyclic OB. Interconnect the parameters of the instruction as follows.

```
                    ModuleStates
              EN                    ENO
                                          "My_gDB_
"My_gDB_                                  ModuleStates".
ModuleStates".                            returnValue
    myLADDR ──── LADDR       Ret_Val ────

"My_gDB_
ModuleStates".
    myMODE ───── MODE

"My_gDB_
ModuleStates".
    mySTATE ──── STATE
```

In the "PLC_13" CPU: Set up this CPU "PLC_13" as an IO device using the CPU properties.

Operating mode

IO controller

IO system:

Device number: 0

☑ IO device

Assigned IO controller: PLC_1.PROFINET interface_1

☐ Parameter assignment of PN interface by higher-level IO controller

☐ Prioritized startup

Device number: 1

An IO system is displayed in the Network view.

PLC_13
CPU 1513-1 PN

PLC_14

PLC_14
CPU 1516-3 PN/...

PLC_14.PROFINET IO-Syst...

In the "PLC_14" CPU: A module is located in slot 1 of the IO device.

0 1 2 3 4

In the "PLC_14" CPU: The HW identifier of the IO device is made known to the "ModuleS-tates" instruction through parameter LADDR ("myLADDR"). According to the value "4" of parameter MODE ("myMODE"), the IO device is searched for modules.

At parameter STATE ("mySTATE"), the presence is output for the modules (based on the value of parameter MODE) . Bit 0 serves as a group value and indicates that modules are present. Bit 2 indicates that a module is present in slot 1.

The output parameter RET_VAL ("returnValue") indicates that processing took place without errors.

		Name	Data type	Start value	Monitor value
1		▼ Static			
2		myLADDR	HW_DEVICE	260	16#0104
3		myMODE	UInt	4	4
4		returnValue	Int	0	0
5		▼ mySTATE	Array[0..127] of Bool		
6		mySTATE[0]	Bool	false	TRUE
7		mySTATE[1]	Bool	false	FALSE
8		mySTATE[2]	Bool	false	TRUE
9		mySTATE[3]	Bool	false	FALSE
10		mySTATE[4]	Bool	false	FALSE
11		mySTATE[5]	Bool	false	FALSE
12		mySTATE[6]	Bool	false	FALSE

My_gDB_ModuleStates

Program code

You can find additional information and the program code for the above-named example here: **Sample Library for Instructions**.

Example

An IO device contains 4 modules in slots 1 to 4. The module in slot 2 is faulty.

The instruction "ModuleStates" is executed for the IO device with MODE = 2 (faulty/not faulty).

The following bits are set in the STATE parameter:

- Bit 0 = 1: A fault exists for at least one module.
- Bit 1 = 0: Slot number 0 (used by IO device)
- Bit 2 = 0: Module in slot number 1 is not faulty.
- Bit 3 = 1: Module in slot number 2 is faulty.
- Bit 4 = 0: Module in slot number 3 is not faulty.
- Bit 5 = 0: Module in slot number 4 is not faulty.
- Bit 6 = 0: Irrelevant
- Bit 7 = 0: Irrelevant

See also

Switching display formats in the program status