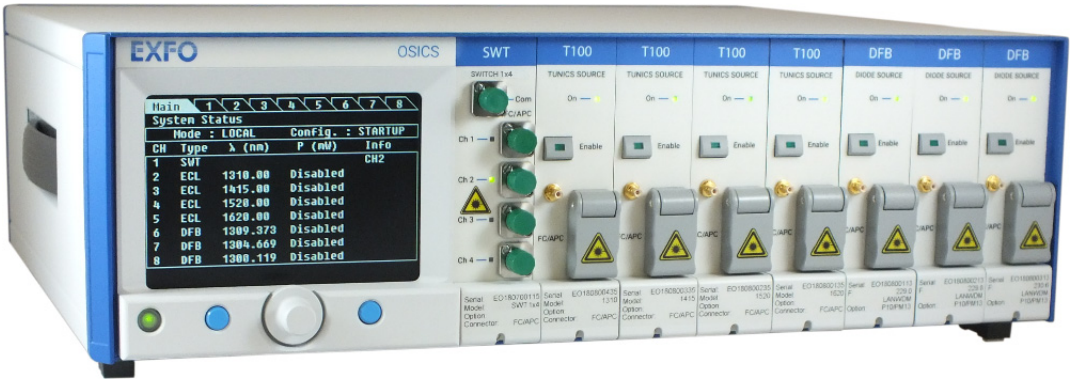
# OSICS Multifunction Platform

## 8-Channel Modular Platform




# Programming Guide

# About This Manual

**Subject**

This manual specifies the remote interfaces of the OSICS Mainframe and modules and the corresponding remote commands.

**Application**

Information in this document applies to the OSICS Mainframe version 3.06 and the following versions of OSICS modules:

- OSICS ATN v. 1.07 and higher versions
- OSICS BKR v. 1.07 and higher versions
- OSICS DFB v. 2.38 and higher versions
- OSICS SLD v. 1.03 and higher versions
- OSICS SWT v. 1.07 and higher versions
- OSICS T100 v. 3.05 and higher versions

**Intended Readers**

Users of this manual must be familiar with:

- Fiber optic technology
- The RS-232C and/or IEEE-488.1 interfaces used to operate the OSICS in remote mode
- The use of the OSICS multifunction platform (see *OSICS User Guide*)

**Date**

30 September 2022

**Manual Reference**

OSICS_PG_3v4.0

**Typographical Conventions**

| | |
|---|---|
| **bold** | Identifies graphical interface objects such as menu names, labels, buttons and icons. |
| *italic* | Identifies references to other sections or other guides. |
| `monospace` | Identifies portions of program codes, command lines, or messages displayed in command windows. |
| **IMPORTANT** | Identifies important information to which you must pay particular attention. |

**Command Syntax Notation Conventions**

| Notation | Meaning |
|---|---|
| [...] | The content between square brackets is optional. |
| <...> | The content between angled brackets indicates the type of information that you must enter as parameter (command) or that is received (response). |
| \| | Indicates an alternative. Equivalent to "or". |
| # | Represents a numeric suffix, for example an OSICS slot number. |

## Symbols

**Warning**
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Do not proceed unless you understand and meet the required conditions.

**Caution**
Indicates a potentially hazardous situation which, if not avoided, may result in component damage. Do not proceed unless you understand and meet the required conditions.

## Abbreviations Used

| Abbreviation | Meaning |
|---|---|
| GPIB | General Purpose Interface Bus |
| LF | line feed |
| CR | carriage return |
| EOI | End-Or-Identify |
| LSB | Least Significant Bit |

## Copyright



Information provided by EXFO is believed to be accurate and reliable. However, no responsibility is assumed by EXFO for its use nor for any infringements of patents or other rights of third parties that may result from its use. No license is granted by implication or otherwise under any patent rights of EXFO.

EXFO's Commerce And Government Entities (CAGE) code under the North Atlantic Treaty Organization (NATO) is 0L8C3.

The information contained in this publication is subject to change without notice.

## Trademarks

EXFO's trademarks have been identified as such. However, the presence or absence of such identification does not affect the legal status of any trademark.

## Units of Measurement

Units of measurement in this publication conform to SI standards and practices.

## Patents

The exhaustive list of patents is available at www.EXFO.com/patent.

## Product Warranty and Limitation of Warranty

For detailed information about the sales terms and conditions, visit the EXFO web site at www.exfo.com/how-to-buy/sales-terms-conditions

## Contact Information

To obtain after-sales service or technical support for this product, contact EXFO at one of the following numbers.

**Technical Support Group**

400 Godin Avenue
Quebec (Quebec) G1M 2K2
CANADA

Tel. USA and Canada: 1 866 683-0155
Fax: 1 418 683-9224
E-mail: support@exfo.com

For detailed information about technical support and for a list of other worldwide locations, visit the EXFO web site at
www.EXFO.com/support

To accelerate the process, please have information such as the name and the serial number (see the product identification label), as well as a description of your problem, close at hand.

# Table of Contents

# 1. Remotely Controlling the OSICS Multifunction Platform

You can remotely control the OSICS Mainframe through the following ports:

- IEEE-488.2 communication through the GPIB port
- RS-232C communication through the USB-B port

This section explains how to use these ports to remotely control the OSICS multifunction platform.

## 1.1 Switching Between Remote and Local Mode

**Procedures**

**Entering the Remote Mode**

- The OSICS multifunction platform automatically switches to remote mode if it receives a command (via the USB or GPIB port).

  When the OSICS multifunction platform enters into remote mode, the Mode area displays **Mode: REMOTE** and the user interface control-panel is disabled.

  The **System Status** screen remains active and displays the current module settings, such as operating wavelength (or frequency) or output power.

**Switching Back to Local Mode**

- To go back to local mode, select **LOCAL** by pressing the right control button (see the front panel description in the *OSICS User Guide*).

  In GPIB, if the OSICS multifunction platform is set to local lockout condition, the message `LOCAL LOCKOUT` is displayed. This means that the OSICS multifunction platform is locked into GPIB remote-control operation: all OSICS front panel controls are disabled and local operating mode can no longer be restored using the **LOCAL** soft-key.
  To restore the user interface control panel, send the "Go to local" instruction to the OSICS multifunction platform from the computer or GPIB controller (refer to the programming guide of your GPIB board to know the exact syntax for the "Go to local" instruction).

## 1.2 Remotely Controlling the OSICS via IEEE 488

**Subject**

This section explains how to use the IEEE-488.2 GPIB interface to remotely operate the OSICS multifunction platform.

The GPIB port is located on the rear panel and is labeled **IEEE 488** (see *OSICS User Guide*).

**Capabilities**

The following table lists the OSICS GPIB capabilities.

| Mnemonic | Function |
|---|---|
| SH1 | Complete source handshake |
| AH1 | Complete acceptor handshake |
| T5 | Complete talker |
| L3 | Complete listener |
| SR1 | Complete service request |
| RL1 | Complete remote/local |
| PP0 | No parallel poll |
| DC1 | Complete device clear |
| DT0 | No device trigger |
| C0 | No controller |

*Table 1: GPIB Interface Capabilities*

### 1.2.1 Setting the GPIB Address

**Subject**

The default GPIB address of the OSICS is factory-set to 10. This section explains how to modify it (possible values are 1 to 30).

Up to 15 devices may be connected on the same GPIB bus simultaneously. Each device has its own GPIB address in the range of 0 to 30. To avoid address conflicts, you must make sure that your OSICS GPIB address is different from the address of any other device already connected to the GPIB port.

**Procedure**

1. Access the **Main Setup** menu (see *OSICS User Guide*).
2. Turn the rotary knob to put the cursor before the **GPIB address** menu and press the knob to enter it.

   The **GPIB Address** sub-menu appears and displays the current GPIB address.

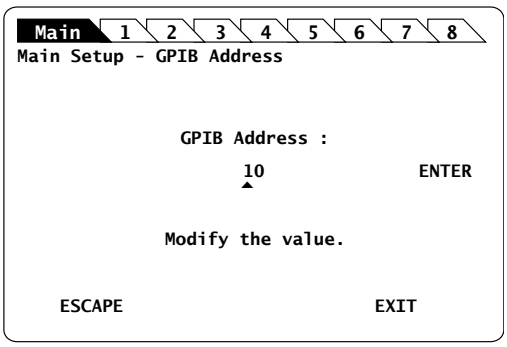



*Figure 1: Main Setup – GPIB Address*

3. Enter the wanted address as follows:

a. Turn the rotary knob to put the cursor under the digit to modify and press the knob to highlight it.
b. Turn the knob clockwise to increase the value or anticlockwise to decrease it and press the knob to validate the selected digit.
c. Perform steps a. and b. for every digit you want to modify.
d. Turn the rotary knob clockwise to put the cursor under **ENTER** and press the knob to validate the new address.

The new GPIB address is set and stored in memory. You do not need to restart the OSICS Mainframe.

## 1.2.2 Connecting the OSICS to an IEEE 488 Controller

**Subject** The GPIB port enables you to connect the OSICS Mainframe to a computer and to control it via remote commands.

**Before Starting** Make sure you have a GPIB cable to link the OSICS Mainframe to an IEEE-488.2 controller (GPIB PCI card or GPIB-USB-HS module from National Instrument) connected to your computer.

**Procedure**

1. Connect the GPIB port of the OSICS Mainframe to the IEEE-488.2 controller connected to your computer via the GPIB cable.
2. Use the authorized remote GPIB commands detailed in the present guide to remotely control the OSICS multifunction platform.

## 1.3 Remotely Controlling the OSICS via USB-B (RS-232C Protocol)

**Subject**

The USB 2.0-B port is located on the on the rear panel and is labeled **USB-B** (see *OSICS User Guide*).

The OSICS multifunction platform can receive RS-232C commands at the USB-B port from a computer on which the appropriate USB driver is installed. To achieve this, you must install the OSICS USB Driver on your computer in order to make the USB port appear as an additional COM port available to the PC (see the following procedure).

Application software can then access the USB port in the same way as it would access a standard COM port. Therefore, RS-232C commands can be sent to the OSICS using a serial-communication terminal.

The OSICS USB Driver is available on the USB key provided with the OSICS, or from the EXFO website.

This section explains how to connect your computer to the OSICS Mainframe and how to install the OSICS USB driver.

**Before Starting**

- Make sure your computer runs one of the following operating systems: Windows 10, Windows 8, Windows 7.
  If not, the OSICS USB driver is not supported by your computer.
- Make sure you have a USB-A to USB-B cable to link the OSICS Mainframe to your computer.

**Procedure**

1. Do one of the following:
   - Connect the OSICS USB key to the USB-A port of your computer.
   - From the EXFO website (www.exfo.com/en/exfo-apps), download the OSICS USB Driver (.zip file) and unzip it to a temporary folder on your computer.
2. In the USB Driver folder, double-click one of the following files, depending on you Windows platform (if you select the wrong file, a message appears, prompting you to select the other file):
   - 32-bit system: OSICSUSBInstaller_x86.exe
   - 64-bit system: OSICSUSBInstaller_x64.exe

   The OSICS USB Driver installation wizard appears.
3. Follow the instructions displayed in the wizard window.

   The OSICS USB Driver is now installed on your computer.
4. Connect the USB-B port of the OSICS to the USB-A port of your computer using a USB-A to USB-B cable.

   The OSICS USB-B port is recognized as a COM port by the computer.
5. Use the authorized remote RS-232C commands (detailed in the present guide) to remotely control the OSICS multifunction platform.

**Port Settings**

On your computer, make sure the port settings are configured with the following values:

- Baud rate (bits per second): 9600 bauds
- Data bits: 8
- Parity: none
- Stop bits: 1
- Flow control (handshaking): none

# 2. General System and Status Control

## 2.1 Communication Principles

### 2.1.1 Format of Messages

**Message Endings**

**Command Message Ending**

A command message must end with one of the following:

- USB (RS-232C): CR (or ASCII code 13 character)
- GPIB: LF (or ASCII code 10 character) or EOI message

**Response Message Ending**

- All commands sent via RS-232C generate a response message from the OSICS Mainframe to inform the computer whether the order was successfully performed (`OK`) or that an error was produced (error messages are explained in the following *Error Handling* section, *p 14*).

  A response message always ends with the end-of-message sequence composed of:
  - the `<CR>` at the end of the message string
  - a blank line
  - the `>` sign placed on the next line followed by one white-space character, to separate messages from one another along the vertical layout.

  Example:

  ```
  P=0.5 <CR>
  P=? <CR>
  ```

  will generate the following two response messages if operation is successful:

  ```
  OK <CR>
  >
  P=0.5 DBM <CR>
  >
  ```

- Commands sent via GPIB follow the standard status model, see section *Standard Status Model, p. 15*.

**Message Syntax Rules**

**Case**

Commands are not case sensitive, you can type messages in upper-case or lower-case characters.

**White Space**

White spaces are allowed only before or after a command string, but not within a command mnemonic.

**Multiple Commands**

Compound commands are allowed and consist of a series of individual instructions separated from one another by a semicolon ( ; ).

The commands are processed by the OSICS Mainframe in the order received.

**Command Length**

A single command string can be up to 255 characters long. A longer command string generates a command-error message and the buffer is cleared.
A new command cannot be sent until all the instructions of the command string already in the buffer are completed. This will otherwise clear the buffer and generate a command-error. Moreover all the previous commands will be lost.

**Numeric Values**

Numeric values are either integers or doubles depending on the definition of the parameter.

- A numeric value can start with a leading `0`
  Example: `P=01.2`
- The = sign cannot be totally omitted but can be replaced by a white-space character.
  Example: `P 1.2`
- White spaces are allowed before and after the = sign.
- Unit notation cannot be used after a numeric value.
- A comma cannot be used in a dot-decimal notation.
- White spaces are not allowed within a numerical value.

**Error Handling**

The OSICS Mainframe performs error-checking on each command received and during command execution. Errors fall into three categories and may generate one of the following error messages:

- Execution Error

  The command syntax is valid but the data contained in the command parameter is out of valid range. The current parameter setting remains unchanged.
- Command Error

  An unknown command is received or the command string has a syntax error in it.
- Device Dependent Error

  Some condition due to instrument malfunction or overload has been detected.

## 2.1.2 Command Applicability

Commands are based on a simple two-level hierarchy:

- First-level commands affect the **OSICS Mainframe** only. To enter an OSICS Mainframe command, simply type in the instruction string followed by the carriage return character in RS-232C, as shown in the following example:

  `P=0.22 <CR>`
  This command sets the output power for all the modules installed in the OSICS Mainframe to 0.22 mW (if mW is the selected power unit).
- Second-level commands are used to control the operation and setting parameters of **OSICS modules** installed in the OSICS Mainframe.

Module commands require the `CH#:` specifier, where `#` is the slot number of the module to which the command applies (ranging from 1 to 8), as shown in the following example:

`CH2:P=0.22 <CR>`
This command sets the output power of the module installed in the channel-slot 2 to 0.22 mW (if mW is the selected power unit).

Similarly, the OSICS modules send a response statement to every command received and executed. Response messages are similar in syntax to programming commands' responses and feature the channel-specifier `CH#` in front of the message to differentiate between channels.

# 2.2 Standard IEEE Status Register Commands and Queries

## 2.2.1 Standard Status Model

**Status Model**

The status word is an 8-bit variable that relates to the status of the OSICS Mainframe and error reporting as well. It contains a number of binary indicators which can be used by the controller for an optimal synchronization between the OSICS Mainframe and the controller. They indicate to the controller the nature of the current operation as well as the errors encountered.

The following figure shows the standard IEEE status model.

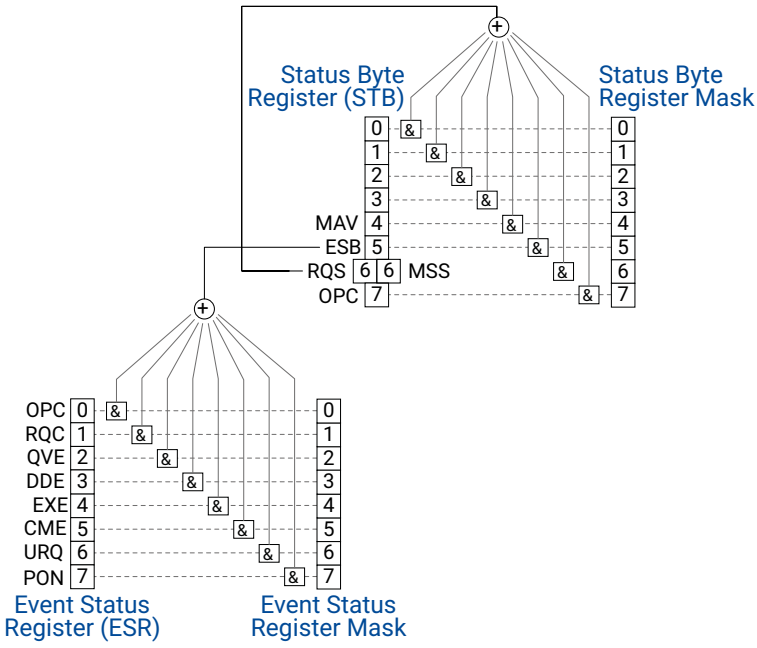



*Figure 2: Status Word Model*

Two mask registers are associated with the Status Byte register (STB) and the standard Event Status Register (ESR). These masks are used to control the service request operation of the instrument.

In the status and standard event registers, individual bits are validated by setting to `1` the corresponding bit in the mask register. Once the required bits have been set in each

mask register, the summary bit will be set to `1` when the corresponding status or event register bits are set to `1`.

The summary bit is obtained by performing a logical AND operation between each register and the corresponding mask register, and then a logical OR operation between all individual bits of the result.

**Status Byte Register**

| Bit Number | Name | Meaning |
|---|---|---|
| 7 | OPC (OPeration Complete) | Set to `1` once the last command has been completed. |
| 6 | RQS (ReQuest Service) | Set to `1` if a service request has been generated by the OSICS Mainframe. This bit remains activated until a serial poll has been performed. |
| 6 | MSS (Master Summary Status) | Set to `1` together with the RQS bit. This bit remains activated as long as the condition that has lead to a service request is high.<br>It is cleared as soon as this condition ceases. This bit can be read by the `*STB?` command. |
| 5 | ESB (Event Status Bit) | Set to `1` as soon as one or more bits in the Event Status Register (ESR) are activated. |
| 4 | MAV (Message AVailable) | Set to `1` if a message is available and ready to be read in the output queue. This bit remains activated as long as the output queue has not been emptied. |

**Event Status Register**

The following table gives the meaning of each bit in the Event Status register (ESR).

| Bit Number | Name | Meaning |
|---|---|---|
| 7 | PON (Power ON) | Set to `1` once the instrument initialization routine has been completed. |
| 6 | URQ (User ReQuest) | Set to `1` to indicate that an instrument front-panel key has been pressed. |
| 5 | CME (ComMand Error) | Set to `1` to indicate a command syntax error or an unknown command. |
| 4 | EXE (EXecution Error) | Set to `1` when a parameter value is out of the valid range or when a command cannot be executed. |
| 3 | DDE (Device Dependent Error) | Set to `1` if a malfunction has occurred on the instrument or an overload condition has been reached. |
| 2 | QYE (QuerY Error) | Set to `1` in either of those two cases:<br>• The GPIB controller has attempted to read from the OSICS Mainframe while the output queue was empty.<br>• The data in the GPIB output queue has been overwritten and lost. |

| Bit Number | Name | Meaning |
|---|---|---|
| 1 | RQC (ReQuest Control) | This bit may not be set to 1, since the OSICS instrument does not work as an IEEE-488.2 bus controller. |
| 0 | OPC (OPeration Complete) | In most cases this bit is set to 1 as soon as a command has been completely executed. |

The Event Status Register is cleared each time it is read by the controller. When the execution of a command line begins, the OPC bit is cleared.

### Task Synchronization

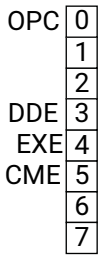
The GPIB interface of the OSICS Mainframe performs tasks sequentially in the order received; it does not support overlapping tasks.

- The **OPC** (OPeration Complete) bit is cleared while the instruction is being processed and set to 1 once it has been completed. This is particularly useful when setting a channel to a new wavelength, as this operation may take a few seconds to complete. The computer should verify this flag until it is set to 1 and then only proceed to the next instruction. The status of the OPC flag is available through serial-polling the STB byte register. The OPC flag is contained in bit 7 of the STB byte register.
- The **MAV** (Message AVailable) bit indicates that messages are available in the output buffer and ready to be read. For instance, if a query command was sent, the computer must wait until the response message is placed in the output queue before reading it. If several queries were sent via a compound command, the MAV flag remains activated until all response messages have polled by the computer. The MAV flag is contained in bit 4 of the STB byte register.

To ensure a proper sequence of events, it may be useful to combine the use of the STatus Byte Register (STB) with the Event Status Register (ESR). The most relevant bit in the STB byte is bit 4 (MAV). The STB byte can be read either through a serial poll or as a response to the *STB? query.

### Error Handling

If different types of errors occur, relevant bits in the Event Status Register (ESR) are set to 1. The following diagram shows the ESR error model:




Event Status Register (ESR)

The ESR byte can be read via the *ESR? query.

The relevant bits in this control byte are the following bits:

- 0 (OPeration Complete: OPC)
- 3 (Device Dependent Error: DDE)
- 4 (EXecution Error: EXE)
- 5 (CoMmand Error: CME).

We recommend reading the ESR bit each time a command is sent to help trace errors throughout programmed operation, identify possible causes for errors and make the necessary programming adjustments.

**Caution**

Reading the ESR byte with the *ESR? query command clears all the bits in the Event Status Register. Therefore, we recommend reading all significant bits at the time of query to ensure no relevant information is left out or lost.

## 2.2.2 Common IEEE Commands and Queries

To accelerate and secure the exchange of information between the controller and the OSICS Mainframe, we recommend checking the values of the Status Register and of the standard Event Status Register using the IEEE-488.2 common commands presented in the following table.

| Command | Parameter | Action | OSICS Response |
|---|---|---|---|
| *CLS | none | Clears the Event Status Register and the output queue. Sets the OPC bit to `1`.<br>The CLS instruction is automatically sent to each module. | |
| *ESE | Integer value<br>(0 to 255) | The standard event mask register is set to a value equal to the parameter of ESE command.<br>If the parameter is out of the range of 0 to 255, this triggers the “Execution Error”. | |
| *ESE? | none | The value of ESE is placed in the output queue. | Returns the value of ESE (0 to 255). |
| *ESR? | none | Standard Event Status Register query.<br>The value of the standard event register is placed into the output queue and the standard event register is cleared. | Returns the value of the ESR byte<br>(0 to 255). |
| *IDN? | none | IDeNtification query. | `EXFO,OSICS,`<br>`<serial number>,`<br>`<software version>`<br>`/<FPGA version>` |
| *OPC | none | Waits until the pending command is completed, then sets the OPC bit in the Event Status Register. | |
| *OPC? | none | Waits until OPC bit is true, then places “1” in the output queue, followed by the LF character. | This command always returns `1`. |
| *RST | none | The input buffer is cleared. The command interpreter is reset and a reset instruction is sent to every module. The status and event registers are cleared. Sets the OPC bit to 1. | OK |
| *SRE | Integer value<br>(0 to 255) | Sets the value of the Service Request Enable Register. SRE determines which event triggers a serial poll. SRE is assigned the value of its parameter. For example, if bit 4 is set, this means that a service request will be generated when a message becomes available in the output queue.<br>If the parameter is out of the range from 0 to 255, this triggers the “Execution Error”. | |

| Command | Parameter | Action | OSICS Response |
|---|---|---|---|
| *SRE? | none | Reads the value of the SRE register. | Value of the SRE register (0 to 255). |
| *STB? | none | STatus Byte query.<br>The value of the status byte register is sent to the output queue. STB contains the MAV flag that takes bit number 4.<br>In the STB? query, bit 6 is assigned the MSS flag rather than the RQS flag, unlike the standard STB. | Value of the STB status byte (0 to 255). |
| *WAI | none | Does nothing but wait until the pending command has been completed. | |

## 2.3 RS-232C Common Commands

**Subject**

This section describes the ECHON command, which is useful for viewing the characters keyed in at the terminal.

Setting the echo mode by using the ECHON command is needed for some terminals and terminal emulation programs that do not feature local echo, otherwise typed characters cannot be seen.

**Before Starting**

Make sure that the "echo" feature is enabled on the terminal emulation program you use.

**Commands**

| Command/ Query | Parameter | Description | OSICS Mainframe Response |
|---|---|---|---|
| ECHON | none | Sets the OSICS Mainframe to echo each typed character received back to the terminal. | OK |
| ECHOFF | none | Default setting.<br>Cancels the echo mode on the OSICS Mainframe.<br>If the local operating mode is restored using the front-panel **LOCAL** button, the echo mode is automatically switched off and restored to default: ECHOFF. | OK |

# 3. OSICS Mainframe Control

The following table gives an overview of all available commands and queries for OSICS Mainframe control.

| | Command/Query | Corresponding Section |
|---|---|---|
| **Optical-Output Control** | DISABLE | *DISABLE, p. 22* |
| | ENABLE | *ENABLE, p. 22* |
| | ENABLE? | *ENABLE?, p. 22* |
| **Spectral Unit Selection** | GHZ | *GHZ, p. 23* |
| | NM | *NM, p. 23* |
| | NM? | *NM?, p. 23* |
| **Output Power Control** | DBM | *Power Unit Selection, p. 24* |
| | MW | |
| | MW? | |
| | P= | *Power Setting, p. 25* |
| | P? | |
| **Modulation Control** | MOD_SRC | *MOD_SRC?, p. 26* |
| | MOD_SRC? | *MOD_SRC?, p. 26* |
| | MOD_F= | *MOD_F=, p. 26* |
| | MOD_F? | *MOD_F?, p. 27* |
| **Working Configuration Control** | SAVE | *SAVE, p. 27* |
| | RECALL | *RECALL, p. 27* |
| **OSICS System Management Control** | *IDN? | **IDN?, p. 28* |
| | *RST | **RST, p. 28* |
| | INTERLOCK? | *INTERLOCK?, p. 28* |
| | PRESENT? | *PRESENT?, p. 29* |

# 3.1 Optical-Output Control

## 3.1.1 DISABLE

**Syntax** `DISABLE`

**Parameter** None.

**Description** Default setting.
Disables the laser output on all installed OSICS modules.

**OSICS Response**
- RS-232C: `OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 3.1.2 ENABLE

**Syntax** `ENABLE`

**Parameter** None.

**Description** Enables the laser output on all installed OSICS modules.

**OSICS Response**
- RS-232C: `OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 3.1.3 ENABLE?

**Syntax** `ENABLE?`

**Parameter** None.

**Description** Returns the current state of the OSICS Mainframe laser output master control.

**OSICS Response**
- `ENABLED`: the laser is set to **ENABLE**.
- `DISABLED`: the laser is set to **DISABLE**.

# 3.2 Spectral Unit Selection

## 3.2.1 GHZ

**Syntax** `GHZ`

**Parameter** None.

**Description** Sets the frequency in **GHz** as the spectral unit on all modules throughout the system.

**OSICS Response**
- RS-232C: `OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 3.2.2 NM

**Syntax** `NM`

**Parameter** None.

**Description** Default setting.
Sets the wavelength in **nm** as the spectral unit on the OSICS Mainframe and all installed OSICS modules.

**OSICS Response**
- RS-232C: `OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 3.2.3 NM?

**Syntax** `NM?`

**Parameter** None.

**Description** Returns the current spectral unit used on the OSICS Mainframe and all installed OSICS modules.

**OSICS Response**
- `1`: the current spectral unit used is **nm**.
- `0`: the current spectral unit used is **GHz**.

# 3.3 Output Power Control

## 3.3.1 Power Unit Selection

### 3.3.1.1 DBM

**Syntax** `DBM`

**Parameter** None.

**Description** Sets **dBm** as the power unit on all modules. All power-related functions throughout the OSICS Mainframe now use **dBm** as power unit.

**OSICS Response**
- RS-232C: `OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 3.3.1.2 MW

**Syntax** `MW`

**Parameter** None.

**Description** Default setting.
Sets **mW** as the power unit on all modules. All power-related functions throughout the OSICS Mainframe now use **mW** as power unit.

**OSICS Response**
- RS-232C: `OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 3.3.1.3 MW?

**Syntax** `MW?`

**Parameter** None.

**Description** Returns the current power unit used on the OSICS Mainframe and all installed OSICS modules.

**OSICS Response**
- `1`: the current power unit used is **mW**.
- `0`: the current power unit used is **dBm**.

## 3.3.2 Power Setting

### 3.3.2.1 P=

**Syntax** `P=xx.xx|(±)xx.xx`

**Parameter**

- `[±]xx.xx`: optical output power in dBm, if the unit is set to dBm (see section *DBM, p. 24*). Possible values are given in the *Technical Specifications* section corresponding to the installed modules in the *OSICS User Guide*.
- `xx.xx`: optical output power in mW, if the unit is set to mW (see section *MW, p. 24*). Possible values are given in the *Technical Specifications* section corresponding to the installed modules in the *OSICS User Guide*.

**Description** Sets the optical output power of all modules to the same value, depending on the selected power unit (see section *Power Unit Selection, p. 24*).

**OSICS Response**

- RS-232C: `OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 3.3.2.2 P?

**Syntax** `P?`

**Parameter** None.

**Description** Returns the optical output power value set for the modules, according to the selected power unit. The format of the response depends on the power unit selected (see section *Power Unit Selection, p. 24*).
The returned response is the value set using the `P=` command (see section *P=, p. 25*), it does not give the power of the installed modules.

**OSICS Response**

- `P=xx.xx`: output power value in mW.
- `P=±xx.xx`: output power value in dBm.

# 3.4 Modulation Control

## 3.4.1 MOD_SRC

**Syntax** `MOD_SRC INT|EXT`

**Parameters**

- `INT`: **INTERNAL** digital modulation signal. The internal source uses the OSICS Mainframe on-board modulation signal generator. To set the frequency of the OSICS internal TTL modulation, use the `MOD_F` command (see section *MOD_F=, p. 26*)
- `EXT`: **EXTERNAL** digital modulation signal. In this case, you must connect a TTL signal generator to the **Mod. In** BNC connector located at the rear panel of the OSICS Mainframe (see *OSICS User Guide*).

**Description** Sets the type of modulation source of the OSICS Mainframe.

**OSICS Response**

- RS-232C: `OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 3.4.2 MOD_SRC?

**Syntax** `MOD_SRC?`

**Parameter** None.

**Description** Returns the type of digital (TTL) modulation source currently selected for the OSICS.

**OSICS Response**

- `MOD_SRC=INT`: the modulation source is set to **INTERNAL**.
- `MOD_SRC=EXT`: the modulation source is set to **EXTERNAL**.

## 3.4.3 MOD_F=

**Syntax** `MOD_F=xxxxxxx`

**Parameter**

- `xxxxxxx`: frequency in Hz, in the range 123 Hz to 1000000 Hz (1 MHz).

  Default value: 200 Hz

**Description** Sets the frequency of the OSICS Mainframe internal digital (TTL) modulation source.
If the OSICS Mainframe is not able to generate the exact value of the frequency setting, it applies the nearest available frequency value, right under the value of the setting.

**OSICS Response**

- RS-232C: `OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 3.4.4 MOD_F?

**Syntax** `MOD_F?`

**Parameter** None.

**Description** Returns the frequency of the OSICS internal digital (TTL) modulation source in Hz.

**OSICS Response** `MOD_F=xxxxxxx`

## 3.5 Working Configuration Control

The commands detailed in this section enable you to load or save working configurations. For more details on working configuration, see *OSICS User Guide*.

### 3.5.1 SAVE

**Syntax** `SAVE STARTUP|A|B|C|D`

**Parameters**

- `STARTUP`: configuration loaded at OSICS startup.
- `A`: **A** configuration memory.
- `B`: **B** configuration memory.
- `C`: **C** configuration memory.
- `D`: **D** configuration memory.

**Description** Saves the current OSICS Mainframe and module configuration settings to the selected configuration memory.

**OSICS Response**

- RS-232C: `OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 3.5.2 RECALL

**Syntax** `RECALL DEFAULT|STARTUP|A|B|C|D`

**Parameter**

- `DEFAULT`: factory-set **DEFAULT** configuration type.
- `STARTUP`: **STARTUP** configuration type.
- `A`: **A** configuration memory.
- `B`: **B** configuration memory.
- `C`: **C** configuration memory.
- `D`: **D** configuration memory.

**Description** Loads the selected configuration type.

**OSICS Response**
- RS-232C: `OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 3.6 OSICS System Management Control

### 3.6.1 *IDN?

**Syntax** `*IDN?`

**Parameter** None.

**Description** Returns information about the OSICS Mainframe.

**OSICS Response** `EXFO,OSICS,<serial number>,<software version>/<FPGA version>`

### 3.6.2 *RST

**Syntax** `*RST`

**Parameter** None.

**Description**
- Resets the OSICS Mainframe and all modules to the same state as after system turn-on and initialization.
- Clears the input queue.
- Sets the OPC bit to 1.

The command interpreter is reset and a reset instruction is sent to every module.
The status and event registers are cleared.

**OSICS Response**
- RS-232C: `OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 3.6.3 INTERLOCK?

**Syntax** `INTERLOCK?`

**Parameter** None.

**Description** Returns the current state of the remote interlock mode.

**OSICS Response**
- `1`: the remote interlock is on (laser switched off).
- `0`: the remote interlock is off (laser switched on).

### 3.6.4 PRESENT?

**Syntax** `PRESENT? #`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the type of OSICS module installed in channel-slot number `#`. Each type of OSICS module has its own module code.

**OSICS Response**
- `-1`: empty slot.
- `1`: the module installed in the selected slot is a T100 module.
- `2`: the module installed in the selected slot is a DFB or SLD module.
- `7`: the module installed in the selected slot is an SWT module.
- `8`: the module installed in the selected slot is an ATN or BKR module.
- `10`: the module installed in the selected slot is a TLS module (deprecated).

# 4. OSICS ATN Control

The following table gives an overview of all available commands and queries for OSICS ATN control.

| | Command/Query |
|---|---|
| **Unit Selection (*p. 31*)** | CH#:GHZ |
| | CH#:NM |
| | CH#:NM? |
| **Attenuation Setting (*p. 33*)** | CH#:ATN |
| | CH#:ATN? |
| | CH#:ATN_MIN_MAX? |
| **Wavelength Setting (*p. 35*)** | CH#:L |
| | CH#:L? |
| | CH#:LREF? |
| **Offset Setting (*p. 35*)** | CH#:OFFSET |
| | CH#:OFFSET? |
| **Module System-Version Information (*p. 36*)** | CH#:FIRM? |
| | CH#:*IDN? |
| | CH#:TYPE? |

## 4.1 Unit Selection

### 4.1.1 CH#:GHZ

**Syntax** CH#:GHZ

**Parameter**
- #: slot number of the module, in the range 1 to 8.

**Description** Sets **GHz** as the spectral unit of the module.

**OSICS Response**
- RS-232C: CH#:OK
- GPIB: none, see section *Standard Status Model, p. 15*.

### 4.1.2 CH#:NM

**Syntax** CH#:NM

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Sets **nm** as the spectral unit of the module.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 4.1.3 CH#:NM?

**Syntax** `CH#:NM?`

**Parameter**

**Description** Returns the actual spectral unit.

**OSICS Response**
- `CH#:NM=TRUE`: the selected unit is **nm**.
- `CH#:NM=FALSE`: the selected unit is **GHz**.

# 4.2 Attenuation Setting

## 4.2.1 CH#:ATN

**Syntax** `CH#:ATN xx.xx`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `xx.xx`: total attenuation value, which must be set between minimum insertion loss value and the attenuation range value indicated in the *Technical Specifications* section of the module in the *OSICS User Guide*. To know the possible values, see section *CH#:ATN_MIN_MAX?, p. 33*.

**Description** Set the total attenuation in dB.

**OSICS Response**

- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 4.2.2 CH#:ATN?

**Syntax** `CH#:ATN?`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the value of the attenuation in dB.

**OSICS Response** `CH#:ATN=xx.xx`

## 4.2.3 CH#:ATN_MIN_MAX?

**Syntax** `CH#:ATN_MIN_MAX? 1|2`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `1`: first wavelength value of the factory calibration:
  - on SMF: 1300 nm
  - on PMF: 1550 nm
- `2`: second wavelength value of the factory calibration:
  - on SMF: 1550 nm
  - on PMF: 1625 nm

**Description** Returns the minimum and maximum attenuation setting in dB for the given wavelength number (1|2).

**OSICS Response** `CH#:ATN_MIN_MAX=+<minimum value>+<maximum value>`

# 4.3 Wavelength Setting

## 4.3.1 CH#:L

**Syntax** `CH#:L 1|2`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `1`: first wavelength value of the factory calibration:
  - on SMF: 1300 nm
  - on PMF: 1550 nm
- `2`: second wavelength value of the factory calibration:
  - on SMF: 1550 nm
  - on PMF: 1625 nm
-

**Description** Sets the reference wavelength. Each module is factory-calibrated at different wavelengths depending on the module version (SMF or PMF).

**OSICS Response**

- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 4.3.2 CH#:L?

**Syntax** `CH#:L?`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the number of the wavelength used (see section *CH#:L, p. 34*).

**OSICS Response** `CH#:L=1|2`

## 4.3.3 CH#:LREF?

**Syntax** `CH#:LREF? 1|2`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `1`: first wavelength value of the factory calibration:
  - on SMF: 1300 nm
  - on PMF: 1550 nm
- `2`: second wavelength value of the factory calibration:
  - on SMF: 1550 nm
  - on PMF: 1625 nm

**Description** Returns the wavelength in nanometer corresponding to the given wavelength number (1|2).

**OSICS Response** `CH#:L(1|2)=<wavelength value>`

# 4.4 Offset Setting

## 4.4.1 CH#:OFFSET

**Syntax** `CH#:OFFSET 1|2 xx.xx`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `1`: first wavelength value of the factory calibration:
  - on SMF: 1300 nm
  - on PMF: 1550 nm
- `2`: second wavelength value of the factory calibration:
  - on SMF: 1550 nm
  - on PMF: 1625 nm
- `xx.xx`: offset value in dB, in the range -10 dB to +10 dB.

**Description** Sets the attenuation **Offset** for the given wavelength number (`1|2`).

**OSICS Response**

- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 4.4.2 CH#:OFFSET?

**Syntax** `CH#:OFFSET? 1|2`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `1`: first wavelength value of the factory calibration:
  - on SMF: 1300 nm
  - on PMF: 1550 nm
- `2`: second wavelength value of the factory calibration:
  - on SMF: 1550 nm
  - on PMF: 1625 nm

**Description** Returns the **Offset** value in dB for the given wavelength number (`1|2`).

**OSICS Response** `CH#:OFFSET(1|2)=+xx.xx`

# 4.5 Module System-Version Information

## 4.5.1 CH#:FIRM?

**Syntax** `CH#:FIRM=x.xx`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the software version of the module.

**OSICS Response** `CH#:FIRM=x.xx`

## 4.5.2 CH#:*IDN?

**Syntax** `CH#:*idn?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns information about the ATN module as follows: company name, module name, serial number, software version number (FPGA version).

**OSICS Response**
```
CH#:EXFO,OSICS-<Module name>,<serial number>,
<software version>/<FPGA version>
```

## 4.5.3 CH#:TYPE?

**Syntax** `CH#:TYPE?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the ATN module type version and options.

**OSICS Response** `CH#:ATN`

# 5. OSICS BKR Control

The following table gives an overview of all available commands and queries for OSICS BKR control.

| | Command/Query |
|---|---|
| **Unit Selection (*p. 37*)** | CH#:GHZ |
| | CH#:NM |
| | CH#:NM? |
| **Reflectance Setting (*p. 39*)** | CH#:ATN |
| | CH#:ATN? |
| | CH#:ATN_MIN_MAX? |
| **Wavelength Setting (*p. 40*)** | CH#:L |
| | CH#:L? |
| | CH#:LREF? |
| **Offset Setting (*p. 41*)** | CH#:OFFSET |
| | CH#:OFFSET? |
| **Module System-Version Information (*p. 42*)** | CH#:FIRM? |
| | CH#:*IDN? |
| | CH#:TYPE? |

## 5.1 Unit Selection

### 5.1.1 CH#:GHZ

**Syntax** CH#:GHZ

**Parameter**
- #: slot number of the module, in the range 1 to 8.

**Description** Sets **GHz** as the spectral unit of the module.

**OSICS Response**
- RS-232C: CH#:OK
- GPIB: none, see section *Standard Status Model, p. 15*.

### 5.1.2 CH#:NM

**Syntax** CH#:NM

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Sets **nm** as the spectral unit of the module.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 5.1.3 CH#:NM?

**Syntax** `CH#:NM?`

**Parameter**

**Description** Returns the actual spectral unit.

**OSICS Response**
- `CH#:NM=TRUE`: the selected unit is **nm**.
- `CH#:NM=FALSE`: the selected unit is **GHz**.

# 5.2 Reflectance Setting

## 5.2.1 CH#:ATN

**Syntax** `CH#:ATN xx.xx`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `xx.xx`: total reflectance value, which must be set between minimum insertion loss value and the reflectance range value indicated in the *Technical Specifications* section of the module in the *OSICS User Guide*. To know the possible values, see section *CH#:ATN_MIN_MAX?, p. 39*.

**Description** Set the total reflectance in dB.

**OSICS Response**

- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 5.2.2 CH#:ATN?

**Syntax** `CH#:ATN?`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the value of the reflectance in dB.

**OSICS Response** `CH#:ATN=xx.xx`

## 5.2.3 CH#:ATN_MIN_MAX?

**Syntax** `CH#:ATN_MIN_MAX? 1|2`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `1`: first wavelength value of the factory calibration:
  - on SMF: 1300 nm
  - on PMF: 1550 nm
- `2`: second wavelength value of the factory calibration:
  - on SMF: 1550 nm
  - on PMF: 1625 nm

**Description** Returns the minimum and maximum reflectance setting in dB for the given wavelength number (1|2).

**OSICS Response** `CH#:ATN_MIN_MAX=+<minimum value>+<maximum value>`

# 5.3 Wavelength Setting

## 5.3.1 CH#:L

**Syntax** `CH#:L 1|2`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `1`: first wavelength value of the factory calibration:
  - on SMF: 1300 nm
  - on PMF: 1550 nm
- `2`: second wavelength value of the factory calibration:
  - on SMF: 1550 nm
  - on PMF: 1625 nm
-

**Description** Sets the reference wavelength. Each module is factory-calibrated at different wavelengths depending on the module version (SMF or PMF).

**OSICS Response**

- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 5.3.2 CH#:L?

**Syntax** `CH#:L?`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the number of the wavelength used (see section *CH#:L, p. 40*).

**OSICS Response** `CH#:L=1|2`

## 5.3.3 CH#:LREF?

**Syntax** `CH#:LREF? 1|2`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `1`: first wavelength value of the factory calibration:
  - on SMF: 1300 nm
  - on PMF: 1550 nm
- `2`: second wavelength value of the factory calibration:
  - on SMF: 1550 nm
  - on PMF: 1625 nm

**Description** Returns the wavelength in nanometer corresponding to the given wavelength number (1|2).

**OSICS Response** `CH#:L(1|2)=<wavelength value>`

# 5.4 Offset Setting

## 5.4.1 CH#:OFFSET

**Syntax** `CH#:OFFSET 1|2 xx.xx`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `1`: first wavelength value of the factory calibration:
  - on SMF: 1300 nm
  - on PMF: 1550 nm
- `2`: second wavelength value of the factory calibration:
  - on SMF: 1550 nm
  - on PMF: 1625 nm
- `xx.xx`: offset value in dB, in the range -10 dB to +10 dB.

**Description** Sets the attenuation **Offset** for the given wavelength number (`1|2`).

**OSICS Response**

- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 5.4.2 CH#:OFFSET?

**Syntax** `CH#:OFFSET? 1|2`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `1`: first wavelength value of the factory calibration:
  - on SMF: 1300 nm
  - on PMF: 1550 nm
- `2`: second wavelength value of the factory calibration:
  - on SMF: 1550 nm
  - on PMF: 1625 nm

**Description** Returns the **Offset** value in dB for the given wavelength number (`1|2`).

**OSICS Response** `CH#:OFFSET(1|2)=+xx.xx`

# 5.5 Module System-Version Information

## 5.5.1 CH#:FIRM?

**Syntax** `CH#:FIRM=x.xx`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the software version of the module.

**OSICS Response** `CH#:FIRM=x.xx`

## 5.5.2 CH#:*IDN?

**Syntax** `CH#:*idn?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns information about the BKR module as follows: company name, module name, serial number, software version number (FPGA version).

**OSICS Response** `CH#:EXFO,OSICS-<Module name>,<serial number>,<software version>/<FPGA version>`

## 5.5.3 CH#:TYPE?

**Syntax** `CH#:TYPE?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the BKR module type version and options.

**OSICS Response** `CH#:BKR`

# 6. OSICS DFB Control

The following table gives an overview of all available commands and queries for OSICS DFB control.

| | Command/Query |
|---|---|
| **Optical-Output Control (*p. 44*)** | CH#:DISABLE |
| | CH#:ENABLE |
| | CH#:ENABLE? |
| **Unit Selection (*p. 45*)** | CH#:GHZ |
| | CH#:NM |
| | CH#:NM? |
| | CH#:DBM |
| | CH#:MW |
| | CH#:MW? |
| **Output-Power Setting (*p. 47*)** | CH#:P= |
| | CH#:P? |
| | CH#:LIMIT? |
| **Diode-Current Setting (*p. 48*)** | CH#:I? |
| | CH#:IMAX? |
| **Optical Emission-Wavelength/Frequency Setting (*p. 49*)** | CH#:L= |
| | CH#:L? |
| | CH#:LMAX? |
| | CH#:LMIN? |
| | CH#:F= |
| | CH#:F? |
| | CH#:FMAX? |
| | CH#:FMIN? |
| **Modulation Control (*p. 51*)** | CH#:MOD_CTRL |
| | CH#:MOD_CTRL? |
| | CH#:MOD_SRC |
| | CH#:MOD_F= |
| | CH#MOD_F? |
| | CH#:MOD_SRC? |
| | CH#:SIN_FREQ= |
| | CH#:SIN_RATE= |
| | CH#:SIN_OUT |
| | CH#:SIN_FREQ? |
| | CH#:SIN_RATE? |
| | CH#:SIN_OUT? |

| | Command/Query |
|---|---|
| **Calibration Control (*p. 55*)** | CH#:PCAL= |
| | CH#:PCAL? |
| | CH#:DL= |
| | CH#:DL? |
| **Module Parameter-Monitoring with the OUT 1 Output (*p. 57*)** | CH#:AOUT |
| | CH#:AOUT? |
| **Module System-Version Information (*p. 58*)** | CH#:FIRM? |
| | CH#:*IDN? |
| | CH#:TYPE? |
| | CH#:ERRORT? |

# 6.1 Optical-Output Control

## 6.1.1 CH#:DISABLE

**Syntax** CH#:DISABLE

**Parameter**
- #: slot number of the module, in the range 1 to 8.

**Description** Default setting.
Disables the laser output of the DFB module.

**OSICS Response**
- RS-232C: CH#:OK
- GPIB: none, see section *Standard Status Model, p. 15*.

## 6.1.2 CH#:ENABLE

**Syntax** CH#:ENABLE

**Parameter**
- #: slot number of the module, in the range 1 to 8.

**Description** Enables the laser output of the DFB module.

**OSICS Response**
- RS-232C: CH#:OK
- GPIB: none, see section *Standard Status Model, p. 15*.

## 6.1.3 CH#:ENABLE?

**Syntax** CH#:ENABLE?

**Parameter**
- #: slot number of the module, in the range 1 to 8.

**Description** Returns the state of the laser-output control on the DFB module.

**OSICS Response**
- `CH#:ENABLED`: the laser output is set to **ENABLE**.
- `CH#:DISABLED`: the laser output is set to **DISABLE**.

## 6.2 Unit Selection

### 6.2.1 CH#:GHZ

**Syntax** `CH#:GHZ`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Sets **GHz** as the spectral unit of the module.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 6.2.2 CH#:NM

**Syntax** `CH#:NM`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Sets **nm** as the spectral unit of the module.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 6.2.3 CH#:NM?

**Syntax** `CH#:NM?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the actual spectral unit.

**OSICS Response**
- `CH#:1`: the selected unit is **nm**.
- `CH#:0`: the selected unit is **GHz**.

### 6.2.4 CH#:DBM

**Syntax** `CH#:DBM`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Sets **dBm** as the power unit of the module.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 6.2.5 CH#:MW

**Syntax** `CH#:MW`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Sets **mW** as the power unit of the module.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 6.2.6 CH#:MW?

**Syntax** `CH#:MW?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the actual power unit.

**OSICS Response**
- `CH#:1`: the selected unit is **mW**.
- `CH#:0`: the selected unit is **dBm**.

# 6.3 Output-Power Setting

## 6.3.1 CH#:P=

**Syntax** `CH#:P=[±]xx.xx|xx.xx`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `[±]xx.xx`: optical output power in dBm, if the unit is set to dBm (see section *Unit Selection, p. 45*). Possible values are given in the module *Technical Specifications* section in the *OSICS User Guide*.
- `xx.xx`: optical output power in mW, if the unit is set to mW (see section *Unit Selection, p. 45*). Possible values are given in the module *Technical Specifications* section in the *OSICS User Guide*.

**Description** Sets the optical output-power of the module depending on the selected power unit (see section *Unit Selection, p. 45*).

**OSICS Response**

- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 6.3.2 CH#:P?

**Syntax** `CH#:P?`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the current value of the output power according to the selected power unit. The format of the response depends on the power unit selected (see section *Unit Selection, p. 45*).
The module optical-output must be enabled (see section *Optical-Output Control, p. 44*).

**OSICS Response**

- `CH#:P=xx.xx`: output-power value in mW.
- `CH#:P=±xx.xx`: output-power value in dBm.
- `CH#:Disabled`: the optical output is disabled; the output-power value cannot be returned.

## 6.3.3 CH#:LIMIT?

**Syntax** `CH#:LIMIT?`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the state of the output power.

**OSICS Response**

- `CH#:1`: the selected output power is not reached.
- `CH#:0`: the selected output power is reached.

## 6.4 Diode-Current Setting

### 6.4.1 CH#:I?

**Syntax** `CH#:I?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the present current level in mA.
The module optical output must be enabled (see section *Optical-Output Control, p. 44*).

**OSICS Response**
- `CH#:I=xxx.x`
- `CH#:Disabled`: the optical output is disabled; the current level value cannot be returned.

### 6.4.2 CH#:IMAX?

**Syntax** `CH#:IMAX?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the diode maximum current in mA.

**OSICS Response** `CH#:IMAX=xxx.x`

# 6.5 Optical Emission-Wavelength/Frequency Setting

## 6.5.1 CH#:L=

**Syntax** `CH#:L=xxxx.xxx`

**Parameters**
- `#`: slot number of the module, in the range 1 to 8.
- `xxxx.xxx`: the emission wavelength value in nm. The possible wavelength range is available by using the *CH#:LMIN?* and *CH#:LMAX?* commands (see *p. 49*).

**Description** Sets the emission wavelength of the module in nm.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 6.5.2 CH#:L?

**Syntax** `CH#:L?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the emission wavelength of the module in nm.

**OSICS Response** `CH#:L=xxxx.xxx`

## 6.5.3 CH#:LMAX?

**Syntax** `CH#:LMAX?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the highest possible wavelength of the DFB module wavelength range in nm.

**OSICS Response** `CH#=xxxx.xxx`

## 6.5.4 CH#:LMIN?

**Syntax** `CH#:LMIN?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the lowest possible wavelength of the DFB module wavelength range in nm.

**OSICS Response** `CH#=xxxx.xxx`

### 6.5.5 CH#:F=

**Syntax** `CH#:F=xxxxxx.x`

**Parameters**
- `#`: slot number of the module, in the range 1 to 8.
- `xxxxxx.x`: the emission frequency value in GHz. The possible frequency range is available by using the *CH#:FMIN?* and *CH#:FMAX?* commands (see *p. 50*).

**Description** Sets the emission frequency of the module in GHz.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 6.5.6 CH#:F?

**Syntax** `CH#:F?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the emission frequency of the module in GHz.

**OSICS Response** `CH#:F=xxxxxx.x`

### 6.5.7 CH#:FMAX?

**Syntax** `CH#:FMAX?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the highest possible frequency of the DFB module frequency range in GHz.

**OSICS Response** `CH#=xxxxxx.x`

### 6.5.8 CH#:FMIN?

**Syntax** `CH#:FMIN?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the lowest possible frequency of the DFB module frequency range in GHz.

**OSICS Response** `CH#=xxxxxx.x`

# 6.6 Modulation Control

## 6.6.1 CH#:MOD_CTRL

**Syntax** `CH#:MOD_CTRL OFF|ON|ON_INV`

**Parameters**
- `#`: slot number of the module, in the range 1 to 8.
- `OFF` (default setting): the digital modulation is turned off.
- `ON`: the digital modulation is turned on.
- `ON_INV`: the reversed digital modulation is turned on.

**Description** Sets the digital (TTL) modulation of the DFB module optical signal.
If you apply analog modulation directly via the SMB subclic connector at the module faceplate, you must set this function to disable all pending digital modulation.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 6.6.2 CH#:MOD_CTRL?

**Syntax** `CH#:MOD_CTRL?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the selected modulation activation state.

**OSICS Response**
- `CH#:MOD_CTRL=OFF`: the modulation signal is set to **OFF**.
- `CH#:MOD_CTRL=ON`: the modulation signal is set to **ON**.
- `CH#:MOD_CTRL=ON_INV`: the modulation signal is set to **ON INVERTED**.

## 6.6.3 CH#:MOD_SRC

**Syntax** `CH#:MOD_SRC MAIN|INT`

**Parameters**
- `#`: slot number of the module, in the range 1 to 8.
- `MAIN`: the modulation source is set to **MAINFRAME**.
- `INT` (default setting): the modulation source is set to **INTERNAL**.

**Description** Sets the modulation source of the DFB module.
- The MAINFRAME modulation signal may be generated either by the OSICS Mainframe's own source, or by an external function generator connected to the Mainframe's **Mod. In** BNC connector. To set the frequency of the internal Mainframe generator, see section *MOD_F=, p. 26*.

- The internal source uses the module's built-in modulation signal generator. To set the frequency of the internal TTL modulation, see the *CH#:MOD_F=* section of the module.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 6.6.4 CH#:MOD_F=

**Syntax** `CH#:MOD_F=xxxxxx`

**Parameters**
- `#`: slot number of the module, in the range 1 to 8.
- `xxxxxx`: frequency of the modulation signal in Hz, in the range 1 to 555000 (555 kHz).

**Description** Sets the frequency of the DFB module INTERNAL digital (TTL) modulation source.
If the module is not able to generate the exact value of the frequency setting, it applies the nearest available frequency-value right under the value of the original setting.
To check the actual frequency of the INTERNAL modulation source see section *CH#:MOD_F=, p. 52*.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 6.6.5 CH#:MOD_F?

**Syntax** `CH#:MOD_F?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the frequency selected for the internal modulation generator in Hz.

**OSICS Response** `CH#:MOD_F=xxxxxx`

## 6.6.6 CH#:MOD_SRC?

**Syntax** `CH#:MOD_SRC?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the selected modulation source.

**OSICS Response**
- `CH#:MOD_SRC=INT`: the modulation source is set to **INTERNAL**.
- `CH#:MOD_SRC=MAIN`: the modulation source is set to **MAINFRAME**.

## 6.6.7 CH#:SIN_FREQ=

**Syntax** `CH#:SIN_FREQ=xxx.x`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.
- `xx.x`: frequency of the sinus modulation signal in kHz, in the range 10 kHz to 100 kHz.

**Description** Sets the frequency of the DFB module's internal sinus modulation signal.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 6.6.8 CH#:SIN_RATE=

**Syntax** `CH#:SIN_RATE=xx.x`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.
- `xx.x`: amplitude rate of the sinus modulation signal in %, in the range of 0 % to 15 %.

**Description** Sets the amplitude rate of the DFB module's internal sinus modulation signal as a percentage of the diode bias-current. For more details, see *OSICS User Guide*.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 6.6.9 CH#:SIN_OUT

**Syntax** `CH#:SIN_OUT ON|OFF`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.
- `ON`: the sinus modulation function is set to on.
- `OFF`: the sinus modulation function is set to off.

**Description** Turns on or off the sinus modulation function.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 6.6.10 CH#:SIN_FREQ?

**Syntax** `CH#:SIN_FREQ?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the frequency setting of the DFB module's internal sinus modulation signal in kHz.

**OSICS Response** `CH#:SIN_FREQ=xxx.x`

### 6.6.11 CH#:SIN_RATE?

**Syntax** `CH#:SIN_RATE?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the amplitude rate setting of the sinus modulation signal as a percentage of the diode bias-current.

**OSICS Response** `CH#:SIN_RATE=xx.x`

### 6.6.12 CH#:SIN_OUT?

**Syntax** `CH#:SIN_OUT?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the state of the sinus modulation

**OSICS Response**
- `CH#:SIN_OUT=ON`: the sinus modulation is turned on.
- `CH#:SIN_OUT=OFF`: the sinus modulation is turned off.

# 6.7 Calibration Control

## 6.7.1 CH#:PCAL=

**Syntax** `CH#:PCAL=xx.xxx`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `xx.xxx`: output power (in mW) corresponding to the following formula:
  `PCAL`=0.5 x (<$P_{real\ power\ masured\ on\ powermeter\ in\ mW}$> / <$P_{Set\ on\ DFB\ in\ mW}$>)
  - Default value: 0.5
  - Possible values: from 0.3 to 0.6 (with power value set to 1)

**Description**

Sets the power value of the one-point power calibration method to correct the discrepancies between the power displayed by the OSICS DFB module and the power measured at your reference power meter.

To perform a power calibration, proceed as follows (full detail on the power calibration method is given in *OSICS User Guide*):

1. Make sure the unit is set to mW.
2. Set the DFB module output-power to 1 mW (see section *CH#:P=, p. 47*).
3. Connect a power-meter to the module optical-output port.
4. Set the new PCAL value with the one measured by the power meter by applying the following formula: 0.5 x (<$P_{real\ power\ masured\ on\ powermeter\ in\ mW}$> / <$P_{Set\ on\ DFB\ mW}$>).

This value replaces the PCAL setting, which is internally updated for further optical-power display.

**OSICS Response**

- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 6.7.2 CH#:PCAL?

**Syntax** `CH#:PCAL?`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description**

Returns the power value used for the one-point power calibration. PCAL is the absolute power-value measured on your reference power-meter.

**OSICS Response** `CH#:PCAL=xx.xxx`

### 6.7.3 CH#:DL=

**Syntax** `CH#:DL=0.xxx`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.
- `0.xxx`: wavelength offset in nm, in the range -0.200 nm to +0.200 nm.

**Description** Sets the wavelength offset applied to the emission wavelength of the DFB module.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 6.7.4 CH#:DL?

**Syntax** `CH#:DL?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the value of the wavelength offset in nm.

**OSICS Response**
- `CH#:DL=0.xxx`

# 6.8 Module Parameter-Monitoring with the OUT 1 Output

## 6.8.1 CH#:AOUT

**Syntax** `CH#:AOUT I|P|T`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `I`: the OUT 1 BNC port (corresponding to the # slot number) is assigned to monitor the diode's current signal.
- `P`: the OUT 1 BNC port (corresponding to the # slot number) is assigned to monitor the optical-power signal.
- `T`: the OUT 1 BNC port (corresponding to the # slot number) is assigned to monitor the laser-chip's temperature.

**Description** Assigns the OUT 1 BNC port (corresponding to the # slot number) to monitor the selected signal or temperature.

**OSICS Response**

- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 6.8.2 CH#:AOUT?

**Syntax** `CH#:AOUT?`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the parameter monitored by the OUT 1 BNC port (corresponding to the # slot number).

**OSICS Response**

- `CH#:AOUT=P`: the optical output-power is monitored.
- `CH#:AOUT=I`: the DFB module laser-diode's current is monitored.
- `CH#:AOUT=T`: the DFB module laser-chip's temperature is monitored.

# 6.9 Module System-Version Information

## 6.9.1 CH#:FIRM?

**Syntax** `CH#:FIRM=x.xx`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the software version of the module.

**OSICS Response** `CH#:FIRM=x.xx`

## 6.9.2 CH#:*IDN?

**Syntax** `CH#:*idn?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns information about the DFB module as follows: company name, module name, serial number, software version number (FPGA version).

**OSICS Response** `CH#:EXFO,OSICS-<Module name>,<serial number>,<software version>/<FPGA version>`

## 6.9.3 CH#:TYPE?

**Syntax** `CH#:TYPE?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the DFB module type version and options.

**OSICS Response** `CH#:DFB/<Wavelength>/<Option 1>/<Option 2>`

## 6.9.4 CH#:ERRORT?

**Syntax** `CH#:ERRORT?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Verifies the temperature of the module.

**OSICS Response**
- `CH#:1`: temperature error.
- `CH#:0`: normal operation.

# 7. OSICS SLD Control

The following table gives an overview of all available commands and queries for OSICS SLD control.

| | Command/Query |
|---|---|
| **Unit Selection (*p. 59*)** | CH#:GHZ |
| | CH#:NM |
| | CH#:NM? |
| | CH#:DBM |
| | CH#:MW |
| | CH#:MW? |
| **Optical-Output Control (*p. 61*)** | CH#:DISABLE |
| | CH#:ENABLE |
| | CH#:ENABLE? |
| **Optical Output Settings (*p. 62*)** | CH#:P= |
| | CH#:P? |
| | CH#:L? |
| **Module System-Version Information (*p. 63*)** | CH#:FIRM? |
| | CH#:*IDN? |
| | CH#:TYPE? |

## 7.1 Unit Selection

### 7.1.1 CH#:GHZ

**Syntax** CH#:GHZ

**Parameter**
- #: slot number of the module, in the range 1 to 8.

**Description** Sets **GHz** as the spectral unit of the module.

**OSICS Response**
- RS-232C: CH#:OK
- GPIB: none, see section *Standard Status Model, p. 15*.

### 7.1.2 CH#:NM

**Syntax** CH#:NM

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Sets **nm** as the spectral unit of the module.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 7.1.3 CH#:NM?

**Syntax** `CH#:NM?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the actual spectral unit.

**OSICS Response**
- `CH#:1`: the selected unit is **nm**.
- `CH#:0`: the selected unit is **GHz**.

### 7.1.4 CH#:DBM

**Syntax** `CH#:DBM`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Sets **dBm** as the power unit of the module.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 7.1.5 CH#:MW

**Syntax** `CH#:MW`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Sets **mW** as the power unit of the module.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 7.1.6 CH#:MW?

**Syntax** `CH#:MW?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the actual power unit.

**OSICS Response**
- `CH#:1`: the selected unit is **mW**.
- `CH#:0`: the selected unit is **dBm**.

## 7.2 Optical-Output Control

### 7.2.1 CH#:DISABLE

**Syntax** `CH#:DISABLE`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Default setting.
Disables the laser output of the SLD module.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 7.2.2 CH#:ENABLE

**Syntax** `CH#:ENABLE`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Enables the laser output of the SLD module.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 7.2.3 CH#:ENABLE?

**Syntax** `CH#:ENABLE?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the state of the laser-output control on the SLD module.

**OSICS Response**
- `CH#:ENABLED`: the laser output is set to **ENABLE**.
- `CH#:DISABLED`: the laser output is set to **DISABLE**.

# 7.3 Optical Output Settings

## 7.3.1 CH#:P=

**Syntax** `CH#:P=high|low`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.
- `high`: high power setting, which is 10 mW or +10dBm depending on the power unit setting.
- `low`: low power setting, which is 5 mW or +7 dBm depending on the power unit setting.

**Description** Sets the optical output-power of the module depending on the selected power unit (see section *Unit Selection, p. 59*).

**OSICS Response**

- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 7.3.2 CH#:P?

**Syntax** `CH#:P?`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the actual power output level.

**OSICS Response**

- `Disabled`: the optical output is disabled. You must enable the optical output to get the selected power output level (see section *CH#:ENABLE, p. 61*)
- `CH#:P=LOW`: the power level is set to `low`.
- `CH#:P=HIGH`: the power level is set to `high`.

## 7.3.3 CH#:L?

**Syntax** `CH#:L?`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the emission wavelength of the module in nm.

**OSICS Response** `CH#:L=xxxx`

# 7.4 Module System-Version Information

## 7.4.1 CH#:FIRM?

**Syntax** `CH#:FIRM=x.xx`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the software version of the module.

**OSICS Response** `CH#:FIRM=x.xx`

## 7.4.2 CH#:*IDN?

**Syntax** `CH#:*idn?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns information about the SLD module as follows: company name, module name, serial number, software version number (FPGA version).

**OSICS Response**
```
CH#:EXFO,OSICS-<Module name>,<serial number>,
<software version>/<FPGA version>
```

## 7.4.3 CH#:TYPE?

**Syntax** `CH#:TYPE?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the SLD module type version and options.

**OSICS Response** `CH#:SLD_<Module Type>`

# 8. OSICS SWT Control

The following table gives an overview of all available commands and queries for OSICS SWT control.

| | Command/Query |
|---|---|
| **Input/Output Selection (*p. 65*)** | CH#:SHUT |
| | CH#:OPEN |
| | CH#:SHUT? |
| | CH#:SHUTMODE |
| | CH#:SHUTMODE? |
| | CH#:BAR |
| | CH#:CROSS |
| | CH#:BAR? |
| | CH#:CH |
| | CH#:CH? |
| **Module System-Version Information (*p. 69*)** | CH#:FIRM? |
| | CH#:*IDN? |
| | CH#:TYPE? |

## 8.1 Input/Output Selection

### 8.1.1 CH#:SHUT

**Syntax** CH#:SHUT

**Parameter**
- #: slot number of the module, in the range 1 to 8.

**Description**
Only on shutter SWT 1x1.
Shuts the shutter.

**OSICS Response**
- RS-232C: CH#:OK
- GPIB: none, see section *Standard Status Model, p. 15*.

### 8.1.2 CH#:OPEN

**Syntax** `CH#:OPEN`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description**
Only on shutter SWT 1x1.
Opens the shutter.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 8.1.3 CH#:SHUT?

**Syntax** `CH#:SHUT?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description**
Only on shutter SWT 1x1.
Returns the state of the shutter.

**OSICS Response**
- `CH#:SHUT=TRUE`: the shutter is shut.
- `CH#:SHUT=FALSE`: the shutter is open.

### 8.1.4 CH#:SHUTMODE

**Syntax** `CH#:SHUTMODE 0|1 0|1`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.
- `0|1` (first digit): output mode of the A–B shutter:
  - `0`: closes the A–B shutter
  - `1`: opens the A–B shutter
- `0|1` (second digit): output mode of the 1–2 shutter
  - `0`: closes the 1–2 shutter
  - `1`: opens the 1–2 shutter

**Description**
Only on 2x shutter SWT 2x(1x1).
Opens or closes the A–B and/or 1–2 shutters.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

**Example** `CH6:SHUTMODE 0 1`

means:

- 2x shutter is in slot 6.
- Shutter A-B is closed.
- Shutter 1-2 is open.

### 8.1.5 CH#:SHUTMODE?

**Syntax** `CH#:SHUTMODE?`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Only on 2x shutter SWT 2x(1x1).
Returns the output mode of the A–B and 1–2 shutters.

**OSICS Response** `CH#:SHUTMODE 0|1 0|1`

### 8.1.6 CH#:BAR

**Syntax** `CH#:BAR`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Only on SWT 2x2.
Sets the switch output mode to **Bar**:

- A is linked to 1
- B is linked to 2

**OSICS Response**

- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 8.1.7 CH#:CROSS

**Syntax** `CH#:CROSS`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Only on SWT 2x2.
Default setting.
Sets the switch output mode to **Cross**:

- A is linked to 2
- B is linked to 1

**OSICS Response**

- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 8.1.8 CH#:BAR?

**Syntax** `CH#:BAR?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description**
Only on SWT 2x2.
Returns the output mode of the switch
- A is linked to 1
- B is linked to 2

**OSICS Response**
- `CH#:BAR=TRUE`: the switch is set to `Bar`.
- `CH#:BAR=FALSE`: the switch is set to `Cross`.

### 8.1.9 CH#:CH

**Syntax** `CH#:CH <channel number>`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.
- `<channel number>`: number of the channel you want to activate in the range 1 to 2 or 1 to 4 depending on the model of your switch.

**Description**
Only on SWT 1x2 and 1x4.
Selects the channel through which the signal will be directed.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 8.1.10 CH#:CH?

**Syntax** `CH#:CH?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description**
Only on SWT 1x2 and 1x4.
Returns the active channel through which the signal is directed.

**OSICS Response** `CH#:CH=<channel number>`

## 8.2 Module System-Version Information

### 8.2.1 CH#:FIRM?

**Syntax** `CH#:FIRM=x.xx`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the software version of the module.

**OSICS Response** `CH#:FIRM=x.xx`

### 8.2.2 CH#:*IDN?

**Syntax** `CH#:*idn?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns information about the SWT module as follows: company name, module name, serial number, software version number (FPGA version).

**OSICS Response** `CH#:EXFO,OSICS-<Module name>,<serial number>,<software version>/<FPGA version>`

### 8.2.3 CH#:TYPE?

**Syntax** `CH#:TYPE?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the SWT module type version and options.

**OSICS Response** Switch: `CH#:SWT/<Model>`
`Shutter: CH#:2_X_SHUTTER`

# 9. OSICS T100 Control

The following table gives an overview of all available commands and queries for OSICS T100 control.

| | Command/Query |
|---|---|
| **Optical-Output Control (*p. 72*)** | CH#:DISABLE |
| | CH#:ENABLE |
| | CH#:ENABLE? |
| **Unit Selection (*p. 73*)** | CH#:GHZ |
| | CH#:NM |
| | CH#:NM? |
| | CH#:DBM |
| | CH#:MW |
| | CH#:MW? |
| **Output-Power Setting (*p. 75*)** | CH#:P= |
| | CH#:P? |
| | CH#:LIMIT? |
| **Diode-Current Setting (*p. 76*)** | CH#:I? |
| | CH#:IMAX? |
| **Optical Emission-Wavelength/Frequency Setting (*p. 77*)** | CH#:L= |
| | CH#:L? |
| | CH#:F= |
| | CH#:F? |
| **Coherence Control (*p. 78*)** | CH#:CTRL |
| | CH#:CTRL? |
| **Auto-peak Find Control (*p. 78*)** | CH#:APF |
| | CH#:APF? |
| **Modulation Control (*p. 80*)** | CH#:MOD_CTRL |
| | CH#:MOD_CTRL? |
| | CH#:MOD_SRC |
| | CH#:MOD_F= |
| | CH#MOD_F? |
| | CH#:MOD_SRC? |

| | Command/Query |
|---|---|
| **Calibration Control (*p. 82*)** | CH#:WAVEREF |
| | CH#:LCAL1= |
| | CH#:LCAL2= |
| | CH#:LCAL1? |
| | CH#:LCAL2? |
| | CH#:PCAL1= |
| | CH#:PCAL2= |
| | CH#:PCAL1? |
| | CH#:PCAL2? |
| **Module Parameter-Monitoring with the OUT 1 Output (*p. 85*)** | CH#:AOUT |
| | CH#:AOUT? |
| **Module System-Version Information (*p. 86*)** | CH#:FIRM? |
| | CH#:*IDN? |
| | CH#:TYPE? |

# 9.1 Optical-Output Control

## 9.1.1 CH#:DISABLE

**Syntax** CH#:DISABLE

**Parameter**
- #: slot number of the module, in the range 1 to 8.

**Description** Default setting.
Disables the laser output of the T100 module.

**OSICS Response**
- RS-232C: CH#:OK
- GPIB: none, see section *Standard Status Model, p. 15*.

## 9.1.2 CH#:ENABLE

**Syntax** CH#:ENABLE

**Parameter**
- #: slot number of the module, in the range 1 to 8.

**Description** Enables the laser output of the T100 module.

**OSICS Response**
- RS-232C: CH#:OK
- GPIB: none, see section *Standard Status Model, p. 15*.

## 9.1.3 CH#:ENABLE?

**Syntax** CH#:ENABLE?

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the state of the laser-output control on the T100 module.

**OSICS Response**
- `CH#:ENABLED`: the laser output is set to **ENABLE**.
- `CH#:DISABLED`: the laser output is set to **DISABLE**.

## 9.2 Unit Selection

### 9.2.1 CH#:GHZ

**Syntax** `CH#:GHZ`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Sets **GHz** as the spectral unit of the module.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 9.2.2 CH#:NM

**Syntax** `CH#:NM`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Sets **nm** as the spectral unit of the module.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 9.2.3 CH#:NM?

**Syntax** `CH#:NM?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the actual spectral unit.

**OSICS Response**
- `CH#:1`: the selected unit is **nm**.
- `CH#:0`: the selected unit is **GHz**.

### 9.2.4 CH#:DBM

**Syntax** `CH#:DBM`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Sets **dBm** as the power unit of the module.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 9.2.5 CH#:MW

**Syntax** `CH#:MW`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Sets **mW** as the power unit of the module.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 9.2.6 CH#:MW?

**Syntax** `CH#:MW?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the actual power unit.

**OSICS Response**
- `CH#:1`: the selected unit is **mW**.
- `CH#:0`: the selected unit is **dBm**.

# 9.3 Output-Power Setting

## 9.3.1 CH#:P=

**Syntax** `CH#:P=[±]xx.xx|xx.xx`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `[±]xx.xx`: optical output power in dBm, if the unit is set to dBm (see section *Unit Selection, p. 73*). Possible values are given in the module *Technical Specifications* section in the *OSICS User Guide*.
- `xx.xx`: optical output power in mW, if the unit is set to mW (see section *Unit Selection, p. 73*). Possible values are given in the module *Technical Specifications* section in the *OSICS User Guide*.

**Description** Sets the optical output-power of the module depending on the selected power unit (see section *Unit Selection, p. 73*).

**OSICS Response**

- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 9.3.2 CH#:P?

**Syntax** `CH#:P?`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the current value of the output power according to the selected power unit. The format of the response depends on the power unit selected (see section *Unit Selection, p. 73*).
The module optical-output must be enabled (see section *Optical-Output Control, p. 72*).

**OSICS Response**

- `CH#:P=xx.xx`: output-power value in mW.
- `CH#:P=±xx.xx`: output-power value in dBm.
- `CH#:Disabled`: the optical output is disabled; the output-power value cannot be returned.

## 9.3.3 CH#:LIMIT?

**Syntax** `CH#:LIMIT?`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the state of the output power.

**OSICS Response**

- `CH#:1`: the selected output power is not reached.
- `CH#:0`: the selected output power is reached.

## 9.4 Diode-Current Setting

### 9.4.1 CH#:I?

**Syntax** `CH#:I?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the present current level in mA.
The module optical output must be enabled (see section *Optical-Output Control, p. 72*).

**OSICS Response**
- `CH#:I=xxx.x`
- `CH#:Disabled`: the optical output is disabled; the current level value cannot be returned.

### 9.4.2 CH#:IMAX?

**Syntax** `CH#:IMAX?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the diode maximum current in mA.

**OSICS Response** `CH#:IMAX=xxx.x`

# 9.5 Optical Emission-Wavelength/Frequency Setting

## 9.5.1 CH#:L=

**Syntax** `CH#:L=xxxx.xxx`

**Parameters**
- `#`: slot number of the module, in the range 1 to 8.
- `xxxx.xxx`: the emission wavelength value in nm. The possible wavelength range is available in the module *Technical Specifications* section in the *OSICS User Guide*.

**Description** Sets the emission wavelength of the module in nm.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 9.5.2 CH#:L?

**Syntax** `CH#:L?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the emission wavelength of the module in nm.

**OSICS Response** `CH#:L=xxxx.xxx`

## 9.5.3 CH#:F=

**Syntax** `CH#:F=xxxxxx.x`

**Parameters**
- `#`: slot number of the module, in the range 1 to 8.
- `xxxxxx.x`: the emission frequency value in GHz. The possible frequency range is available in the module *Technical Specifications* section in the *OSICS User Guide*.

**Description** Sets the emission frequency of the module in GHz.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 9.5.4 CH#:F?

**Syntax** `CH#:F?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the emission frequency of the module in GHz.

**OSICS Response** `CH#:F=xxxxxx.x`

# 9.6 Coherence Control

## 9.6.1 CH#:CTRL

**Syntax** `CH#:CTRL OFF|ON`

**Parameters**
- `#`: slot number of the module, in the range 1 to 8.
- `OFF` (default setting): the **Coherence Control** function is disabled.
- `ON`: the **Coherence Control** function is enabled.

**Description** Default setting.
Enables/disables the **Coherence Control** function.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 9.6.2 CH#:CTRL?

**Syntax** `CH#:CTRL?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the state of the **Coherence Control** function.

**OSICS Response**
- `CH#:1`: the **Coherence Control** function is set to **ON** (enabled).
- `CH#:0`: the **Coherence Control** function is set to **OFF** (disabled).

# 9.7 Auto-peak Find Control

## 9.7.1 CH#:APF

**Syntax** `CH#:APF OFF|ON`

**Parameters**
- `#`: slot number of the module, in the range 1 to 8.
- `OFF` (default setting): the **Auto-peak Find** function is disabled.
- `ON`: the **Auto-peak Find** function is enabled.

**Description** Enables/disables the **Auto-peak Find** function.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 9.7.2 CH#:APF?

**Syntax** `CH#:APF?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the state of the **Auto-peak Find** function.

**OSICS Response**
- `CH#:1`: the **Auto-peak Find** function is set to **ON**.
- `CH#:0`: the **Auto-peak Find** function is set to **OFF**.

# 9.8 Modulation Control

## 9.8.1 CH#:MOD_CTRL

**Syntax** `CH#:MOD_CTRL OFF|ON|ON_INV`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `OFF` (default setting): the digital modulation is turned off.
- `ON`: the digital modulation is turned on.
- `ON_INV`: the reversed digital modulation is turned on.

**Description** Sets the digital (TTL) modulation of the T100 module optical signal.
If you apply analog modulation directly via the SMB subclic connector at the module faceplate, you must set this function to disable all pending digital modulation.

**OSICS Response**

- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 9.8.2 CH#:MOD_CTRL?

**Syntax** `CH#:MOD_CTRL?`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the selected modulation activation state.

**OSICS Response**

- `CH#:MOD_CTRL=OFF`: the modulation signal is set to **OFF**.
- `CH#:MOD_CTRL=ON`: the modulation signal is set to **ON**.
- `CH#:MOD_CTRL=ON_INV`: the modulation signal is set to **ON INVERTED**.

## 9.8.3 CH#:MOD_SRC

**Syntax** `CH#:MOD_SRC MAIN|INT`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `MAIN`: the modulation source is set to **MAINFRAME**.
- `INT` (default setting): the modulation source is set to **INTERNAL**.

**Description** Sets the modulation source of the T100 module.

- The MAINFRAME modulation signal may be generated either by the OSICS Mainframe's own source, or by an external function generator connected to the Mainframe's **Mod. In** BNC connector. To set the frequency of the internal Mainframe generator, see section *MOD_F=, p. 26*.
- The internal source uses the module's built-in modulation signal generator. To set the frequency of the internal TTL modulation, see the *CH#:MOD_F=* section of the module.

**OSICS Response**

- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 9.8.4 CH#:MOD_F=

**Syntax** `CH#:MOD_F=xxxxxx`

**Parameters**
- `#`: slot number of the module, in the range 1 to 8.
- `xxxxxx`: frequency of the modulation signal in Hz, in the range 153 to 1000000 (1 Mhz).

**Description** Sets the frequency of the T100 module INTERNAL digital (TTL) modulation source.
If the module is not able to generate the exact value of the frequency setting, it applies the nearest available frequency-value right under the value of the original setting.
To check the actual frequency of the INTERNAL modulation source see section *CH#:MOD_F=, p. 81*.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

### 9.8.5 CH#:MOD_F?

**Syntax** `CH#:MOD_F?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the frequency selected for the internal modulation generator in Hz.

**OSICS Response** `CH#:MOD_F=xxxxxx`

### 9.8.6 CH#:MOD_SRC?

**Syntax** `CH#:MOD_SRC?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the selected modulation source.

**OSICS Response**
- `CH#:MOD_SRC=INT`: the modulation source is set to **INTERNAL**.
- `CH#:MOD_SRC=MAIN`: the modulation source is set to **MAINFRAME**.

# 9.9 Calibration Control

## 9.9.1 CH#:WAVEREF

**Syntax** `CH#:WAVEREF`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Runs the internal wavelength referencing procedure.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 9.9.2 CH#:LCAL1=

**Syntax** `CH#:LCAL1=xxxx.xxx`

**Parameters**
- `#`: slot number of the module, in the range 1 to 8.
- `xxxx.xxx`: first wavelength in nm of the two-point wavelength calibration method. Possible values are factory-set wavelength range values (±1 nm) given in the module *Technical Specifications* section in the *OSICS User Guide*.

**Description** Sets the first wavelength value of the two-point wavelength calibration method.
LCAL1 is the first factory calibration wavelength (in nm only). The value of LCAL1 corresponds to the value displayed on the wavemeter (see *OSICS User Guide* for more details).
This value replaces the LCAL1 setting and is updated in the flash-memory for further wavelength display of the wavelength.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 9.9.3 CH#:LCAL2=

**Syntax** `CH#:LCAL1=xxxx.xxx`

**Parameters**
- `#`: slot number of the module, in the range 1 to 8.
- `xxxx.xxx`: second wavelength in nm of the two-point wavelength calibration method. Possible values are factory-set wavelength range values (±1 nm) given in the module *Technical Specifications* section in the *OSICS User Guide*.

**Description** Sets the second wavelength value of the two-point wavelength calibration method.
LCAL2 is the second factory calibration wavelength (in nm only). The value of LCAL2 corresponds to the value displayed on the wavemeter (see *OSICS User Guide* for more details).
This value replaces the LCAL2 setting and is updated in the flash-memory for further display wavelength of the wavelength.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 9.9.4 CH#:LCAL1?

**Syntax** `CH#:LCAL1=xxxx.xxx`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the first calibration wavelength of the two-point wavelength calibration method.

**OSICS Response** `CH#:LCAL1=xxxx.xxx`

## 9.9.5 CH#:LCAL2?

**Syntax** `CH#:LCAL2=xxxx.xxx`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the second calibration wavelength of the two-point wavelength calibration method.

**OSICS Response** `CH#:LCAL2=xxxx.xxx`

## 9.9.6 CH#:PCAL1=

**Syntax** `CH#:PCAL1=xx.xxx`

**Parameters**
- `#`: slot number of the module, in the range 1 to 8.
- `xx.xxx`: output power (in mW) matching the lower limit of the T100 module wavelength-range, corresponding to the following formula:
  `PCAL1`=0.5 x (<$P_{\text{real power masured on powermeter in mW}}$> / <$P_{\text{Set on T100 in mW}}$>)
  - Default value: 0.5
  - Possible values: from 0.3 to 0.6 (with power value set to 1)

**Description** Sets the first power value of the two-point power calibration method. This value corresponds to the lower limit of the T100 module wavelength-range.

To perform a power calibration, proceed as follows (full detail on the power calibration method is given in *OSICS User Guide*):

1. Make sure the unit is set to mW.
2. Set the T100 module output-power to 1 mW (see section *CH#:P=, p. 75*).
3. Connect a power-meter to the module optical-output port.
4. Set the new PCAL1 value with the one measured by the power meter by applying the following formula: 0.5 x (<$P_{\text{real power masured on powermeter in mW}}$> / <$P_{\text{Set on DFB mW}}$>).

This value replaces the PCAL1 setting, which is internally updated for further optical-power display.

**OSICS Response**
- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 9.9.7 CH#:PCAL2=

**Syntax** `CH#:PCAL2=xx.xxx`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.
- `xx.xxx`: output power (in mW) matching the upper limit of the T100 module wavelength range, corresponding to the following formula:
  `PCAL2`=0.5 x (<$P_{\text{Real power masured on powermeter in mW}}$> / <$P_{\text{Set on T100 in mW}}$>)
  - Default value: 0.5
  - Possible values: 0.3 to 0.6 (with power value set to 1).

**Description**

Sets the second power-value of the two-point power calibration method. This value corresponds to the upper limit of the T100 module wavelength range.

To perform a power calibration proceed as follows (full detail on the power calibration method is given in *OSICS User Guide*):

1. Make sure the unit is set to mW.
2. Set the T100 module output-power to 1 mW (see section *CH#:P=, p. 75*).
3. Connect a power-meter to the module optical output port.
4. Set the new PCAL2 value with the one measured by the power meter by applying the following formula: 0.5 x (<$P_{\text{real power masured on powermeter in mW}}$> / <$P_{\text{Set on DFB mW}}$>).

This value replaces PCAL2 setting, which is internally updated for further optical-power display.

**OSICS Response**

- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 9.9.8 CH#:PCAL1?

**Syntax** `CH#:PCAL1?`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the first power value used for the two-point power calibration. PCAL1 is the absolute power-value measured on your reference power-meter for the first wavelength.

**OSICS Response** `CH#:PCAL1=xx.xxx`

## 9.9.9 CH#:PCAL2?

**Syntax** `CH#:PCAL2?`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the second power value used for the two-point power calibration. PCAL2 is the absolute power-value measured on the user's reference power-meter for the second wavelength.

**OSICS Response** `CH#:PCAL2=xx.xxx`

# 9.10 Module Parameter-Monitoring with the OUT 1 Output

## 9.10.1 CH#:AOUT

**Syntax** `CH#:AOUT I|P`

**Parameters**

- `#`: slot number of the module, in the range 1 to 8.
- `I`: the OUT 1 BNC port (corresponding to the # slot number) is assigned to monitor the diode's current signal.
- `P`: the OUT 1 BNC port (corresponding to the # slot number) is assigned to monitor the optical-power signal.

**Description** Assigns the OUT 1 BNC port (corresponding to the # slot number) to monitor the selected signal.

**OSICS Response**

- RS-232C: `CH#:OK`
- GPIB: none, see section *Standard Status Model, p. 15*.

## 9.10.2 CH#:AOUT?

**Syntax** `CH#:AOUT?`

**Parameter**

- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the parameter monitored by the OUT 1 BNC port (corresponding to the # slot number).

**OSICS Response**

- `CH#:AOUT=P`: the optical output-power is monitored.
- `CH#:AOUT=I`: the T100 module laser-diode's current is monitored.

# 9.11 Module System-Version Information

## 9.11.1 CH#:FIRM?

**Syntax** `CH#:FIRM=x.xx`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the software version of the module.

**OSICS Response** `CH#:FIRM=x.xx`

## 9.11.2 CH#:*IDN?

**Syntax** `CH#:*idn?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns information about the T100 module as follows: company name, module name, serial number, software version number (FPGA version).

**OSICS Response**
```
CH#:EXFO,OSICS-<Module name>,<serial number>,
<software version>/<FPGA version>
```

## 9.11.3 CH#:TYPE?

**Syntax** `CH#:TYPE?`

**Parameter**
- `#`: slot number of the module, in the range 1 to 8.

**Description** Returns the T100 module type version and options.

**OSICS Response** `CH#:T100/<Module Model>`

# 10. Error Codes

**Subject**

This section describes specific errors of the instrument (-399 to -300).

All other command errors (range -199 to -100) and execution errors (range -299 to -200) are described in the *Standard Commands for Programmable Instruments (SCPI)* document available at the following URL http://www.ivifoundation.org/docs/scpi-99.pdf (URL valid in September 2022).

**Instrument Specific Errors**

| Error Code | Error Description |
|---|---|
| **-300** | **OSICS-Specific Error**<br>Generic instrument-dependent error for instruments that cannot detect more specific errors. This code indicates only that a device-dependent error as defined in IEEE 488.2 has occurred. |
| **-301** | **OSICS Scan-State Busy**<br>The OSA is still scanning, analyzing, stopping or aborting and is not in an idle state. |
| **-302** | **OSICS Calibration-State Busy**<br>The OSA is still calibrating and is not in an idle state. |
| **-303** | **OSICS Mode-State Busy**<br>The OSA is still opening or closing a mode and is not in an idle state. |

# Index