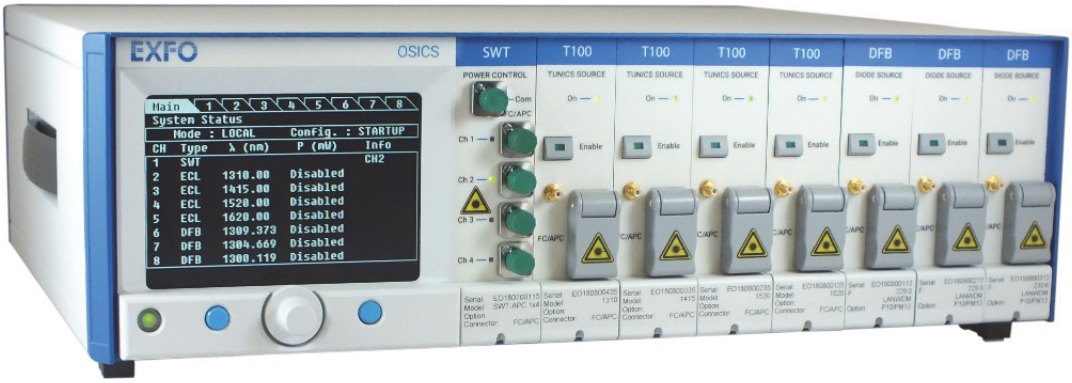
OSICS Multifunction Platform

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 SWT-APC v. 1.13 and higher versions
- OSICS T100 v. 3.05 and higher versions
- OSICS TLS-AG v. 3.14 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

17 September 2018

Manual Reference

OSICS_PG_3v2.2

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

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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.

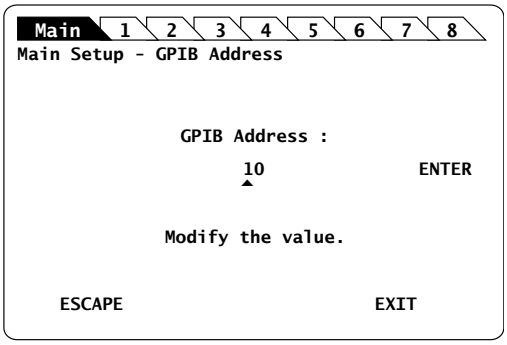


Figure 1: Main Setup – GPIB Address

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.

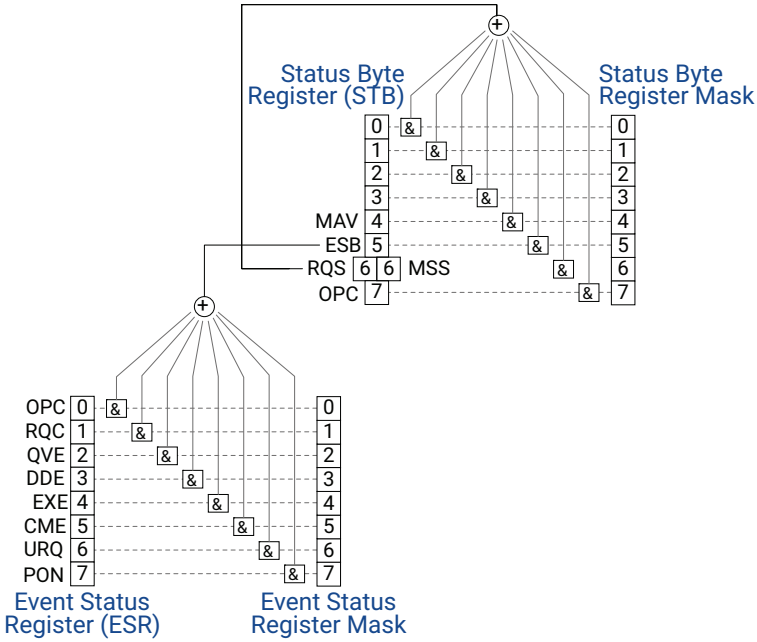


Figure 2: Status Word Model

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. 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: • The GPIB controller has attempted to read from the OSICS Mainframe while the output queue was empty. • 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

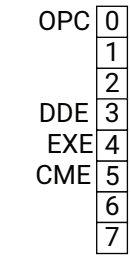
The GPIB interface of the OSICS Mainframe performs tasks sequentially in the order received; it does not support overlapping tasks.

- 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`. The CLS instruction is automatically sent to each module.	
*ESE	Integer value (0 to 255)	The standard event mask register is set to a value equal to the parameter of ESE command. 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. 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 (0 to 255).

*IDN?	none	IDeNtification query.	`EXFO,OSICS,`
			`<serial number>,`
			`<software version>`
			`/<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 (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. 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. The value of the status byte register is sent to the output queue. STB contains the MAV flag that takes bit number 4. 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. Cancels the echo mode on the OSICS Mainframe. 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.

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. 34*)	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 SWT-APC Control

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

	Command/Query
Operating-Mode Selection and Configuration (*p. 72*)	CH#:MODE
	CH#:ACFG
	CH#:MODE?
Input/Output Channel Selection (*p. 73*)	CH#:CLOSE=
	CH#:CLOSE?
Unit Selection (*p. 73*)	CH#:GHZ
	CH#:NM
	CH#:NM?
	CH#:DBM
	CH#:MW
	CH#:MW?
Optical-Output Control (*p. 75*)	CH#:DISABLE
	CH#:ENABLE
	CH#:ENABLE?
Output-Power Setting (*p. 77*)	CH#:P=
	CH#:P?
	CH#:LIMIT?
Optical Emission-Wavelength/Frequency Setting (*p. 79*)	CH#:L=
	CH#:L?
	CH#:F=
	CH#:F?
Coherence Control (*p. 80*)	CH#:CTRL
	CH#:CTRL?
Auto-peak Find Control (*p. 81*)	CH#:APF
	CH#:APF?
Modulation Control (*p. 82*)	CH#:MOD_CTRL
	CH#:MOD_CTRL?
	CH#:MOD_SRC
	CH#:MOD_SRC?
Module System-Version Information (*p. 84*)	CH#:FIRM?
	CH#:*IDN?
	CH#:TYPE?

9.1 Operating-Mode Selection and Configuration

9.1.1 CH#:MODE

Syntax `CH#:MODE SWT|ECL`

Parameter
- `#`: slot number of the module, in the range 1 to 8.
- `SWT`: the module is set to **Switch** mode.
- `ECL`: the module is set to **Full-band** mode.

Description Selects the SWT-APC module operating-mode.

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

9.1.2 CH#:ACFG

Syntax `CH#:ACFG`

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

Description Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
Automatically detects the T100 modules connected to the SWT-APC module.
If your module's software-version is older than v. 2.21, this function is not available. You must manually configure the T100 modules connected to the SWT-APC module as explained in *OSICS User Guide*.

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

9.1.3 CH#:MODE?

Syntax `CH#:MODE?`

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

Description Returns the operating-mode of the SWT-APC module.

OSICS Response
- `CH#:MODE=SWT`: the SWT-APC module is set to **Switch** mode.
- `CH#:MODE=ECL`: the SWT-APC module is set to **Full-band** mode.

9.2 Input/Output Channel Selection

9.2.1 CH#:CLOSE=

Syntax `CH#:CLOSE=<channel number>`

Parameter
- `#`: slot number of the module, in the range 1 to 8.
- `x`: number of the channel you want to activate in the range 1 to 4.

Description 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*.

9.2.2 CH#:CLOSE?

Syntax `CH#:CLOSE?`

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

Description Returns the active channel through which the signal is directed.

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

9.3 Unit Selection

9.3.1 CH#:GHZ

Syntax `CH#:GHZ`

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

Description Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
Sets **GHz** as the spectral unit of the SWT-APC module.

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

9.3.2 CH#:NM

Syntax `CH#:NM`

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

Description Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
Sets **nm** as the spectral unit of the SWT-APC module.

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

9.3.3 CH#:NM?

Syntax `CH#:NM?`

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

Description Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
Returns the actual spectral unit of the SWT-APC module.

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

9.3.4 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*.

9.3.5 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*.

9.3.6 CH#:MW?

Syntax `CH#:MW?`

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

Description Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
Returns the actual power unit of the SWT-APC module.

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

9.4 Optical-Output Control

9.4.1 CH#:DISABLE

Syntax `CH#:DISABLE`

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

Description Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
Default setting.
Disables the laser output of all the modules connected to the SWT-APC module.

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

9.4.2 CH#:ENABLE

Syntax `CH#:ENABLE`

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

Description Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
Enables the laser output of all the T100 modules connected to the SWT-APC module.

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

9.4.3 CH#:ENABLE?

Syntax `CH#:ENABLE?`

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

Description Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
Returns the state of the laser-output control on the active channel of the SWT-APC module.

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

9.5 Output-Power Setting

9.5.1 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 Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
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*.

9.5.2 CH#:P?

Syntax `CH#:P?`

Parameter

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

Description Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
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. 75*).

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.

9.5.3 CH#:LIMIT?

Syntax `CH#:LIMIT?`

Parameter

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

Description Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
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.

9.6 Optical Emission-Wavelength/Frequency Setting

9.6.1 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 Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
Sets the emission wavelength of the module in nm.

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

9.6.2 CH#:L?

Syntax `CH#:L?`

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

Description Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
Returns the emission wavelength of the module in nm.

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

9.6.3 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 Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
Sets the emission frequency of the module in GHz.

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

9.6.4 CH#:F?

Syntax `CH#:F?`

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

Description Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
Returns the emission frequency of the module in GHz.

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

9.7 Coherence Control

9.7.1 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 Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
Default setting.
Enables/disables the **Coherence Control** function on all T100 modules connected to the SWT-APC module and detected by it (see section *CH#:ACFG, p. 72*).

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

9.7.2 CH#:CTRL?

Syntax `CH#:CTRL?`

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

Description Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
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).

9.8 Auto-peak Find Control

9.8.1 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 Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*)
Enables/disables the **Auto-peak Find** function on all T100 modules connected to the SWT-APC module and detected by it (see section *CH#:ACFG, p. 72*).

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

9.8.2 CH#:APF?

Syntax `CH#:APF?`

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

Description Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
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**.

9.9 Modulation Control

9.9.1 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
Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
Sets the digital (TTL) modulation of all the T100 modules connected to the SWT-APC module optical signal.
If you apply analog modulation directly via the SMB subclic connector at the T100 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*.

9.9.2 CH#:MOD_CTRL?

Syntax `CH#:MOD_CTRL?`

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

Description
Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).
Returns the selected modulation activation state of all the T100 modules connected to the SWT-APC module and detected by it (see section *CH#:ACFG, p. 72*).

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**.

9.9.3 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

Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).

Sets the modulation source of all the T100 modules connected to the SWT-APC 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 T100 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*.

9.9.4 CH#:MOD_SRC?

Syntax

`CH#:MOD_SRC?`

Parameter

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

Description

Only available if the SWT-APC module to is set to **Full-band** mode (see section *CH#:MODE, p. 72*).

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**.

9.10 Module System-Version Information

9.10.1 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`

9.10.2 CH#:*IDN?

Syntax `CH#:*idn?`

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

Description Returns information about the SWT-APC 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>`

9.10.3 CH#:TYPE?

Syntax `CH#:TYPE?`

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

Description Returns the SWT-APC module type version and options.

OSICS Response `CH#:SWT-APC/<Model>`

10. 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. 86*)	CH#:DISABLE
	CH#:ENABLE
	CH#:ENABLE?
Unit Selection (*p. 87*)	CH#:GHZ
	CH#:NM
	CH#:NM?
	CH#:DBM
	CH#:MW
	CH#:MW?
Output-Power Setting (*p. 89*)	CH#:P=
	CH#:P?
	CH#:LIMIT?
Diode-Current Setting (*p. 90*)	CH#:I?
	CH#:IMAX?
Optical Emission-Wavelength/Frequency Setting (*p. 91*)	CH#:L=
	CH#:L?
	CH#:F=
	CH#:F?
Coherence Control (*p. 92*)	CH#:CTRL
	CH#:CTRL?
Auto-peak Find Control (*p. 92*)	CH#:APF
	CH#:APF?
Modulation Control (*p. 94*)	CH#:MOD_CTRL
	CH#:MOD_CTRL?
	CH#:MOD_SRC
	CH#:MOD_F=
	CH#MOD_F?
	CH#:MOD_SRC?

	Command/Query
Calibration Control (*p. 96*)	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. 99*)	CH#:AOUT
	CH#:AOUT?
Module System-Version Information (*p. 100*)	CH#:FIRM?
	CH#:*IDN?
	CH#:TYPE?

10.1 Optical-Output Control

10.1.1 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*.

10.1.2 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*.

10.1.3 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**.

10.2 Unit Selection

10.2.1 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*.

10.2.2 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*.

10.2.3 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**.

10.2.4 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*.

10.2.5 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*.

10.2.6 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**.

10.3 Output-Power Setting

10.3.1 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. 87*). 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. 87*). 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. 87*).

OSICS Response

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

10.3.2 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. 87*).
The module optical-output must be enabled (see section *Optical-Output Control, p. 86*).

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.

10.3.3 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.

10.4 Diode-Current Setting

10.4.1 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. 86*).

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

10.4.2 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`

10.5 Optical Emission-Wavelength/Frequency Setting

10.5.1 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*.

10.5.2 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`

10.5.3 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*.

10.5.4 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`

10.6 Coherence Control

10.6.1 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*.

10.6.2 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).

10.7 Auto-peak Find Control

10.7.1 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*.

10.7.2 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**.

10.8 Modulation Control

10.8.1 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*.

10.8.2 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**.

10.8.3 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*.

10.8.4 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. 95*.

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

10.8.5 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`

10.8.6 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**.

10.9 Calibration Control

10.9.1 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*.

10.9.2 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*.

10.9.3 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*.

10.9.4 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`

10.9.5 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`

10.9.6 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. 89*).
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*.

10.9.7 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. 89*).
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*.

10.9.8 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`

10.9.9 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`

10.10 Module Parameter-Monitoring with the OUT 1 Output

10.10.1 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*.

10.10.2 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.

10.11 Module System-Version Information

10.11.1 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`

10.11.2 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>`

10.11.3 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>`

11. OSICS TLS-AG Control

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

	Command/Query
Optical-Output Control (*p. 102*)	CH#:DISABLE
	CH#:ENABLE
	CH#:ENABLE?
Unit Selection (*p. 102*)	CH#:GHZ
	CH#:NM
	CH#:NM?
	CH#:DBM
	CH#:MW
	CH#:MW?
Operating-Mode Control (*p. 105*)	CH#:MODE
	CH#:MODE?
	CH#:GRID_START
	CH#:GRID_START?
	CH#:GRID_SPACING
	CH#:GRID_SPACING?
Output-Power Setting (*p. 107*)	CH#:P=
	CH#:P?
Optical Emission-Wavelength/Frequency Setting (*p. 108*)	CH#:L=
	CH#:L?
	CH#:L_MIN?
	CH#:L_MAX?
	CH#:CHN=
	CH#:CHN?
	CH#:CHN_MAX?
	CH#:F=
	CH#:F?
	CH#:F_MIN?
	CH#:F_MAX?
	CH#:ISL?
	CH#:LOCKED?
	CH#:FT_L=
	CH#:FT_L?
	CH#:FT_F=
	CH#:FT_F?
Module System-Version Information (*p. 113*)	CH#:FIRM?
	CH#:*IDN?
	CH#:TYPE?

11.1 Optical-Output Control

11.1.1 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 TLS-AG module.

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

11.1.2 CH#:ENABLE

Syntax `CH#:ENABLE`

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

Description Enables the laser output of the TLS-AG module.

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

11.1.3 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 TLS-AG module.

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

11.2 Unit Selection

11.2.1 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*.

11.2.2 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*.

11.2.3 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**.

11.2.4 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*.

11.2.5 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*.

11.2.6 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**.

11.3 Operating-Mode Control

11.3.1 CH#:MODE

Syntax `CH#:MODE 0|1|2`

Parameter
- `#`: slot number of the module, in the range 1 to 8.
- `0`: Grid mode.
- `1`: Manual mode.
- `2`: High Resolution mode

Description Sets the operating mode of the module.

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

11.3.2 CH#:MODE?

Syntax `CH#:MODE?`

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

Description Returns the operating mode of the module.

OSICS Response
- `CH#:MODE=0`: the module is set to Grid mode.
- `CH#:MODE=1`: the module is set to Manual mode.
- `CH#:MODE=2`: the module is set to High Resolution mode.

11.3.3 CH#:GRID_START

Syntax
- If the unit is set to nm: `CH#:GRID_START xxxx.xxx`
- If the unit is set to GHz: `CH#:GRID_START xxxxxx.x`

Parameter
- `#`: slot number of the module, in the range 1 to 8.
- `xxxx.xxx`: the first emission wavelength in nm. Wavelength range is given in the module *Technical Specifications* section in the *OSICS User Guide*.
- `xxxxxx.x`: the first emission frequency in GHz. Wavelength range is given in the module *Technical Specifications* section in the *OSICS User Guide*.

Description Sets the first channel emission wavelength in nm or frequency in GHz, depending on the current unit selected.

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

11.3.4 CH#:GRID_START?

Syntax `CH#:GRID_START?`

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

Description Returns the first channel emission wavelength in nm or frequency in GHz, depending on the current unit selected

OSICS Response
- `CH#:GRID_START=xxxx.xxx`: the first emission wavelength in nm.
- `CH#:GRID_START= xxxxxx.x`: the first emission frequency in GHz.

11.3.5 CH#:GRID_SPACING

Syntax `CH#:GRID_SPACING xxxx.xx`

Parameter
- `#`: slot number of the module, in the range 1 to 8.
- `xxxx.xx`: the grid spacing in GHz, in the range 0.1 to 3281 Ghz.

Description Only available if the module is set to Grid mode (see section *CH#:MODE, p. 105*).
Sets the grid spacing of channels on the grid in GHz.

OSICS Response
- RS-232C:
  - `CH#:OK`
  - `CH#:NOT_GRID_MODE`: the module is not set to Grid mode, the grid spacing cannot be set.
- GPIB: none, see section *Standard Status Model, p. 15*.

11.3.6 CH#:GRID_SPACING?

Syntax `CH#:GRID_SPACING?`

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

Description Only available if the module is set to Grid mode (see section *CH#:MODE, p. 105*).
Returns the grid spacing in GHz.

OSICS Response
- `CH#:GRID_SPACING=xxxx.xx`
- `CH#:NOT_GRID_MODE`: the module is not set to Grid mode, the grid spacing cannot be returned.

11.4 Output-Power Setting

11.4.1 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. 102*). 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. 102*). 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. 102*).

OSICS Response

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

11.4.2 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. 102*).
The module optical-output must be enabled (see section *Optical-Output Control, p. 102*).

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.

11.5 Optical Emission-Wavelength/Frequency Setting

11.5.1 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#:L_MIN?* and *CH#:L_MAX?* commands (see *p. 108*).

Description Only available if the TLS-AG module is set to Manual or High Resolution mode (see section *CH#:MODE, p. 105*).
Sets the emission wavelength of the module in nm.

OSICS Response
- RS-232C: `CH#:OK`: the wavelength is set.
  `CH#:GRID_MODE`: the mode is set to Grid mode (see section *CH#:MODE, p. 105*), you cannot set the emission wavelength.
- GPIB: none, see section *Standard Status Model, p. 15*.

11.5.2 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 (the fine tune offset is not integrated in this value).

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

11.5.3 CH#:L_MIN?

Syntax `CH#:L_MIN?`

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

Description Returns the first wavelength of the laser in nm.

OSICS Response `CH#:L_MIN=xxxx.xxx`

11.5.4 CH#:L_MAX?

Syntax `CH#:L_MAX?`

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

Description Returns the last wavelength of the laser in nm.

OSICS Response `CH#:L_MAX=xxxx.xxx`

11.5.5 CH#:CHN=

Syntax `CH#:CHN=xxx`

Parameters
- `#`: slot number of the module, in the range 1 to 8.
- `xxx`: emission channel number of the TLS-AG module. The number of available channels depends on grid spacing (see section *CH#:GRID_SPACING, p. 106*) and is given using the *CH#:CHN_MAX?* command (see *p. 109*)

Description Only available if the module is set to Grid mode (see section *CH#:MODE, p. 105*).
Sets the emission channel of the TLS-AG module.

OSICS Response
- RS-232C: `CH#:OK`
  `CH#:NOT_GRID_MODE`: the module is not set to Grid mode; the emission channel cannot be set.
- GPIB: none, see section *Standard Status Model, p. 15*.

11.5.6 CH#:CHN?

Syntax `CH#:CHN?`

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

Description Only available if the module is set to Grid mode (see section *CH#:MODE, p. 105*).
Returns the present emission channel number of the TLS-AG module.

OSICS Response `CH#:CHN=xxx`
`CH#:NOT_GRID_MODE`: the module is not set to Grid mode; the emission channel cannot be set.

11.5.7 CH#:CHN_MAX?

Syntax `CH#:CHN_MAX?`

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

Description Only available if the module is set to Grid mode (see section *CH#:MODE, p. 105*).
Returns the highest valid channel of the TLS-AG module.

OSICS Response `CH#:CHN_MAX=xxx`
`CH#:NOT_GRID_MODE`: the module is not set to Grid mode; the channel cannot be returned.

11.5.8 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*.

11.5.9 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 (the fine tune offset is not integrated in this value).

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

11.5.10 CH#:F_MIN?

Syntax `CH#:F_MIN?`

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

Description Returns the first frequency of the laser in GHz.

OSICS Response `CH#:F_MIN=xxxxxx.x`

11.5.11 CH#:F_MAX?

Syntax `CH#:F_MAX?`

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

Description Returns the last frequency of the laser in GHz.

OSICS Response `CH#:F_MAX=xxxxxx.x`

11.5.12 CH#:ISL?

Syntax `CH#:ISL?`

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

Description Returns the grid spacing of the laser in GHz.

OSICS Response `CH#:ISL=xxx.xx`

11.5.13 CH#:LOCKED?

Syntax `CH#:LOCKED?`

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

Description This command is only available from software version 3.07 and above.
Returns the laser status.

OSICS Response
- `CH#:0`: the laser is tuning (changing the laser output-power does not generate a tuning of the laser).
- `CH#:1`: the laser is locked on a wavelength.

11.5.14 CH#:FT_L=

Syntax `CH#:FT_L=(±)xx.xx`

Parameter
- `#`: slot number of the module, in the range 1 to 8.
- `xx.xx`: fine tune value in pm, in the range -46.75 to +46.75.

Description Only available if the module is set to Manual or Grid mode (see section *CH#:MODE, p. 105*).
Sets the fine tune in pm.

OSICS Response
- RS-232C:
  - `CH#:OK`: the fine tune is set.
  - `CH#:HIGH_RES_MODE`: the module is set to High resolution mode (see section *CH#:MODE, p. 105*), the fine tune value cannot be set.
- GPIB: none, see section *Standard Status Model, p. 15*.

11.5.15 CH#:FT_L?

Syntax `CH#:FT_L?`

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

Description Only available if the module is set to Manual or Grid mode (see section *CH#:MODE, p. 105*).
Returns the offset value of the fine tuning in pm.

OSICS Response
- `CH#:FT_L=xx.xx`.
- `CH#:HIGH_RES_MODE`: the module is set to High resolution mode (see section *CH#:MODE, p. 105*), the fine tune value cannot be returned.

11.5.16 CH#:FT_F=

Syntax `CH#:FT_F=(±)xxxx`

Parameter
- `#`: slot number of the module, in the range 1 to 8.
- `xxxx`: fine tune value in MHz, in the range -6000 to +6000 MHz.

Description Only available if the module is set to Manual or Grid mode (see section *CH#:MODE, p. 105*).
Sets the fine tune in MHz.

OSICS Response
- RS-232C:
  - `CH#:OK`: the fine tune is set.
  - `CH#:HIGH_RES_MODE`: the module is set to High resolution mode (see section *CH#:MODE, p. 105*; the fine tune value cannot be set.
- GPIB: none, see section *Standard Status Model, p. 15*.

11.5.17 CH#:FT_F?

Syntax `CH#:FT_F?`

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

Description Only available if the module is set to Manual or Grid mode (see section *CH#:MODE, p. 105*).
Returns the offset value of the fine tuning in MHz.

OSICS Response
- `CH#:FT_F=xxxx`
- `CH#:HIGH_RES_MODE`: the module is set to High resolution mode (see section *CH#:MODE, p. 105*); the fine tune value cannot be returned.

11.6 Module System-Version Information

11.6.1 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`

11.6.2 CH#:*IDN?

Syntax `CH#:*idn?`

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

Description Returns information about the TLS-AG 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>`

11.6.3 CH#:TYPE?

Syntax `CH#:TYPE?`

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

Description Returns the TLS-AG module type version and options.

OSICS Response `CH#:TLS/<Module Model>/<Module Type>/<Option 1>/<Option 2>`

12. 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 March 2018).

Instrument Specific Errors

Error Code	Error Description
-300	**OSICS-Specific Error** 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** The OSA is still scanning, analyzing, stopping or aborting and is not in an idle state.
-302	**OSICS Calibration-State Busy** The OSA is still calibrating and is not in an idle state.
-303	**OSICS Mode-State Busy** The OSA is still opening or closing a mode and is not in an idle state.

13. Program Example and Library

Subject

EXFO provides the following tools allow you to control the OSICS via GPIB and RS-232C:

- LabVIEW Virtual Instrument example *OSICS_FBL_Example.vi*
- LabVIEW library *OSICS_LIB.lvlib*

These tools are available on the USB key delivered with the OSICS Mainframe, or you can download them from the EXFO website (www.exfo.com/en/exfo-apps).

Compatibility

The Virtual Instrument *OSICS_FBL_Example* is part of the LabVIEW library *OSICS_LIB.lvlib*, developed for LabVIEW 2010 or later.

The example and library are compatible with 32- and 64-bits versions of LabVIEW.

13.1 OSICS LabVIEW Library

The *OSICS_LIB.lvlib* LabVIEW library is organized in three sub-folder:

- **Parameter Settings**

  This folder contains sub-Vis that allow to configure the settings of laser modules such as power, emission wavelength/frequency and to enable/disable the optical output.

- **Parameters Queries**

  This folder contains sub-Vis that collect current values of parameters and settings of laser modules such as power, emission wavelength/frequency, module identification and state of the laser output.

- **Communication**

  This folder contains the sub-Vis that allow write/read of commands/responses in both communication modes GPIB and RS 232C. Specific functionalities for each mode are available in the GPIB or RS-232C sub-folders.

13.2 OSICS LabVIEW Example

This VI example controls an OSICS Full-band Laser (FBL) remotely.
The OSICS FBL consists of an OSICS SWT-APC module and up to four OSICS T100 laser modules (for more information about how to setup an OSICS Full-Band Laser, please see *OSICS User Guide*).

All commands and queries are sent to the OSICS SWT-APC module, which is configured to operate in "Full-band" mode.

The OSICS Mainframe can be connected to the computer via USB (for RS-232C communication) or GPIB.

13.2.1 Using the Front Panel to Remotely Control the OSICS SWT-APC in Full-band Mode

Front Panel Presentation

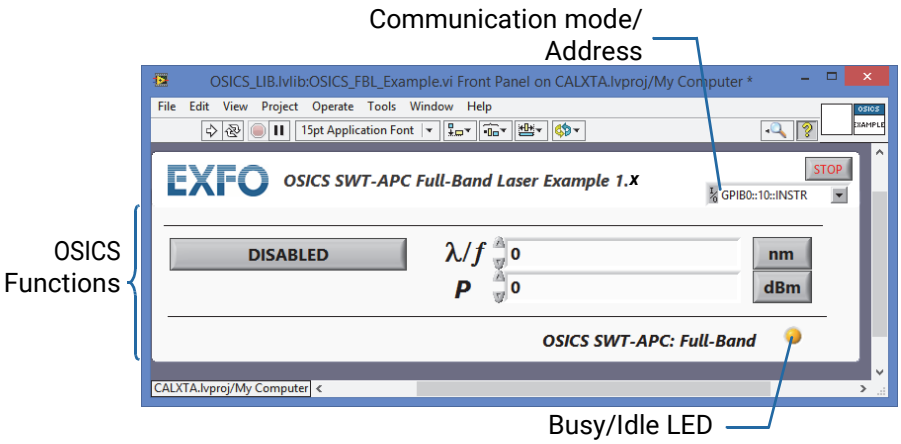


Figure 3: OSICS SWT-APC in Full-band mode Example – Front Panel

OSICS Functions

The VI example reproduces most of the functionalities of the OSICS SWT-APC in Full-band mode by emulating the following functions:

- **λ/f**: Wavelength/Frequency screen. Displays the wavelength/frequency value.
- **P**: Power screen. Displays the power value.
- **nm** and **dBm**: unit buttons. Display the unit used.
- **DISABLED/ENABLED**: Enable button. Enables/disables the laser output.

Busy/Idle LED

- Orange: remote access is performing a remote command.
- Green: remote access is ready for a new command.

Procedures

Opening and Initializing the Application Example

1. To open the remote control example, double-click the *OSICS_FBL_Example.vi* file.
2. In the **I/O** parameter on the top right of the application, set the correct communication mode and address.

3. Run the Vi by pressing the **Run** arrow, or using the shortcut **CTRL+R**.

   The Vi first runs the *OSICS_Openport.vi* to establish communication with the OSICS Mainframe and modules used in the Full-band setup.

   Next the *OSICS_Get_Laser_Settings_SWT-APC.vi* collects the laser output state, wavelength/frequency and power settings.

   If the laser is DISABLED, NaN (Not a Number) is displayed in **P** and **I** parameters.

   When the application is ready for remote control, the Busy/Idle LED becomes green.

Controlling the OSICS Full-band Laser

- **Modifying a Parameter**

  a. Click on the **P** and **I** fields and type the desired value.

  b. Press the **Enter** key on the keyboard to confirm the typed value.

     The instrument is set to the new value. If the value is outside of the allowed limits, the application resets the parameter to the previous value.

  The application behavior reproduces the behavior displayed on the front panel of the instrument:
  - When in "Idle" state, both wavelength/frequency and power are updated to the set values.
  - When entering a new Current value, the APC and ACC are automatically turned OFF.
  - When entering a new Power value, the APC is automatically turned ON.

- **Changing Unit**

  To toggle between nm and GHz, or between mW and dBm, click on the unit buttons next to the parameter fields.

- **Enabling/Disabling the laser output**

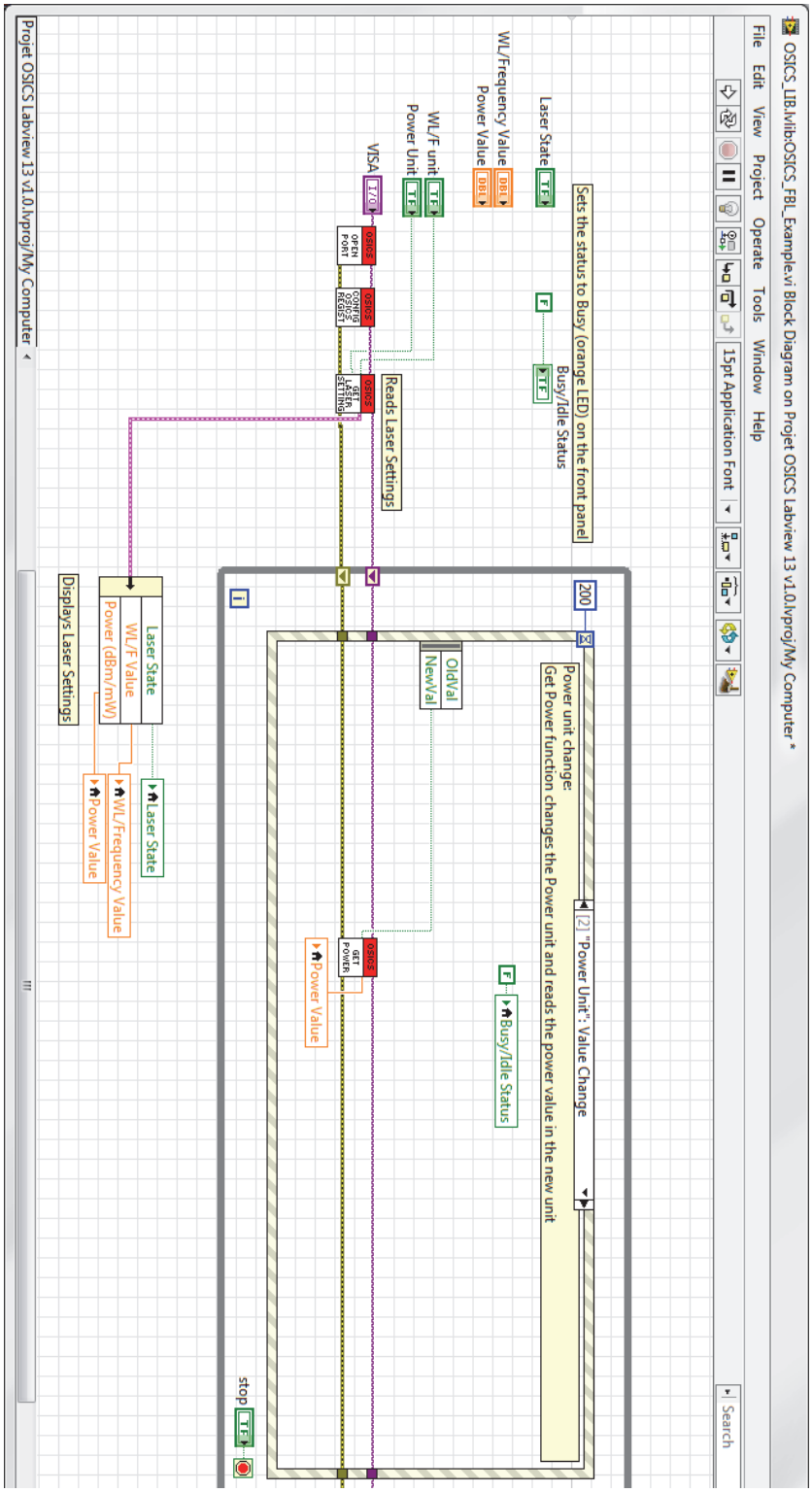
  To enable or disable the output of the SWT-APC module, click on the DISABLED/ ENABLED button.

13.2.2 Example Diagram

The LabVIEW diagram of *OSICS_FL_Example.vi* is composed of two sections:

- The first section is the initialization of the communication with the instrument using the *OSICS_Openport.vi*. The *OSICS_Set_ESE.vi* configures the OSICS Standard-Event-Status-Register for error-handling (for more detailed information, see section *General System and Status Control, p. 13*) and the *OSICS_Get_Settings_SWT-APC.vi* to collect the current settings.
- The second section consists of on an *Event Handler*. Comments in each relevant Event Case helps understand the structure of the program.

The program has been written to be easily exported or modified by the user in order to suit a particular need.


OSICS_LIB.lvlib:OSICS_FBL_Example.vi Block Diagram on Projet OSICS Labview 13 v1.0.lvproj/My Computer *
File Edit View Project Operate Tools Window Help
15pt Application Font
Search
Sets the status to Busy (orange LED) on the front panel
Busy/Idle Status
Laser State
WL/Frequency Value
Power Value
WL/F unit
Power Unit
VISA
OPEN PORT
CONFIG PORT
GET LASER SETTING
Reads Laser Settings
200
Power unit change:
Get Power function changes the Power unit and reads the power value in the new unit
[2] "Power Unit": Value Change
OldVal
NewVal
Busy/Idle Status
GET POWER
Power Value
stop
Projet OSICS Labview 13 v1.0.lvproj/My Computer
Displays Laser Settings
Laser State
WL/F Value
Power (dBm/mW)
Laser State
WL/Frequency Value
Power Value

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