

COMMAND SET

LAB Series Instruments

QCL LAB, TC LAB, & LDTC LAB



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TC LAB and QCL LAB firmware versions 1.5 and later operate with the LabVIEW Virtual Instrument application and the Remote Command Set



GENERAL OVERVIEW

INTRODUCTION

The Wavelength Electronics LAB Series instruments can be operated remotely using a basic set of commands. Traditionally, this is done through GPIB protocols. These instruments, however, conform to USBTMC (Universal Serial Bus Test and Measurement Class) and Ethernet VXI 11 protocols[1], so a GPIB-like interface is provided over USB and Ethernet connections.

Once the instrument is set up, go to the National Instruments website (<http://www.ni.com>) to find all the information necessary to install NI MAX and NI VISA and learn how to use the software to communicate with the instrument. This document is meant to supplement the NI information with material specific to the LAB Series instruments.

COMMAND REFERENCE

IEEE-488.2 COMMANDS

The following IEEE-488.2 commands are supported by all Wavelength instruments:

*CLS	*OPC	*RCL
*ESE	*OPC?	*RST
*ESE?	*PRE	*SAV
*ESR?	*PRE?	*SRE
*IDN?	*PSC	*SRE?
*IST?	*PSC?	*STB?

DEVICE-INDEPENDENT COMMANDS

The following device-independent commands are supported by all Wavelength instruments:

BEEP	HEXFLOAT	RADix
BEEP?	HEXFLOAT?	RADix?
BRIGHT	LOCAL	REMERR
BRIGHT?	MESsage	REMERR?
CALdate?	MESsage?	SCRIPT:GET?
DELAY	PROFile:BEEP	SCRIPT:GO
DELAY?	PROFile:BEEP?	SCRIPT:PUT
EQUIPment?	PROFile:BRIGHT	SN?
ERRors?	PROFile:BRIGHT?	TIME?
ERRSTR?	PROFile:DESC	TIMER?
	PROFile:DESC?	VER?

When the computer sends the first command, the editable parameters on the front panel change from blue to white text and can no longer be edited. The screen displays monitor values and the Remote icon animation. To exit **Remote** mode, press the Remote icon or send the LOCAL command, either of which returns the instrument to **Local** mode.

SHARED QCL/TC LAB COMMANDS

The following commands are only supported by the QCL LAB and TC LAB instruments:

PROFile:CABLER	SECurity:APPLY	TECH:FLASHDRIVE?
PROFile:CABLER?	SECurity:APPLY?	TECH:HWADDR
PWR	SECurity:CHMOD	TECH:HWADDR?
PWR?	SECurity:CHMOD?	TECH:IPADDR
	SECurity:NUser	TECH:IPADDR?
	SECurity:NUser?	TECH:IPGW
	SECurity:PASSWD	TECH:IPGW?
	SECurity:RECALLENABLE	TECH:IPMASK
	SECurity:RECALLENABLE?	TECH:IPMASK?
	SECurity:SAVEENABLE	
	SECurity:SAVEENABLE?	
	SECurity:SUser	
	SECurity:SUser?	

[1] Ethernet interface only available on QCL LAB and TC LAB Series models.

PROFILE COMMANDS

A predefined set of operational parameters can be applied to the instrument simply by recalling a profile. Profiles are managed by adjusting the instrument to the state you want it in and saving that configuration to a specific profile or by sending remote **PROFile** commands.

Profile commands can be either device-independent or specific to a particular instrument type and are listed in the corresponding table. They represent an operational state of the unit. A profile command begins with **PROFile**:

When configured remotely, the profiles can be loaded from the instrument, edited, and re-saved to the instrument without changing its active operating state.

There are 10 user profiles that can be configured, referenced by the profile number 1 through 10. The *SAV and *RCL commands use the same profile index. Once a profile has been saved either with the *SAV command, or with profile commands remotely, the *RCL command places the instrument in the configuration state defined by that profile. Profile 0 is the factory profile, and cannot be overwritten or deleted. During local operation, profiles can also be saved and recalled from the instrument front panel.

SECURITY COMMANDS

The QCL LAB and TC LAB instruments support restricting which operational functions the user can adjust, based on whether they are normal or super users. All of these controls can also be applied to each operating profile.

Most security commands can be used on either instrument and begin with **SECurity**:

SCRIPTING COMMANDS

A script is a series of commands, anything you can normally send to the instrument, but stored in memory for execution at a later time. A script can contain any valid command except:

```
SCRIPT:GET?  
SCRIPT:GO  
SCRIPT:PUT
```

Note that if multiple device-dependent commands are sent, the initial command path should not be sent again. For example, **SCRIPT:PUT 1, LASer:CABLER 0.5^OUT 0^COND?** will set the cable resistance to 0.5Ω, turn output current off, and query the conditon register.

SCRIPT:PUT1,LAS:CABLER0.5^LAS:OUT0^LAS:COND? will be written to memory. Upon execution, however, the cable resistance will be set to 0.5 and a path not found error will be returned. The parser will find the LASer:CABLER command then look for LASer:LASer:OUT and LASer:LASer:COND? and not find them.

If using the LDTC LAB, to switch between LAS and TEC commands, insert an additional colon before either LAS or TEC, whichever comes second. For example, **SCRIPT PUT 2, LAS:LDI 1^OUT 1^:TEC:SET 20^OUT 1** will set the laser diode setpoint to 1 A, turn LD output on, set the temperature setpoint to 20, and turn TC output on.

A script can be a maximum of 200 characters and up to four scripts can be stored. It can contain more than one command, but there is a slight difference when concatenating commands as compared to normal communications: instead of using a semicolon (;) to separate commands, you must use a carat (^).

QCL LAB COMMANDS

In addition to the IEEE commands, the device-independent commands, and the shared QCL/TC LAB commands, the following commands are supported by the QCL LAB:

QCL DRIVER COMMANDS		
LASer:AMP	LASer:LDV?	PROFile:ILIM
LASer:AMP?	LASer:LIMit:LDI	PROFile:ILIM?
LASer:CABLER	LASer:LIMit:LDI?	PROFile:ISet
LASer:CABLER?	LASer:LIMit:LDV	PROFile:ISet?
LASer:COND?	LASer:LIMit:LDV?	PROFile:VIStART
LASer:DEC	LASer:OUTput	PROFile:VIStART?
LASer:DISplay	LASer:OUTput?	PROFile:VIStEP
LASer:DISplay?	LASer:SEt:LDI?	PROFile:VIStEP?
LASer:ENABle:COND	LASer:STB?	PROFile:VIStOP
LASer:ENABle:COND?	LASer:StEP	PROFile:VIStOP?
LASer:ENABle:EVEnt	LASer:StEP?	PROFile:VIWAIt
LASer:ENABle:EVEnt?	LASer:TOLerance	PROFile:VIWAIt?
LASer:EVEnt?	LASer:TOLerance?	PROFile:VLIM
LASer:INC	ONDELAY	PROFile:VLIM?
LASer:LDI	ONDELAY?	SECurity:CHMOD
LASer:LDI?		SECurity:CHMOD?

TC LAB COMMANDS

In addition to the IEEE commands, the device-independent commands, and the shared QCL/TC LAB commands, the following commands are supported by the TC LAB:

TC COMMANDS		
CONST:DEL	PROfile:UNITS?	TEC:LIMit:IPOS?
CONST:ICV	PROFile:VLIM	TEC:LIMit:RHI
CONST:LIST?	PROFile:VLIM?	TEC:LIMit:RHI?
CONST:OPT	SECurity:CHMOD	TEC:LIMit:RLO
CONST:RTDn	SECurity:CHMOD?	TEC:LIMit:RLO?
CONST:THERM	TEC:ACT?	TEC:LIMit:THI
PROFile:AUTOTUNE	TEC:AUTOTUNE	TEC:LIMit:THI?
PROFile:AUTOTUNE?	TEC:AUTOTUNE?	TEC:LIMit:TLO
PROFile:INEG	TEC:AUX?	TEC:LIMit:TLO?
PROFile:INEG?	TEC:AUX:BIAS	TEC:OUTput
PROFile:IPOS	TEC:AUX:BIAS?	TEC:OUTput?
PROFile:IPOS?	TEC:BIAS	TEC:PID
PROFile:PID	TEC:BIAS?	TEC:PID?
PROFile:PID?	TEC:CABLER	TEC:SENSOR
PROFile:SCANSTART	TEC:CABLER?	TEC:SENSOR?
PROFile:SCANSTART?	TEC:COND?	TEC:SENSOREDEL
PROFile:SCANSTEP	TEC:DEC	TEC:SENSORLIST?
PROFile:SCANSTEP?	TEC:DISplay	TEC:SEt
PROFile:SCANSTOP	TEC:DISplay?	TEC:SEt?
PROFile:SCANSTOP?	TEC:ENABle:COND	TEC:STB?
PROFile:SCANWAIT	TEC:ENABle:COND?	TEC:StEP
PROFile:SCANWAIT?	TEC:ENABle:EVEnt	TEC:StEP?
PROFile:SENsor	TEC:ENABle:EVEnt?	TEC:TOLerance
PROFile:SENsor?	TEC:EVEnt?	TEC:TOLerance?
PROFile:SEt	TEC:!??	TEC:TUNEABORT
PROFile:SEt?	TEC:INC	TEC:TUNESTART
PROFile:THI	TEC:INTPOL	TEC:UNITS
PROFile:THI?	TEC:INTSTAT?	TEC:UNITS?
PROFile:TLO	TEC:LDSHUTdown:POL	TEC:V?
PROFile:TLO?	TEC:LDSHUTdown:POL?	TEC:VALID?
PROFile:TOLerance	TEC:LIMit:INEG	TEC:VLIM
PROFile:TOLerance?	TEC:LIMit:INEG?	TEC:VLIM?
PROfile:UNITS	TEC:LIMit:IPOS	

LDTc LAB COMMANDS

In addition to the IEEE and device-independent commands, the following commands are supported by the LDTc LAB:

LDTc COMMANDS			
CONST:DEL	LASer:PDRange	PROFile:TEC:BIAS	TEC:LIMit:INEG
CONST:ICV	LASer:PDRange?	PROFile:TEC:BIAS?	TEC:LIMit:INEG?
CONST:LIST?	LASer:POL:ENABLE	PROFile:TEC:CABLER	TEC:LIMit:IPOS
CONST:THERM	LASer:POL:ENABLE?	PROFile:TEC:CABLER?	TEC:LIMit:IPOS?
LASer:AMP	LASer:POL:STAT	PROFile:TEC:LIMit:INEG	TEC:LIMit:RHI
LASer:AMP?	LASer:POL:STAT?	PROFile:TEC:LIMit:INEG?	TEC:LIMit:RHI?
LASer:CABLER	LASer:SET:LDI?	PROFile:TEC:LIMit:IPOS	TEC:LIMit:RLO
LASer:CABLER?	LASer:SET:MDI?	PROFile:TEC:LIMit:IPOS?	TEC:LIMit:RLO?
LASer:COND?	LASer:SET:MDP?	PROFile:TEC:LIMit:RHI	TEC:LIMit:THI
LASer:ENABLE:COND	LASer:STABLE?	PROFile:TEC:LIMit:RHI?	TEC:LIMit:THI?
LASer:ENABLE:COND?	LASer:TOLerance	PROFile:TEC:LIMit:RLO	TEC:LIMit:TLO
LASer:ENABLE:EVEnt	LASer:TOLerance?	PROFile:TEC:LIMit:RLO?	TEC:LIMit:TLO?
LASer:ENABLE:EVEnt?	ONDELAY	PROFile:TEC:LIMit:THI	TEC:LIMit:VLIM
LASer:ENABLE:OUTOFF	ONDELAY?	PROFile:TEC:LIMit:THI?	TEC:LIMit:VLIM?
LASer:ENABLE:OUTOFF?	PROFile:LASer:CABLER	PROFile:TEC:LIMit:TLO	TEC:OUTput
LASer:EVEnt?	PROFile:LASer:CABLER?	PROFile:TEC:LIMit:TLO?	TEC:OUTput?
LASer:LDI	PROFile:LASer:LDI	PROFile:TEC:LIMit:VLIM	TEC:PID
LASer:LDI?	PROFile:LASer:LIMit:LDI	PROFile:TEC:LIMit:VLIM?	TEC:PID?
LASer:LDV?	PROFile:LASer:LIMit:LDI?	PROFile:TEC:PID	TEC:POL:ENABLE
LASer:LIMit:LDI	PROFile:LASer:LIMit:LDV	PROFile:TEC:PID?	TEC:POL:ENABLE?
LASer:LIMit:LDI?	PROFile:LASer:LIMit:LDV?	PROFile:TEC:SENSOR	TEC:POL:STABLE
LASer:LIMit:LDV	PROFile:LASer:LIMit:MDP	PROFile:TEC:SENSOR?	TEC:POL:STABLE?
LASer:LIMit:LDV?	PROFile:LASer:LIMit:MDP?	PROFile:TEC:SET	TEC:POL:STAT
LASer:LIMit:MDP	PROFile:LASer:MDI	PROFile:TEC:SET?	TEC:POL:STAT?
LASer:LIMit:MDP?	PROFile:LASer:MDP	PROFile:TEC:TOLerance	TEC:SENSOR
LASer:MDI	PROFile:LASer:MODE:LDI	PROFile:TEC:TOLerance?	TEC:SENSOR?
LASer:MDI?	PROFile:LASer:MODE:LDI?	PROFile:TEC:UNITS	TEC:SET
LASer:MDP	PROFile:LASer:MODE:MDI	PROFile:TEC:UNITS?	TEC:SET?
LASer:MDP?	PROFile:LASer:MODE:MDI?	PROFile:TEC:VALID?	TEC:STABLE?
LASer:MOD	PROFile:LASer:MODE:TYPE	PROFile:TEC:VLIM	TEC:TOLerance
LASer:MOD?	PROFile:LASer:MODE:TYPE?	PROFile:TEC:VLIM?	TEC:TOLerance?
LASer:MODE:LDI	PROFile:LASer:MODE?	TEC:ACT?	TEC:TUNEABORT
LASer:MODE:LDI?	PROFile:LASer:ONDELAY	TEC:AUTOTUNE	TEC:TUNESTART
LASer:MODE:MDI	PROFile:LASer:ONDELAY?	TEC:AUTOTUNE?	TEC:UNITS
LASer:MODE:MDI?	PROFile:LASer:PDBias	TEC:BIAS	TEC:UNITS?
LASer:MODE:TYPE	PROFile:LASer:PDBias?	TEC:BIAS?	TEC:V?
LASer:MODE:TYPE?	PROFile:LASer:PDRange	TEC:CABLER	TEC:VALID?
LASer:MODE?	PROFile:LASer:PDRange?	TEC:CABLER?	TEC:VLIM
LASer:ONDELAY	PROFile:LASer:SET:LDI?	TEC:COND?	TEC:VLIM?
LASer:ONDELAY?	PROFile:LASer:SET:MDI?	TEC:ENABLE:COND	
LASer:OUTput	PROFile:LASer:SET:MDP?	TEC:ENABLE:COND?	
LASer:OUTput?	PROFile:LASer:TOLerance	TEC:ENABLE:EVEnt	
LASer:PDBias	PROFile:LASer:TOLerance?	TEC:ENABLE:EVEnt?	
LASer:PDBias?	PROFile:TEC:AUTOTUNE	TEC:EVEnt?	
	PROFile:TEC:AUTOTUNE?	TEC:I?	

SYNTAX

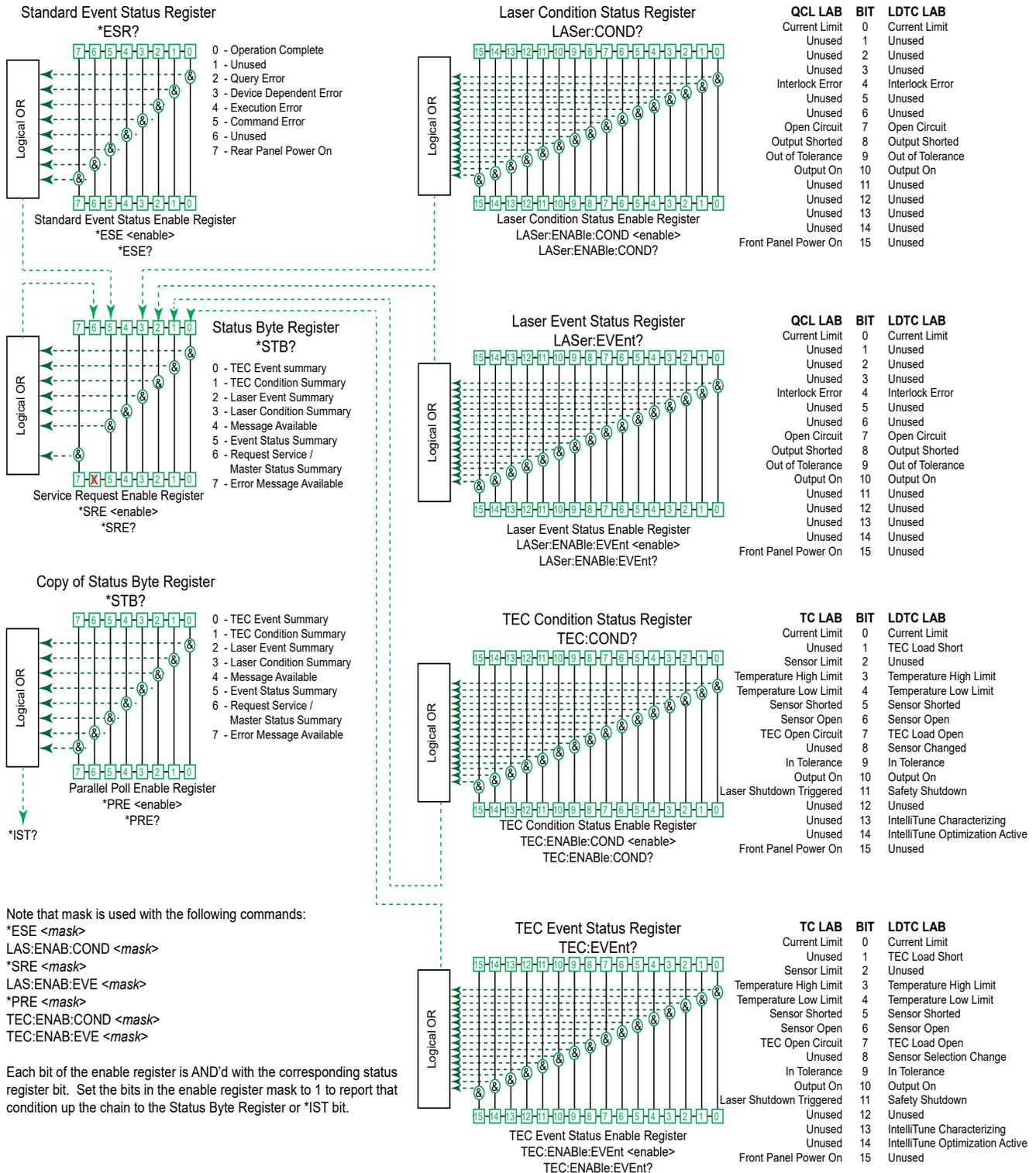
SYNTAX	DEFINITION	EXAMPLE												
Abbreviation	Truncated commands are acceptable but only if the correct letters are used. Also see Capitalization	Correct: LAS for laser	Incorrect: LSR for laser											
Brackets, square ([])	When parameters are optional, they are enclosed with brackets.	LASer:INC <step> [,time] step is necessary, time is optional												
Brackets, triangle (< >)	When a parameter is enclosed by angle brackets, a value must be specified for the enclosed parameter.	LASer:LDI <current> Current level is a necessary parameter												
Capitalization	While commands are case insensitive, the command definition must contain all of the letters shown in uppercase. Lowercase letters are optional but are helpful for clarity. If the optional letters are included, then all in a word must be included and in the correct sequence.	Correct: LASer:TOLerance LAS:TOL LAS:TOLerance	Incorrect: LASe:TOL											
Carat	In scripts, commands are separated with carats, not semicolons.	SCRIPT 1, LAS:AMP 1^LIM:LDI 0.5^LDI 0.5^OUT 1												
Colon	When separating a command keyword from a lower-level command keyword, a colon is used. No space is used to separate the colon from either keyword.	Correct: LASer:ENABLE	Incorrect: LASer ENABLE LAS: ENAB											
Comma	Where a command has multiple parameters, separate them with a comma. No space is necessary.	PROF:BRIGHT 1,100												
Command Path	A Command Path is a tree-like structure where commands for devices or functions are grouped together. Usually device-dependent commands have this structure.	LASer:CABLER LASer:LDI TEC:SET TEC:EVENT?												
Multiple Commands	More than one command may be in the same command string but only if each command is separated with a semicolon.	LAS:AMP 1; LIM:LDI 0.6; LDI 0.5; OUT 1 will set units to Amps, set current limit to 0.6A, set laser setpoint to 0.5A, and turn on/enable output current.												
Numeric substitution	Numbers can be used to set bits. Zero (0) can be replaced with OFF, NEW, or FALSE, and one (1) can be replaced with ON, OLD, or TRUE.	LAS:OUT ON and LAS:OUT 1 are equivalent.												
Parameter	<p>When parameters are required, they must be separated from the command by at least one white space. The parameters are separated by commas. The value for a missing parameter will be assumed to be zero. If all parameters are not present, an error will occur.</p> <p>If extra parameters are sent on a write command, they are ignored. For example, LAS:CABLER 4,5 sets R to 4Ω and ignores the 5.</p> <p>There are three types of numeric parameters that IEEE 488.2 standards use: NR1, NR2, and NR3 and are defined with examples for the number "30" below.</p> <table border="1"> <tbody> <tr> <td>NR1</td> <td>Integer</td> <td>30</td> <td>+30</td> </tr> <tr> <td>NR2</td> <td>Floating Point</td> <td>30.0</td> <td>+30.0</td> </tr> <tr> <td>NR3</td> <td>Scientific Notation*</td> <td>3.0E+1 3.0e+1</td> <td>+3.0E+1 +3.0e+1</td> </tr> </tbody> </table> <p>If a fractional number is sent in place of an integer argument, the command reads the integer value and truncates the fractional value.</p> <p>* Scientific notation is only allowed for non-integer values.</p>	NR1	Integer	30	+30	NR2	Floating Point	30.0	+30.0	NR3	Scientific Notation*	3.0E+1 3.0e+1	+3.0E+1 +3.0e+1	<p>Incorrect:</p> <p>LAS:LDI1 (no white space) LAS:TOL 1 2 (space not comma) LAS:TOL ,25 (stores 0 and 25) HEXFLOAT (sets HEXFLOAT to zero) SCRIPT:GET? (assumes the index is 0 and an out of range error will be returned)</p>
NR1	Integer	30	+30											
NR2	Floating Point	30.0	+30.0											
NR3	Scientific Notation*	3.0E+1 3.0e+1	+3.0E+1 +3.0e+1											
Query	A command used to instruct the instrument to respond with current data to the computer. A query ends with a question mark. Any parameters after the ? will be ignored.	BEEP? *STB?												
Semicolon	More than one command in the same substring can be placed in a command string if it is separated by a semicolon. Spaces before or after the semicolon are acceptable.	See <i>Multiple Commands</i> above												

SYNTAX	DEFINITION	EXAMPLE
White space	<p>A single space or a TAB (both horizontal and vertical) must separate a command from its parameters or data. These are the standard space characters and are interpreted as white space.</p> <p>Do not use white space before the question mark in a Query command.</p> <p>Multiple spaces will be ignored.</p>	<p>Correct: Space before number: LASer:CABLER 30 No space before ?: BEEP?</p> <p>Incorrect: No space before number: LASer:CABLER30 Space before ?: BEEP ?</p>

The following are some common mistakes in command string syntax that will produce errors:

COMMAND SYNTAX	COMMENT
LASer ENABle	Colon missing between command paths Correct: LASer:ENABle
DISPLAY ON *IDN? DISPLAY ON *IDN?	Semicolon missing Correct: DISPLAY ON;*IDN? DISPLAY ON ; *IDN?
LAS:OUTPUT ?	Space added before question mark Correct: LAS:OUTPUT?
&SRE	& not * precedes command characters CORRECT: *SRE
*ESE a	Alpha not numeric argument CORRECT: *ESE 40
*STB? 5	The *STB? command does not support a query argument. The 5 will be ignored. CORRECT: *STB?
STB?	Missing the * at the beginning of the command CORRECT: *STB?
LAS:ENAB:COND	Missing an argument or query question mark. CORRECT: LAS:ENAB:COND 4 LAS:ENAB:COND?
LAS:ENA:COND 2	Missing character in command string CORRECT: LAS:ENAB:COND 2
LAS:ENAB:EVE4095	Missing space between command and parameter CORRECT: LAS:ENAB:EVE 4095
LAS:E?	Missing core characters in the command CORRECT: LAS:EVE?
LAS:COND:ENAB 2	Commands listed out of order in the command string CORRECT: LAS:ENAB:COND 2
LAS:ENAB:COND @	Special character as argument. It must be numeric. CORRECT: LAS:ENAB:COND 4
*CSL	Transposed letters in the command CORRECT: *CLS
*CLD	Typo in the command CORRECT: *CLS
LAB:ENAB:COND 512	Wrong letter in the command prefix. CORRECT: LAS:ENAB:COND 512

STATUS REPORTING STRUCTURE



COMMAND SET QUICK REFERENCE

COMMANDS LISTED ALPHABETICALLY

COMMAND	INSTR	DESCRIPTION	PAGE
*CLS	ALL	Clears the following: Standard Event Status Enable Register (*ESE), Standard Event Status Register (*ESR), Status Byte Register (*STB), Laser or TEC Condition Status registers (LAS:COND, TEC:COND), Laser and TEC Event Status registers (LAS:EVE, TEC:EVE), Service Request Enable register (*SRE), Parallel Poll Enable Register (*PRE), Laser and TEC Condition Status Enable registers (LAS:ENAB:COND, TEC:ENAB:COND), Laser and TEC Event Status Enable registers (LAS:ENAB:EVE, TEC:ENAB:EVE), Instrument Status Register (*IST,) and the error queue (ERR? or ERRSTR?)	page 18
*ESE	ALL	Sets the Standard Event Status Enable Register	page 18
*ESE?	ALL	Queries the Standard Event Status Enable Register	page 18
*ESR?	ALL	Queries the status of the Standard Event Status Register and then clears it	page 19
*IDN?	ALL	Queries the instrument identification	page 19
*IST?	ALL	Queries a summary of the instrument status	page 20
*OPC	ALL	Sets the Operation Complete bit (Bit 0) in the Standard Event Status Register when all pending commands have been completed	page 20
*OPC?	ALL	Operation Complete query returns 1 when all pending operations have been finished, if the *OPC command is sent after the final command	page 20
*PRE	ALL	Sets the Parallel Poll Enable Register mask	page 20
*PRE?	ALL	Queries the Parallel Poll Enable Register mask	page 20
*PSC	ALL	Sets the Power-On Clear Status for several status registers	page 21
*PSC?	ALL	Queries the Power-On Clear Status	page 21
*RCL	ALL	Recalls a stored setup configuration from memory. The memory space is called a Profile. Output current is shut off during a recall.	page 22
*RST	ALL	Reset to factory default settings	page 23
*SAV	ALL	Saves all current settings to memory in a recallable profile number	page 23
*SRE	ALL	Sets the Service Request Enable Register mask	page 24
*SRE?	ALL	Queries the Service Request Enable Register mask	page 24
*STB?	ALL	Queries the Status Byte Register	page 25
BEEP	ALL	Sets the beep enable status	page 26
BEEP?	ALL	Queries the beep enable status	page 26
BRIGHT	ALL	Sets the display brightness level	page 26
BRIGHT?	ALL	Queries the display brightness level	page 26
CALdate?	ALL	Queries the last calibration date of the instrument	page 26
CONST:DEL	TC LAB LDTC LAB	Deletes a user-created sensor profile	page 60
CONST:ICV	TC LAB LDTC LAB	Creates a custom LM335 or other constant voltage source sensor profile using slope and offset or voltage and temperature pairs	page 60
CONST:LIST?	TC LAB LDTC LAB	Queries the stored sensor profile names	page 61
CONST:OPT	TC LAB	Creates a custom infrared optical sensor profile	page 61
CONST:RTDn	TC LAB	Creates a custom 3-wire (CONST:RTD3) or 4-wire (CONST:RTD4) RTD sensor profile	page 62
CONST:THERM	TC LAB LDTC LAB	Creates a custom thermistor profile	page 63
DELAY	ALL	Causes a delay in command processing	page 27
DELAY?	ALL	Queries the set delay in command processing	page 27
EQUIPment?	ALL	Queries the instrument model information	page 27
ERRors?	ALL	Queries for errors	page 27
ERRSTR?	ALL	Queries for errors with string descriptions	page 27
HEXFLOAT	ALL	Enables hex float mode	page 28
HEXFLOAT?	ALL	Queries the state of the hex float mode	page 28

COMMAND	INSTR	DESCRIPTION	PAGE
LASer:AMP	QCL LAB LDTC LAB	Sets the laser units to Amps or mAmps	page 38
LASer:AMP?	QCL LAB LDTC LAB	Queries the type of laser units in use	page 38
LASer:CABLER	QCL LAB LDTC LAB	Sets laser cable resistance compensation value in Ohms	page 38
LASer:CABLER?	QCL LAB LDTC LAB	Queries the laser cable resistance compensation value in Ohms	page 38
LASer:COND?	QCL LAB LDTC LAB	Queries the Laser Condition Status Register	page 39
LASer:DEC	QCL LAB	Decrements the laser setpoint	page 39
LASer:DISPlay	QCL LAB	Sets the front panel display to on or off	page 40
LASer:DISPlay?	QCL LAB	Queries the display enable state	page 40
LASer:ENABLE:COND	QCL LAB LDTC LAB	Sets the Laser Condition Status Enable Register mask	page 40
LASer:ENABLE:COND?	QCL LAB LDTC LAB	Queries the Laser Condition Status Enable Register mask	page 40
LASer:ENABLE:EVEnt	QCL LAB LDTC LAB	Sets the Laser Event Status Enable Register mask	page 41
LASer:ENABLE:EVEnt?	QCL LAB LDTC LAB	Queries the Laser Event Status Enable Register mask	page 41
LASer:ENABLE:OUTOFF	LDTC LAB	Sets the Laser Enable Output Off Register mask	page 41
LASer:ENABLE:OUTOFF?	LDTC LAB	Queries the Laser Enable Output Off Register mask	page 41
LASer:EVEnt?	QCL LAB LDTC LAB	Queries the value of the Laser Event Status Register	page 42
LASer:INC	QCL LAB	Increments the laser setpoint by the specified number of steps	page 42
LASer:LDI	QCL LAB LDTC LAB	Sets the laser current setpoint	page 43
LASer:LDI?	QCL LAB LDTC LAB	Queries the actual laser current	page 43
LASer:LDV?	QCL LAB LDTC LAB	Queries the actual laser voltage	page 43
LASer:LIMit:LDI	QCL LAB LDTC LAB	Sets the laser current limit	page 43
LASer:LIMit:LDI?	QCL LAB LDTC LAB	Queries the laser current limit setting	page 43
LASer:LIMit:LDV	QCL LAB LDTC LAB	QCL: Sets the internal power supply voltage level limit LDTC: Sets the voltage limit across the laser Can only be changed when LAS:OUT = 0	page 44
LASer:LIMit:LDV?	QCL LAB LDTC LAB	QCL: Queries internal power supply voltage level limit LDTC: Queries voltage limit across the laser	page 44
LASer:LIMit:MDP	LDTC LAB	Sets the photodiode transfer function	page 44
LASer:LIMit:MDP?	LDTC LAB	Queries the photodiode transfer function	page 44
LASer:MDI	LDTC LAB	Sets the photodiode current setpoint in A in constant power mode	page 44
LASer:MDI?	LDTC LAB	Queries the actual photodiode current	page 45
LASer:MDP	LDTC LAB	Sets the photodiode power setpoint in constant power mode	page 45
LASer:MDP?	LDTC LAB	Queries the calculated photodiode power	page 45
LASer:MOD	LDTC LAB	Toggles whether modulation input is used as part of the setpoint value	page 45
LASer:MOD?	LDTC LAB	Queries the status of modulation input as part of the setpoint value	page 45
LASer:MODE:LDI	LDTC LAB	Sets the operation mode to constant current control and sets laser type	page 45
LASer:MODE:LDI?	LDTC LAB	Queries if the operation mode is constant current	page 46
LASer:MODE:MDI	LDTC LAB	Sets the operation mode to constant power control and sets laser type	page 46
LASer:MODE:MDI?	LDTC LAB	Queries if the operation mode is constant power	page 46
LASer:MODE:TYPE	LDTC LAB	Sets the configuration for laser type A or C	page 46

COMMAND	INSTR	DESCRIPTION	PAGE
LASer:MODE:TYPE?	LDTc LAB	Queries which type of laser the instrument is configured to control	page 46
LASer:MODE?	LDTc LAB	Queries the type of laser and the control mode for which the instrument is configured	page 47
LASer:ONDELAy	LDTc LAB	Sets the turn-on delay time for laser current in milliseconds (see ONDELAy)	page 47
LASer:ONDELAy?	LDTc LAB	Queries the turn-on delay time for laser current (see ONDELAy?)	page 47
LASer:OUTput	QCL LAB LDTc LAB	Sets the laser output state (current enabled or disabled)	page 47
LASer:OUTput?	QCL LAB LDTc LAB	Queries the laser output state	page 47
LASer:PDBias	LDTc LAB	Enables or disables the photodiode bias voltage	page 48
LASer:PDBias?	LDTc LAB	Queries the status of the photodiode bias voltage	page 48
LASer:PDRange	LDTc LAB	Sets the current operation range for the photodiode feedback	page 48
LASer:PDRange?	LDTc LAB	Queries the photodiode current range setting	page 48
LASer:POL:ENABLE	LDTc LAB	Sets the polarity of the remote laser diode enable input pin on the rear panel	page 48
LASer:POL:ENABLE?	LDTc LAB	Queries the polarity status for the remote laser diode enable input pin on the rear panel	page 49
LASer:POL:STAT	LDTc LAB	Sets the polarity for the remote laser diode enable output pin on the rear panel	page 49
LASer:POL:STAT?	LDTc LAB	Queries the polarity status for the remote laser diode enable output pin on the rear panel	page 49
LASer:SET:LDI?	QCL LAB LDTc LAB	Queries the laser current setpoint	page 49
LASer:SET:MDI?	LDTc LAB	Queries the photodiode current setpoint	page 49
LASer:SET:MDP?	LDTc LAB	Queries the photodiode power setpoint	page 49
LASer:STABLE?	LDTc LAB	Queries if the power supply for the laser driver is stable	page 50
LASer:STB?	QCL LAB	Queries the Laser Status Byte Register (equivalent to *STB?)	page 50
LASer:STEP	QCL LAB	Sets laser step size	page 50
LASer:STEP?	QCL LAB	Queries the laser step size	page 50
LASer:TOLerance	QCL LAB LDTc LAB	Sets the laser tolerance criteria	page 51
LASer:TOLerance?	QCL LAB LDTc LAB	Queries the laser tolerance criteria	page 51
LOCAL	ALL	Returns to local mode	page 28
MESsage	ALL	Writes a message to the front panel	page 28
MESsage?	ALL	Reads message written to front panel	page 28
ONDELAy	QCL LAB LDTc LAB	Sets the turn-on delay time for laser current	page 51
ONDELAy?	QCL LAB LDTc LAB	Queries the turn-on delay time for laser current	page 51
PROFile:AUTOTUNE	TC LAB	Set the IntelliTune® method to manual tuning, Setpoint Response, or Disturbance Rejection for a specific profile	page 63
PROFile:AUTOTUNE?	TC LAB	Queries the IntelliTune settings for a specific profile	page 64
PROFile:BEEP	ALL	Sets the beeper ON or OFF for the specified profile	page 29
PROFile:BEEP?	ALL	Queries the beeper status for the specified profile	page 29
PROFile:BRIGHt	ALL	Sets the brightness of the display for the specified profile	page 29
PROFile:BRIGHt?	ALL	Queries the brightness of the display for the specified profile	page 29
PROFile:CABLER	QCL LAB TC LAB	Sets the cable resistance for the specified profile	page 29
PROFile:CABLER?	QCL LAB TC LAB	Queries the cable resistance for the specified profile	page 30
PROFile:DESC	ALL	Sets the description strings (both lines) for the specified profile	page 30
PROFile:DESC?	ALL	Queries the description strings (both lines) for the specified profile	page 30
PROFile:ILIM	QCL LAB	Sets the laser current limit for the specified profile	page 52
PROFile:ILIM?	QCL LAB	Queries the laser current limit for the specified profile	page 52
PROFile:INEG	TC LAB	Sets the negative current limit for the specified profile	page 64
PROFile:INEG?	TC LAB	Queries the negative current limit for the specified profile	page 64

COMMAND	INSTR	DESCRIPTION	PAGE
PROFile:IPOS	TC LAB	Sets the positive current limit for the specified profile	page 64
PROFile:IPOS?	TC LAB	Queries the positive current limit for the specified profile	page 64
PROFile:ISET	QCL LAB	Sets the laser current setpoint for the specified profile	page 52
PROFile:ISET?	QCL LAB	Queries the laser current setpoint for the specified profile	page 52
PROFile:LASer:CABLER	LDTc LAB	Sets the laser cable resistance for the specified profile	page 52
PROFile:LASer:CABLER?	LDTc LAB	Queries the laser cable resistance for the specified profile	page 52
PROFile:LASer:LDI	LDTc LAB	Sets the laser current setpoint for the specified profile	page 53
PROFile:LASer:LIMit:LDI	LDTc LAB	Sets the laser current limit for the specified profile	page 53
PROFile:LASer:LIMit:LDI?	LDTc LAB	Queries the laser current limit for the specified profile	page 53
PROFile:LASer:LIMit:LDV	LDTc LAB	Sets the laser voltage limit for the specified profile	page 53
PROFile:LASer:LIMit:LDV?	LDTc LAB	Queries the laser voltage limit for the specified profile	page 53
PROFile:LASer:LIMit:MDP	LDTc LAB	Sets the photodiode transfer function for the specified profile	page 53
PROFile:LASer:LIMit:MDP?	LDTc LAB	Queries the photodiode transfer function for the specified profile	page 54
PROFile:LASer:MDI	LDTc LAB	Sets the photodiode current setpoint for the specified profile	page 54
PROFile:LASer:MDP	LDTc LAB	Sets the photodiode power setpoint for the specified profile	page 54
PROFile:LASer:MODE:LDI	LDTc LAB	Sets the operation mode to constant current and sets the laser type for the specified profile	page 54
PROFile:LASer:MODE:LDI?	LDTc LAB	Queries if the operation mode is constant current for the specified profile	page 54
PROFile:LASer:MODE:MDI	LDTc LAB	Sets the operation mode to constant power and sets the laser type for the specified profile	page 54
PROFile:LASer:MODE:MDI?	LDTc LAB	Queries if the operation mode is constant power for the specified profile	page 54
PROFile:LASer:MODE:TYPE	LDTc LAB	Sets the laser type configuration for the specified profile	page 55
PROFile:LASer:MODE:TYPE?	LDTc LAB	Queries the laser type configuration for the specified profile	page 55
PROFile:LASer:MODE?	LDTc LAB	Queries the laser type configuration and operation mode configuration for the specified profile	page 55
PROFile:LASer:ONDELAY	LDTc LAB	Sets the turn-on time for laser current for the specified profile	page 55
PROFile:LASer:ONDELAY?	LDTc LAB	Queries the turn-on time for laser current for the specified profile	page 55
PROFile:LASer:PDBias	LDTc LAB	Enables/disables the photodiode bias voltage for the specified profile	page 55
PROFile:LASer:PDBias?	LDTc LAB	Queries if the photodiode bias voltage is enabled or disabled for the specified profile	page 55
PROFile:LASer:PDRange	LDTc LAB	Sets the photodiode operating range for the specified profile	page 56
PROFile:LASer:PDRange?	LDTc LAB	Queries the photodiode current range for the specified profile	page 56
PROFile:LASer:SET:LDI?	LDTc LAB	Queries the laser current setpoint for the specified profile	page 56
PROFile:LASer:SET:MDI?	LDTc LAB	Queries the photodiode current setpoint for the specified profile	page 56
PROFile:LASer:SET:MDP?	LDTc LAB	Queries the photodiode power setpoint for the specified profile	page 56
PROFile:LASer:TOLerance	LDTc LAB	Sets the laser tolerance parameters for the specified profile	page 56
PROFile:LASer:TOLerance?	LDTc LAB	Queries the laser tolerance parameters for the specified profile	page 57
PROFile:PID	TC LAB	Sets the PID coefficients for a specific profile	page 65
PROFile:PID?	TC LAB	Queries the PID coefficients for a specific profile	page 65
PROFile:SCANSTART	TC LAB	Sets the scan start temperature for the specified profile	page 65
PROFile:SCANSTART?	TC LAB	Queries scan start temperature for the specified profile	page 65
PROFile:SCANSTEP	TC LAB	Sets the scan step temperature interval in °C for the specified profile	page 66
PROFile:SCANSTEP?	TC LAB	Queries the scan step temperature interval in °C for the specified profile	page 66
PROFile:SCANSTOP	TC LAB	Sets the scan stop temperature for the specified profile	page 66
PROFile:SCANSTOP?	TC LAB	Queries the scan stop temperature for the specified profile	page 66
PROFile:SCANWAIT	TC LAB	Sets the settling wait time between steps of a temperature scan for the specified profile	page 66
PROFile:SCANWAIT?	TC LAB	Queries the settling wait time between steps of a temperature scan for a specified profile	page 67
PROFile:SENsor	TC LAB	Sets the sensor selection for a specific profile	page 67
PROFile:SENsor?	TC LAB	Queries the sensor selection for a specific profile	page 67
PROFile:SET	TC LAB	Sets the temperature setpoint for the specified profile	page 67
PROFile:SET?	TC LAB	Queries the temperature setpoint for the specified profile	page 67
PROFile:TEC:AUTOTUNE	LDTc LAB	Sets the IntelliTune mode for the specified profile	page 67
PROFile:TEC:AUTOTUNE?	LDTc LAB	Queries the IntelliTune mode for the specified profile	page 68

COMMAND	INSTR	DESCRIPTION	PAGE
PROFile:TEC:BIAS	LDTc LAB	Sets the sensor bias current for the specified profile	page 68
PROFile:TEC:BIAS?	LDTc LAB	Queries the sensor bias current for the specified profile	page 68
PROFile:TEC:CABLER	LDTc LAB	Sets the TEC cable resistance for the specified profile	page 68
PROFile:TEC:CABLER?	LDTc LAB	Queries the TEC cable resistance for the specified profile	page 68
PROFile:TEC:LIMit:INEG	LDTc LAB	Sets the negative current limit for the specified profile	page 68
PROFile:TEC:LIMit:INEG?	LDTc LAB	Queries the negative current limit for the specified profile	page 68
PROFile:TEC:LIMit:IPOS	LDTc LAB	Sets the positive TEC current limit for the specified profile	page 69
PROFile:TEC:LIMit:IPOS?	LDTc LAB	Queries the positive TEC current limit for the specified profile	page 69
PROFile:TEC:LIMit:RHI	LDTc LAB	Sets the upper limit for the sensor in physical units for the specified profile	page 69
PROFile:TEC:LIMit:RHI?	LDTc LAB	Queries the upper limit for the sensor in physical units for the specified profile	page 69
PROFile:TEC:LIMit:RLO	LDTc LAB	Sets the lower limit for the sensor in physical units for the specified profile	page 69
PROFile:TEC:LIMit:RLO?	LDTc LAB	Queries the lower limit for the sensor in physical units for the specified profile	page 69
PROFile:TEC:LIMit:THI	LDTc LAB	Sets the upper temperature limit for the specified profile	page 69
PROFile:TEC:LIMit:THI?	LDTc LAB	Queries the upper temperature limit for the specified profile	page 70
PROFile:TEC:LIMit:TLO	LDTc LAB	Sets the lower temperature limit for the specified profile	page 70
PROFile:TEC:LIMit:TLO?	LDTc LAB	Queries the lower temperature limit for the specified profile	page 70
PROFile:TEC:LIMit:VLIM	LDTc LAB	Sets the maximum TEC internal voltage limit for the specified profile	page 70
PROFile:TEC:LIMit:VLIM?	LDTc LAB	Queries the maximum TEC internal voltage limit for the specified profile	page 70
PROFile:TEC:PID	LDTc LAB	Sets the PID coefficients for the specified profile	page 70
PROFile:TEC:PID?	LDTc LAB	Queries the PID coefficients for the specified profile	page 70
PROFile:TEC:SENSOR	LDTc LAB	Sets the active temperature sensor for the specified profile	page 71
PROFile:TEC:SENSOR?	LDTc LAB	Queries the active temperature sensor for the specified profile	page 71
PROFile:TEC:SET	LDTc LAB	Sets the temperature setpoint for the specified profile	page 71
PROFile:TEC:SET?	LDTc LAB	Queries the temperature setpoint for the specified profile	page 71
PROFile:TEC:TOLerance	LDTc LAB	Sets the temperature tolerance parameters for the specified profile	page 71
PROFile:TEC:TOLerance?	LDTc LAB	Queries the temperature tolerance parameters for the specified profile	page 71
PROFile:TEC:UNITS	LDTc LAB	Sets the active temperature units for the specified profile	page 71
PROFile:TEC:UNITS?	LDTc LAB	Queries the active temperature units for the specified profile	page 72
PROFile:TEC:VALID?	LDTc LAB	Queries if there is valid IntelliTune data stored for the specified profile	page 72
PROFile:TEC:VLIM	LDTc LAB	Sets the maximum TEC internal voltage limit for the specified profile	page 72
PROFile:TEC:VLIM?	LDTc LAB	Queries the maximum TEC internal voltage limit for the specified profile	page 72
PROFile:THI	TC LAB	Sets the high temperature limit setting for a specific profile	page 72
PROFile:THI?	TC LAB	Queries the high temperature limit setting for a specific profile	page 72
PROFile:TLO	TC LAB	Sets the low temperature limit for a specific profile	page 73
PROFile:TLO?	TC LAB	Queries the low temperature limit for a specific profile	page 73
PROFile:TOLerance	TC LAB	Sets the tolerance criteria for a specific profile	page 73
PROFile:TOLerance?	TC LAB	Queries the tolerance criteria for a specific profile	page 73
PROFile:UNITS	TC LAB	Sets the display and control units for a specific profile	page 74
PROFile:UNITS?	TC LAB	Queries the display and control units for a specific profile	page 74
PROFile:VISTART	QCL LAB	Sets the VI scan start current for the specified profile	page 57
PROFile:VISTART?	QCL LAB	Queries the VI scan start current for the specified profile	page 57
PROFile:VISTEP	QCL LAB	Sets the VI scan laser current step size for the specified profile	page 57
PROFile:VISTEP?	QCL LAB	Queries the VI scan laser current step size for the specified profile	page 57
PROFile:VISTOP	QCL LAB	Sets the VI scan stop current for the specified profile	page 57
PROFile:VISTOP?	QCL LAB	Queries the VI scan stop current for the specified profile	page 58
PROFile:VIWAIT	QCL LAB	Sets the settling wait time after each step in a VI scan for the specified profile	page 58
PROFile:VIWAIT?	QCL LAB	Queries the settling wait time after each step in a VI scan for the specified profile	page 58
PROFile:VLIM	QCL LAB	Sets the maximum internal supply voltage for the specified profile	page 58
PROFile:VLIM	TC LAB	Sets the maximum internal supply voltage for the specified profile	page 74

COMMAND	INSTR	DESCRIPTION	PAGE
PROFile:VLIM?	QCL LAB	Queries the maximum internal supply voltage for the specified profile	page 58
PROFile:VLIM?	TC LAB	Queries the maximum supply voltage for the specified profile	page 74
PWR	QCL LAB TC LAB	Turns the front panel power button ON or OFF	page 30
PWR?	QCL LAB TC LAB	Queries the state of the front panel power button	page 30
RADix	ALL	Sets the radix (number base) for integer values	page 31
RADix?	ALL	Queries the radix (number base) for integer values	page 31
REMERR	ALL	Sets the display of errors on screen while in remote mode	page 31
REMERR?	ALL	Queries the status of displaying error messages on the instrument front panel while in remote mode	page 31
SCRIPT:GET?	ALL	Retrieves a script from instrument memory	page 37
SCRIPT:GO	ALL	Remotely executes a script	page 37
SCRIPT:PUT	ALL	Puts a script into memory at the specified index	page 37
SECurity:APPLY	QCL LAB TC LAB	Enables or disables application of permissions. If not applied then the user has unrestricted access at the front panel	page 32
SECurity:APPLY?	QCL LAB TC LAB	Queries whether permissions are applied.	page 32
SECurity:CHMOD	QCL LAB	Writes permissions mask to set which controls a normal user may change for a particular profile	page 59
SECurity:CHMOD	TC LAB	Writes permissions mask to specify which controls a normal user may change on a TC LAB instrument	page 75
SECurity:CHMOD?	QCL LAB	Queries which controls a normal user may change for a particular profile	page 59
SECurity:CHMOD?	TC LAB	Queries which controls a normal user may change	page 75
SECurity:NUser	QCL LAB TC LAB	Places the unit into normal user mode from any other state (calibration/admin, super user)	page 32
SECurity:NUser?	QCL LAB TC LAB	Indicates whether user holds normal user privileges (versus super user)	page 32
SECurity:PASSWD	QCL LAB TC LAB	Sets the super user password	page 32
SECurity:RECALLENABLE	QCL LAB TC LAB	Sets whether a user is allowed to recall a profile.	page 33
SECurity:RECALLENABLE?	QCL LAB TC LAB	Queries whether a user is allowed to recall a profile	page 33
SECurity:SAVEENABLE	QCL LAB TC LAB	Sets whether a user is allowed to save a profile	page 33
SECurity:SAVEENABLE?	QCL LAB TC LAB	Queries whether a user is allowed to save a profile	page 33
SECurity:SUser	QCL LAB TC LAB	Attempts to change to super user mode	page 33
SECurity:SUser?	QCL LAB TC LAB	Queries whether super user privileges are held	page 34
SN?	ALL	Queries the serial number of the instrument	page 34
TEC:ACT?	TC LAB LDTC LAB	Queries the actual temperature at the currently selected sensor	page 75
TEC:AUTOTUNE	TC LAB LDTC LAB	Sets the type of IntelliTune process	page 76
TEC:AUTOTUNE?	TC LAB LDTC LAB	Queries IntelliTune mode	page 76
TEC:AUX?	TC LAB	Queries the actual temperature of the auxiliary sensor	page 77
TEC:AUX:BIAS	TC LAB	Sets bias current for the auxiliary sensor	page 77
TEC:AUX:BIAS?	TC LAB	Queries the bias current for the auxiliary sensor	page 77
TEC:BIAS	TC LAB LDTC LAB	Selects the bias current of the main control sensor	page 78

COMMAND	INSTR	DESCRIPTION	PAGE
TEC:BIAS?	TC LAB LDTC LAB	Queries the bias current for the main control sensor	page 78
TEC:CABLER	TC LAB LDTC LAB	Sets the cable resistance value, in Ohms	page 78
TEC:CABLER?	TC LAB LDTC LAB	Queries the cable resistance value, in Ohms	page 78
TEC:COND?	TC LAB LDTC LAB	Queries the TEC Status Condition Register value	page 79
TEC:DEC	TC LAB	Decrements the temperature setpoint by the specified number of steps	page 79
TEC:DISplay	TC LAB	Turns the front panel touchscreen display on or off	page 80
TEC:DISplay?	TC LAB	Queries the front panel display state	page 80
TEC:ENABLE:COND	TC LAB LDTC LAB	Sets the Temperature Controller Condition Status Enable Register mask	page 80
TEC:ENABLE:COND?	TC LAB LDTC LAB	Queries the Temperature Controller Condition Status Enable Register mask	page 80
TEC:ENABLE:EVEnt	TC LAB LDTC LAB	Sets the Temperature Controller Event Status Enable Register mask	page 81
TEC:ENABLE:EVEnt?	TC LAB LDTC LAB	Queries the Temperature Controller Event Status Enable Register mask	page 81
TEC:EVEnt?	TC LAB LDTC LAB	Queries the value of the Temperature Controller Event Status Register	page 81
TEC:I?	TC LAB LDTC LAB	Queries the actual thermoelectric current	page 82
TEC:INC	TC LAB	Increments the temperature setpoint by a specified number of steps.	page 82
TEC:INTPOL	TC LAB	Sets the polarity for the remote enable input (Pin 1 on the DB-9 connector).	page 82
TEC:INTSTAT?	TC LAB	Queries and returns the value of the INTPOL bit.	page 82
TEC:LDSHUTdown:POL	TC LAB	Sets the polarity of the TTL signal sent from the Laser Diode (LD) Shutdown BNC	page 83
TEC:LDSHUTdown:POL?	TC LAB	Queries the polarity of the TTL signal sent from the LD Shutdown BNC.	page 83
TEC:LIMit:INEG	TC LAB LDTC LAB	Sets the negative output current limit for the instrument	page 83
TEC:LIMit:INEG?	TC LAB LDTC LAB	Queries and returns the negative output current limit for the instrument as a positive number, in Amps	page 83
TEC:LIMit:IPOS	TC LAB LDTC LAB	Sets the positive output current limit for the instrument	page 84
TEC:LIMit:IPOS?	TC LAB LDTC LAB	Queries and returns the positive output current limit for the instrument, in Amps	page 84
TEC:LIMit:RHI	TC LAB LDTC LAB	Sets the high resistance limit of the sensor, in physical units that match the active sensor	page 84
TEC:LIMit:RHI?	TC LAB LDTC LAB	Queries the high resistance limit of the sensor, in physical units	page 84
TEC:LIMit:RLO	TC LAB LDTC LAB	Sets the low resistance limit of the sensor, in physical units that match the active sensor	page 85
TEC:LIMit:RLO?	TC LAB LDTC LAB	Queries the low resistance limit of the sensor	page 85
TEC:LIMit:THI	TC LAB LDTC LAB	Sets the high temperature limit of the sensor in the currently active units	page 85
TEC:LIMit:THI?	TC LAB LDTC LAB	Queries the high temperature limit of the sensor in the currently active units	page 85
TEC:LIMit:TLO	TC LAB LDTC LAB	Sets the low temperature limit of the sensor in the currently active units	page 85
TEC:LIMit:TLO?	TC LAB LDTC LAB	Queries the low temperature limit of the sensor, in the currently active units	page 86
TEC:LIMit:VLIM	LDTC LAB	Sets the maximum TEC internal voltage limit	page 86
TEC:LIMit:VLIM?	LDTC LAB	Queries the maximum TEC internal voltage limit for the specified profile	page 86
TEC:OUTput	TC LAB LDTC LAB	Sets the thermoelectric output current state	page 86

COMMAND	INSTR	DESCRIPTION	PAGE
TEC:OUTput?	TC LAB LDTC LAB	Queries the state of the thermoelectric output current	page 86
TEC:PID	TC LAB LDTC LAB	Sets the PID parameters used by the control stage	page 87
TEC:PID?	TC LAB LDTC LAB	Queries the PID parameters used by the control stage	page 87
TEC:POL:ENABLE	LDTC LAB	Sets whether the polarity of the remote TEC enable input on the rear panel uses inverted logic	page 87
TEC:POL:ENABLE?	LDTC LAB	Queries whether the polarity of the remote TEC enable input on the rear panel uses inverted logic	page 87
TEC:POL:STABLE	LDTC LAB	Sets whether the temperature stability status signal on the rear panel uses inverted logic	page 88
TEC:POL:STABLE?	LDTC LAB	Queries whether the temperature stability status signal on the rear panel uses inverted logic	page 88
TEC:POL:STAT	LDTC LAB	Sets whether the polarity for the TEC enable status output pin on the rear panel uses inverted logic	page 88
TEC:POL:STAT?	LDTC LAB	Queries whether the polarity for the TEC enable status output pin on the rear panel uses inverted logic	page 88
TEC:SENSOR	TC LAB LDTC LAB	Selects the sensor to be used as feedback for the control loop	page 89
TEC:SENSOR?	TC LAB LDTC LAB	Queries the calibration coefficients for the currently selected sensor	page 89
TEC:SENSOREDEL	TC LAB	Deletes a user-created sensor	page 90
TEC:SENSORLIST?	TC LAB	Queries and returns a list of stored sensor names, including factory profiles and user-configured custom profiles	page 90
TEC:SET	TC LAB LDTC LAB	Sets the temperature setpoint in the currently active units	page 90
TEC:SET?	TC LAB LDTC LAB	Queries the setpoint value	page 90
TEC:STABLE?	LDTC LAB	Queries if the TEC power supply is stable	page 90
TEC:STB?	TC LAB	Queries the status byte register	page 91
TEC:STEP	TC LAB	Sets the temperature step size as a multiple of 0.01°C.	page 91
TEC:STEP?	TC LAB	Queries the temperature step size	page 91
TEC:TOLerance	TC LAB LDTC LAB	Sets the temperature tolerance criteria for the in tolerance flag.	page 92
TEC:TOLerance?	TC LAB LDTC LAB	Queries the temperature tolerance criteria	page 92
TEC:TUNEABORT	TC LAB LDTC LAB	Stops an in-progress IntelliTune	page 92
TEC:TUNESTART	TC LAB LDTC LAB	Starts an IntelliTune in the mode defined by the TEC:AUTOTUNE command	page 92
TEC:UNITS	TC LAB LDTC LAB	Sets which units the temperature is controlled and reported in	page 93
TEC:UNITS?	TC LAB LDTC LAB	Queries the units that temperature is set and reported in	page 93
TEC:V?	TC LAB LDTC LAB	Queries the actual voltage across the thermoelectric	page 93
TEC:VALID?	TC LAB LDTC LAB	Queries whether valid IntelliTune data is stored for the current sensor	page 93
TEC:VLIM	TC LAB LDTC LAB	Sets the maximum internal voltage supply limit	page 94
TEC:VLIM?	TC LAB LDTC LAB	Queries the internal voltage limit setting	page 94
TECH:FLASHDRIVE?	QCL LAB TC LAB	Queries whether a flashdrive is inserted in the instrument front panel	page 34
TECH:HWADDR	QCL LAB TC LAB	Sets the 48-bit Ethernet MAC address the instrument will use (HEX)	page 34

COMMAND	INSTR	DESCRIPTION	PAGE
TECH:HWADDR?	QCL LAB TC LAB	Queries the 48-bit Ethernet MAC address for the instrument (HEX)	page 34
TECH:IPADDR	QCL LAB TC LAB	Sets the IPv4 address the instrument will use when attached to an Ethernet network	page 34
TECH:IPADDR?	QCL LAB TC LAB	Queries the IPv4 address of the instrument	page 35
TECH:IPGW	QCL LAB TC LAB	Sets the IPv4 default gateway address for the instrument	page 35
TECH:IPGW?	QCL LAB TC LAB	Queries the IPv4 default gateway address for the instrument	page 35
TECH:IPMASK	QCL LAB TC LAB	Sets the IPv4 subnet mask of the instrument	page 35
TECH:IPMASK?	QCL LAB TC LAB	Queries the IPv4 Subnet mask of the instrument	page 35
TIME?	ALL	Queries the Run Time of the instrument since last turn on	page 35
TIMER?	ALL	Queries the time since last TIMER? request or last power on	page 36
VER?	ALL	Queries the firmware version	page 36

IEEE-488.2 COMMANDS

COMMAND	*CLS
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB
DESCRIPTION	Clears the following: Standard Event Status Enable Register (*ESE), Standard Event Status Register (*ESR), Status Byte Register (*STB), Laser or TEC Condition Status registers (LAS:COND, TEC:COND), Laser and TEC Event Status registers (LAS:EVE, TEC:EVE), Service Request Enable register (*SRE), Parallel Poll Enable Register (*PRE), Laser and TEC Condition Status Enable registers (LAS:ENAB:COND, TEC:ENAB:COND), Laser and TEC Event Status Enable registers (LAS:ENAB:EVE, TEC:ENAB:EVE), Instrument Status Register (*IST,) and the error queue (ERR? or ERRSTR?).
SYNTAX	*CLS
DETAILS	Clears registers
SEE ALSO	*ESR?, ERR?, *IST?, *STB?, *ESE, LASer:COND?, LASer:EVEnt?, *SRE, *PRE, LASer:ENABLE:COND, LASer:ENABLE:EVEnt, TEC:COND?, TEC:EVEnr?, TEC:ENABLE:COND, ERRSTR?
MORE INFO	Does not clear the LASer:ENABLE:OUTOFF register (LDTC LAB)

COMMAND	*ESE
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB
DESCRIPTION	Sets Standard Event Status Enable Register
SYNTAX	*ESE <mask>
DETAILS	The value must be an integer between 0 and 255. The value determines which conditions of the Standard Event Status Register are reported to the Status Byte Register. See *ESR? for a definition of the individual bits with the response value.
EXAMPLES	*ESE 40 sets the standard event status enable register to report Bits 3 & 5 of the Standard Status Event Register if a device-dependent error or a command error occurs (40 = 8 + 32). Bit 5 will be set in the Status Byte Register if either of these errors occur.
SEE ALSO	*ESE?, *ESR?, *STB?
MORE INFO	See *ESR? for a description of each bit in the Standard Event Status Register along with a diagram of the reporting structure.

COMMAND	*ESE?
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB
DESCRIPTION	Queries the Standard Event Status Enable Register
SYNTAX	*ESE?
DETAILS	Returns the value of the Event Status Enable Register. See *ESR? for a definition of the individual bits.
EXAMPLES	A response of 20 means the query error and execution error bits have been enabled in the Standard Event Status Enable Register (20 = 4 + 16).
SEE ALSO	*ESE, *ESR?, *STB?
MORE INFO	See *ESR? for a description of each bit in the Standard Event Status Register along with a diagram of the reporting structure.

COMMAND	*ESR?																																				
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB																																				
DESCRIPTION	Queries the status of the Standard Event Status Register and then clears it.																																				
SYNTAX	*ESR?																																				
DETAILS	<p>Returns the value of the Standard Event Status Register, the response is an integer value between 0 and 255. After the value has been read, the register will reset to zero.</p> <div style="text-align: center;"> <p>Standard Event Status Register *ESR?</p> <p>Standard Event Status Enable Register *ESE <enable> *ESE?</p> </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">BIT</th> <th style="width: 10%;">VALUE</th> <th style="width: 20%;">NAME</th> <th style="width: 60%;">DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>1</td> <td>Operation Complete</td> <td>Operation Complete is set when all pending device operations have been finished after the *OPC command has been executed.</td> </tr> <tr> <td>1</td> <td>2</td> <td>Unused</td> <td></td> </tr> <tr> <td>2</td> <td>4</td> <td>Query Error</td> <td>Query Error means that there was an error executing a query command.</td> </tr> <tr> <td>3</td> <td>8</td> <td>Device-Specific Error</td> <td>Device-Specific Error is an error with the hardware. Error 511 will be reported.</td> </tr> <tr> <td>4</td> <td>16</td> <td>Execution Error</td> <td>Execution Error means there was an error executing a script.</td> </tr> <tr> <td>5</td> <td>32</td> <td>Command Error</td> <td>Command Error means a command could not be interpreted by the parser.</td> </tr> <tr> <td>6</td> <td>64</td> <td>Unused</td> <td>Unused and always reports "0".</td> </tr> <tr> <td>7</td> <td>128</td> <td>Power On</td> <td>Power On indicates that an off-to-on transition has occurred in the power supply. This indicates power is on at the back panel of the instrument.</td> </tr> </tbody> </table>	BIT	VALUE	NAME	DESCRIPTION	0	1	Operation Complete	Operation Complete is set when all pending device operations have been finished after the *OPC command has been executed.	1	2	Unused		2	4	Query Error	Query Error means that there was an error executing a query command.	3	8	Device-Specific Error	Device-Specific Error is an error with the hardware. Error 511 will be reported.	4	16	Execution Error	Execution Error means there was an error executing a script.	5	32	Command Error	Command Error means a command could not be interpreted by the parser.	6	64	Unused	Unused and always reports "0".	7	128	Power On	Power On indicates that an off-to-on transition has occurred in the power supply. This indicates power is on at the back panel of the instrument.
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EXAMPLES	A response of 32 means a Command Error has occurred. If *ESE was set to 32, the error will set Bit 5 of the Status Byte Register.																																				
SEE ALSO	*ESE, *ESE?, *STB?																																				

COMMAND	*IDN?
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB
DESCRIPTION	Queries the instrument identification
SYNTAX	*IDN?
DETAILS	Queries the instrument to identify itself, returning a string of instrument identification information including manufacturer, model number, serial number, and firmware revision.
EXAMPLES	*IDN? responds with Wavelength Electronics, [model #], [serial #], [rev/version #]
SEE ALSO	EQUIPment?, VER?, SN?, CALdate?

COMMAND	*IST?		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Queries a summary of the instrument status		
SYNTAX	*IST?		
DETAILS	Individual status flag returns the value of the IST bit within the reporting structure. The Parallel Poll Enable Register is AND'd with a copy of the Status Byte Register. If any of the reported bits is true, *IST? returns 1.		
	RESPONSE	VALUE	DESCRIPTION
	IST	0	IST false
		1	IST true
EXAMPLES	If *IST? returns 1 and *PRE was set to 4, the Laser Event Status Register is reporting a condition. If *IST? returns 1 and *PRE was set to 12, the Laser Event Status Register or Laser Condition Register are reporting a condition.		
SEE ALSO	*PRE, *STB?		
MORE INFO	Status Byte Register bit map is with the *STB? command.		

COMMAND	*OPC		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Sets the Operation Complete bit (Bit 0) in the Standard Event Status Register when all pending commands have been completed		
SYNTAX	*OPC		
DETAILS	This command does not delay subsequent operations. Determine whether previous commands have completed by setting up the status system such that a service request is asserted in the Status Byte Register when Bit 0 is set in the Standard Event Status Register.		
EXAMPLES	LAS:OUT 1; *OPC will set Bit 0 in the Standard Event Status Register when the output has turned on.		
SEE ALSO	*OPC?, *ESR?		

COMMAND	*OPC?		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	An Operation Complete Query returns the value of Bit 0 in the Standard Event Status Register and resets the bit to 0.		
SYNTAX	*OPC?		

COMMAND	*PRE		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Sets the Parallel Poll Enable Register mask.		
SYNTAX	*PRE <mask>		
DETAILS	See *STB? for the bit assignments. The mask is an integer value between 0 and 255. The mask is logically AND'd with a copy of the Status Byte Register, and if any of the resulting bits are high, the *IST? bit is set.		
EXAMPLES	<p>*PRE 128 will trigger the *IST? bit if an error message is available</p> <p>*PRE 32 will trigger the *IST? bit if a condition is reported in the Standard Event Status Register.</p> <p>*PRE 160 will trigger the *IST? bit if either of the above is true (160=32+128).</p>		
SEE ALSO	*PRE?, *STB?, *IST?		

COMMAND	*PRE?		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Queries the Parallel Poll Enable Register mask value		
SYNTAX	*PRE?		
DETAILS	Request the Parallel Poll Enable Register value. See *STB? command for the bit assignments.		
EXAMPLES	If *PRE? returns 12, the IST bit is set if a condition in the Laser Condition Status Register is reported or if an event is recorded in the Laser Event Status Register, and the corresponding masks report those bits to the Status Byte Register.		
SEE ALSO	*PRE, *STB?, *IST?		

COMMAND	*PSC		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Sets the Power-On Clear Status for several status registers		
SYNTAX	*PSC <enable>		
DETAILS	Enables or disables clearing the power-on of the enable registers.		
	ARGUMENT	VALUE	DESCRIPTION
	<i>enable</i>	1	All Enable Registers are cleared at power-up.
		0	All Enable Registers are restored to their last power-off state.
EXAMPLES	<p>*PSC 1 resets all enable registers (masks) to zero when the power is turned off.</p> <p>*PSC 0 restores the masks to their states at last power off.</p>		
SEE ALSO	*PSC?		

COMMAND	*PSC?		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Queries the Power-On Clear Status		
SYNTAX	*PSC?		
DETAILS	Returns the value of the Power-On Clear Status Register. See the *PSC command for the response value.		
EXAMPLES	If *PSC? returns zero (0), then all enable registers (masks) will be restored to the values they were when the power was last turned off.		
SEE ALSO	*PSC		

COMMAND	*RCL																																																																																																																												
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB																																																																																																																												
DESCRIPTION	Recalls a stored setup configuration from memory. The memory space is called a Profile. Output current is shut off during a recall.																																																																																																																												
SYNTAX	*RCL <profile>																																																																																																																												
DETAILS	<p>Profile is an integer from 0 to 10. The *RCL command is used to restore the unit to saved configuration. *RCL 0 returns the instrument to the factory default settings and is identical to the *RST command.</p> <p>The *SAV function is used to save configurations for recall.</p>																																																																																																																												
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Photodiode Transfer Function	0 W/mA	Positive Current Limit	0 A																																																																																																																										
Laser Current Limit	0 A	Negative Current Limit	0 A																																																																																																																										
Laser Voltage Limit	10.25 V	High Temperature Limit	50°C																																																																																																																										
Laser Cable Resistance	0 Ω	Low Temperature Limit	-20°C																																																																																																																										
Laser Turn-on Delay	2000 ms	TC Voltage Limit	18.3 V																																																																																																																										
Laser Current Tolerance	0.1 A, 1.0 sec	TEC Cable Resistance	0 Ω																																																																																																																										
Beeper	ON	Temperature Units	Celsius																																																																																																																										
Display Brightness	100%	Temperature Tolerance	0.05°C, 1.0 sec																																																																																																																										
SEE ALSO	*RST, *SAV																																																																																																																												

COMMAND	*RST
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB
DESCRIPTION	Reset to factory default settings
SYNTAX	*RST
DETAILS	<p>Resets the instrument to factory defaults, and the output is shut off. The unit remains in remote mode.</p> <ol style="list-style-type: none"> 1. Clears *OPC or *OPC? device requirements 2. Clears the Enable Registers 3. Clears *STB, LAS:EVE, *ESE, *SRE, *PRE, LAS:ENAB:EVE, LAS:ENAB:COND, TEC:EVE, TEC:ENAB:EVE and TEC:ENAB:COND 4. Sets all device specific function to a known state (*RST Value) 5. Clears the Response Queue <p>The reset command does NOT affect the *PSC state</p>
SEE ALSO	*RCL

COMMAND	*SAV
	QCL LAB, TC LAB, LDTC LAB
DESCRIPTION	Saves all current settings to memory in a recallable profile number
SYNTAX	*SAV <profile>
DETAILS	Profile is an integer between 1 and 10. The current setup is automatically stored to this profile.
EXAMPLES	<p>For the QCL LAB, *SAV 1 saves the current values of Setpoint Current, Limit Current, Maximum Supply Voltage, Cable Resistance, VI Scan parameters (Start, Stop, Step, Wait Interval), Display Brightness and Beeper Status to Profile 1.</p> <p>For the TC LAB, *SAV 1 saves the values of the setpoint temperature, PID coefficients, IntelliTune Mode, Sensor Type, Current Limits, Temperature Limits, Shutdown Laser Criteria, Display Brightness, Tolerance, Beeper Status, Scan parameters (Start, Stop, Step, Wait Interval), and Cable Resistance to Profile 1.</p> <p>For the LDTC LAB, *SAV 1 saves the IntelliTune mode, temperature setpoint, negative TEC current limit, positive TEC current limit, temperature sensor, temperature sensor bias current, high temperature limit, low temperature limit, PID coefficients, temperature tolerance parameters, temperature units, TEC cable resistance, TEC voltage limit, laser control mode, laser setpoint, laser current limit, maximum laser voltage, photodiode range, photodiode transfer function, photodiode bias voltage status, on delay time, laser cable resistance, laser type, laser tolerance parameters, beeper status, and display brightness to Profile 1.</p>
SEE ALSO	*RCL, *RST
MORE INFO	Use *RCL to recall a stored profile from memory -- what is stored is listed with the *RCL command.

COMMAND	*SRE																																				
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB																																				
DESCRIPTION	Sets the Service Request Enable Register mask																																				
SYNTAX	*SRE <mask>																																				
DETAILS	<p>The *SRE command sets the Service Request Enable Register bits.</p> <p>The mask is an integer value between 0 and 191. The mask is logically AND'd with the Status Byte Register. If any of the resulting bits are high, Bit 6 of the Status Byte Register is set.</p> <p>Setting the service request enable register allows the programmer to select which summary messages in the Status Byte Register may cause service requests. Each bit in the service request enable register corresponds to a bit in the Status Byte Register.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: left;"> <p>Status Byte Register *STB?</p> <ul style="list-style-type: none"> 0 - TEC Event Summary 1 - TEC Condition Summary 2 - Laser Event Summary 3 - Laser Condition Summary 4 - Message Available 5 - Event Status Summary 6 - Request Service / Master Status Summary 7 - Error Message Available </div> <div style="text-align: center;"> <p style="text-align: center;">Service Request Enable Register *SRE <enable> *SRE?</p> </div> </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th>ARGUMENT</th> <th>BIT</th> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td><i>mask</i></td> <td>0</td> <td>1</td> <td>TEC Event Summary</td> </tr> <tr> <td></td> <td>1</td> <td>2</td> <td>TEC Condition Summary</td> </tr> <tr> <td></td> <td>2</td> <td>4</td> <td>Laser Event Summary</td> </tr> <tr> <td></td> <td>3</td> <td>8</td> <td>Laser Condition Summary</td> </tr> <tr> <td></td> <td>4</td> <td>16</td> <td>Message Available</td> </tr> <tr> <td></td> <td>5</td> <td>32</td> <td>Event Status Summary</td> </tr> <tr> <td></td> <td>6</td> <td>--</td> <td>Request Service / Master Status Summary cannot be set</td> </tr> <tr> <td></td> <td>7</td> <td>128</td> <td>Error Message Available</td> </tr> </tbody> </table>	ARGUMENT	BIT	VALUE	DESCRIPTION	<i>mask</i>	0	1	TEC Event Summary		1	2	TEC Condition Summary		2	4	Laser Event Summary		3	8	Laser Condition Summary		4	16	Message Available		5	32	Event Status Summary		6	--	Request Service / Master Status Summary cannot be set		7	128	Error Message Available
ARGUMENT	BIT	VALUE	DESCRIPTION																																		
<i>mask</i>	0	1	TEC Event Summary																																		
	1	2	TEC Condition Summary																																		
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	4	16	Message Available																																		
	5	32	Event Status Summary																																		
	6	--	Request Service / Master Status Summary cannot be set																																		
	7	128	Error Message Available																																		
EXAMPLES	<p>If *SRE 16 is set, Bit 4 of the Status Byte Register goes high whenever a message is available, then Bit 6 of the Status Byte Register will be set.</p> <p>If *SRE 12 is set, whenever a condition is reported in the Laser Event or Laser Condition Status registers, Bit 6 of the Status Byte Register will be set.</p>																																				
SEE ALSO	*SRE?, LASer:COND?, LASer:EVEnt?, *STB?, TEC:COND?, TEC:EVEnt?																																				

COMMAND	*SRE?
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB
DESCRIPTION	Queries the Service Request Enable Register mask
SYNTAX	*SRE?
DETAILS	Returns the value of the Service Request Enable Register. See the *SRE command for the bit assignments.
EXAMPLES	A response of 128 *SRE signifies that the Error Message Available bit is set.
SEE ALSO	*SRE, *STB?

COMMAND	*STB?																																				
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB																																				
DESCRIPTION	Queries the Status Byte Register																																				
SYNTAX	*STB?																																				
DETAILS	<p>Returns the value of the Status Byte Register, the response is the sum of the enabled bits and must be an integer value between 0 and 255.</p> <p>Status Byte Register *STB?</p> <p>0 - TEC Event Summary 1 - TEC Condition Summary 2 - Laser Event Summary 3 - Laser Condition Summary 4 - Message Available 5 - Event Status Summary 6 - Request Service / Master Status Summary 7 - Error Message Available</p> <p>Service Request Enable Register *SRE <enable> *SRE?</p> <table border="1"> <thead> <tr> <th>RESPONSE</th> <th>BIT</th> <th>VALUE</th> <th>NAME / DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>*STB?</td> <td>0</td> <td>1</td> <td>TEC Event Summary</td> </tr> <tr> <td></td> <td>1</td> <td>2</td> <td>TEC Condition Summary</td> </tr> <tr> <td></td> <td>2</td> <td>4</td> <td>Laser Event Summary</td> </tr> <tr> <td></td> <td>3</td> <td>8</td> <td>Laser Condition Summary</td> </tr> <tr> <td></td> <td>4</td> <td>16</td> <td>Message Available</td> </tr> <tr> <td></td> <td>5</td> <td>32</td> <td>Event Status Summary</td> </tr> <tr> <td></td> <td>6</td> <td>64</td> <td>Request Service / Master Status Summary</td> </tr> <tr> <td></td> <td>7</td> <td>128</td> <td>Error Message Available</td> </tr> </tbody> </table>	RESPONSE	BIT	VALUE	NAME / DESCRIPTION	*STB?	0	1	TEC Event Summary		1	2	TEC Condition Summary		2	4	Laser Event Summary		3	8	Laser Condition Summary		4	16	Message Available		5	32	Event Status Summary		6	64	Request Service / Master Status Summary		7	128	Error Message Available
RESPONSE	BIT	VALUE	NAME / DESCRIPTION																																		
*STB?	0	1	TEC Event Summary																																		
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	5	32	Event Status Summary																																		
	6	64	Request Service / Master Status Summary																																		
	7	128	Error Message Available																																		
EXAMPLES	A response of 136 (128 + 8) indicates that the Laser Condition Summary and the Error Message Available bits are set.																																				
SEE ALSO	*SRE, LASer:COND?, LASer:EVEnt?, LASer:STB?, TEC:COND?, TEC:EVEnt?																																				

CONFIGURATION COMMANDS

COMMAND	BEEP		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Sets the beep enable status		
SYNTAX	BEEP [<i>enable</i>]		
DETAILS	Causes the instrument to beep, or enables or disables the beep sound for error messages and other events that generate an audible response. If <i>enable</i> is omitted, it is the equivalent of doing a 'BEEP 2'.		
	ARGUMENT	VALUE	DESCRIPTION
	<i>enable</i>	0	Disable the beep sound
		1	Enable the beep sound
	2	Generate one beep	
SEE ALSO	BEEP?		

COMMAND	BEEP?		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Queries the beep enable status		
SYNTAX	BEEP?		
DETAILS	Returns the value of the Beep register.		
	RESPONSE	VALUE	DESCRIPTION
	<i>enable</i>	0	Beep sound is muted
		1	Beep sound is enabled
SEE ALSO	BEEP		

COMMAND	BRIGHT		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Sets the display brightness level		
SYNTAX	BRIGHT < <i>brightness</i> >		
DETAILS	Value of <i>brightness</i> must be an integer.		
	ARGUMENT	VALUE	DESCRIPTION
	<i>brightness</i>	0-100	Brightness level of the display as a percentage of maximum
EXAMPLES	BRIGHT 50 dims the screen to 50% of the maximum brightness		
SEE ALSO	BRIGHT?		

COMMAND	BRIGHT?		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Queries the display brightness level		
SYNTAX	BRIGHT?		
DETAILS	Returns the value of the display brightness as a percent of maximum.		
SEE ALSO	BRIGHT		

COMMAND	CALdate?		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Queries the last calibration date of the instrument		
SYNTAX	CALdate?		
DETAILS	Returns the date string of the last calibration in yyyy-mm-dd format.		

COMMAND	DELAY		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Causes a delay in command processing		
SYNTAX	DELAY <time>		
DETAILS	Causes command processing to be delayed for a specified integer number of milliseconds.		
	ARGUMENT	VALUE	DESCRIPTION
	time	1 – 30000	Delay, in milliseconds
EXAMPLES	DELAY 10000 means that the next command will not be implemented until 10 seconds has passed.		
SEE ALSO	DELAY?		

COMMAND	DELAY?		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Queries the delay in command processing		
SYNTAX	DELAY?		
DETAILS	The returned value indicates the number of milliseconds command processing is delayed for.		
EXAMPLES	A return of 10000 means that the next command will not be implemented until 10 seconds has passed.		
SEE ALSO	DELAY		

COMMAND	EQUIPment?		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Queries the instrument model information		
SYNTAX	EQUIPment?		
DETAILS	The EQUIPment? request returns the model number of the instrument.		
SEE ALSO	*IDN?, VER?, SN?, CALdate?		

COMMAND	ERRors?		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Queries for errors		
SYNTAX	ERRors?		
DETAILS	Returns a comma-delimited list of error codes. If no error has occurred, a 0 is returned. A typical response might look like: 201,124. Error 201 happened first.		
EXAMPLES	A response of 126 mean an argument is missing (or there are too many arguments) from a previously sent command.		
SEE ALSO	ERRSTR?, the error list in the instrument User Guide, Error Messages on page 95		

COMMAND	ERRSTR?		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Queries for errors with string descriptions		
SYNTAX	ERRSTR?		
DETAILS	Similar to the ERR? query, but a string description is included with the error code.		
EXAMPLES	A typical response might look like: 201,"Out of range",124,"Invalid format"		
SEE ALSO	ERR?, the error list in the instrument User Guide, Error Messages on page 95		

COMMAND	HEXFLOAT		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Enables hex float mode		
SYNTAX	HEXFLOAT <enable>		
DETAILS	Enables return of values in hex number base from the instrument.		
	ARGUMENT	VALUE	DESCRIPTION
	enable	0	Hex float mode is disabled
		1	Hex float mode is enabled
EXAMPLES	If HEXFLOAT is OFF, 0.4 may be returned from a LAS:LDI? query if the actual current is 0.4A. If HEXFLOAT is ON, 3FD9999999999999A will be returned.		
SEE ALSO	HEXFLOAT?		
MORE INFO	Returns a 64-bit hexadecimal number for non-integer values.		

COMMAND	HEXFLOAT?		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Queries the state of hex float mode		
SYNTAX	HEXFLOAT?		
DETAILS	Returns state of hex mode as either one (1) or zero (0). See the HEXFLOAT command for more details.		
SEE ALSO	HEXFLOAT		

COMMAND	LOCAL		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Returns to local mode		
SYNTAX	LOCAL		
DETAILS	The LOCAL command enables the front panel controls and standalone operation.		

COMMAND	MESsage		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Writes a message to the front panel		
SYNTAX	MESsage [string]		
DETAILS	Sets the internal message buffer to the value of string, up to a maximum of 32 characters and appears midscreen, where an error message would be displayed. To clear the message , send MESsage with no argument.		
EXAMPLES	MES Press the Enable button could be used to direct a tester through a test process.		
SEE ALSO	MESsage?		

COMMAND	MESsage?		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Reads message written to front panel		
SYNTAX	MESsage?		
DETAILS	Returns the value of the message buffer.		
SEE ALSO	MESsage		

COMMAND	PROFile:BEEP		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Sets the beeper ON or OFF for the specified profile		
SYNTAX	PROFile:BEEP <profile>, <enable>		
DETAILS	Profiles 1 - 10 can be stored in memory for later recall.		
	ARGUMENT	VALUE	DESCRIPTION
	enable	0	Disable the beep sound
		1	Enable the beep sound
EXAMPLES	PROF:BEEP 3, 1 sets the beeper ON for Profile 3.		
SEE ALSO	PROFile:BEEP?, BEEP, BEEP?, *RCL, *SAV		

COMMAND	PROFile:BEEP?		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Queries the beeper enable status for the specified profile		
SYNTAX	PROFile:BEEP? <profile>		
DETAILS	Profile 0-10 can be queried. Beeper is OFF (0) or ON (1).		
EXAMPLES	PROF:BEEP? 7 returns the beeper enable status for Profile 7.		
SEE ALSO	PROFile:BEEP, BEEP, BEEP?, *RCL, *SAV		

COMMAND	PROFile:BRIGHT		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Sets the brightness of the display for the specified profile		
SYNTAX	PROFile:BRIGHT <profile>, <brightness>		
DETAILS	Profiles 1 - 10 can be stored in memory for later recall. Brightness is 0-100%.		
EXAMPLES	PROFile:BRIGHT 6, 50 sets the brightness of the display to 50% of maximum for Profile 6.		
SEE ALSO	BRIGHT, BRIGHT?, PROFile:BRIGHT?, *RCL, *SAV		

COMMAND	PROFile:BRIGHT?		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Queries the brightness of the display for the specified profile		
SYNTAX	PROFile:BRIGHT? <profile>		
DETAILS	Profiles 0 - 10 can be queried.		
EXAMPLES	PROFile:BRIGHT? 5 queries the brightness level saved to Profile 5.		
SEE ALSO	BRIGHT, BRIGHT?, PROFile:BRIGHT?, *RCL, *SAV		

COMMAND	PROFile:CABLER		
INSTRUMENT	QCL LAB, TC LAB		
DESCRIPTION	Sets the cable resistance for the specified profile		
SYNTAX	PROFile:CABLER <profile>, <resistance>		
DETAILS	Profiles 1-10 can be stored in memory for later recall. Resistance is in Ohms.		
EXAMPLES	PROF:CABLER 3, 0.001 sets cable resistance in Profile 3 to 0.001Ω.		
SEE ALSO	PROFile:CABLER?, LASer:CABLER, LASer:CABLER?, *RCL, *SAV, TEC:CABLER, TEC:CABLER?		

COMMAND	PROFile:CABLER?
INSTRUMENT	QCL LAB, TC LAB
DESCRIPTION	Queries the cable resistance for the specified profile
SYNTAX	PROFile:CABLER? <profile>
DETAILS	Profiles 0-10 can be queried. The value returned is in Ohms.
EXAMPLES	PROF:CABLER? 10 returns the cable resistance stored in Profile 10.
SEE ALSO	PROFile:CABLER, LAsEr:CABLER, LAsEr:CABLER?, *RCL, *SAV, TEC:CABLER, TEC:CABLER?

COMMAND	PROFile:DESC
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB
DESCRIPTION	Sets the description strings (both lines) for the specified profile
SYNTAX	PROFile:DESC <profile>[,<description1>][,<description2>]
DETAILS	Profiles 1 - 10 can be stored in memory for later recall. Both <i>description1</i> and <i>description2</i> are limited to 16 characters. Upon sending this command, the data is immediately written to nonvolatile memory, so it is preserved between rear panel power cycles of the instrument. This command requires that SEC:SAVEENABLE be set (QCL LAB and TC LAB only).
SEE ALSO	PROFile:DESC?

COMMAND	PROFile:DESC?
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB
DESCRIPTION	Queries the description strings (both lines) for the specified profile
SYNTAX	PROFile:DESC? <profile>
DETAILS	Each Profile can be named. The name appears in the Save & Recall sections on the instrument screen. Profiles 0-10 can be queried.
SEE ALSO	PROFile:DESC

COMMAND	PWR									
INSTRUMENT	QCL LAB, TC LAB									
DESCRIPTION	Turns the front panel power button ON or OFF.									
SYNTAX	PWR <enable>									
DETAILS	<table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td><i>enable</i></td> <td>0</td> <td>Turn Power button OFF</td> </tr> <tr> <td></td> <td>1</td> <td>Turn Power button ON</td> </tr> </tbody> </table>	ARGUMENT	VALUE	DESCRIPTION	<i>enable</i>	0	Turn Power button OFF		1	Turn Power button ON
ARGUMENT	VALUE	DESCRIPTION								
<i>enable</i>	0	Turn Power button OFF								
	1	Turn Power button ON								
EXAMPLES	PWR 1 turns on the front panel power button									
SEE ALSO	PWR?									

COMMAND	PWR?
INSTRUMENT	QCL LAB, TC LAB
DESCRIPTION	Queries the state of the front panel power button
SYNTAX	PWR?
DETAILS	Returns 1 if the front panel power button is ON, 0 if it is OFF.
SEE ALSO	PWR

COMMAND	RADix		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Sets the radix (number base) for integer values.		
SYNTAX	RADix <base>		
DETAILS	By default, the instrument is set to decimal number base. Changing to an alternate number base will cause requests for integer values to be returned in the specified number base.		
	ARGUMENT	VALUE	PREFIX
	<i>base</i>	BIN	#B
		OCT	#O
		DEC	
	HEX	#H	Hexadecimal format (base 16)
EXAMPLES	RAD BIN means a value of 4 in decimal will be returned as 100.		
SEE ALSO	RADix?		
MORE INFO	NIMAX Read Status Byte button always returns in decimal, regardless of RADix setting.		

COMMAND	RADix?		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Queries the radix (number base) for integer values.		
SYNTAX	RADix?		
DETAILS	Returns the current number base. See the RADix command for a complete definition of possible return values.		
SEE ALSO	RADix		

COMMAND	REMERR		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Sets the display of errors on screen while in remote mode.		
SYNTAX	REMERR <enable>		
DETAILS	This command controls if the instrument will display errors on the instrument screen while in remote mode. If set to zero, then errors will not be displayed. If set to one, errors will be displayed. Errors will always accumulate in the error queue.		
	ARGUMENT	VALUE	DESCRIPTION
	<i>enable</i>	0	Do not display errors on instrument screen
		1	Display errors
SEE ALSO	REMERR?, ERR?, ERRSTR?		

COMMAND	REMERR?		
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB		
DESCRIPTION	Queries the status of displaying error messages on the instrument front panel while in remote mode		
SYNTAX	REMERR?		
DETAILS	Returns the current REMERR setting. See the REMERR command for a complete definition of possible return values.		
SEE ALSO	REMERR, ERR?, ERRSTR?		

COMMAND	SECurity:APPLY		
INSTRUMENT	QCL LAB, TC LAB		
DESCRIPTION	Enables or disables application of permissions. If not applied then the user has unrestricted access at the front panel		
SYNTAX	SECurity:APPLY <enable>		
DETAILS	ARGUMENT	VALUE	DESCRIPTION
	enable	0	Do not apply restrictions
		1	Apply security restrictions
EXAMPLES	SEC:APPLY 1 means all permissions set by the SEC:CHMOD command will be applied. Note: User must be in Super User mode to set this value.		
SEE ALSO	SECurity:APPLY?, SECurity:CHMOD, SECurity:CHMOD?, SEC:SUser		
MORE INFO	If security is applied, but the lockout bit in CHMOD is not set, pressing the <i>Locked</i> icon on the front panel resets SEC:APPLY to 0. If SEC:APPLY is 1 when the rear panel power is shut down, on power up the front panel power will come on automatically and the unit will use the data stored in non-volatile memory to restore SEC:APPLY, SEC:CHMOD, SEC:RECALLENABLE, and SEC:SAVEENABLE and the data from the last profile will be applied.		

COMMAND	SECurity:APPLY?		
INSTRUMENT	QCL LAB, TC LAB		
DESCRIPTION	Queries whether permissions are applied		
SYNTAX	SECurity:APPLY?		
DETAILS	Returns 1 if permissions are applied and access is limited through the SEC:CHMOD command. Returns 0 if no restrictions are active.		
SEE ALSO	SECurity:APPLY, SECurity:CHMOD, SECurity:CHMOD?		

COMMAND	SECurity:NUser		
INSTRUMENT	QCL LAB, TC LAB		
DESCRIPTION	Sets the unit into normal user mode from any other state (calibration/admin, super user)		
SYNTAX	SECurity:NUser		
SEE ALSO	SECurity:NUser?		

COMMAND	SECurity:NUser?		
INSTRUMENT	QCL LAB, TC LAB		
DESCRIPTION	Queries whether user holds normal user privileges versus super user		
SYNTAX	SECurity:NUser?		
DETAILS	Returns a 1 if the unit is operating in normal user mode. Note that when operating the unit in local mode, the user is in normal user mode.		
SEE ALSO	SECurity:NUser, SECurity:SUser		

COMMAND	SECurity:PASSWD		
INSTRUMENT	QCL LAB, TC LAB		
DESCRIPTION	Sets the super user password		
SYNTAX	SECurity:PASSWD <password>		
DETAILS	The instrument must be in super user mode to set the password. The password can be up to 16 digits and can include any combination of letters, numbers, or special characters. If you lose the password, contact the factory for support.		
SEE ALSO	SECurity:SUser, SECurity:SUser?		

COMMAND	SECurity:RECALLENABLE	
INSTRUMENT	QCL LAB, TC LAB	
DESCRIPTION	Sets whether a user can recall a profile	
SYNTAX	SECurity:RECALLENABLE <enable>	
DETAILS	This enables or disables all recall operations. To set this, the remote application must hold super user rights. This value is saved to nonvolatile memory to preserve the value between power cycles.	
	ARGUMENT	VALUE
	<i>enable</i>	0
		DESCRIPTION
		Cannot recall
		Can recall
SEE ALSO	SECurity:RECALLENABLE?, SECurity:SAVEENABLE, SECurity:SAVEENABLE?	

COMMAND	SECurity:RECALLENABLE?	
INSTRUMENT	QCL LAB, TC LAB	
DESCRIPTION	Queries whether the user can recall a profile	
SYNTAX	SECurity:RECALLENABLE?	
DETAILS	This value can be read with any privilege level.	
SEE ALSO	SECurity:RECALLENABLE, SECurity:SAVEENABLE, SECurity:SAVEENABLE?	

COMMAND	SECurity:SAVEENABLE	
INSTRUMENT	QCL LAB, TC LAB	
DESCRIPTION	Sets whether a user is allowed to save a profile	
SYNTAX	SECurity:SAVEENABLE <enable>	
DETAILS	This enables or disables all save operations. To set this, the remote application must hold super user rights. This value is saved to nonvolatile memory to preserve the value between power cycles.	
	ARGUMENT	VALUE
	<i>enable</i>	0
		DESCRIPTION
		Cannot save
		Can save
SEE ALSO	SECurity:RECALLENABLE, SECurity:RECALLENABLE?, SECurity:SAVEENABLE?	

COMMAND	SECurity:SAVEENABLE?	
INSTRUMENT	QCL LAB, TC LAB	
DESCRIPTION	Queries whether a user is allowed to save a profile	
SYNTAX	SECurity:SAVEENABLE?	
DETAILS	This value can be read with any privilege level.	
SEE ALSO	SECurity:RECALLENABLE, SECurity:RECALLENABLE?, SECurity:SAVEENABLE?	

COMMAND	SECurity:SUser	
INSTRUMENT	QCL LAB, TC LAB	
DESCRIPTION	Attempts to change to super user mode	
SYNTAX	SECurity:SUser <password>	
DETAILS	Password must match the stored password on the instrument. If this is the first time use of the command, the password is blank.	
SEE ALSO	SECurity:SUser?, SECurity:PASSWD	

COMMAND	SECurity:SUser?
INSTRUMENT	QCL LAB, TC LAB
DESCRIPTION	Queries whether super user privileges are held
SYNTAX	SECurity:SUser?
DETAILS	Returns 1 if the instrument is in super user mode. Returns 0 for normal user or calibration mode.
SEE ALSO	SECurity:SUser, SECurity:NUser, SECurity:NUser?

COMMAND	SN?
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB
DESCRIPTION	Queries the serial number of the instrument
SYNTAX	SN?
DETAILS	Returns the serial number of the instrument. This is the same information that is part of the *IDN? query.
SEE ALSO	*IDN?, EQUIPment?, VER?, CALdate?

COMMAND	TECH:FLASHDRIVE?
INSTRUMENT	QCL LAB, TC LAB
DESCRIPTION	Queries whether a flashdrive is inserted in the instrument front panel
SYNTAX	TECH:FLASHDRIVE?
DETAILS	Returns 1 if flashdrive is inserted in the instrument front panel. Returns 0 if it is not inserted.

COMMAND	TECH:HWADDR
INSTRUMENT	QCL LAB, TC LAB
DESCRIPTION	Sets the 48-bit Ethernet MAC address the instrument will use
SYNTAX	TECH:HWADDR <addr>
DETAILS	<p>Sets the 48-bit Ethernet MAC address the instrument will use. The MAC address is specified in 12-digit hexadecimal notation, without a leading base specifier.</p> <p>This should only need to be changed from the factory value in the event of a conflict with another Ethernet device on your network. Please consult your network administrator if assistance is required.</p> <p>The instrument must be powered off for this value to take effect.</p>
EXAMPLES	TECH:HWADDR 020FBF2FC6D2
SEE ALSO	TECH:HWADDR?

COMMAND	TECH:HWADDR?
INSTRUMENT	QCL LAB, TC LAB
DESCRIPTION	Queries the 48-bit Ethernet MAC address for the instrument
SYNTAX	TECH:HWADDR?
SEE ALSO	TECH:HWADDR

COMMAND	TECH:IPADDR
INSTRUMENT	QCL LAB, TC LAB
DESCRIPTION	Sets the IPv4 address the instrument will use when attached to an Ethernet network
SYNTAX	TECH:IPADDR <addr>
DETAILS	<p>The address is stored in decimal dotted notation.</p> <p>The instrument must be powered off for this value to take effect.</p>
EXAMPLES	TECH:IPADDR 192.168.1.2
SEE ALSO	TECH:IPADDR?

COMMAND	TECH:IPADDR?
INSTRUMENT	QCL LAB, TC LAB
DESCRIPTION	Queries the IPv4 address of the instrument
SYNTAX	TECH:IPADDR?
SEE ALSO	TECH:IPADDR

COMMAND	TECH:IPGW
INSTRUMENT	QCL LAB, TC LAB
DESCRIPTION	Sets the IPv4 default gateway address for the instrument
SYNTAX	TECH:IPGW <addr>
DETAILS	Sets the IPv4 default gateway address for the instrument in dotted decimal notation. This is only necessary if the instrument will communicate across subnets. If not required, the gateway should be set to 0.0.0.0. The instrument must be powered off for this value to take effect.
EXAMPLES	TECH:IPGW 192.168.1.1
SEE ALSO	TECH:IPGW?

COMMAND	TECH:IPGW?
INSTRUMENT	QCL LAB, TC LAB
DESCRIPTION	Queries the IPv4 default gateway address for the instrument
SYNTAX	TECH:IPGW?
SEE ALSO	TECH:IPGW

COMMAND	TECH:IPMASK
INSTRUMENT	QCL LAB, TC LAB
DESCRIPTION	Sets the IPv4 subnet mask of the instrument
SYNTAX	TECH:IPMASK <mask>
DETAILS	Sets the IPv4 subnet mask in decimal dotted notation. The instrument must be powered off for this value to take effect.
EXAMPLES	TECH:IPMASK 255.255.255.0
SEE ALSO	TECH:IPMASK?

COMMAND	TECH:IPMASK?
INSTRUMENT	QCL LAB, TC LAB
DESCRIPTION	Queries the IPv4 subnet mask of the instrument
SYNTAX	TECH:IPMASK?
SEE ALSO	TECH:IPMASK

COMMAND	TIME?
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB
DESCRIPTION	Queries the Run Time of the instrument since last turned on
SYNTAX	TIME?
DETAILS	Returns the elapsed time since the unit has been turned on. Format is in D:HH:MM:SS.ss, where D is days, HH is hours, MM is minutes, SS is seconds, and ss is hundredths of a second.
SEE ALSO	TIMER?

COMMAND	TIMER?
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB
DESCRIPTION	Queries the time since last TIMER? request or last power on
SYNTAX	TIMER?
DETAILS	Returns the elapsed time since the last TIMER? request was received, or, if this is the first TIMER? query, the time since unit has been turned on. Format is in D:HH:MM:SS.ss, where D is days, HH is hours, MM is minutes, SS is seconds, and ss is hundredths of a second.
SEE ALSO	TIME?

COMMAND	VER?
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB
DESCRIPTION	Queries the firmware version
SYNTAX	VER?
DETAILS	Returns the firmware version. This is the same information that is part of the *IDN? query.
SEE ALSO	*IDN?, EQUIPment?, SN?, CALdate?

SCRIPT COMMANDS

COMMAND	SCRIPT:GET?
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB
DESCRIPTION	Retrieves a script from instrument memory
SYNTAX	SCRIPT:GET? <index>
DETAILS	Returns the script stored in position index. Index can be 1-4.
EXAMPLES	SCRIPT:GET? 1 This command will retrieve the script saved to the Memory Index 1.
SEE ALSO	SCRIPT:PUT, SCRIPT:GO
MORE INFO	See Scripting Commands on page 3

COMMAND	SCRIPT:GO
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB
DESCRIPTION	Remotely executes a script
SYNTAX	SCRIPT:GO <index>
DETAILS	Executes the script stored at position index. Index can be 1-4.
EXAMPLES	SCRIPT:GO 4 executes the script stored at Memory Index 4.
SEE ALSO	SCRIPT:PUT, SCRIPT:GET
MORE INFO	See Scripting Commands on page 3

COMMAND	SCRIPT:PUT						
INSTRUMENT	QCL LAB, TC LAB, LDTC LAB						
DESCRIPTION	Puts a script into memory at the specified index						
SYNTAX	SCRIPT:PUT <index>, <script>						
DETAILS	Stores a script for execution with the SCRIPT:GO command. <table border="1" data-bbox="321 1129 1523 1249"> <thead> <tr> <th>ARGUMENT</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td><i>index</i></td> <td>Script index, 1 to 4</td> </tr> <tr> <td><i>script</i></td> <td>Script, maximum 200 characters.</td> </tr> </tbody> </table>	ARGUMENT	DESCRIPTION	<i>index</i>	Script index, 1 to 4	<i>script</i>	Script, maximum 200 characters.
ARGUMENT	DESCRIPTION						
<i>index</i>	Script index, 1 to 4						
<i>script</i>	Script, maximum 200 characters.						
EXAMPLES	<p>For the QCL LAB, SCRIPT:PUT 1, LAS:LDI 0.500^LIMIT:LDI 0.75^OUT 1 stores a script in Memory Index 1 that sets the setpoint to 0.5A, the limit to 0.75A, and enables laser output. The script is not executed until the SCRIPT:GO command is issued.</p> <p>For the TC LAB, SCRIPT:PUT 2, TEC:SET 25^ LIMIT:IPOS 3.2^ OUT 1 stores a script in Memory Index 2 that makes the setpoint 25°C (if units are in Celsius), the positive current limit to 3.2 A, and enables current to the thermoelectric or resistive heater.</p> <p>For the LDTC LAB, SCRIPT:PUT 3, TEC:SET 25 ^ LIM:THI 50 ^ TLO 0 ^ :LAS:OUT 1 stores a script in Memory Index 3 that changes the setpoint to 25°C (if current units are Celsius), the high temperature limit to 50°C, the low temperature limit to 0°C, and turns laser output on. Note the extra ":" prior to the "LAS". This extra colon indicates to the instrument to back out of the TEC:LIM portion of the command structure, and go back to the root, where LAS is an appropriate branch to take.</p>						
SEE ALSO	SCRIPT:GET?, SCRIPT:GO						
MORE INFO	<p>Script commands are separated by carats and primary command paths are not repeated. See Scripting Commands on page 3 for more information.</p> <p>Note that scripts are not checked to verify they contain only valid commands when they are put into memory.</p>						

LASER DRIVER COMMANDS

COMMAND	LASer:AMP							
INSTRUMENT	QCL LAB, LDTC LAB							
DESCRIPTION	Sets the laser current units to Amps or mAmps							
SYNTAX	LASer:AMP <enable>							
DETAILS	<table border="1"> <thead> <tr> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>0 FALSE OFF</td> <td>Causes all laser current measurements to be scaled in units of milliamps.</td> </tr> <tr> <td>1 TRUE ON</td> <td>Causes all laser current measurements to be scaled in units of Amps.</td> </tr> </tbody> </table>	VALUE	DESCRIPTION	0 FALSE OFF	Causes all laser current measurements to be scaled in units of milliamps.	1 TRUE ON	Causes all laser current measurements to be scaled in units of Amps.	
VALUE	DESCRIPTION							
0 FALSE OFF	Causes all laser current measurements to be scaled in units of milliamps.							
1 TRUE ON	Causes all laser current measurements to be scaled in units of Amps.							
EXAMPLES	<p>LAS:AMP 1 means the units for the following commands will be Amps: LAS:LDI, LAS:LDI?, LAS:LIM:LDI, LAS:LIM:LDI?, LAS:TOL, LAS:TOL?, LAS:SET:LDI?, PROF:ILIM, PROF:ILIM?, PROF:ISSET, PROF:ISSET?, PROF:LAS:LDI, PROF:LAS:LIM:LDI, PROF:LAS:LIM:LDI?, PROF:LAS:SET:LDI?, PROF:LAS:TOL, PROF:LAS:TOL?, PROF:VISTART, PROF:VISTART?, PROF:VISTEP, PROF:VISTEP?, PROF:VISTOP, PROF:VISTOP?.</p> <p>Note that LAS:STEP, LAS:MDI, LAS:MDI?, LAS:SET:MDI?, PROF:LAS:MDI, and PROF:LAS:SET:MDI? are not affected by the LASer:AMP command.</p>							
SEE ALSO	LASer:AMP?							
MORE INFO	QCL LAB has default units of mA, while the LDTC LAB has default units of A.							

COMMAND	LASer:AMP?	
INSTRUMENT	QCL LAB, LDTC LAB	
DESCRIPTION	Queries the laser current units in use	
SYNTAX	LASer:AMP?	
DETAILS	See LASer:AMP for a list of commands affected.	
SEE ALSO	LASer:AMP	

COMMAND	LASer:CABLER								
INSTRUMENT	QCL LAB, LDTC LAB								
DESCRIPTION	Sets laser cable resistance compensation value in Ohms								
SYNTAX	LASer:CABLER <resistance>								
DETAILS	Set the cable resistance to adjust the voltage measurement to display the voltage at the laser, compensating for the voltage losses in the cable and connectors. See your instrument manual for additional information on using this feature.								
	<table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>resistance</td> <td>0 to 4</td> <td>Cable resistance, in ohms</td> </tr> </tbody> </table>	ARGUMENT	VALUE	DESCRIPTION	resistance	0 to 4	Cable resistance, in ohms		
ARGUMENT	VALUE	DESCRIPTION							
resistance	0 to 4	Cable resistance, in ohms							
EXAMPLES	LAS:CABLER 0.01 sets the cable resistance to 0.01 Ω								
SEE ALSO	LASer:CABLER?								

COMMAND	LASer:CABLER?		
INSTRUMENT	QCL LAB, LDTC LAB		
DESCRIPTION	Queries laser cable resistance compensation value in Ohms		
SYNTAX	LASer:CABLER?		
DETAILS	Returns the value of the cable resistance compensation value. See the LASer:CABLER command for more details.		
SEE ALSO	LASer:CABLER		

COMMAND	LASer:COND?			
INSTRUMENT	QCL LAB, LDTC LAB			
DESCRIPTION	Queries the Laser Condition Status Register			
SYNTAX	LASer:COND?			
DETAILS	Returns the Laser Condition Status Register value. The Laser Condition Register reports the current condition of the instrument.			
	RESPONSE	BIT	VALUE	QCL LAB DESCRIPTION
	<i>conditions</i>	0	1	Current limit
		1	2	Unused
		2	4	Unused
		3	8	Unused
		4	16	Interlock error
		5	32	Unused
		6	64	Unused
		7	128	Laser load open
		8	256	Laser load short
		9	512	Out of tolerance
		10	1024	Output enabled
		11	2048	Unused
		12	4096	Unused
		13	8192	Unused
		14	16384	Unused
	15	32768	Front panel power on	
			LDTC LAB DESCRIPTION	
			Current limit	
			Unused	
			Unused	
			Unused	
			Interlock error	
			Unused	
			Unused	
			Laser load open	
			Laser load short	
			Out of tolerance	
			Output enabled	
			Unused	
			Front panel power on	
			Unused	
	Note that laser open circuit and short circuit events are transient. Once detected, the output turns off so the bits will be set to 0 quickly after the condition is detected.			
EXAMPLES	A response of LAS:COND 33793 means the Laser Condition Register enabled Bits 0, 10, and 15 (33793 = 32768 [Power on, Bit 15] + 1024 [Output enabled, Bit 10] + 1 [Current Limit Bit 0]). So the unit is in current limit, the output is enabled, and the front panel power switch is on. (This example only applies to the QCL Lab as Bit 15 is unused on the LDTC Lab.)			
SEE ALSO	LASer:ENABLE:COND, *STB?			
MORE INFO	See page 8 for the Status Reporting Structure diagram.			

COMMAND	LASer:DEC		
INSTRUMENT	QCL LAB		
DESCRIPTION	Decrements the laser setpoint		
SYNTAX	LASer:DEC <steps> [, time]		
DETAILS	The LASer:DEC command uses the step size defined with the LASer:STEP command to decrement the laser setpoint. If the time parameter is omitted, then the setpoint is immediately decremented steps times the step size. If the time parameter is included, then the instrument will still decrement steps times the step size, but will pause at each step for time milliseconds.		
	ARGUMENT	VALUE	DESCRIPTION
	<i>steps</i>	1 – 65000	Number of steps to decrements
	<i>time</i>	0 – 65000	Number of milliseconds to pause between each step
EXAMPLES	LAS:DEC 3, 4000 will decrement the setpoint by the value included in the STEP command, wait four seconds, and then decrement at four second intervals two more times.		
SEE ALSO	LASer:INC, LASer:STEP		

COMMAND	LASer:DISplay		
INSTRUMENT	QCL LAB		
DESCRIPTION	Turns the front panel touchscreen display on or off.		
SYNTAX	LASer:DISplay <enable>		
DETAILS	The LASer:DISplay command can be used to lock out local operation of the instrument via the touchscreen, while still allowing the front Power and Enable switches to work.		
	RESPONSE	VALUE	DESCRIPTION
	enable	0	Disables the display
		1	Enables the display
EXAMPLES	Once the display is disabled, the only way to restore functionality to the front panel is to issue a LASer:DISplay 1 or cycle back panel power on the unit.		
SEE ALSO	LASer:DISplay?		

COMMAND	LASer:DISplay?		
INSTRUMENT	QCL LAB		
DESCRIPTION	Queries the front panel display state		
SYNTAX	LASer:DISplay?		
DETAILS	Returns the value of the laser display enable state. See the LASer:DISplay command for more details.		
SEE ALSO	LASer:DISplay		

COMMAND	LASer:ENABle:COND		
INSTRUMENT	QCL LAB, LDTC LAB		
DESCRIPTION	Sets the Laser Condition Status Enable Register mask		
SYNTAX	LASer:ENABle:COND <mask>		
DETAILS	Enables reporting of selected conditions to the Status Byte Register. See the LASer:COND? command for a definition of the bits in the LASer:COND Register. The mask is logically AND'd with the Laser Condition Status Register, and if any of the resulting bits are high, Bit 3 in the Status Byte Register will be set.		
EXAMPLES	If LAS:ENAB:COND 17 is sent, and any of the following conditions exist, Bit 3 of the Status Byte Register will be set: Bits 0 and 4 (17 = 1 [Current Limit, Bit 0] + 16 [Interlock, Bit 4]).		
SEE ALSO	LASer:ENABle:COND?, LASer:COND?, *STB?		
MORE INFO	See page 8 for the Status Reporting Structure diagram.		

COMMAND	LASer:ENABle:COND?		
INSTRUMENT	QCL LAB, LDTC LAB		
DESCRIPTION	Queries the Laser Condition Status Enable Register mask		
SYNTAX	LASer:ENABle:COND?		
DETAILS	Returns the value of the Laser Condition Enable Register. See the LASer:COND command for a definition of the condition bits in the Laser Condition Enable Register.		
EXAMPLES	A response of LAS:ENABle:COND 1025 means any of the following conditions will set Bit 3 of the Status Byte Register: Bits 0 and 10 (1025 = 1 [Current limit, Bit 0] + 1024 [Output on, Bit 10]).		
SEE ALSO	LASer:ENABle:COND, LASer:COND?, LASer:COND, *STB?		
MORE INFO	See page 8 for the Status Reporting Structure diagram.		

COMMAND	LASer:ENABle:EVEnt
INSTRUMENT	QCL LAB, LDTC LAB
DESCRIPTION	Sets the Laser Event Status Enable Register mask
SYNTAX	LASer:ENABle:EVEnt <mask>
DETAILS	Enables reporting of selected events to the Status Byte Register. See the LASer:EVEnt command for a definition of the event bits. The mask is logically ANDed with the Laser Event Register, and if any of the resulting bits are high, Bit 2 of the Status Byte Register will be set.
EXAMPLES	If LAS:ENAB:EVE 400 is sent, and any of the following conditions change, Bit 2 of the Status Byte Register will be set: Bits 4, 7, and 8 (400 = 16 [Interlock, Bit 4] + 128 [Laser open circuit, Bit 7] + 256 [Laser short circuit, Bit 8]).
SEE ALSO	LASer:ENABle:EVEnt?, LASer:EVEnt?, *STB?
MORE INFO	See page 8 for the Status Reporting Structure diagram.

COMMAND	LASer:ENABle:EVEnt?
INSTRUMENT	QCL LAB, LDTC LAB
DESCRIPTION	Queries the Laser Event Enable Register mask
SYNTAX	LASer:ENABle:EVEnt?
DETAILS	Returns the value of the Laser Event Enable register. See the LASer:EVEnt? command for a definition of the response.
EXAMPLES	If 1168 is returned, the following conditions will trigger Bit 2 of the Status Byte Register to be set: Bits 4, 7, and 10 (1168 = 1024 [Output changed, Bit 10] + 128 [Laser open circuit, Bit 7] + 16 [Interlock state changed, Bit 4]).
SEE ALSO	LASer:ENABle:EVEnt, LASer:EVEnt?, *STB?
MORE INFO	See page 8 for the Status Reporting Structure diagram.

COMMAND	LASer:ENABle:OUTOFF																																				
INSTRUMENT	LDTC LAB																																				
DESCRIPTION	Sets the Laser Enable Output Off Register mask																																				
SYNTAX	LASer:ENABle:OUTOFF <mask>																																				
DETAILS	Setting a bit in this register will force laser output to be disabled if the described condition occurs. <table border="1" data-bbox="321 1098 1526 1434"> <thead> <tr> <th>ARGUMENT</th> <th>BIT</th> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>mask</td> <td>0</td> <td>1</td> <td>TEC output off</td> </tr> <tr> <td></td> <td>1</td> <td>2</td> <td>TEC load short detected</td> </tr> <tr> <td></td> <td>2</td> <td>4</td> <td>TEC load open detected</td> </tr> <tr> <td></td> <td>3</td> <td>8</td> <td>Temperature unstable (out of tolerance)</td> </tr> <tr> <td></td> <td>4</td> <td>16</td> <td>Sensor short detected</td> </tr> <tr> <td></td> <td>5</td> <td>32</td> <td>Sensor open detected</td> </tr> <tr> <td></td> <td>6</td> <td>64</td> <td>High temperature limit exceeded</td> </tr> <tr> <td></td> <td>7</td> <td>128</td> <td>Low temperature limit exceeded</td> </tr> </tbody> </table>	ARGUMENT	BIT	VALUE	DESCRIPTION	mask	0	1	TEC output off		1	2	TEC load short detected		2	4	TEC load open detected		3	8	Temperature unstable (out of tolerance)		4	16	Sensor short detected		5	32	Sensor open detected		6	64	High temperature limit exceeded		7	128	Low temperature limit exceeded
ARGUMENT	BIT	VALUE	DESCRIPTION																																		
mask	0	1	TEC output off																																		
	1	2	TEC load short detected																																		
	2	4	TEC load open detected																																		
	3	8	Temperature unstable (out of tolerance)																																		
	4	16	Sensor short detected																																		
	5	32	Sensor open detected																																		
	6	64	High temperature limit exceeded																																		
	7	128	Low temperature limit exceeded																																		
EXAMPLES	LAS:ENAB:OUTOFF 48 will configure the instrument to shutdown laser current if a short or open is detected at the sensor pins (16+32). LAS:ENAB:OUTOFF 0 will configure the instrument to not shutdown laser current, regardless of the status of these conditions. LAS:ENAB:OUTOFF 255 will configure the instrument to shutdown laser current if any of these conditions occur.																																				
SEE ALSO	LASer:ENABle:OUTOFF?, LAS:COND?, TEC:COND?																																				

COMMAND	LASer:ENABle:OUTOFF?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the Laser Enable Output Off register mask
SYNTAX	LASer:ENABle:OUTOFF?
DETAILS	The response indicates what TC conditions trigger laser output to be disabled. See LAS:ENAB:OUTOFF for the description of individual bits.
EXAMPLES	A response of 6 indicates the instrument will shutdown laser current if a short or open is detected at the TEC pins (4+2). A response of 0 indicates the instrument will not shutdown laser current based on the status of these conditions. A response of 255 indicates the instrument will shutdown laser current if any of these conditions occur.
SEE ALSO	LASer:ENABle:OUTOFF?, LAS:COND?, TEC:COND?

COMMAND	LASer:EVEnt?			
INSTRUMENT	QCL LAB, LDTC LAB			
DESCRIPTION	Queries the value of the Laser Event Status Register			
SYNTAX	LASer:EVEnt?			
DETAILS	Returns the Laser Event Status Register. If a condition has changed, these bits will be latched high. IMPORTANT: After reading the event register, it is set to zero.			
	RESPONSE	BIT	VALUE	QCL LAB DESCRIPTION
	<i>events</i>	0	1	Current limit
		1	2	Unused
		2	4	Unused
		3	8	Unused
		4	16	Interlock state changed
		5	32	Unused
		6	64	Unused
		7	128	Laser load open
		8	256	Laser load short
		9	512	Out of tolerance changed state
		10	1024	Output changed state
		11	2048	Unused
		12	4096	Unused
		13	8192	Unused
	14	16384	Unused	
	15	32768	Front panel power on changed state	
EXAMPLES	A response of LAS:EVEnt 1041 means the Laser Condition Register enabled Bits 0, 4, and 10 (1041 = 1 [Current limit, Bit 1] + 16 [Interlock state changed, Bit 4] + 1024 [Output state changed, Bit 10]). Note that the laser open and short circuit bits will be set if the problem is detected. Because the unit does not check for these errors while the output is off, correcting the error will not set these bits.			
SEE ALSO	LASer:ENABLE:EVEnt			
MORE INFO	The Laser Event Status Register reports if any condition in the instrument has changed. See page 8 for the Status Reporting Structure diagram.			

COMMAND	LASer:INC	
INSTRUMENT	QCL LAB	
DESCRIPTION	Increments the laser setpoint by the specified number of steps	
SYNTAX	LASer:INC <steps> [, time]	
DETAILS	The LASer:INC command uses the step size defined with the LASer:STEP command to increment the laser setpoint. If the <i>time</i> parameter is omitted, then the set point is immediately incremented <i>steps</i> times the step size. If the time parameter is included, then the instrument will still increment <i>steps</i> times the step size, but will pause at each step for <i>time</i> milliseconds.	
	ARGUMENT	VALUE
	<i>steps</i>	1 – 65000
	<i>time</i>	0 – 65000
EXAMPLES	LAS:INC 3, 4000 will increment the setpoint by the value included in the LASer:STEP command, wait four seconds, and then increment at four second intervals two more times.	
SEE ALSO	LASer:DEC, LASer:STEP	

COMMAND	LASer:LDI		
INSTRUMENT	QCL LAB, LDTC LAB		
DESCRIPTION	Sets the laser current setpoint		
SYNTAX	LASer:LDI <setpoint>		
DETAILS	An error will be generated if the value of setpoint is greater than the instrument capacity.		
	ARGUMENT	VALUE	DESCRIPTION
	setpoint	0 to I _{MAX}	Set the current setpoint in mAmps or Amps
EXAMPLES	LAS:LDI 400 will set the setpoint to 400 mA if LAS:AMP is 0. If LAS:AMP is 1, an out of range error will be generated.		
SEE ALSO	LASer:LDI?, LASer:LIMit:LDI, LASer:SET:LDI, LAS:AMP		

COMMAND	LASer:LDI?		
INSTRUMENT	QCL LAB, LDTC LAB		
DESCRIPTION	Queries the actual laser current		
SYNTAX	LASer:LDI?		
DETAILS	Returns the actual (measured) laser current in Amps if LAS:AMP is 1 or in mA if LAS:AMP is 0..		
	RESPONSE	DESCRIPTION	
	current	The actual (measured) current in milliamps or Amps.	
SEE ALSO	LASer:LDI, HEXFLOAT, LASer:AMP		

COMMAND	LASer:LDV?		
INSTRUMENT	QCL LAB, LDTC LAB		
DESCRIPTION	Queries the actual laser voltage		
SYNTAX	LASer:LDV?		
DETAILS	Returns the value of the laser voltage in Volts		
SEE ALSO	LASer:LIMit:LDV		

COMMAND	LASer:LIMit:LDI		
INSTRUMENT	QCL LAB, LDTC LAB		
DESCRIPTION	Sets the laser current limit		
SYNTAX	LASer:LIMit:LDI <limit>		
DETAILS	LASer:LIMit:LDI sets the laser current limit. If the laser current setpoint is greater than the limit, then the actual output current will be slightly below the limit. For more information, see the instrument User Guide.		
	ARGUMENT	VALUE	DESCRIPTION
	limit	0 to I _{MAX}	Set the laser current limit in mAmps or Amps
EXAMPLES	LAS:LIM:LDI 500 will set the limit current to 500 mA if LAS:AMP is 0. If LAS:AMP is 1, an out of range error will be generated.		
SEE ALSO	LASer:LDI, LASer:LIMit:LDI?, LASer:AMP		

COMMAND	LASer:LIMit:LDI?		
INSTRUMENT	QCL LAB, LDTC LAB		
DESCRIPTION	Queries the laser current limit setting		
SYNTAX	LASer:LIMit:LDI?		
DETAILS	Returns the value of the laser current limit in mAmps or Amps. See LASer:LIMit:LDI for a definition of the limit response value.		
SEE ALSO	LASer:LIMit:LDI, LASer:AMP		

COMMAND	LASer:LIMit:LDV		
INSTRUMENT	QCL LAB, LDTC LAB		
DESCRIPTION	Sets the internal power supply voltage level limit (QCL LAB) or sets the voltage limit across the laser (LDTC LAB) Can only be changed when LAS:OUT = 0		
SYNTAX	LASer:LIMit:LDV <limit>		
DETAILS	ARGUMENT	INSTRUMENT	VALUE
	limit	QCL LAB	18 to 28
		LDTC LAB	0.75 to 10.25
DESCRIPTION	Set the internal power supply voltage limit in Volts		
DESCRIPTION	Set the bound for a voltage error to be thrown in Volts		
EXAMPLES	LAS:LIM:LDV 18 sets the internal supply to 18V, reducing the compliance to the laser (QCL LAB). LAS:LIM:LDV 5 sets the maximum voltage across the laser to 5 V. Voltage developed above 5 V triggers an error (LDTC LAB).		
SEE ALSO	LASer:LIMit:LDV?		
MORE INFO	How to determine the laser voltage limit from the supply limit is discussed in the QCL LAB instrument User Guide under <i>Reduce Internal Temperature or Provide Compliance Voltage Limit</i> .		

COMMAND	LASer:LIMit:LDV?		
INSTRUMENT	QCL LAB, LDTC LAB		
DESCRIPTION	Queries internal power supply voltage level limit (QCL LAB) or queries voltage limit across the laser (LDTC LAB)		
SYNTAX	LASer:LIMit:LDV?		
DETAILS	Returns the value in Volts. See LASer:LIMit:LDV for details (instrument-dependent).		
SEE ALSO	LASer:LIMit:LDV		

COMMAND	LASer:LIMit:MDP		
INSTRUMENT	LDTC LAB		
DESCRIPTION	Sets the photodiode transfer function.		
SYNTAX	LASer:LIMit:MDP <value>		
DETAILS	LASer:LIMit:MDP allows for display and control of output power in Watts.		
	ARGUMENT	VALUE	DESCRIPTION
	value	0 to 0.1	Converts photodiode current to laser power. Units are W/mA.
SEE ALSO	LASer:LIMit:MDP?		

COMMAND	LASer:LIMit:MDP?		
INSTRUMENT	LDTC LAB		
DESCRIPTION	Queries the photodiode transfer function.		
SYNTAX	LASer:LIMit:MDP?		
DETAILS	Returns the set photodiode transfer function in units of W/mA.		
SEE ALSO	LASer:LIMit:MDP		

COMMAND	LASer:MDI		
INSTRUMENT	LDTC LAB		
DESCRIPTION	Sets the photodiode current setpoint in A in constant power mode		
SYNTAX	LASer:MDI <setpoint>		
DETAILS	Changes the photodiode current setpoint when operating in Constant Power mode with a zero photodiode transfer function.		
	ARGUMENT	VALUE	DESCRIPTION
	setpoint	0 to PDR MAX	Set the photodiode current setpoint in units of A.
	PDR is the photodiode range.		
SEE ALSO	LASer:MDI?, LASer:PDRange, LASer:LIMit:MDP,		

COMMAND	LASer:MDI?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the photodiode current.
SYNTAX	LASer:MDI?
DETAILS	Returns the actual (measured) photodiode current in Amps.
SEE ALSO	LASer:MDI?, LASer:PDRange, LASer:LIMit:MDP

COMMAND	LASer:MDP						
INSTRUMENT	LDTC LAB						
DESCRIPTION	Sets the photodiode power setpoint in constant power mode.						
SYNTAX	LASer:MDP <setpoint>						
DETAILS	Changes the photodiode power setpoint when operating in Constant Power mode with a nonzero photodiode transfer function.						
	<table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>setpoint</td> <td>0 to 0.1·(PDR MAX)</td> <td>Set the photodiode power setpoint in units of W.</td> </tr> </tbody> </table>	ARGUMENT	VALUE	DESCRIPTION	setpoint	0 to 0.1·(PDR MAX)	Set the photodiode power setpoint in units of W.
ARGUMENT	VALUE	DESCRIPTION					
setpoint	0 to 0.1·(PDR MAX)	Set the photodiode power setpoint in units of W.					
SEE ALSO	LASer:MDP?, LASer:PDRange, LASer:LIMit:MDP						

COMMAND	LASer:MDP?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the calculated photodiode power.
SYNTAX	LASer:MDP?
DETAILS	Returns the actual (measured and converted) photodiode power.
SEE ALSO	LASer:MDP?, LASer:LIMit:MDP

COMMAND	LASer:MOD									
INSTRUMENT	LDTC LAB									
DESCRIPTION	Toggles whether modulation input is used as part of the setpoint value									
SYNTAX	LASer:MOD <boolean>									
DETAILS	<table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>boolean</td> <td>0</td> <td>Modulation input disabled. Input will not be used as part of the setpoint.</td> </tr> <tr> <td></td> <td>1</td> <td>Modulation input enabled. Input will be summed with the onboard setpoint.</td> </tr> </tbody> </table>	ARGUMENT	VALUE	DESCRIPTION	boolean	0	Modulation input disabled. Input will not be used as part of the setpoint.		1	Modulation input enabled. Input will be summed with the onboard setpoint.
ARGUMENT	VALUE	DESCRIPTION								
boolean	0	Modulation input disabled. Input will not be used as part of the setpoint.								
	1	Modulation input enabled. Input will be summed with the onboard setpoint.								
SEE ALSO	LASer:MOD?									

COMMAND	LASer:MOD?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the status of modulation input as part of the setpoint value
SYNTAX	LASer:MOD?
DETAILS	See LASer:MOD for a description of the boolean responses to this query.
SEE ALSO	LASer:MOD

COMMAND	LASer:MODE:LDI									
INSTRUMENT	LDTC LAB									
DESCRIPTION	Sets the operation mode to constant current control and sets laser type.									
SYNTAX	LASer:MODE:LDI <type>									
DETAILS	<table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>type</td> <td>A</td> <td>Type A laser</td> </tr> <tr> <td></td> <td>C</td> <td>Type C laser</td> </tr> </tbody> </table>	ARGUMENT	VALUE	DESCRIPTION	type	A	Type A laser		C	Type C laser
ARGUMENT	VALUE	DESCRIPTION								
type	A	Type A laser								
	C	Type C laser								
SEE ALSO	LASer:MODE:LDI?, LASer:MODE:MDI, LASer:MODE:MDI?, LASer:MODE?									

COMMAND	LASer:MODE:LDI?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries if the operation mode is constant current.
SYNTAX	LASer:MODE:LDI?
DETAILS	Returns a boolean true/false.
SEE ALSO	LASer:MODE:LDI, LASer:MODE:MDI, LASer:MODE:MDI?, LASer:MODE?

COMMAND	LASer:MODE:MDI									
INSTRUMENT	LDTc LAB									
DESCRIPTION	Sets the operation mode to constant power control and sets laser type.									
SYNTAX	LASer:MODE:MDI <type>									
DETAILS	<table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>type</td> <td>A</td> <td>Type A laser</td> </tr> <tr> <td></td> <td>C</td> <td>Type C laser</td> </tr> </tbody> </table>	ARGUMENT	VALUE	DESCRIPTION	type	A	Type A laser		C	Type C laser
ARGUMENT	VALUE	DESCRIPTION								
type	A	Type A laser								
	C	Type C laser								
SEE ALSO	LASer:MODE:LDI, LASer:MODE:LDI?, LASer:MODE:MDI?, LASer:MODE?									

COMMAND	LASer:MODE:MDI?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries if the operation mode is constant power.
SYNTAX	LASer:MODE:MDI?
DETAILS	Returns a boolean true/false.
SEE ALSO	LASer:MODE:LDI, LASer:MODE:LDI?, LASer:MODE:MDI, LASer:MODE?

COMMAND	LASer:MODE:TYPE									
INSTRUMENT	LDTc LAB									
DESCRIPTION	Sets the configuration for laser type A or C.									
SYNTAX	LASer:MODE:TYPE <type>									
DETAILS	<table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>type</td> <td>A</td> <td>Type A laser</td> </tr> <tr> <td></td> <td>C</td> <td>Type C laser</td> </tr> </tbody> </table>	ARGUMENT	VALUE	DESCRIPTION	type	A	Type A laser		C	Type C laser
ARGUMENT	VALUE	DESCRIPTION								
type	A	Type A laser								
	C	Type C laser								
SEE ALSO	LASer:MODE:TYPE?, LASer:MODE?									

COMMAND	LASer:MODE:TYPE?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries which type of laser the instrument is configured to control.
SYNTAX	LASer:MODE:TYPE?
DETAILS	Returns "A" or "C" as described in LASer:MODE:TYPE
SEE ALSO	LASer:MODE:TYPE, LASer:MODE?

COMMAND	LASer:MODE?	
INSTRUMENT	LDTC LAB	
DESCRIPTION	Queries the type of laser and the control mode for which the instrument is configured.	
SYNTAX	LASer:MODE?	
DETAILS	Returns a comma delimited response of <i>type,control</i> .	
	ARGUMENT	VALUE
	<i>type</i>	A
		C
	<i>control</i>	CURR
		POW
		DESCRIPTION
		Type A laser
		Type C laser
		Constant Current mode
		Constant Power mode
SEE ALSO	LASer:MODE:LDI, LASer:MODE:LDI?, LASer:MODE:MDI, LASer:MODE:MDI?, LASer:MODE:TYPE, LASer:MODE:TYPE?	

COMMAND	LASer:ONDELAY	
INSTRUMENT	LDTC LAB	
DESCRIPTION	Sets the turn-on delay time for laser current in milliseconds (see ONDELAY).	
SYNTAX	LASer:ONDELAY <time>	
DETAILS	Alias for ONDELAY in the LASer:* tree. See ONDELAY for full details.	
SEE ALSO	LASer:ONDELAY?, ONDELAY, ONDELAY?	

COMMAND	LASer:ONDELAY?	
INSTRUMENT	LDTC LAB	
DESCRIPTION	Queries the turn-on delay time for laser current (see ONDELAY?).	
SYNTAX	LASer:ONDELAY?	
DETAILS	Alias for ONDELAY? in the LASer:* tree. See ONDELAY? for full details.	
SEE ALSO	LASer:ONDELAY, ONDELAY, ONDELAY?	

COMMAND	LASer:OUTput	
INSTRUMENT	QCL LAB, LDTC LAB	
DESCRIPTION	Sets the laser output state (current enabled or disabled)	
SYNTAX	LASer:OUTput <state>	
DETAILS	ARGUMENT	VALUE
	<i>state</i>	0
		1
		DESCRIPTION
		Turn the laser output current OFF
		Turn the laser output current ON
EXAMPLES	LAS:OUT 1 turns laser output on.	
SEE ALSO	LASer:OUTput?	

COMMAND	LASer:OUTput?	
INSTRUMENT	QCL LAB, LDTC LAB	
DESCRIPTION	Queries the laser output state	
SYNTAX	LASer:OUTput?	
DETAILS	Returns the value of the laser output state. See LASer:OUTput for a definition of the state response value.	
SEE ALSO	LASer:OUTput	

COMMAND	LASer:PDBias		
INSTRUMENT	LDTC LAB		
DESCRIPTION	Enables or disables the photodiode bias voltage.		
SYNTAX	LASer:PDBias < <i>boolean</i> >		
DETAILS	ARGUMENT	VALUE	DESCRIPTION
	<i>boolean</i>	0	Turn the photodiode bias voltage OFF
		1	Turn the photodiode bias voltage ON
SEE ALSO	LASer:PDBias?		

COMMAND	LASer:PDBias?		
INSTRUMENT	LDTC LAB		
DESCRIPTION	Queries the status of the photodiode bias voltage.		
SYNTAX	LASer:PDBias?		
DETAILS	Returns the value of the photodiode bias voltage state. See LASer:PDBias for a definition of the state response value.		
SEE ALSO	LASer:PDBias		

COMMAND	LASer:PDRange		
INSTRUMENT	LDTC LAB		
DESCRIPTION	Sets the current operation range for the photodiode feedback		
SYNTAX	LASer:PDRange < <i>range</i> >		
DETAILS	ARGUMENT	VALUE	DESCRIPTION
	<i>range</i>	1	500 μ A range
		2	5 mA range
		3	10 mA range
SEE ALSO	LASer:PDRange?		

COMMAND	LASer:PDRange?		
INSTRUMENT	LDTC LAB		
DESCRIPTION	Queries the photodiode current range setting.		
SYNTAX	LASer:PDRange?		
DETAILS	Returns the value of the photodiode current range state. See LASer:PDRange for a definition of the state response value.		
SEE ALSO	LASer:PDRange		

COMMAND	LASer:POL:ENABLE		
INSTRUMENT	LDTC LAB		
DESCRIPTION	Sets the polarity of the remote laser diode enable input pin on the rear panel.		
SYNTAX	LASer:POL:ENABLE < <i>invert</i> >		
DETAILS	Turns the laser output current on or off.		
	ARGUMENT	VALUE	DESCRIPTION
	<i>invert</i>	0	Default logic (enable high).
		1	Inverted logic (disable high).
SEE ALSO	LASer:POL:ENABLE?		

COMMAND	LASer:POL:ENABle?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries the polarity status for the remote laser diode enable input pin on the rear panel.
SYNTAX	LASer:POL:ENABle?
DETAILS	Returns a boolean True/False as described in LASer:POL:ENABle.
SEE ALSO	LASer:POL:ENABle

COMMAND	LASer:POL:STAT									
INSTRUMENT	LDTc LAB									
DESCRIPTION	Sets the polarity for the remote laser diode enable output pin on the rear panel.									
SYNTAX	LASer:POL:STAT <invert>									
DETAILS	<table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td><i>invert</i></td> <td>0</td> <td>Default logic (high if current is disabled).</td> </tr> <tr> <td></td> <td>1</td> <td>Use inverted logic (high if current is enabled).</td> </tr> </tbody> </table>	ARGUMENT	VALUE	DESCRIPTION	<i>invert</i>	0	Default logic (high if current is disabled).		1	Use inverted logic (high if current is enabled).
ARGUMENT	VALUE	DESCRIPTION								
<i>invert</i>	0	Default logic (high if current is disabled).								
	1	Use inverted logic (high if current is enabled).								
SEE ALSO	LASer:POL:STAT?									

COMMAND	LASer:POL:STAT?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries the polarity status of the remote laser diode enable output pin on the rear panel.
SYNTAX	LASer:POL:STAT?
DETAILS	Returns a boolean True/False as described in LASer:POL:STAT.
SEE ALSO	LASer:POL:STAT

COMMAND	LASer:SET:LDI?
INSTRUMENT	QCL LAB, LDTc LAB
DESCRIPTION	Queries the laser current setpoint
SYNTAX	LASer:SET:LDI?
DETAILS	Returns the value of the laser current setpoint in Amps if LAS:AMP is 1 or mA if LAS:AMP is 0.
SEE ALSO	LASer:LDI, LASer:AMP

COMMAND	LASer:SET:MDI?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries the photodiode current setpoint
SYNTAX	LASer:SET:MDI?
DETAILS	Returns the value of the photodiode current setpoint in Amps.
SEE ALSO	LASer:MDI

COMMAND	LASer:SET:MDP?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries the photodiode power setpoint
SYNTAX	LASer:SET:MDP?
DETAILS	Returns the value of the photodiode power setpoint in Watts. Must have a nonzero value set in LAS:LIM:MDP.
SEE ALSO	LASer:MDP, LASer:LIMit:MDP, LASer:LIMit:MDP?

COMMAND	LASer:STABLE?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries if the power supply for the laser driver is stable
SYNTAX	LASer:STABLE?
DETAILS	Returns a boolean True/False to indicate if the laser driver power supply has stabilized at a final value after changing LASer:LIMit:LDV.
SEE ALSO	LASer:LIMit:LDV

COMMAND	LASer:STB?																																				
INSTRUMENT	QCL LAB																																				
DESCRIPTION	Queries the Laser Status Byte Register																																				
SYNTAX	LASer:STB?																																				
DETAILS	<p>Returns a summary of the enabled conditions within the laser condition and event registers. These bits mirror the bits in the Status Byte Register.</p> <table border="1"> <thead> <tr> <th>RESPONSE</th> <th>BIT</th> <th>VALUE</th> <th>NAME / DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>LAS:STB?</td> <td>0</td> <td>1</td> <td>Temperature Controller Event Summary (not used by the QCL LAB or LD LAB)</td> </tr> <tr> <td></td> <td>1</td> <td>2</td> <td>Temperature controller Condition Summary (not used by the QCL LAB or LD LAB)</td> </tr> <tr> <td></td> <td>2</td> <td>4</td> <td>Laser Event Summary</td> </tr> <tr> <td></td> <td>3</td> <td>8</td> <td>Laser Condition Summary</td> </tr> <tr> <td></td> <td>4</td> <td>16</td> <td>Message Available</td> </tr> <tr> <td></td> <td>5</td> <td>32</td> <td>Event Status Summary</td> </tr> <tr> <td></td> <td>6</td> <td>64</td> <td>Request Service / Master Status Summary</td> </tr> <tr> <td></td> <td>7</td> <td>128</td> <td>Error Message Available</td> </tr> </tbody> </table>	RESPONSE	BIT	VALUE	NAME / DESCRIPTION	LAS:STB?	0	1	Temperature Controller Event Summary (not used by the QCL LAB or LD LAB)		1	2	Temperature controller Condition Summary (not used by the QCL LAB or LD LAB)		2	4	Laser Event Summary		3	8	Laser Condition Summary		4	16	Message Available		5	32	Event Status Summary		6	64	Request Service / Master Status Summary		7	128	Error Message Available
RESPONSE	BIT	VALUE	NAME / DESCRIPTION																																		
LAS:STB?	0	1	Temperature Controller Event Summary (not used by the QCL LAB or LD LAB)																																		
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	5	32	Event Status Summary																																		
	6	64	Request Service / Master Status Summary																																		
	7	128	Error Message Available																																		
EXAMPLES	A response of 96 (64 + 32) specifies that the Request Service Summary and the Event Status Summary bits are set.																																				
SEE ALSO	*STB?, LASer:COND?, LASer:ENABLE:COND, LASer:ENABLE:EVEnt, LASer:EVEnt?																																				
MORE INFO	See page 8 for the Status Reporting Structure diagram.																																				

COMMAND	LASer:STEP						
INSTRUMENT	QCL LAB						
DESCRIPTION	Sets laser step size						
SYNTAX	LASer:STEP <size>						
DETAILS	<p>The command sets the laser step size used by the LASer:INC or LASer:DEC commands in mAmps or Amps.</p> <table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>size</td> <td>1 - 65000</td> <td>Step size</td> </tr> </tbody> </table> <p>A step of 1 equates to 0.01mA.</p>	ARGUMENT	VALUE	DESCRIPTION	size	1 - 65000	Step size
ARGUMENT	VALUE	DESCRIPTION					
size	1 - 65000	Step size					
SEE ALSO	LASer:DEC, LASer:INC, LASer:STEP?						

COMMAND	LASer:STEP?
INSTRUMENT	QCL LAB
DESCRIPTION	Queries the laser step size
SYNTAX	LASer:STEP?
DETAILS	Returns the value of the laser step size. See LASer:STEP for a definition of the size response value.
SEE ALSO	LASer:STEP

COMMAND	LASer:TOLerance		
INSTRUMENT	QCL LAB, LDTC LAB		
DESCRIPTION	Sets the laser tolerance criteria		
SYNTAX	LASer:TOLerance <tolerance>, <time>		
DETAILS	The LASer:TOLerance command sets the parameters for when the output of the laser driver is considered in tolerance (or stable).		
	ARGUMENT	INSTRUMENT	VALUE
	<i>tolerance</i>	QCL LAB	0.01 to IMAX
		LDTC LAB	1 mA to IMAX
	<i>time</i>	QCL LAB	0.1 to 50
		LDTC LAB	
	Current tolerance, in mAmps or Amps		
	Current tolerance. 1 mA minimum, regardless of unit system.		
	Time window in seconds		
	To be considered in tolerance, the measured current must be within the set point plus or minus the tolerance value (the tolerance window) for time seconds. Any time it leaves the tolerance window, the timer will reset to zero and begin counting the next time it enters the tolerance window.		
	Bit 9 of the Laser Condition Status Register will be set if the current level is out of tolerance. Bit 9 of the Laser Event Status Register will be set if the current level tolerance status changes.		
EXAMPLES	If LAS:TOL 0.1, 500 is sent and LAS:AMP is 1, when the laser current varies from the setpoint by more than ± 0.1 A over a 500 msec window, Bit 9 will be set in the Laser Condition Status register.		
	If LAS:TOL 0.1, 500 is sent and LAS:AMP is 0, when the laser current varies from the setpoint by more than ± 0.1 mA over a 500 msec window, Bit 9 will be set in the Laser Condition Status register.		
SEE ALSO	LASer:TOLerance?, LASer:AMP, LASer:COND?, LASer:EVEnt?		

COMMAND	LASer:TOLerance?		
INSTRUMENT	QCL LAB, LDTC LAB		
DESCRIPTION	Queries the laser tolerance criteria		
SYNTAX	LASer:TOLerance?		
DETAILS	Returns the value of the laser tolerance criteria. See LASer:TOLerance for a definition of the tolerance and time response values.		
SEE ALSO	LASer:TOLerance		

COMMAND	ONDELAY		
INSTRUMENT	QCL LAB, LDTC LAB		
DESCRIPTION	Sets the turn-on delay time for laser current		
SYNTAX	ONDELAY <time>		
DETAILS	The ONDELAY command controls how long the laser driver will delay between the time the user or command enables current to the laser and when the output is actually turned on.		
	ARGUMENT	INSTRUMENT	VALUE
	<i>time</i>	QCL LAB	1 – 25500
		LDTC LAB	1 – 30000
	On delay, in milliseconds		
EXAMPLES	ONDELAY 3000 delays turning on the laser current for 3 seconds after the Enable button is pressed or LAS:OUT 1 command is issued. Factory default is 2 seconds.		
SEE ALSO	ONDELAY?		

COMMAND	ONDELAY?		
INSTRUMENT	QCL LAB, LDTC LAB		
DESCRIPTION	Queries the turn-on delay time for laser current		
SYNTAX	ONDELAY?		
DETAILS	Returns the value of the laser output on delay. See the ONDELAY command for a complete definition of possible return values.		
SEE ALSO	ONDELAY		

COMMAND	PROFile:ILIM
INSTRUMENT	QCL LAB
DESCRIPTION	Sets the laser current limit for the specified profile
SYNTAX	PROFile:ILIM <profile>, <limit>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Limit current is saved in Amps or mA, depending on the state of the LAS:AMP flag.
EXAMPLES	PROF:ILIM 3, 0.75 sets the limit current to 0.75A in Profile 3 if LAS:AMP is 1.
SEE ALSO	PROFile:ILIM?, LASer:LIMit:LDI, LASer:LIMit:LDI?, *RCL, *SAV

COMMAND	PROFile:ILIM?
INSTRUMENT	QCL LAB
DESCRIPTION	Queries the laser current limit for the specified profile
SYNTAX	PROFile:ILIM? <profile>
DETAILS	Profiles 0-10 can be queried. This returns the limit current setting. Limit current is returned in Amps or mA, depending on the state of the LAS:AMP flag.
SEE ALSO	PROFile:ILIM, LASer:LIMit:LDI, LASer:LIMit:LDI?, *RCL, *SAV

COMMAND	PROFile:ISET
INSTRUMENT	QCL LAB
DESCRIPTION	Sets the laser current setpoint for the specified profile
SYNTAX	PROFile:ISET <profile>, <setpoint>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Current setpoint is saved in Amps or mA, depending on the state of the LAS:AMP flag.
EXAMPLES	PROF:ISET 4, 0.5 sets the current setpoint to 0.5A in Profile 4 if LAS:AMP is 1.
SEE ALSO	PROFile:ISET?, LASer:LDI, LASer:LDI?, LASer:SET:LDI, *RCL, *SAV

COMMAND	PROFile:ISET?
INSTRUMENT	QCL LAB
DESCRIPTION	Queries the laser current setpoint for the specified profile
SYNTAX	PROFile:ISET? <profile>
DETAILS	Profiles 0-10 can be queried. This returns the current setpoint. Current setpoint is returned in Amps or mA, depending on the state of the LAS:AMP flag.
SEE ALSO	PROFile:ISET, LASer:LDI, LASer:LDI?, LASer:SET:LDI?, *RCL, *SAV

COMMAND	PROFile:LASer:CABLER
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the laser cable resistance for the specified profile
SYNTAX	PROFile:LASer:CABLER <profile>, <resistance>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Cable resistance is saved in Ohms.
SEE ALSO	PROFile:LASer:CABLER?, LASer:CABLER, LASer:CABLER?, *RCL, *SAV

COMMAND	PROFile:LASer:CABLER?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the laser cable resistance for the specified profile
SYNTAX	PROFile:LASer:CABLER? <profile>
DETAILS	Profiles 0-10 can be queried. This returns the cable resistance in Ohms.
SEE ALSO	PROFile:LASer:CABLER, LASer:CABLER, LASer:CABLER?, *RCL, *SAV

COMMAND	PROFile:LASer:LDI
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the laser current setpoint for the specified profile
SYNTAX	PROFile:LASer:LDI <profile>,<setpoint>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Laser current setpoint is saved in Amps or mA, depending on the configuration of LASer:AMP.
SEE ALSO	PROFile:LASer:SET:LDI?, LASer:LDI, LASer:SET:LDI?, LASer:AMP, *RCL, *SAV

COMMAND	PROFile:LASer:LIMit:LDI
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the laser current limit for the specified profile.
SYNTAX	PROFile:LASer:LIMit:LDI <profile>,<limit>
DETAILS	Profiles 1-10 can be stored in memory for later recall. The laser current limit is set in either Amps or mA, depending on the configuration of LASer:AMP.
SEE ALSO	PROFile:LASer:LIMit:LDI?, LASer:LIMit:LDI, LASer:LIMit:LDI?, LASer:AMP, *RCL, *SAV

COMMAND	PROFile:LASer:LIMit:LDI?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the laser current limit for the specified profile.
SYNTAX	PROFile:LASer:LIMit:LDI? <profile>
DETAILS	Profiles 0-10 can be queried. This returns the laser current limit in either Amps or mA, depending on the configuration of LASer:AMP.
SEE ALSO	PROFile:LASer:LIMit:LDI, LASer:LIMit:LDI, LASer:LIMit:LDI?, LASer:AMP, *RCL, *SAV

COMMAND	PROFile:LASer:LIMit:LDV
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets a voltage limit for the laser for the specified profile.
SYNTAX	PROFile:LASer:LIMit:LDV <profile>,<limit>
DETAILS	Profiles 1-10 can be stored in memory for later recall. The laser voltage limit is set in Volts.
SEE ALSO	PROFile:LASer:LIMit:LDV?, LASer:LIMit:LDV, LASer:LIMit:LDV?, *RCL, *SAV

COMMAND	PROFile:LASer:LIMit:LDV?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the laser voltage limit for the specified profile.
SYNTAX	PROFile:LASer:LIMit:LDV? <profile>
DETAILS	Profiles 0-10 can be queried. The value returned has units of Volts.
SEE ALSO	PROFile:LASer:LIMit:LDV, LASer:LIMit:LDV, LASer:LIMit:LDV?, *RCL, *SAV

COMMAND	PROFile:LASer:LIMit:MDP
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the photodiode transfer function for the specified profile.
SYNTAX	PROFile:LASer:LIMit:MDP <profile>,<value>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Transfer function is specified in units of W/mA.
SEE ALSO	PROFile:LASer:LIMit:MDP?, LASer:LIMit:MDP, LASer:LIMit:MDP?, *RCL, *SAV

COMMAND	PROFile:LASer:LIMit:MDP?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the photodiode transfer function for the specified profile.
SYNTAX	PROFile:LASer:LIMit:MDP? <profile>
DETAILS	Profiles 0-10 can be queried. Transfer function is reported in units of W/mA.
SEE ALSO	PROFile:LASer:LIMit:MDP, LASer:LIMit:MDP, LASer:LIMit:MDP?, *RCL, *SAV

COMMAND	PROFile:LASer:MDI
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the photodiode current setpoint for the specified profile.
SYNTAX	PROFile:LASer:MDI <profile>,<setpoint>
DETAILS	Profiles 1-10 can be stored in memory for later recall. The photodiode current setpoint is set in Amps.
SEE ALSO	PROFile:LASer:SET:MDI?, LASer:MDI, LASer:SET:MDI?, *RCL, *SAV

COMMAND	PROFile:LASer:MDP
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the photodiode power setpoint for the specified profile
SYNTAX	PROFile:LASer:MDP <profile>,<setpoint>
DETAILS	Profiles 1-10 can be stored in memory for later recall. The photodiode power setpoint is set in Watts.
SEE ALSO	PROFile:LASer:SET:MDP?, LASer:MDP, LASer:SET:MDP?, *RCL, *SAV

COMMAND	PROFile:LASer:MODE:LDI
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the operation mode to constant current and sets the laser type for the specified profile.
SYNTAX	PROFile:LASer:MODE:LDI <profile>,<type>
DETAILS	Profiles 1-10 can be stored in memory for later recall. The <type> argument has the same syntax as LASer:MODE:LDI.
SEE ALSO	PROFile:LASer:MODE:LDI?, LASer:MODE:LDI, LASer:MODE:LDI?, *RCL, *SAV

COMMAND	PROFile:LASer:MODE:LDI?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries if the operation mode is constant current for the specified profile.
SYNTAX	PROFile:LASer:MODE:LDI? <profile>
DETAILS	Profiles 0-10 can be queried. Returns a boolean True/False response.
SEE ALSO	PROFile:LASer:MODE:LDI, LASer:MODE:LDI, LASer:MODE:LDI?, *RCL, *SAV

COMMAND	PROFile:LASer:MODE:MDI
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the operation mode to constant power and sets the laser type for the specified profile.
SYNTAX	PROFile:LASer:MODE:MDI <profile>,<type>
DETAILS	Profiles 1-10 can be stored in memory for later recall. The <type> argument has the same syntax as LASer:MODE:MDI.
SEE ALSO	PROFile:LASer:MODE:MDI?, LASer:MODE:MDI, LASer:MODE:MDI?, *RCL, *SAV

COMMAND	PROFile:LASer:MODE:MDI?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries if the operation mode is constant power for the specified profile.
SYNTAX	PROFile:LASer:MODE:MDI? <profile>
DETAILS	Profiles 0-10 can be queried. Returns a boolean True/False response.
SEE ALSO	PROFile:LASer:MODE:MDI, LASer:MODE:MDI, LASer:MODE:MDI?, *RCL, *SAV

COMMAND	PROFile:LASer:MODE:TYPE
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the laser type configuration for the specified profile
SYNTAX	PROFile:LASer:MODE:TYPE <profile>,<type>
DETAILS	Profiles 1-10 can be stored in memory for later recall. The <type> field has the same syntax as LASer:MODE:TYPE.
SEE ALSO	PROFile:LASer:MODE:TYPE?, LASer:MODE:TYPE, LASer:MODE:TYPE?, *RCL, *SAV

COMMAND	PROFile:LASer:MODE:TYPE?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the laser type configuration for the specified profile.
SYNTAX	PROFile:LASer:MODE:TYPE? <profile>
DETAILS	Profiles 0-10 can be queried. Returns either an "A" or a "C" response. See LASer:MODE:TYPE? for more details.
SEE ALSO	PROFile:LASer:MODE:TYPE, LASer:MODE:TYPE, LASer:MODE:TYPE?, *RCL, *SAV

COMMAND	PROFile:LASer:MODE?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the laser type configuration and the operation mode configuration for the specified profile.
SYNTAX	PROFile:LASer:MODE? <profile>
DETAILS	Profiles 0-10 can be queried. Returns <i>type,control</i> as described in LASer:MODE?.
SEE ALSO	PROFile:LASer:MODE:LDI?, PROFile:LASer:MODE:MDI?, PROFile:LASer:MODE:TYPE?, LASer:MODE?, *RCL, *SAV

COMMAND	PROFile:LASer:ONDELAY
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the turn-on delay time for laser current for the specified profile.
SYNTAX	PROFile:LASer:ONDELAY <profile>,<time>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Set the delay time in milliseconds.
SEE ALSO	PROFile:LASer:ONDELAY?, ONDELAY, ONDELAY?, *RCL, *SAV

COMMAND	PROFile:LASer:ONDELAY?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the turn-on delay time for laser current for the specified profile.
SYNTAX	PROFile:LASer:ONDELAY? <profile>
DETAILS	Profiles 0-10 can be queried. Returns an integer value in units of milliseconds.
SEE ALSO	PROFile:LASer:ONDELAY, ONDELAY, ONDELAY?, *RCL, *SAV

COMMAND	PROFile:LASer:PDBias
INSTRUMENT	LDTC LAB
DESCRIPTION	Enables/disables the photodiode bias voltage for the specified profile.
SYNTAX	PROFile:LASer:PDBias <profile>,<boolean>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Boolean True/False sets the bias voltage on/off.
SEE ALSO	PROFile:LASer:PDBias?, LASer:PDBias, LASer:PDBias?, *RCL, *SAV

COMMAND	PROFile:LASer:PDBias?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries if the photodiode bias voltage is enabled or disabled for the specified profile.
SYNTAX	PROFile:LASer:PDBias? <profile>
DETAILS	Profiles 0-10 can be queried. Returns a boolean True/False.
SEE ALSO	PROFile:LASer:PDBias, LASer:PDBias, LASer:PDBias?, *RCL, *SAV

COMMAND	PROFile:LASer:PDRange
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the photodiode current range for the specified profile
SYNTAX	PROFile:LASer:PDRange <profile>,<range>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Input the appropriate index value for the operation range (see LASer:PDRange).
SEE ALSO	PROFile:LASer:PDRange, LASer:PDRange, LASer:PDRange?, *RCL, *SAV

COMMAND	PROFile:LASer:PDRange?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the photodiode current range for the specified profile
SYNTAX	PROFile:LASer:PDRange? <profile>
DETAILS	Profiles 0-10 can be queried. Returns an index corresponding to a current range. See LASer:PDRange for a description.
SEE ALSO	PROFile:LASer:PDRange, LASer:PDRange, LASer:PDRange?, *RCL, *SAV

COMMAND	PROFile:LASer:SET:LDI?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the laser current setpoint for the specified profile.
SYNTAX	PROFile:LASer:SET:LDI? <profile>
DETAILS	Profiles 0-10 can be queried. Returns a value in Amps or mA, depending on the LASer:AMP configuration.
SEE ALSO	PROFile:LASer:LDI, LASer:SET:LDI?, LASer:LDI, LASer:AMP, *RCL, *SAV

COMMAND	PROFile:LASer:SET:MDI?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the photodiode current setpoint for the specified profile.
SYNTAX	PROFile:LASer:SET:MDI? <profile>
DETAILS	Profiles 0-10 can be queried. Returns a value in Amps.
SEE ALSO	PROFile:LASer:MDI, LASer:SET:MDI?, LASer:MDI, *RCL, *SAV

COMMAND	PROFile:LASer:SET:MDP?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the photodiode power setpoint for the specified profile
SYNTAX	PROFile:LASer:SET:MDP? <profile>
DETAILS	Profiles 0-10 can be queried. Returns a value in W.
SEE ALSO	PROFile:LASer:MDP, LASer:SET:MDP?, LASer:MDP, LASer:LIM:MDP, LASer:LIM:MDP?, *RCL, *SAV

COMMAND	PROFile:LASer:TOLerance
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the laser tolerance parameters for a specific profile.
SYNTAX	PROFile:LASer:TOLerance <profile>,<tolerance>,<time>
DETAILS	Profiles 1-10 can be stored in memory for later recall. The <tolerance> parameter is input in units dictated by LASer:AMP, and the <time> field has units of seconds.
SEE ALSO	PROFile:LASer:TOLerance?, LASer:TOLerance, LASer:TOLerance?, *RCL, *SAV

COMMAND	PROFile:LASer:TOLerance?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries the laser tolerance parameters for a specific profile.
SYNTAX	PROFile:LASer:TOLerance? <profile>
DETAILS	Profiles 0-10 can be queried. Returns the tolerance value in A or mA (see LASer:AMP) and time value in seconds.
SEE ALSO	PROFile:LASer:TOLerance, LASer:TOLerance, LASer:TOLerance?, *RCL, *SAV

COMMAND	PROFile:VISTART
INSTRUMENT	QCL LAB
DESCRIPTION	Sets the VI scan start current for the specified profile
SYNTAX	PROFile:VISTART <profile>, <start>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Current is saved in Amps or mA, depending on the state of the LAS:AMP flag.
EXAMPLES	PROF:VISTART 2, 0.1 sets the VI scan start current stored in Profile 2 to 0.1A if LAS:AMP is 1.
SEE ALSO	PROFile:VISTART?, LASer:AMP, *RCL, *SAV

COMMAND	PROFile:VISTART?
INSTRUMENT	QCL LAB
DESCRIPTION	Queries the VI scan start current for the specified profile
SYNTAX	PROFile:VISTART? <profile>
DETAILS	Profiles 0-10 can be queried. Current is returned in Amps or mA, depending on the state of the LAS:AMP flag.
SEE ALSO	PROFile:VISTART, *RCL, *SAV

COMMAND	PROFile:VISTEP
INSTRUMENT	QCL LAB
DESCRIPTION	Sets the VI scan laser current step size for the specified profile
SYNTAX	PROFile:VISTEP <profile>, <step>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Step size is saved in Amps or mA depending on the state of the LAS:AMP flag. Range is 1% to 10% maximum current.
EXAMPLES	PROF:VISTEP 6, 10 sets the VI scan step stored in Profile 6 to 10 mA if LAS:AMP is 0.
SEE ALSO	PROFile:VISTEP?, LAS:AMP, *RCL, *SAV

COMMAND	PROFile:VISTEP?
INSTRUMENT	QCL LAB
DESCRIPTION	Queries the VI scan laser current step size for the specified profile
SYNTAX	PROFile:VISTEP? <profile>
DETAILS	Profiles 0-10 can be queried. Step size is returned in Amps or mA depending on the state of the LAS:AMP flag.
SEE ALSO	PROFile:VISTEP, LASer:AMP, *RCL, *SAV

COMMAND	PROFile:VISTOP
INSTRUMENT	QCL LAB
DESCRIPTION	Sets the VI scan stop current for the specified profile
SYNTAX	PROFile:VISTOP <profile>, <stop>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Current is saved in Amps or mA, depending on the state of the LAS:AMP flag.
EXAMPLES	PROF:VISTOP 1, 0.7 sets the VI scan stop current stored in Profile 1 to 0.7 A if LAS:AMP is 1.
SEE ALSO	PROFile:VISTOP?, LASer:AMP, *RCL, *SAV

COMMAND	PROFile:VISTOP?
INSTRUMENT	QCL LAB
DESCRIPTION	Queries the VI scan stop current for the specified profile
SYNTAX	PROFile:VISTOP? <profile>
DETAILS	Profiles 0-10 can be queried. Current is saved in Amps or mA, depending on the state of the LAS:AMP flag.
SEE ALSO	PROFile:VISTOP, *RCL, *SAV

COMMAND	PROFile:VIWAIT
INSTRUMENT	QCL LAB
DESCRIPTION	Sets the settling wait time after each step in a VI scan for the specified profile
SYNTAX	PROFile:VIWAIT <profile>, <delay>
DETAILS	Profiles 1-10 can be stored in memory for later recall. The wait time is saved in seconds. Range is 0.1 to 10 seconds. For best results use 2 seconds or more.
EXAMPLES	PROF:VIWAIT 7, 10 sets the wait time for Profile 7 to 10 seconds.
SEE ALSO	PROFile:VIWAIT?, *RCL, *SAV

COMMAND	PROFile:VIWAIT?
INSTRUMENT	QCL LAB
DESCRIPTION	Queries the settling wait time after each step in a VI scan for the specified profile
SYNTAX	PROFile:VIWAIT? <profile>
DETAILS	Profiles 0-10 can be queried. Wait time is saved in seconds.
SEE ALSO	PROFile:VIWAIT, *RCL, *SAV

COMMAND	PROFile:VLIM						
INSTRUMENT	QCL LAB						
DESCRIPTION	Sets the maximum supply voltage for the specified profile						
SYNTAX	PROFile:VLIM <profile>, <limit>						
DETAILS	Profiles 1-10 can be stored in memory for later recall. The voltage limit is saved in Volts. How to determine the laser voltage limit from the supply limit is discussed in the QCL LAB instrument User Guide under <i>Reduce Internal Temperature or Provide Compliance Voltage Limit</i> .						
	<table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td><i>limit</i></td> <td>18 to 28</td> <td>Set the voltage limit in Volts</td> </tr> </tbody> </table>	ARGUMENT	VALUE	DESCRIPTION	<i>limit</i>	18 to 28	Set the voltage limit in Volts
ARGUMENT	VALUE	DESCRIPTION					
<i>limit</i>	18 to 28	Set the voltage limit in Volts					
EXAMPLES	PROF:VLIM 6 22 sets the maximum supply voltage for Profile 6 to 22 V.						
SEE ALSO	PROFile:VLIM?, *RCL, *SAV						

COMMAND	PROFile:VLIM?
INSTRUMENT	QCL LAB
DESCRIPTION	Queries the maximum supply voltage for the specified profile
SYNTAX	PROFile:VLIM? <profile>
DETAILS	Profiles 0-10 can be queried. The voltage limit is returned in Volts.
SEE ALSO	PROFile:VLIM, *RCL, *SAV

COMMAND	SECurity:CHMOD		
INSTRUMENT	QCL LAB		
DESCRIPTION	Writes permissions mask to specify which controls a normal user may change on a QCL LAB instrument		
SYNTAX	SECurity:CHMOD <profile>, <mask>		
DETAILS	Sending to Profiles 1-10 will save the permission state to the profile. Sending to Profile 0 will write permissions to the current running state. NOTE that SEC:APPLY must be set for permissions to be active.		
	BIT	VALUE	NAME
	0	1	Setpoint
	1	2	ILimit
	2	4	VInternal
	3	8	RCable
	4	16	OnDelay
	5	32	VIScan
	64	Lockout	
	These bits can be combined using a bitwise-OR operation.		
EXAMPLES	SEC:CHMOD 5, 1 means that Profile 5 allows a normal user to change the setpoint current, but nothing else (1 = 1 [Setpoint, Bit 0]). Note that the user is not locked out (Bit 6). Press the <i>Locked</i> icon on the front panel to clear restrictions.		
SEE ALSO	SECurity:CHMOD?		

COMMAND	SECurity:CHMOD?		
INSTRUMENT	QCL LAB		
DESCRIPTION	Queries which controls a normal user may change on a QCL LAB instrument		
SYNTAX	SECurity:CHMOD? <profile>		
DETAILS	Profiles 0-10 can be recalled from memory. Returns the value of the security mask applied to that profile. See SEC:CHMOD for the bit list.		
EXAMPLES	SEC:CHMOD? 3 returns the value of the security mask applied to Profile 3.		
SEE ALSO	SECurity:CHMOD on a QCL LAB instrument		

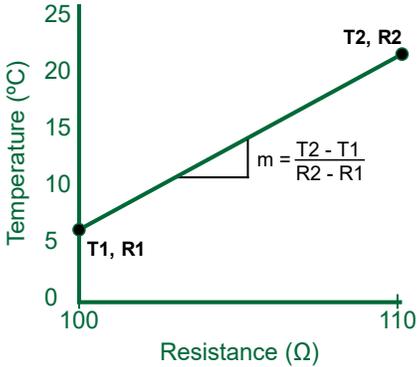
TEMPERATURE CONTROLLER COMMANDS

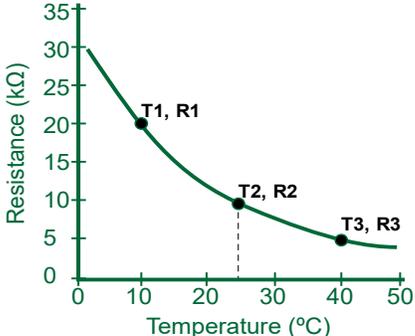
COMMAND	CONST:DEL
INSTRUMENT	TC LAB, LDTC LAB
DESCRIPTION	Deletes a user-created sensor profile
SYNTAX	CONST:DEL <sensor name>
DETAILS	Factory Default and Active sensor calibration profiles cannot be deleted.
EXAMPLES	CONST:DEL QCLdetector deletes the sensor profile called "QCLdetector".
SEE ALSO	CONST:ICV, CONST:LIST?, CONST:OPT, CONST:RTDn, CONST:THERM, TEC:SENSORDEL
MORE INFO	Once a user-created profile has been deleted, there is no way to retrieve it. Sensor names are not case-sensitive.

COMMAND	CONST:ICV												
INSTRUMENT	TC LAB, LDTC LAB												
DESCRIPTION	Creates a custom LM335 or other constant voltage source sensor profile using slope and offset or voltage and temperature pairs												
SYNTAX	CONST:ICV <name>, <m>, -or- CONST:ICV <name>, <t1>, <v1>, <t2>, <v2>												
DETAILS	<p>The values are as follows:</p> <table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td><i>name</i></td> <td>Name of profile, 15 character maximum</td> </tr> <tr> <td><i>m</i></td> <td>Slope in degree Kelvin per Volt (K/V)</td> </tr> <tr> <td><i>b</i></td> <td>Offset</td> </tr> <tr> <td><i>t1, v1</i></td> <td>Pair 1: <i>t1</i>, degrees Celsius (°C), at <i>v1</i>, sensor voltage (V)</td> </tr> <tr> <td><i>t2, v2</i></td> <td>Pair 2: <i>t2</i>, degrees Celsius (°C), at <i>v2</i>, sensor voltage (V)</td> </tr> </tbody> </table>	ARGUMENT	DESCRIPTION	<i>name</i>	Name of profile, 15 character maximum	<i>m</i>	Slope in degree Kelvin per Volt (K/V)	<i>b</i>	Offset	<i>t1, v1</i>	Pair 1: <i>t1</i> , degrees Celsius (°C), at <i>v1</i> , sensor voltage (V)	<i>t2, v2</i>	Pair 2: <i>t2</i> , degrees Celsius (°C), at <i>v2</i> , sensor voltage (V)
ARGUMENT	DESCRIPTION												
<i>name</i>	Name of profile, 15 character maximum												
<i>m</i>	Slope in degree Kelvin per Volt (K/V)												
<i>b</i>	Offset												
<i>t1, v1</i>	Pair 1: <i>t1</i> , degrees Celsius (°C), at <i>v1</i> , sensor voltage (V)												
<i>t2, v2</i>	Pair 2: <i>t2</i> , degrees Celsius (°C), at <i>v2</i> , sensor voltage (V)												
EXAMPLES	<p>CONST:ICV LM335temp, 100, 0.05 creates a profile named <i>LM335temp</i>, where the slope of the response equals 100 K/V and offset is 0.05 K.</p> <p>CONST:ICV LM335temp, 0, 2.7315, 25, 2.9815 creates a profile named <i>LM335temp</i>, where the sensor produces 2.73V at 0°C and 2.98V at 25°C.</p>												
SEE ALSO	CONST:DEL, CONST:LIST?, TEC:SENSOR?												
MORE INFO	Profile name cannot contain comma, semi-colon, or new line return. Once a sensor has been created, it cannot be edited. To correct an entry, delete the sensor and then re-create it.												

COMMAND	CONST:LIST?
INSTRUMENT	TC LAB, LDTC LAB
DESCRIPTION	Queries the stored sensor profile names
SYNTAX	CONST:LIST?
DETAILS	Returns a list of comma-separated profile names, including factory default and user-configured profiles.
EXAMPLES	CONST:LIST? returns all stored sensor names.
SEE ALSO	CONST:DEL, TEC:SENSOR?

COMMAND	CONST:OPT	
INSTRUMENT	TC LAB	
DESCRIPTION	Creates a custom infrared optical sensor profile	
SYNTAX	CONST:OPT <name>, <m>, -or- CONST:OPT <name>, <t1>, <v1>, <t2>, <v2>	
DETAILS	The values are as follows:	
	ARGUMENT	DESCRIPTION
	<i>name</i>	Name of profile, 15 character maximum
	<i>m</i>	Slope in Volt per degree Kelvin (V/K)
	<i>b</i>	Offset
	<i>t1, v1</i>	Pair 1: <i>v1</i> , sensor voltage (V), at <i>t1</i> , degrees Celsius (°C)
<i>t2, v2</i>	Pair 2: <i>v2</i> , sensor voltage (V), at <i>t2</i> , degrees Celsius (°C)	
EXAMPLES	CONST:ICV OPTtemp, 104, 253.15 creates a profile named <i>OPTtemp</i> , where the slope of the response equals 104 V/K and 0V is produced at 253.15 K.	
SEE ALSO	CONST:DEL, CONST:LIST?, TEC:SENSOR?	
MORE INFO	Profile name cannot contain comma, semi-colon, or new line return. Once a sensor has been created, it cannot be edited. To correct an entry, delete the sensor and then re-create it.	

COMMAND	CONST:RTDn																				
INSTRUMENT	TC LAB																				
DESCRIPTION	Creates a custom 3-wire (CONST:RTD3) or 4-wire (CONST:RTD4) RTD sensor profile																				
SYNTAX	CONST:RTDn <name>, <D A>, <r> -or- CONST:RTDn <name>, L, <m>, -or- CONST:RTDn <name>, L, <t1>, <r1>, <t2>, <r2>																				
DETAILS	<p>The values are as follows:</p> <table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td><i>n</i></td> <td>Choose one: 3 for 3-wire RTD 4 for 4-wire RTD</td> </tr> <tr> <td><i>name</i></td> <td>Name of profile, 15 character maximum</td> </tr> <tr> <td><D A></td> <td>Denotes a Callendar - Van Dusen Curve Fit Choose one: D for DIN 43760 Standard I for International Temperature Scale A for U.S. Industrial or American Standard</td> </tr> <tr> <td><i>r</i></td> <td>Resistance at 0°C in Ohms (Ω)</td> </tr> <tr> <td>L</td> <td>Denotes a Linear Curve fit</td> </tr> <tr> <td><i>m</i></td> <td>Slope in degree Celsius per Ohm (°C/Ω)</td> </tr> <tr> <td><i>b</i></td> <td>Offset</td> </tr> <tr> <td><i>t1, r1</i></td> <td>Pair 1: <i>t1</i>, temperature in degrees Celsius , at <i>r1</i>, resistance in Ohms</td> </tr> <tr> <td><i>t2, r2</i></td> <td>Pair 2: <i>t2</i>, temperature in degrees Celsius, at <i>r2</i>, resistance in Ohms</td> </tr> </tbody> </table>	ARGUMENT	DESCRIPTION	<i>n</i>	Choose one: 3 for 3-wire RTD 4 for 4-wire RTD	<i>name</i>	Name of profile, 15 character maximum	<D A>	Denotes a Callendar - Van Dusen Curve Fit Choose one: D for DIN 43760 Standard I for International Temperature Scale A for U.S. Industrial or American Standard	<i>r</i>	Resistance at 0°C in Ohms (Ω)	L	Denotes a Linear Curve fit	<i>m</i>	Slope in degree Celsius per Ohm (°C/Ω)	<i>b</i>	Offset	<i>t1, r1</i>	Pair 1: <i>t1</i> , temperature in degrees Celsius , at <i>r1</i> , resistance in Ohms	<i>t2, r2</i>	Pair 2: <i>t2</i> , temperature in degrees Celsius, at <i>r2</i> , resistance in Ohms
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L	Denotes a Linear Curve fit																				
<i>m</i>	Slope in degree Celsius per Ohm (°C/Ω)																				
<i>b</i>	Offset																				
<i>t1, r1</i>	Pair 1: <i>t1</i> , temperature in degrees Celsius , at <i>r1</i> , resistance in Ohms																				
<i>t2, r2</i>	Pair 2: <i>t2</i> , temperature in degrees Celsius, at <i>r2</i> , resistance in Ohms																				
EXAMPLE	CONST:RTD4 RTD4temp, L, 0, 1000, 25, 1006.425 creates a profile named <i>RTD4temp</i> for a linear 4-wire RTD where the sensor is 1000Ω at 0°C and 1006.425Ω at 25°C.																				
SEE ALSO	CONST:DEL, CONST:LIST?, TEC:SENSOR?																				
MORE INFO	<p>Depending on your need for accuracy, the TC LAB instrument offers three methods for modeling RTDs: two Linear and one Callendar - Van Dusen Curve fit.</p> <p>Linear RTD Configuration The first method assumes the RTD temperature response to be linear. Enter two (Temperature, Resistance) data pairs <i>t1, r1</i> and <i>t2, r2</i> or the slope (<i>m</i>) and offset (<i>b</i>) of the line. Note that the offset is typically the resistance the RTD is known by: i.e. a "100 Ω RTD" is usually 100 Ω at 0°C.</p> <p>Callendar - Van Dusen Curve Fit Configuration For more accuracy, the RTD response can be approximated by the Callendar-Van Dusen curve fit. Most platinum RTDs follow one of three standardized curves, the DIN 43760 standard (D), the U.S. Industrial or American standard (A), or the International Temperature Scale (I) that is used with wire-wound RTDs.</p> <p>Callendar - Van Dusen Curve Fit Equation $R_T = R_0 (1 + \beta_1 T + \beta_2 T^2 + \beta_3 (T - 100)^3)$ $m = \frac{T_2 - T_1}{R_2 - R_1}$ </p> <p><i>R</i>₀ = RTD Resistance at 0°C <i>R</i>_T = Resistance of RTD <i>T</i> = Temperature of RTD $\beta_1, \beta_2, \beta_3$ = Callendar - Van Dusen coefficients (see the table below for the coefficients for the three platinum RTDs described)</p> <table border="1"> <thead> <tr> <th>STANDARD</th> <th>β_1</th> <th>β_2</th> <th>β_3</th> </tr> </thead> <tbody> <tr> <td>DIN 43760</td> <td>3.908×10^{-3}</td> <td>-5.8019×10^{-7}</td> <td>-4.2735×10^{-12}</td> </tr> <tr> <td>American</td> <td>3.9692×10^{-3}</td> <td>-5.8495×10^{-7}</td> <td>-4.2325×10^{-12}</td> </tr> <tr> <td>ITS-90</td> <td>3.9848×10^{-3}</td> <td>5.87×10^{-7}</td> <td>-4.0×10^{-12}</td> </tr> </tbody> </table>  <p>Profile name cannot contain comma, semi-colon, or new line return. Once a sensor has been created, it cannot be edited. To correct an entry, delete the sensor and then re-create it.</p>	STANDARD	β_1	β_2	β_3	DIN 43760	3.908×10^{-3}	-5.8019×10^{-7}	-4.2735×10^{-12}	American	3.9692×10^{-3}	-5.8495×10^{-7}	-4.2325×10^{-12}	ITS-90	3.9848×10^{-3}	5.87×10^{-7}	-4.0×10^{-12}				
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COMMAND	CONST:THERM																				
INSTRUMENT	TC LAB, LDTc LAB																				
DESCRIPTION	Creates a custom thermistor profile																				
SYNTAX	CONST:THERM <name>, <a>, , <c> -or- CONST:THERM <name>.<Fn>, <a>, , <c> CONST:THERM <name>, <t1>, <r1>, <t2>, <r2>, <t3>, <r3> -or- CONST:THERM <name>.<Fn>, <t1>, <r1>, <t2>, <r2>, <t3>, <r3>																				
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EXAMPLES	<p>CONST:THERM ThermTemp, 1.1279E-03, 2.3429E-04, 8.7298E-08 creates a profile called <i>ThermTemp</i>, for a 100 µA range using the Steinhart-Hart coefficients for a 10 kΩ thermistor with auto-ranging bias current.</p> <p>CONST:THERM ThermTemp, 0, 32660, 13, 17260, 25, 10000 creates a profile called <i>ThermTemp</i>, for a 10 kΩ thermistor using the values 32660 Ω at 0°C, 17260 Ω at 13°C, and 10000 Ω at 25°C with auto-ranging bias current.</p> <p>CONST:THERM ThermTemp.F2, 9.6911E-04, 2.1014E-04, 8.8019E-08 creates a profile called <i>ThermTemp</i>, for a 50kΩ @ 25°C thermistor with a fixed and persistent 100µA bias current.</p>																				
SEE ALSO	CONST:DEL, CONST:LIST?, TEC:SENSOR?																				
MORE INFO	<p>You can approximate the response of a thermistor with the Steinhart-Hart Equation. The A, B, and C values listed below apply to the following equation. The coefficients are optimized for the ranges covered by the bias currents.</p> $1 / T = A + B \ln(R) + C[\ln(R)]^3$ <table border="1"> <thead> <tr> <th colspan="4">STEINHART-HART COEFFICIENTS</th> </tr> <tr> <th colspan="2">10 µA Range</th> <th colspan="2">100 µA Range</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>1.1235E-03</td> <td>A</td> <td>1.1279E-03</td> </tr> <tr> <td>B</td> <td>2.3500E-04</td> <td>B</td> <td>2.3429E-04</td> </tr> <tr> <td>C</td> <td>8.4538E-08</td> <td>C</td> <td>8.7298E-08</td> </tr> </tbody> </table> <p>Profile name cannot contain comma, semi-colon, or new line return. Once a sensor has been created, it cannot be edited. To correct an entry, delete the sensor and then re-create it.</p> 	STEINHART-HART COEFFICIENTS				10 µA Range		100 µA Range		A	1.1235E-03	A	1.1279E-03	B	2.3500E-04	B	2.3429E-04	C	8.4538E-08	C	8.7298E-08
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C	8.4538E-08	C	8.7298E-08																		

COMMAND	PROFile:AUTOTUNE												
INSTRUMENT	TC LAB												
DESCRIPTION	Set the IntelliTune method to Manual Tuning, Setpoint Response, or Disturbance Rejection for a specific profile												
SYNTAX	PROFile:AUTOTUNE <profile>, <value>												
DETAILS	<p>The values are as follows:</p> <table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td><i>value</i></td> <td>0</td> <td>Manual Control</td> </tr> <tr> <td></td> <td>1</td> <td>Disturbance Rejection</td> </tr> <tr> <td></td> <td>2</td> <td>Setpoint Response</td> </tr> </tbody> </table> <p>Profiles 1-10 can be stored in memory for later recall.</p>	ARGUMENT	VALUE	DESCRIPTION	<i>value</i>	0	Manual Control		1	Disturbance Rejection		2	Setpoint Response
ARGUMENT	VALUE	DESCRIPTION											
<i>value</i>	0	Manual Control											
	1	Disturbance Rejection											
	2	Setpoint Response											
EXAMPLES	PROFile:AUTOTUNE 3, 2 sets the IntelliTune method to Setpoint Response for Profile 3.												
SEE ALSO	TEC:AUTOTUNE, *RCL, *SAV												
MORE INFO	See TEC:AUTOTUNE or the TC LAB datasheet for complete details on the IntelliTune methods.												

COMMAND	PROFile:AUTOTUNE?
INSTRUMENT	TC LAB
DESCRIPTION	Queries the IntelliTune settings for a specific profile
SYNTAX	PROFile:AUTOTUNE? <profile>
DETAILS	Profiles 0-10 can be queried.
EXAMPLES	PROFile:AUTOTUNE? 5 queries the IntelliTune method for Profile 5.
SEE ALSO	TEC:AUTOTUNE, PROFile:AUTOTUNE, *RCL, *SAV

COMMAND	PROFile:INEG
INSTRUMENT	TC LAB
DESCRIPTION	Sets the negative current limit for the specified profile
SYNTAX	PROFile:INEG <profile>, <limit>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Enter the limit value as a positive number in Amps.
EXAMPLES	PROF:INEG 3, 2 sets the limit at negative 2 Amps (-2A) for Profile 3.
SEE ALSO	PROFile:INEG?, TEC:LIMit:INEG, TEC:LIMit:INEG?, *RCL, *SAV
MORE INFO	To operate a resistive heater, set one limit to zero.

COMMAND	PROFile:INEG?
INSTRUMENT	TC LAB
DESCRIPTION	Queries the negative current limit for the specified profile
SYNTAX	PROFile:INEG? <profile>
DETAILS	Profiles 0-10 can be queried. This returns the negative limit current. The returned value is positive but represents a negative current.
EXAMPLES	PROF:INEG? 4 returns the negative current limit as a positive number in Amps for Profile 4.
SEE ALSO	PROFile:INEG, TEC:LIMit:INEG, TEC:LIMit:INEG?, *RCL, *SAV

COMMAND	PROFile:IPOS
INSTRUMENT	TC LAB
DESCRIPTION	Sets the positive current limit for the specified profile
SYNTAX	PROFile:IPOS <profile>, <limit>
DETAILS	Profiles 1-10 can be stored in memory for later recall.
EXAMPLES	PROF:IPOS 3, 4 sets the positive current limit setting to 4 Amps for Profile 3.
SEE ALSO	PROFile:IPOS?, TEC:LIMit:IPOS, TEC:LIMit:IPOS?, *RCL, *SAV
MORE INFO	To operate a resistive heater, set one limit to zero.

COMMAND	PROFile:IPOS?
INSTRUMENT	TC LAB
DESCRIPTION	Queries the positive current limit for the specified profile
SYNTAX	PROFile:IPOS? <profile>
DETAILS	Profiles 0-10 can be queried. This returns the positive limit current setting.
EXAMPLES	PROF:IPOS? 3 returns the positive current limit settings in Amps for Profile 3.
SEE ALSO	PROFile:IPOS, TEC:LIMit:IPOS, TEC:LIMit:IPOS?, *RCL, *SAV

COMMAND	PROFile:PID		
INSTRUMENT	TC LAB		
DESCRIPTION	Sets the PID coefficients for a specific profile		
SYNTAX	PROFile:PID <profile>, <p> -or- PROFile:PID <profile>, <p [i]> -or- PROFile:PID <profile>, <p [i, d]>		
DETAILS	The available arguments are: <i>p</i> or <i>p [i]</i> or <i>p [i, d]</i> . The first value set is always the <i>P</i> value and must be set to 0.1 or more, the second is always the <i>I</i> value, and the third value is always the <i>D</i> value. If one value is set, it is always the <i>P</i> value. If two values are set, they are always the <i>P</i> and <i>I</i> values. If three values are set, then <i>P</i> , <i>I</i> , and <i>D</i> values are set. Decimal values are acceptable values.		
	ARGUMENT	VALUE	DESCRIPTION
	<i>p</i>	Proportional	0.1 to 1000
	<i>i</i>	Integral	0 to 200
	<i>d</i>	Derivative	OFF or 1 to 100
Profiles 1-10 can be stored in memory for later recall.			
EXAMPLES	PROFile:PID 1,30 sets the proportional value to 30 on Profile 1. PROFile:PID 2,30,0 sets the proportional value to 30 and the integral value to 0 on Profile 2. PROFile:PID 3,30,0,10 sets the proportional value to 30, the integral value to 0, and the derivative value to 10 on Profile 3.		
SEE ALSO	PROFile:PID? , PROFile:AUTOTUNE, TEC:PID, TEC:AUTOTUNE, *RCL, *SAV		

COMMAND	PROFile:PID?		
INSTRUMENT	TC LAB		
DESCRIPTION	Queries the PID coefficients for a specific profile		
SYNTAX	PROFile:PID? <profile>		
DETAILS	See PROFile:PID command for a definition of the response. Profiles 1-10 can be queried.		
EXAMPLES	PROFile:PID? 3 returns the PID coefficients set for Profile 3.		
SEE ALSO	PROFile:PID, *RCL, *SAV		

COMMAND	PROFile:SCANSTART		
INSTRUMENT	TC LAB		
DESCRIPTION	Sets the scan start temperature for the specified profile		
SYNTAX	PROFile:SCANSTART <profile>, <temperature>		
DETAILS	Profiles 1-10 can be stored in memory for later recall. Temperature is saved in °C.		
EXAMPLES	PROF:SCANSTART 3, 25 sets a 25°C scan start temperature for Profile 3.		
SEE ALSO	PROFile:SCANSTART?, *RCL, *SAV		
MORE INFO	Scans cannot be performed when the units are set to resistance.		

COMMAND	PROFile:SCANSTART?		
INSTRUMENT	TC LAB		
DESCRIPTION	Queries scan start temperature for the specified profile		
SYNTAX	PROFile:SCANSTART? <profile>		
DETAILS	Profiles 0-10 can be queried. Temperature is returned in °C.		
EXAMPLES	PROF:SCANSTART? 3 returns the scan start temperature in °C for Profile 3.		
SEE ALSO	PROFile:SCANSTART, *RCL, *SAV		

COMMAND	PROFile:SCANSTEP
INSTRUMENT	TC LAB
DESCRIPTION	Sets the scan step temperature interval in °C for the specified profile
SYNTAX	PROFile:SCANSTEP <profile>, <step>
DETAILS	The step size is set in °C. Profiles 1-10 can be set.
EXAMPLES	PROF:SCANSTEP 3, 2 sets the scan step temperature at 2°C for Profile 3.
SEE ALSO	PROFile:SCANSTEP, *RCL, *SAV

COMMAND	PROFile:SCANSTEP?
INSTRUMENT	TC LAB
DESCRIPTION	Queries the scan step temperature interval in °C for the specified profile
SYNTAX	PROFile:SCANSTEP? <profile>
DETAILS	Profiles 0-10 can be queried. The step size is returned in °C.
EXAMPLES	PROF:SCANSTEP? 3 returns the scan step temperature in °C for Profile 3.
SEE ALSO	PROFile:SCANSTEP, *RCL, *SAV

COMMAND	PROFile:SCANSTOP
INSTRUMENT	TC LAB
DESCRIPTION	Sets the scan stop temperature for the specified profile
SYNTAX	PROFile:SCANSTOP <profile>, <temperature>
DETAILS	Profiles 1-10 can be stored in memory for later recall. The temperature is saved in °C.
EXAMPLES	PROF:SCANSTOP 3, 50 sets the scan stop of 50°C for Profile 3.
SEE ALSO	PROFile:SCANSTOP?, *RCL, *SAV

COMMAND	PROFile:SCANSTOP?
INSTRUMENT	TC LAB
DESCRIPTION	Queries the scan stop temperature for the specified profile
SYNTAX	PROFile:SCANSTOP? <profile>
DETAILS	Profiles 0-10 can be queried. The temperature is returned in °C.
EXAMPLES	PROF:SCANSTOP 3 returns the scan stop temperature for Profile 3.
SEE ALSO	PROFile:SCANSTOP, *RCL, *SAV

COMMAND	PROFile:SCANWAIT
INSTRUMENT	TC LAB
DESCRIPTION	Sets the settling wait time between steps of a temperature scan for the specified profile
SYNTAX	PROFile:SCANWAIT <profile>, <time>
DETAILS	Profiles 1-10 can be stored in memory for later recall. The wait time is saved in seconds.
EXAMPLES	PROF:SCANWAIT 3, 2 sets the scan interval time between steps to 2 seconds for Profile 3.
SEE ALSO	PROFile:SCANWAIT?, *RCL, *SAV
MORE INFO	To wait until the actual temperature is within the tolerance window around the setpoint, choose TIME = 0 or STABLE. For best results, the tolerance window should be smaller than the scan increment.

COMMAND	PROFile:SCANWAIT?
INSTRUMENT	TC LAB
DESCRIPTION	Queries the settling wait time between steps of a temperature scan for a specified profile
SYNTAX	PROFile:SCANWAIT? <profile>
DETAILS	Profiles 0-10 can be queried. The wait time is returned in seconds.
EXAMPLES	PROF:SCANWAIT? 3 queries the scan wait time between steps for Profile 3 and returns it in seconds.
SEE ALSO	PROFile:SCANWAIT, *RCL, *SAV
MORE INFO	If 0 is returned, the instrument waits to save the data until the actual temperature is within the tolerance window around the setpoint. STABLE is displayed on the instrument's screen in the Time Interval field.

COMMAND	PROFile:SENSor
INSTRUMENT	TC LAB
DESCRIPTION	Sets the sensor selection for a specific profile
SYNTAX	PROFile:SENSor <profile>, <sensor name>
DETAILS	Sensor name is the description sent with the CONST commands. Profiles 1-10 can be stored in memory for later recall.
EXAMPLES	PROF:SENSor 6, TCS610-10 sets the active sensor in Profile 6 to the 10 kΩ thermistor calibrated across the 10μA range.
SEE ALSO	PROFile:SENSor?, TEC:SENSORLIST?, CONST:LIST?, *RCL, *SAV

COMMAND	PROFile:SENSor?
INSTRUMENT	TC LAB
DESCRIPTION	Queries the sensor selection for a specific profile
SYNTAX	PROFile:SENSor? <profile>
DETAILS	Sensor name is the description sent with the CONST commands. Profiles 0-10 can be queried.
EXAMPLES	PROFile:SENSor? 3 returns the sensor selected for Profile 3.
SEE ALSO	PROFile:SENSor, TEC:SENSORLIST?, CONST:LIST?, *RCL, *SAV

COMMAND	PROFile:SET
INSTRUMENT	TC LAB
DESCRIPTION	Sets the temperature setpoint for the specified profile
SYNTAX	PROFile:SET <profile>, <setpoint>
DETAILS	Profiles 1-10 can be stored in memory for later recall. The temperature is saved in °C.
EXAMPLES	PROF:SET 3, 25 sets the temperature setpoint to 25°C for Profile 3.
SEE ALSO	PROFile:SET?, TEC:SET, TEC:SET?, *RCL, *SAV

COMMAND	PROFile:SET?
INSTRUMENT	TC LAB
DESCRIPTION	Queries the temperature setpoint for the specified profile
SYNTAX	PROFile:SET? <profile>
DETAILS	Profiles 0-10 can be queried. The temperature setpoint is returned in °C.
EXAMPLES	PROF:SET? 3 returns the temperature setpoint for Profile 3.
SEE ALSO	PROFile:SET, TEC:SET, TEC:SET?, *RCL, *SAV

COMMAND	PROFile:TEC:AUTOTUNE
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the IntelliTune mode for the specified profile
SYNTAX	PROFile:TEC:AUTOTUNE <profile>, <tune_mode>
DETAILS	Profiles 1-10 can be stored in memory for later recall. The <i>tune_mode</i> index is described in TEC:AUTOTUNE.
SEE ALSO	PROFile:TEC:AUTOTUNE?, TEC:AUTOTUNE, TEC:AUTOTUNE?, *RCL, *SAV

COMMAND	PROFile:TEC:AUTOTUNE?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries the IntelliTune mode for the specified profile.
SYNTAX	PROFile:TEC:AUTOTUNE? <profile>
DETAILS	Profiles 0-10 can be queried. Returns an indexed response, described in TEC:AUTOTUNE.
SEE ALSO	PROFile:TEC:AUTOTUNE, TEC:AUTOTUNE, TEC:AUTOTUNE?, *RCL, *SAV

COMMAND	PROFile:TEC:BIAS
INSTRUMENT	LDTc LAB
DESCRIPTION	Sets the sensor bias current for the specified profile.
SYNTAX	PROFile:TEC:BIAS <profile>,<range>
DETAILS	Profiles 1-10 can be stored in memory for later recall. The <i>range</i> parameter is described in detail in TEC:BIAS.
SEE ALSO	PROFile:TEC:BIAS?, TEC:BIAS, TEC:BIAS?, *RCL, *SAV

COMMAND	PROFile:TEC:BIAS?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries the sensor bias current for the specified profile.
SYNTAX	PROFile:TEC:BIAS? <profile>
DETAILS	Profiles 0-10 can be queried. Returns an indexed value described in detail in TEC:BIAS.
SEE ALSO	PROFile:TEC:BIAS, TEC:BIAS, TEC:BIAS?, *RCL, *SAV

COMMAND	PROFile:TEC:CABLER
INSTRUMENT	LDTc LAB
DESCRIPTION	Sets the TEC cable resistance for the specified profile.
SYNTAX	PROFile:TEC:CABLER <profile>,<resistance>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Cable resistance is set in Ohms.
SEE ALSO	PROFile:TEC:CABLER?, TEC:CABLER, TEC:CABLER?, *RCL, *SAV

COMMAND	PROFile:TEC:CABLER?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries the TEC cable resistance for the specified profile.
SYNTAX	PROFile:TEC:CABLER? <profile>
DETAILS	Profiles 0-10 can be queried. Returns a value in Ohms.
SEE ALSO	PROFile:TEC:CABLER, TEC:CABLER, TEC:CABLER?, *RCL, *SAV

COMMAND	PROFile:TEC:LIMit:INEG
INSTRUMENT	LDTc LAB
DESCRIPTION	Sets the negative TEC current limit for the specified profile.
SYNTAX	PROFile:TEC:LIMit:INEG <profile>,<limit>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Current limit is set in Amps as a positive number.
SEE ALSO	PROFile:TEC:LIMit:INEG?, TEC:LIMit:INEG, TEC:LIMit:INEG?, *RCL, *SAV

COMMAND	PROFile:TEC:LIMit:INEG?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries the set negative TEC current limit for the specified profile.
SYNTAX	PROFile:TEC:LIMit:INEG? <profile>
DETAILS	Profiles 0-10 can be queried. Returns a value in Amps as a positive number.
SEE ALSO	PROFile:TEC:LIMit:INEG, TEC:LIMit:INEG, TEC:LIMit:INEG?, *RCL, *SAV

COMMAND	PROFile:TEC:LIMit:IPOS
INSTRUMENT	LDTc LAB
DESCRIPTION	Sets the positive TEC current limit for the specified profile.
SYNTAX	PROFile:TEC:LIMit:IPOS <profile>, <limit>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Current limit is set in Amps.
SEE ALSO	PROFile:TEC:LIMit:IPOS?, TEC:LIMit:IPOS, TEC:LIMit:IPOS?, *RCL, *SAV

COMMAND	PROFile:TEC:LIMit:IPOS?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries the set positive TEC current limit for the specified profile.
SYNTAX	PROFile:TEC:LIMit:IPOS? <profile>
DETAILS	Profiles 0-10 can be queried. Returns a value in Amps.
SEE ALSO	PROFile:TEC:LIMit:IPOS, TEC:LIMit:IPOS, TEC:LIMit:IPOS?, *RCL, *SAV

COMMAND	PROFile:TEC:LIMit:RHI
INSTRUMENT	LDTc LAB
DESCRIPTION	Sets the upper limit for the sensor in physical units for the specified profile.
SYNTAX	PROFile:TEC:LIMit:RHI <profile>, <limit>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Units depend on the sensor chosen.
SEE ALSO	PROFile:TEC:LIMit:RHI?, TEC:LIMit:RHI, TEC:LIMit:RHI?, *RCL, *SAV

COMMAND	PROFile:TEC:LIMit:RHI?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries the upper limit for the sensor in physical units for the specified profile.
SYNTAX	PROFile:TEC:LIMit:RHI? <profile>
DETAILS	Profiles 0-10 can be queried. Units depend on the sensor chosen.
SEE ALSO	PROFile:TEC:LIMit:RHI, TEC:LIMit:RHI, TEC:LIMit:RHI?, *RCL, *SAV

COMMAND	PROFile:TEC:LIMit:RLO
INSTRUMENT	LDTc LAB
DESCRIPTION	Sets the lower limit for the sensor in physical units for the specified profile.
SYNTAX	PROFile:TEC:LIMit:RLO <profile>, <limit>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Units depend on the sensor chosen.
SEE ALSO	PROFile:TEC:LIMit:RLO?, TEC:LIMit:RLO, TEC:LIMit:RLO?, *RCL, *SAV

COMMAND	PROFile:TEC:LIMit:RLO?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries the lower limit for the sensor in physical units for the specified profile.
SYNTAX	PROFile:TEC:LIMit:RLO? <profile>
DETAILS	Profiles 0-10 can be queried. Units depend on the sensor chosen.
SEE ALSO	PROFile:TEC:LIMit:RLO, TEC:LIMit:RLO, TEC:LIMit:RLO?, *RCL, *SAV

COMMAND	PROFile:TEC:LIMit:THI
INSTRUMENT	LDTc LAB
DESCRIPTION	Sets the upper temperature limit for the specified profile.
SYNTAX	PROFile:TEC:LIMit:THI <profile>, <limit>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Limit is set in the current temperature units.
SEE ALSO	PROFile:TEC:LIMit:THI?, TEC:LIMit:THI, TEC:LIMit:THI?, *RCL, *SAV

COMMAND	PROFile:TEC:LIMit:THI?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries the upper temperature limit for the specified profile.
SYNTAX	PROFile:TEC:LIMit:THI? <profile>
DETAILS	Profiles 0-10 can be queried. Value is returned in the current temperature units.
SEE ALSO	PROFile:TEC:LIMit:THI, TEC:LIMit:THI, TEC:LIMit:THI?, *RCL, *SAV

COMMAND	PROFile:TEC:LIMit:TLO
INSTRUMENT	LDTc LAB
DESCRIPTION	Sets the lower temperature limit for the specified profile
SYNTAX	PROFile:TEC:LIMit:TLO <profile>, <limit>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Limit is set in the current temperature units.
SEE ALSO	PROFile:TEC:LIMit:TLO?, TEC:LIMit:TLO, TEC:LIMit:TLO?, *RCL, *SAV

COMMAND	PROFile:TEC:LIMit:TLO?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries the lower temperature limit for the specified profile.
SYNTAX	PROFile:TEC:LIMit:TLO? <profile>
DETAILS	Profiles 0-10 can be queried. Value is returned in the current temperature units.
SEE ALSO	PROFile:TEC:LIMit:TLO, TEC:LIMit:TLO, TEC:LIMit:TLO?, *RCL, *SAV

COMMAND	PROFile:TEC:LIMit:VLIM
INSTRUMENT	LDTc LAB
DESCRIPTION	Sets the maximum TEC internal voltage limit for the specified profile.
SYNTAX	PROFile:TEC:LIMit:VLIM <profile>, <limit>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Limit is set in Volts.
SEE ALSO	PROFile:TEC:LIMit:VLIM?, TEC:LIMit:VLIM, TEC:LIMit:VLIM?, TEC:VLIM, TEC:VLIM?, *RCL, *SAV

COMMAND	PROFile:TEC:LIMit:VLIM?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries the maximum TEC internal voltage limit for the specified profile.
SYNTAX	PROFile:TEC:LIMit:VLIM? <profile>
DETAILS	Profiles 0-10 can be queried. Returned value is in Volts.
SEE ALSO	PROFile:TEC:LIMit:VLIM, TEC:LIMit:VLIM, TEC:LIMit:VLIM?, TEC:VLIM, TEC:VLIM?, *RCL, *SAV

COMMAND	PROFile:TEC:PID
INSTRUMENT	LDTc LAB
DESCRIPTION	Sets the PID coefficients for the specified profile.
SYNTAX	PROFile:TEC:PID <profile>, <p[,i[,d]]>
DETAILS	Profiles 1-10 can be stored in memory for later recall. See TEC:PID for details of individual parameters.
SEE ALSO	PROFile:TEC:PID?, TEC:PID, TEC:PID?, *RCL, *SAV

COMMAND	PROFile:TEC:PID?
INSTRUMENT	LDTc LAB
DESCRIPTION	Queries the PID coefficients for the specified profile.
SYNTAX	PROFile:TEC:PID? <profile>
DETAILS	Profiles 0-10 can be queried. PID values are returned in that order.
SEE ALSO	PROFile:TEC:PID, TEC:PID, TEC:PID?, *RCL, *SAV

COMMAND	PROFile:TEC:SENSOR
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the active temperature sensor for the specified profile.
SYNTAX	PROFile:TEC:SENSOR <profile>,<sensor_name>
DETAILS	Profiles 1-10 can be stored in memory for later recall.
SEE ALSO	PROFile:TEC:SENSOR?, TEC:SENSOR, TEC:SENSOR?, CONST:LIST?, *RCL, *SAV

COMMAND	PROFile:TEC:SENSOR?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the active temperature sensor for the specified profile.
SYNTAX	PROFile:TEC:SENSOR? <profile>
DETAILS	Profiles 0-10 can be queried.
SEE ALSO	PROFile:TEC:SENSOR, TEC:SENSOR, TEC:SENSOR?, CONST:LIST?, *RCL, *SAV

COMMAND	PROFile:TEC:SET
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the temperature setpoint for the specified profile.
SYNTAX	PROFile:TEC:SET <profile>,<setpoint>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Setpoint uses the currently active temperature units.
SEE ALSO	PROFile:TEC:SET?, TEC:SET, TEC:SET?, *RCL, *SAV

COMMAND	PROFile:TEC:SET?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the temperature setpoint for the specified profile.
SYNTAX	PROFile:TEC:SET? <profile>
DETAILS	Profiles 0-10 can be queried. Setpoint is returned in the currently active temperature units.
SEE ALSO	PROFile:TEC:SET, TEC:SET, TEC:SET?, *RCL, *SAV

COMMAND	PROFile:TEC:TOLerance
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the temperature tolerance parameters for the specified profile.
SYNTAX	PROFile:TEC:TOLerance <profile>,<tolerance>,<time>
DETAILS	Profiles 1-10 can be stored in memory for later recall. See TEC:TOLerance for details regarding input parameters.
SEE ALSO	PROFile:TEC:TOLerance?, TEC:TOLerance, TEC:TOLerance?, *RCL, *SAV

COMMAND	PROFile:TEC:TOLerance?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the temperature tolerance parameters for the specified profile.
SYNTAX	PROFile:TEC:TOLerance? <profile>
DETAILS	Profiles 0-10 can be queried. Returns two comma-separated values. See TEC:TOLerance for details.
SEE ALSO	PROFile:TEC:TOLerance, TEC:TOLerance, TEC:TOLerance?, *RCL, *SAV

COMMAND	PROFile:TEC:UNITS
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the active temperature units for the specified profile.
SYNTAX	PROFile:TEC:UNITS <profile>,<units>
DETAILS	Profiles 1-10 can be stored in memory for later recall. See TEC:UNITS for details regarding input parameter.
SEE ALSO	PROFile:TEC:UNITS?, TEC:UNITS, TEC:UNITS?, *RCL, *SAV

COMMAND	PROFile:TEC:UNITS?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the active temperature units for the specified profile.
SYNTAX	PROFile:TEC:UNITS? <profile>
DETAILS	Profiles 0-10 can be queried. See TEC:UNITS for details regarding returned value.
SEE ALSO	PROFile:TEC:UNITS, TEC:UNITS, TEC:UNITS?, *RCL, *SAV

COMMAND	PROFile:TEC:VALID?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries if there is valid IntelliTune data stored for the specified profile.
SYNTAX	PROFile:TEC:VALID? <profile>
DETAILS	Profiles 0-10 can be queried. Returns a boolean True/False. See TEC:VALID? for more information.
SEE ALSO	TEC:VALID?, *RCL, *SAV

COMMAND	PROFile:TEC:VLIM
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the maximum TEC internal voltage limit for the specified profile.
SYNTAX	PROFile:TEC:VLIM <profile>, <limit>
DETAILS	Profiles 1-10 can be stored in memory for later recall. Limit is set in Volts.
SEE ALSO	PROFile:TEC:VLIM?, TEC:LIMit:VLIM, TEC:LIMit:VLIM?, TEC:VLIM, TEC:VLIM?, *RCL, *SAV

COMMAND	PROFile:TEC:VLIM?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the maximum TEC internal voltage limit for the specified profile.
SYNTAX	PROFile:TEC:VLIM? <profile>
DETAILS	Profiles 0-10 can be queried. Returned value is in Volts
SEE ALSO	PROFile:TEC:VLIM, TEC:LIMit:VLIM, TEC:LIMit:VLIM?, TEC:VLIM, TEC:VLIM?, *RCL, *SAV

COMMAND	PROFile:THI
INSTRUMENT	TC LAB
DESCRIPTION	Sets the high temperature limit setting for a specific profile
SYNTAX	PROFile:THI <profile>, <temperature>
DETAILS	The temperature is saved in °C. Profiles 1-10 can be stored in memory for later recall.
EXAMPLES	PROFile:THI 8, 59 sets the high temperature limit to 59°C for Profile 8.
SEE ALSO	PROFile:THI?, TEC:LIMit:THI, *RCL, *SAV

COMMAND	PROFile:THI?
INSTRUMENT	TC LAB
DESCRIPTION	Queries the high temperature limit setting for a specific profile
SYNTAX	PROFile:THI? <profile>
DETAILS	Temperature is returned in °C. Profiles 0-10 can be queried.
EXAMPLES	PROFile:THI? 3 returns the high temperature limit for Profile 3.
SEE ALSO	PROFile:THI, TEC:LIMit:THI?, *RCL, *SAV

COMMAND	PROFile:TLO
INSTRUMENT	TC LAB
DESCRIPTION	Sets the low temperature limit for a specific profile
SYNTAX	PROFile:TLO <profile>, <temperature>
DETAILS	Temperature is saved in °C. Profiles 1-10 can be stored in memory for later recall.
EXAMPLES	PROFile:TLO 9, 10 sets the low temperature limit to -10°C for Profile 9.
SEE ALSO	PROFile:TLO?, TEC:LIMit:TLO, *RCL, *SAV

COMMAND	PROFile:TLO?
INSTRUMENT	TC LAB
DESCRIPTION	Queries the low temperature limit for a specific profile
SYNTAX	PROFile:TLO? <profile>
DETAILS	Temperature is returned in °C. Profiles 0-10 can be queried.
EXAMPLES	PROFile:TLO? 3 returns the low temperature limit for Profile 3.
SEE ALSO	PROFile:TLO, TEC:LIMit:TLO?, *RCL, *SAV

COMMAND	PROFile:TOLerance												
INSTRUMENT	TC LAB												
DESCRIPTION	Sets the tolerance criteria for a specific profile												
SYNTAX	PROFile:TOLerance <profile>, <tolerance>, <time>												
DETAILS	<p>The PROFile:TOLerance command sets the parameters for when the temperature of the load sensor is considered in tolerance (or stable).</p> <table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>VALUE</th> <th>DESCRIPTION</th> <th>FACTORY DEFAULT</th> </tr> </thead> <tbody> <tr> <td><i>tolerance</i></td> <td>0.01 to 10</td> <td>Temperature tolerance, in °C</td> <td>0.05°C</td> </tr> <tr> <td><i>time</i></td> <td>0.1 to 50</td> <td>Time window, in seconds</td> <td>1 second</td> </tr> </tbody> </table> <p>To be considered in tolerance, the measured temperature must be within the setpoint plus or minus the tolerance value (the tolerance window) for time seconds. Any time it leaves the tolerance window, the timer will reset to zero and begin counting the next time it enters the tolerance window. Bit 9 of the Temperature Controller Condition Status Register will be set if the temperature is in tolerance. Bit 9 of the Temperature Controller Event Status Register will be set if the temperature tolerance status changes. Profiles 1-10 can be stored in memory for later recall.</p>	ARGUMENT	VALUE	DESCRIPTION	FACTORY DEFAULT	<i>tolerance</i>	0.01 to 10	Temperature tolerance, in °C	0.05°C	<i>time</i>	0.1 to 50	Time window, in seconds	1 second
ARGUMENT	VALUE	DESCRIPTION	FACTORY DEFAULT										
<i>tolerance</i>	0.01 to 10	Temperature tolerance, in °C	0.05°C										
<i>time</i>	0.1 to 50	Time window, in seconds	1 second										
EXAMPLES	PROF:TOL 6, 0.1, 10 sets 0.1°C over 10 seconds as the tolerance criteria for Profile 6.												
SEE ALSO	PROFile:TOLerance?, TEC:TOLerance, *RCL, *SAV												

COMMAND	PROFile:TOLerance?
INSTRUMENT	TC LAB
DESCRIPTION	Queries the tolerance criteria for a specific profile
SYNTAX	PROFile:TOLerance? <profile>
DETAILS	Returns the temperature window in °C and the time window in seconds. Profiles 0-10 can be queried.
EXAMPLES	PROFile:TOL? 3 returns the tolerance criteria for Profile 3.
SEE ALSO	PROFile:TOLerance , TEC:TOLerance?, *RCL, *SAV

COMMAND	PROFile:UNITS										
INSTRUMENT	TC LAB										
DESCRIPTION	Sets the display and control units for a specific profile										
SYNTAX	PROFile:UNITS <profile>, <value>										
DETAILS	<p>The values are as follows:</p> <table border="1"> <thead> <tr> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>0 or C</td> <td>Celsius (°C)</td> </tr> <tr> <td>1 or K</td> <td>Kelvin (°K)</td> </tr> <tr> <td>2 or F</td> <td>Fahrenheit (°F)</td> </tr> <tr> <td>3 or RAW</td> <td> Physical units for resistance: <ul style="list-style-type: none"> • Thermistors are in Ohms (Ω) • RTDs are in Ohms (Ω) • LM335, IR sensor and other voltage-based linear sensors are in Volts (V) • AD590 is displayed as the voltage of the current flowing through an internal 10 kΩ resistor. </td> </tr> </tbody> </table> <p>Profiles 1-10 can be stored in memory for later recall.</p>	VALUE	DESCRIPTION	0 or C	Celsius (°C)	1 or K	Kelvin (°K)	2 or F	Fahrenheit (°F)	3 or RAW	Physical units for resistance: <ul style="list-style-type: none"> • Thermistors are in Ohms (Ω) • RTDs are in Ohms (Ω) • LM335, IR sensor and other voltage-based linear sensors are in Volts (V) • AD590 is displayed as the voltage of the current flowing through an internal 10 kΩ resistor.
VALUE	DESCRIPTION										
0 or C	Celsius (°C)										
1 or K	Kelvin (°K)										
2 or F	Fahrenheit (°F)										
3 or RAW	Physical units for resistance: <ul style="list-style-type: none"> • Thermistors are in Ohms (Ω) • RTDs are in Ohms (Ω) • LM335, IR sensor and other voltage-based linear sensors are in Volts (V) • AD590 is displayed as the voltage of the current flowing through an internal 10 kΩ resistor. 										
EXAMPLES	PROF:UNITS 2, 0 sets the temperature units to °C for Profile 2.										
SEE ALSO	PROFile:UNITS?, TEC:UNITS, *RCL, *SAV										

COMMAND	PROFile:UNITS?
INSTRUMENT	TC LAB
DESCRIPTION	Queries the display and control units for a specific profile
SYNTAX	PROFile:UNITS? <profile>
DETAILS	Returns the numeric value that temperature units are set and reported in. See the PROF:UNITS command for a definition of the response. Profiles 0-10 can be queried.
EXAMPLES	PROFile:UNITS? 3 returns the units set for Profile 3.
SEE ALSO	PROFile:UNITS , TEC:UNITS?, *RCL, *SAV

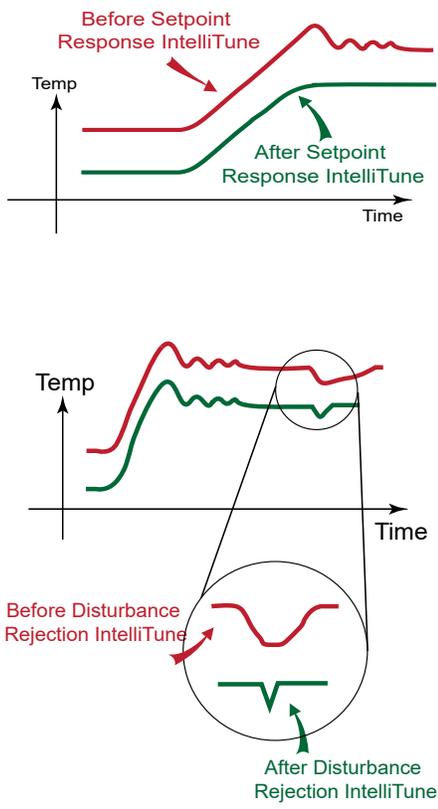
COMMAND	PROFile:VLIM
INSTRUMENT	TC LAB
DESCRIPTION	Sets the maximum internal supply voltage for the specified profile
SYNTAX	PROFile:VLIM <profile>, <limit>
DETAILS	Profiles 1-10 can be stored in memory for later recall. The voltage limit has a value between 9 and 18.33 V for TC5 LAB and TC10 LAB. The voltage limit has a value between 10 and 28 V for the TC15 LAB.
EXAMPLES	PROF:VLIM 6, 17 sets the maximum internal supply voltage to 17 V for Profile 6.
SEE ALSO	PROFile:VLIM?, TEC:VLIM, TEC:VLIM?, *RCL, *SAV
MORE INFO	IntelliTune sets the voltage limit during its process. To achieve minimum time to temperature or maximum Disturbance Rejection, use the VLIM that was established during IntelliTune.

COMMAND	PROFile:VLIM?
INSTRUMENT	TC LAB
DESCRIPTION	Queries the maximum supply voltage for the specified profile
SYNTAX	PROFile:VLIM? <profile>
DETAILS	Profiles 0-10 can be queried. The voltage limit is returned in Volts.
EXAMPLES	PROF:VLIM? 6 returns the voltage limit for Profile 6.
SEE ALSO	PROFile:VLIM, TEC:VLIM, TEC:VLIM?, *RCL, *SAV

COMMAND	SECurity:CHMOD																																	
INSTRUMENT	TC LAB																																	
DESCRIPTION	Writes permissions mask to specify which controls a normal user may change on a TC LAB instrument																																	
SYNTAX	SECurity:CHMOD <profile>, <mask>																																	
DETAILS	Sending to Profiles 1-10 will save the permission state to the profile. Sending to Profile 0 will write permissions to the current running state. NOTE that SEC:APPLY must be set for permissions to be active.																																	
	<table border="1"> <thead> <tr> <th>BIT</th> <th>VALUE</th> <th>NAME</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>4</td> <td>Setpoint</td> <td>If set, the user can change the temperature setpoint.</td> </tr> <tr> <td>3</td> <td>8</td> <td>ILimits</td> <td>If set, the user can change the current limits.</td> </tr> <tr> <td>4</td> <td>16</td> <td>TempLimits</td> <td>If set, the user can change the temperature limits.</td> </tr> <tr> <td>5</td> <td>32</td> <td>RCable</td> <td>If set, the user can change the cable resistance.</td> </tr> <tr> <td>6</td> <td>64</td> <td>PID</td> <td>If set, the user can manually adjust the PID coefficients.</td> </tr> <tr> <td>7</td> <td>128</td> <td>IntelliTune</td> <td>If set, the user can initiate an IntelliTune scan.</td> </tr> <tr> <td>12</td> <td>4096</td> <td>Lockout</td> <td>If set, a normal user can unlock the permissions from the front panel.</td> </tr> </tbody> </table>	BIT	VALUE	NAME	DESCRIPTION	2	4	Setpoint	If set, the user can change the temperature setpoint.	3	8	ILimits	If set, the user can change the current limits.	4	16	TempLimits	If set, the user can change the temperature limits.	5	32	RCable	If set, the user can change the cable resistance.	6	64	PID	If set, the user can manually adjust the PID coefficients.	7	128	IntelliTune	If set, the user can initiate an IntelliTune scan.	12	4096	Lockout	If set, a normal user can unlock the permissions from the front panel.	These bits can be combined using a bitwise-OR operation. Bits 0, 1, and 8 - 11 are not used.
BIT	VALUE	NAME	DESCRIPTION																															
2	4	Setpoint	If set, the user can change the temperature setpoint.																															
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7	128	IntelliTune	If set, the user can initiate an IntelliTune scan.																															
12	4096	Lockout	If set, a normal user can unlock the permissions from the front panel.																															
EXAMPLES	SEC:CHMOD 5, 4 means that Profile 5 allows a normal user to change the setpoint temperature, but nothing else (4 [Setpoint, Bit 2]). Note that the user is not locked out (Bit 12). Press the <i>Locked</i> icon on the front panel to clear restrictions.																																	
SEE ALSO	SECurity:CHMOD?																																	

COMMAND	SECurity:CHMOD?		
INSTRUMENT	TC LAB		
DESCRIPTION	Queries which controls a normal user may change		
SYNTAX	SECurity:CHMOD? <profile>		
DETAILS	Profiles 0-10 can be recalled from memory. Returns the value of the security mask applied to that profile. See SEC:CHMOD for the bit list.		
EXAMPLES	SEC:CHMOD? 3 returns the value of the security mask applied to Profile 3.		
SEE ALSO	SECurity:CHMOD for TC LAB instruments		

COMMAND	TEC:ACT?		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Queries the actual temperature at the currently selected sensor		
SYNTAX	TEC:ACT?		
DETAILS	Returns the actual temperature of the selected sensor in the currently selected temperature units.		
EXAMPLES	If the query returns 25 and the TEC:UNITS command is set to °C, then the actual temperature is 25°C.		
SEE ALSO	All CONST:* commands, TEC:UNITS, TEC:UNITS?, TEC:SET, TEC:SET?		
MORE INFO	The default sensor is a 10kΩ thermistor. The units returned depends on the units set with the TEC:UNITS command. The calibration coefficients entered for the sensor dictate the accuracy of the temperature.		

COMMAND	TEC:AUTOTUNE		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Sets the type of IntelliTune process		
SYNTAX	TEC:AUTOTUNE <value>		
DETAILS	The values are as follows:		
	ARGUMENT	VALUE	DESCRIPTION
	value	0	Manual Control
		1	Disturbance Rejection
		2	Setpoint Response
EXAMPLES	TEC:AUTOTUNE 1 sets the method of IntelliTune to Disturbance Rejection		
SEE ALSO	TEC:AUTOTUNE?, TEC:PID, TEC:PID?, TEC:TUNESTART, TEC:TUNEABORT		
MORE INFO	 <p>Setpoint Response Tuning is valuable when continuously stepping the TC LAB from one temperature to another. Your system will go to temperature quickly and settle in with little or no overshoot.</p> <p>Disturbance Rejection Tuning is valuable when your thermal load is exposed to varied environmental conditions, such as air currents or ambient temperature fluctuations. It also improves temperature stability in applications where the device being temperature controlled experiences significant power or heat transients, such as those found in pulsed laser diode applications.</p>		

COMMAND	TEC:AUTOTUNE?	
INSTRUMENT	TC LAB, LDTC LAB	
DESCRIPTION	Queries IntelliTune mode	
SYNTAX	TEC:AUTOTUNE?	
DETAILS	The values are as follows:	
	VALUE	DESCRIPTION
	0	Manual Control
	1	Disturbance Rejection
	2	Setpoint Response
EXAMPLES	If 2 is returned, then IntelliTune is set to run in Setpoint Response mode.	
SEE ALSO	TEC:AUTOTUNE, TEC:PID, TEC:PID?, TEC:TUNEABORT, TEC:TUNESTART	

COMMAND	TEC:AUX?
INSTRUMENT	TC LAB
DESCRIPTION	Queries the actual temperature of the auxiliary sensor
SYNTAX	TEC:AUX?
DETAILS	This command is used to monitor the temperature of the auxiliary sensor. It is configured to work with a 10 kΩ thermistor and always displays in °C on the Monitor screen.
EXAMPLES	If the query returns 25 , the actual temperature of the auxiliary sensor is 25°C.
SEE ALSO	TEC:AUX:BIAS, TEC:AUX:BIAS?
MORE INFO	The bias current is set by the TEC:AUX:BIAS command. This sensor can be used to monitor the thermoelectric heatsink temperature or another point in the system.

COMMAND	TEC:AUX:BIAS																		
INSTRUMENT	TC LAB																		
DESCRIPTION	Sets bias current for the auxiliary sensor																		
SYNTAX	TEC:AUX:BIAS <range>																		
DETAILS	The current must be entered as one of the following values. <table border="1" data-bbox="321 709 1528 932"> <thead> <tr> <th>ARGUMENT</th> <th>VALUE</th> <th>BIAS CURRENT</th> </tr> </thead> <tbody> <tr> <td><i>range</i></td> <td>0</td> <td>Automatic selection, instrument chooses to keep the sensor signal in range</td> </tr> <tr> <td></td> <td>1</td> <td>10 μA</td> </tr> <tr> <td></td> <td>2</td> <td>100 μA</td> </tr> <tr> <td></td> <td>3</td> <td>1 mA</td> </tr> <tr> <td></td> <td>4</td> <td>10 mA</td> </tr> </tbody> </table>	ARGUMENT	VALUE	BIAS CURRENT	<i>range</i>	0	Automatic selection, instrument chooses to keep the sensor signal in range		1	10 μA		2	100 μA		3	1 mA		4	10 mA
ARGUMENT	VALUE	BIAS CURRENT																	
<i>range</i>	0	Automatic selection, instrument chooses to keep the sensor signal in range																	
	1	10 μA																	
	2	100 μA																	
	3	1 mA																	
	4	10 mA																	
EXAMPLES	TEC:AUX:BIAS 1 sets the bias current for the auxiliary sensor to 10 μA.																		
SEE ALSO	TEC:AUX:BIAS?																		
MORE INFO	A value of 0 enables automatic bias ranging and any non-zero value disables auto-ranging and sets the bias current to the specified value.																		

COMMAND	TEC:AUX:BIAS?
INSTRUMENT	TC LAB
DESCRIPTION	Queries the bias current for the auxiliary sensor
SYNTAX	TEC:AUX:BIAS?
DETAILS	Returns 0 to 4, see the TEC:AUX:BIAS command for more details.
EXAMPLES	A response of MAN, 1 means the bias was manually set to a bias current of 10 μA. A response of AUTO, 1 means a bias current of 10 μA was automatically selected.
SEE ALSO	TEC:AUX?, TEC:AUX:BIAS
MORE INFO	When the value is set to 0, the bias current will change automatically to produce a signal in range from the auxiliary sensor. This sensor can be useful for monitoring the thermoelectric heatsink temperature or another point in the system.

COMMAND	TEC:BIAS	
INSTRUMENT	TC LAB, LDTC LAB	
DESCRIPTION	Selects the bias current of the main control sensor	
SYNTAX	TEC:BIAS <range>	
DETAILS	The current must be entered as one of the following values, auto-ranging is the default.	
	ARGUMENT	VALUE
	<i>range</i>	0
		1
		2
		3
	4	
EXAMPLES	TEC:BIAS 1 sets the bias current for the main control sensor to 10 µA and disables auto-ranging.	
SEE ALSO	TEC:BIAS?	
MORE INFO	A value of 0 enables automatic bias ranging and any non-zero value disables auto-ranging and sets the bias current to the specified value. This command is based on the use of a thermistor or RTD and the bias current will change depending on the compliance voltage range of the selected sensor.	

COMMAND	TEC:BIAS?	
INSTRUMENT	TC LAB, LDTC LAB	
DESCRIPTION	Queries the bias current for the main control sensor	
SYNTAX	TEC:BIAS?	
DETAILS	See the TEC:BIAS command for more details.	
EXAMPLES	A response of MAN, 1 means the bias was manually set to a bias current of 10 µA. A response of AUTO, 1 means a bias current of 10 µA was automatically selected during auto-ranging.	
SEE ALSO	TEC:BIAS	
MORE INFO	When the value is set to 0, the bias current will change automatically according to the bias current that is required at that time to produce an in-range signal from the main control sensor.	

COMMAND	TEC:CABLER	
INSTRUMENT	TC LAB, LDTC LAB	
DESCRIPTION	Sets the cable resistance value, in Ohms	
SYNTAX	TEC:CABLER <resistance>	
DETAILS	Set the cable resistance to adjust the displayed thermoelectric voltage, compensating for the voltage losses in the cable and connectors.	
	ARGUMENT	VALUE
	<i>resistance</i>	0 to 10
EXAMPLES	TEC:CABLER 0.01 sets the cable resistance value to 0.01 Ω.	
SEE ALSO	TEC:CABLER?	

COMMAND	TEC:CABLER?	
INSTRUMENT	TC LAB, LDTC LAB	
DESCRIPTION	Queries the cable resistance value, in Ohms	
SYNTAX	TEC:CABLER?	
DETAILS	Returns the value of the cable resistance compensation value. See the TEC:CABLER command for more details.	
EXAMPLES	If 0.5 is returned, then the cable resistance value is 0.5 Ω and the displayed thermoelectric voltage is <i>ACTUAL V - (ACTUAL I x 0.5 Ω)</i> .	
SEE ALSO	TEC:CABLER	

COMMAND	TEC:COND?				
INSTRUMENT	TC LAB, LDTC LAB				
DESCRIPTION	Queries the TEC Status Condition Register value				
SYNTAX	TEC:COND?				
DETAILS	Returns the Temperature Controller Condition Status Register value. The Temperature Controller Condition Register reports the current condition of the instrument.				
	RESPONSE	BIT	VALUE	TC LAB DESCRIPTION	LDTC LAB DESCRIPTION
	<i>conditions</i>	0	1	Current limit	Current limit
		1	2	Unused	TEC load short
		2	4	Sensor limit (Resistance limit)	Unused
		3	8	Temperature high limit	Temperature high limit
		4	16	Temperature low limit	Temperature low limit
		5	32	Sensor shorted	Sensor shorted
		6	64	Sensor open	Sensor open
		7	128	Thermoelectric open circuit	TEC load open
		8	256	Unused	Sensor changed
		9	512	In tolerance	In tolerance
		10	1024	Output on	Output on
		11	2048	Laser shutdown triggered	Safety shutdown
		12	4096	Unused	Unused
		13	8192	Unused	IntelliTune currently characterizing
		14	16384	Unused	IntelliTune optimization active
	15	32768	Front Panel Power on	Unused	
	Note that thermoelectric open circuit and short circuit events are transient. Once detected, the output turns off so the bits will be set to 0 quickly after the condition is detected.				
EXAMPLES	A response of 33793 means the Thermoelectric Condition Register enabled Bits 0, 10, and 15 (33793 = 32768 [Front Panel Power on, Bit 15] + 1024 [Output enabled, Bit 10] + 1 [Current Limit Bit 0]). So the unit is in current limit, the output is enabled, and the front panel power switch is on.				
SEE ALSO	TEC:ENABLE:COND, *STB?				
MORE INFO	See page 8 for the Status Reporting Structure diagram.				

COMMAND	TEC:DEC		
INSTRUMENT	TC LAB		
DESCRIPTION	Decrements the temperature setpoint by the specified number of steps		
SYNTAX	TEC:DEC <steps>[, time]		
DETAILS	The TEC:DEC command uses the step size defined with the TEC:STEP command to decrement the thermoelectric setpoint. If the time parameter is omitted, then the setpoint is immediately decremented steps times the step size. If the time parameter is included, then the instrument will still decrement steps times the step size, but will pause at each step for time milliseconds.		
	ARGUMENT	VALUE	DESCRIPTION
	<i>steps</i>	1 - 65000	Number of steps to decrement
	<i>time</i>	0 - 65000	Number of milliseconds to pause between each step
EXAMPLES	TEC:DEC 3, 4000 will decrement the setpoint by the value included in the TEC:STEP command, wait 4 seconds, and then decrement at 4 second intervals two more times.		
SEE ALSO	TEC:INC, TEC:STEP		
MORE INFO	This is a legacy command. It is recommended that the scan functions accessed on the Control screen be used instead.		

COMMAND	TEC:DISplay	
INSTRUMENT	TC LAB	
DESCRIPTION	Turns the front panel touchscreen display on or off	
SYNTAX	TEC:DISplay <enable>	
DETAILS	The TEC:DISplay command can be used to lock out local operation of the instrument via the touchscreen, while still allowing the front Power switch to work.	
	ARGUMENT	VALUE
	<i>enable</i>	0
		DESCRIPTION
		Disables the display
		Enables the display
EXAMPLES	Once the display is disabled, the only way to restore functionality to the front panel is to issue a TEC:DISplay 1 or cycle back panel power on the unit.	
SEE ALSO	TEC:DISplay?	

COMMAND	TEC:DISplay?	
INSTRUMENT	TC LAB	
DESCRIPTION	Queries the front panel display state	
SYNTAX	TEC:DISplay?	
DETAILS	Returns the value of the temperature controller display enable state. See the TEC:DISplay command for more details.	
SEE ALSO	TEC:DISplay	

COMMAND	TEC:ENABLE:COND	
	TC LAB, LDTC LAB	
DESCRIPTION	Sets the Temperature Controller Condition Status Enable Register mask	
SYNTAX	TEC:ENABLE:COND <mask>	
DETAILS	Enables reporting of selected conditions to the Status Byte Register. See the TEC:COND? command for a definition of the bits in the TEC:COND Register. The mask is logically AND'd with the Temperature Controller Condition Status Register, and if any of the resulting bits are high, Bit 1 in the Status Byte Register will be set.	
EXAMPLES	If TEC:ENAB:COND 2568 is sent, and any of the conditions exist, Bit 1 of the Status Byte Register will be set: Bits 3, 9, and 11 (2568 = 8 [Temperature high limit, Bit 3] + 512 [In tolerance, Bit 9] + 2048 [Laser shutdown triggered, Bit 11])	
SEE ALSO	TEC:ENABLE:COND?, TEC:COND?, *STB?	
MORE INFO	See page 8 for the Status Reporting Structure diagram.	

COMMAND	TEC:ENABLE:COND?	
INSTRUMENT	TC LAB, LDTC LAB	
DESCRIPTION	Queries the Temperature Controller Condition Status Enable Register mask	
SYNTAX	TEC:ENABLE:COND?	
DETAILS	Returns the value of the Temperature Controller Condition Enable Register. See the TEC:COND command for a definition of the condition bits in the Temperature Controller Condition Enable Register.	
EXAMPLES	A response of 1025 to TEC:ENABLE:COND? means any of the following conditions will set Bit 1 of the Status Byte Register: Bits 0 and 10 (1025 = 1 [Current limit, Bit 0] + 1024 [Output on, Bit 10]).	
SEE ALSO	TEC:ENABLE:COND, TEC:COND, TEC:COND?, *STB?	
MORE INFO	See page 8 for the Status Reporting Structure diagram.	

COMMAND	TEC:ENABLE:EVEnt
INSTRUMENT	TC LAB, LDTC LAB
DESCRIPTION	Sets the Temperature Controller Event Status Enable Register mask
SYNTAX	TEC:ENABLE:EVEnt <mask>
DETAILS	Enables reporting of selected events to the Status Byte Register. See the TEC:EVEnt? command for a definition of the event bits. The mask is logically ANDed with the Temperature Controller Event Register, and if any of the resulting bits are high, Bit 2 of the Status Byte Register will be set.
EXAMPLES	If TEC:ENAB:EVE 652 is sent, and any of the following conditions change, Bit 2 of the Status Byte Register will be set: Bits 4, 7, and 9 (652 = 16 [Temperature low limit, Bit 4] + 128 [TEC open circuit, Bit 7] + 512 [In tolerance, Bit 9]).
SEE ALSO	TEC:ENABLE:EVE?, TEC:EVE?, *STB?
MORE INFO	See page 8 for the Status Reporting Structure diagram.

COMMAND	TEC:ENABLE:EVEnt?
INSTRUMENT	TC LAB, LDTC LAB
DESCRIPTION	Queries the Temperature Controller Event Status Enable Register mask
SYNTAX	TEC:ENABLE:EVEnt?
DETAILS	Returns the value of the Temperature Controller Event Enable Register mask. See the TEC:EVEnt? command for a definition of the response.
EXAMPLES	If 1168 is returned, a change in the following conditions will trigger Bit 2 of the Status Byte Register to be set: Bits 4, 7, and 10 (1168 = 1024 [Output on, Bit 10] + 128 [TEC open circuit, Bit 7] + 16 [Temperature low limit, Bit 4]).
SEE ALSO	TEC:ENABLE:EVEnt, TEC:EVEnt?

COMMAND	TEC:EVEnt?				
INSTRUMENT	TC LAB, LDTC LAB				
DESCRIPTION	Queries the value of the Temperature Controller Event Status Register				
SYNTAX	TEC:EVEnt?				
DETAILS	Returns the Temperature Controller Event Status Register. If a condition has changed, these bits will be latched high. IMPORTANT: After reading the event register, it is set to zero.				
	RESPONSE	BIT	VALUE	TC LAB DESCRIPTION	LDTC LAB DESCRIPTION
	<i>events</i>	0	1	Current limit	Current limit
		1	2	Unused	TEC load short
		2	4	Sensor limit (Resistance limit)	Unused
		3	8	Temperature high limit	Temperature high limit
		4	16	Temperature low limit	Temperature low limit
		5	32	Sensor shorted	Sensor shorted
		6	64	Sensor open	Sensor open
		7	128	TEC open circuit	TEC load open
		8	256	Unused	Sensor changed
		9	512	In tolerance	In tolerance
		10	1024	Output on	Output on
		11	2048	Laser shutdown triggered	Safety shutdown
		12	4096	Unused	Unused
		13	8192	Unused	IntelliTune currently characterizing
		14	16384	Unused	IntelliTune optimization active
		15	32768	Front Panel Power on	Unused
EXAMPLES	A response of 1041 means the Temperature Controller Event Register enabled Bits 0, 4, and 10 (1041 = 1 [Current limit, Bit 1] + 16 [Temperature low limit, Bit 4] + 1024 [Output state on, Bit 10]) because the previous state of each has changed. Note that the TEC open and short circuit bits will be set if the problem is detected while output is enabled. The unit does not check for these errors while the output is off.				
SEE ALSO	TEC:ENABLE:EVEnt, TEC:ENABLE:EVEnt?				
MORE INFO	The Temperature Controller Event Status Register reports if any conditions in the instrument have changed. See page 8 for the Status Reporting Structure diagram.				

COMMAND	TEC:I?
INSTRUMENT	TC LAB, LDTC LAB
DESCRIPTION	Queries the actual thermoelectric current
SYNTAX	TEC:I?
DETAILS	Returns the actual (measured) thermoelectric current in Amps
EXAMPLES	If 3.2 is returned, 3.2 A of current is flowing through the TEC + and TEC - pins.

COMMAND	TEC:INC									
INSTRUMENT	TC LAB									
DESCRIPTION	Increments the temperature setpoint by a specified number of steps									
SYNTAX	TEC:INC <steps>[, time]									
DETAILS	<p>The TEC:INC command uses the step size defined with the TEC:STEP command to increment the temperature setpoint. If the time parameter is omitted, then the setpoint is immediately incremented steps times the step size. If the time parameter is included, then the instrument will still increment steps times the step size, but will pause at each step for time milliseconds.</p> <table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>steps</td> <td>1 – 65000</td> <td>Number of steps to increment</td> </tr> <tr> <td>time</td> <td>0 - 65000</td> <td>Number of milliseconds to pause between each step</td> </tr> </tbody> </table>	ARGUMENT	VALUE	DESCRIPTION	steps	1 – 65000	Number of steps to increment	time	0 - 65000	Number of milliseconds to pause between each step
ARGUMENT	VALUE	DESCRIPTION								
steps	1 – 65000	Number of steps to increment								
time	0 - 65000	Number of milliseconds to pause between each step								
EXAMPLES	TEC:INC 4, 2000 increments the setpoint by the value included in the STEP command, waits 2 seconds, then increments at 2 second intervals three more times.									
SEE ALSO	TEC:DEC, TEC:STEP									
MORE INFO	This is a legacy command. It is recommended that the scan functions accessed on the Control screen be used instead.									

COMMAND	TEC:INTPOL									
INSTRUMENT	TC LAB									
DESCRIPTION	Sets the polarity for the remote enable input (Pin 1 on the DB-9 connector)									
SYNTAX	TEC:INTPOL <level>									
DETAILS	<p>The values are as follows:</p> <table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>level</td> <td>0</td> <td>Remote enable voltage must be 0 VDC to allow output to be enabled from the front panel or with the TEC:OUT command.</td> </tr> <tr> <td></td> <td>1</td> <td>(default), Remote enable voltage must be +5 VDC to allow output to be enabled from the front panel or with the TEC:OUT command</td> </tr> </tbody> </table>	ARGUMENT	VALUE	DESCRIPTION	level	0	Remote enable voltage must be 0 VDC to allow output to be enabled from the front panel or with the TEC:OUT command.		1	(default), Remote enable voltage must be +5 VDC to allow output to be enabled from the front panel or with the TEC:OUT command
ARGUMENT	VALUE	DESCRIPTION								
level	0	Remote enable voltage must be 0 VDC to allow output to be enabled from the front panel or with the TEC:OUT command.								
	1	(default), Remote enable voltage must be +5 VDC to allow output to be enabled from the front panel or with the TEC:OUT command								
EXAMPLES	TEC:INTPOL 0 sets the remote enable logic to ENABLE LO. If there is no 0 VDC signal on Pin 1 of the DB-9 connector, the output current cannot be enabled from the front panel or with the TEC:OUT command .									
SEE ALSO	TEC:INTSTAT?									
MORE INFO	The default polarity (1) is ENABLE HI. Enter 0 V to disable the output regardless of the front panel Enable button. There is an internal 100 kΩ pull up resistor on Pin 1. This means that no external voltage is required for front panel operation with the default polarity.									

COMMAND	TEC:INTSTAT?
INSTRUMENT	TC LAB
DESCRIPTION	Queries and returns the value of the INTPOL bit
SYNTAX	TEC:INTSTAT?
DETAILS	See the TEC:INTPOL command for a definition of the response.
SEE ALSO	TEC:INTPOL

COMMAND	TEC:LDSHUTdown:POL	
INSTRUMENT	TC LAB	
DESCRIPTION	Sets the polarity of the TTL signal sent from the Laser Diode (LD) Shutdown BNC	
SYNTAX	TEC:LDSHUTdown:POL < <i>polarity</i> >	
DETAILS	This sets the active HI or active LO polarity. The default value is 0.	
	ARGUMENT	VALUE
	<i>polarity</i>	0
		DESCRIPTION
		5 V signal from LD shutdown BNC
		1
		0 V signal from LD shutdown BNC
EXAMPLES	TEC:LDSHUTdown:POL 1 sets the polarity of the TTL signal to HI. If the controller is wired to send a signal to the ACTIVE LOCK input on Wavelength's QCL or Laser Diode instruments, then output of the LD or QCL driver current is shut off when the conditions set by the TEC:LIM:TLO or TEC:LIM:THI commands are met.	
SEE ALSO	TEC:LDSHUTdown:POL?, TEC:LIMit:TLO, TEC:LIMit:TLO?, TEC:LIMit:THI, TEC:LIMit:THI?	
MORE INFO	For this shutdown sequence to be effective, the LDSHUTdown BNC must be cabled to the ACTIVE LOCK input on Wavelength's QCL or Laser Diode instruments. The trigger only works when temperature units are chosen.	

COMMAND	TEC:LDSHUTdown:POL?	
INSTRUMENT	TC LAB	
DESCRIPTION	Queries the polarity of the TTL signal sent from the LD Shutdown BNC	
SYNTAX	TEC:LDSHUTdown:POL?	
DETAILS	Returns the polarity. See the TEC:LDSHUTdown:POL command for a definition of the response.	
SEE ALSO	TEC:LDSHUTdown:POL, TEC:LIMit:TLO, TEC:LIMit:TLO?, TEC:LIMit:THI, TEC:LIMit:THI?	

COMMAND	TEC:LIMit:INEG	
INSTRUMENT	TC LAB, LDTC LAB	
DESCRIPTION	Sets the negative output current limit for the instrument	
SYNTAX	TEC:LIMit:INEG < <i>limit</i> >	
DETAILS	Sets the negative limit for the output current in Amps and is entered as a positive number.	
	ARGUMENT	VALUE
	<i>limit</i>	0 to IMAX
		DESCRIPTION
		Set the negative output current limit in Amps
EXAMPLES	TEC:LIMit:INEG 4 sets the output current to a -4 Amp maximum.	
SEE ALSO	TEC:LIMit:INEG?, PROFile:INEG, PROFile:TEC:LIMit:INEG TEC:I?, TEC:LIMit:IPOS	
MORE INFO	To operate a resistive heater, set one limit to zero.	

COMMAND	TEC:LIMit:INEG?	
INSTRUMENT	TC LAB, LDTC LAB	
DESCRIPTION	Queries and returns the negative output current limit for the instrument as a positive number, in Amps	
SYNTAX	TEC:LIMit:INEG?	
DETAILS	Returns the unsigned output current limit in Amps.	
EXAMPLES	If 3 is returned, the negative current limit is -3 A.	
SEE ALSO	TEC:LIMit:INEG, PROFile:INEG, PROFile:TEC:LIMit:INEG?, TEC:I?, TEC:LIMit:IPOS	

COMMAND	TEC:LIMit:IPOS		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Sets the positive output current limit for the instrument		
SYNTAX	TEC:LIMit:IPOS <limit>		
DETAILS	Sets the positive limit for the output current in Amps.		
	ARGUMENT	VALUE	DESCRIPTION
	limit	0 to IMAX	Set the positive output current limit in Amps
EXAMPLES	TEC:LIMit:IPOS 4 sets the output current to a 4 Amp maximum		
SEE ALSO	TEC:LIMit:IPOS?, PROFile:IPOS, PROFile:TEC:LIMit:IPOS, TEC:I?, TEC:LIMit:IPOS		
MORE INFO	To operate a resistive heater, set one limit to zero.		

COMMAND	TEC:LIMit:IPOS?		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Queries and returns the positive output current limit for the instrument, in Amps		
SYNTAX	TEC:LIMit:IPOS?		
DETAILS	Returns the positive output current limit in Amps		
EXAMPLES	If 2.1 is returned, the positive current limit is 2.1 Amps.		
SEE ALSO	TEC:LIMit:IPOS, PROFile:IPOS?, PROFile:TEC:LIMit:IPOS?, TEC:I?, TEC:LIMit:INEG		

COMMAND	TEC:LIMit:RHI		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Sets the high resistance limit of the sensor, in physical units that match the active sensor		
SYNTAX	TEC:LIMit:RHI <limit>		
DETAILS	The values are as follows:		
	ARGUMENT	VALUE	SENSOR
	limit	0 to sensor maximum	Thermistors
		0 to sensor maximum	AD590
		0 to sensor maximum	LM335
		0 to sensor maximum	RTD
EXAMPLES	TEC:LIM:RHI 25400 sets a resistance limit of 25400 Ω (25.4 k Ω), if the active sensor is a thermistor. This corresponds to a temperature on a 10 k Ω thermistor of 5°C. The actual value is interpreted based on the currently active sensor.		
SEE ALSO	TEC:LIMit:RHI?, TEC:UNITS		
MORE INFO	When this condition is triggered, Bit 2 of both the TEC:COND and TEC:EVE registers are set but the LD Shutdown BNC signal is NOT sent.		

COMMAND	TEC:LIMit:RHI?		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Queries the high resistance limit of the sensor, in physical units		
SYNTAX	TEC:LIMit:RHI?		
DETAILS	Returns the high resistance limit of the sensor, in physical units. See the TEC:LIM:RHI command for a definition of the response.		
SEE ALSO	TEC:LIMit:RHI		

COMMAND	TEC:LIMit:RLO		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Sets the low resistance limit of the sensor, in physical units that match the active sensor		
SYNTAX	TEC:LIMit:RLO <limit>		
DETAILS	The values are as follows:		
	ARGUMENT	VALUE	SENSOR
	<i>limit</i>	0 to sensor maximum	Thermistors
		0 to sensor maximum	AD590
		0 to sensor maximum	LM335
	0 to sensor maximum	RTD	Ohms (Ω)
EXAMPLES	TEC:LIM:RLO 4368 would set a resistance limit of 4368 Ω , if the active sensor is a thermistor. This corresponds to a temperature on a 10 k Ω thermistor of 45°C.		
SEE ALSO	TEC:LIMit:RLO?, TEC:UNITS		
MORE INFO	When this condition is triggered, Bit 2 of both the TEC:COND and TEC:EVE registers are set but the LD Shutdown BNC signal is NOT sent.		

COMMAND	TEC:LIMit:RLO?		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Queries the low resistance limit of the sensor		
SYNTAX	TEC:LIMit:RLO?		
DETAILS	Returns the low sensor limit in physical units. See the TEC:LIM:RLO command for a definition of the response.		
SEE ALSO	TEC:LIMit:RLO		

COMMAND	TEC:LIMit:THI		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Sets the high temperature limit of the sensor in the currently active units		
SYNTAX	TEC:LIMit:THI <limit>		
DETAILS	Limit is a temperature. Range limits from -99 to 250°C.		
EXAMPLES	TEC:LIM:THI 50 sets a maximum temperature of 50°C, if the TEC:UNITS command set the units to °C.		
SEE ALSO	TEC:LIMit:THI?, TEC:UNITS		
MORE INFO	A QCL or Laser Diode shutdown can be triggered if the temperature limits are exceeded.		

COMMAND	TEC:LIMit:THI?		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Queries the high temperature limit of the sensor in the currently active units		
SYNTAX	TEC:LIMit:THI?		
DETAILS	Returns the high temperature limit of the sensor in the currently active units. Range limits from -99 to 250°C.		
EXAMPLES	If 273.6 is returned and the units are in Kelvin, 273.6 K is the high temperature limit.		
SEE ALSO	TEC:LIMit:THI, TEC:UNITS		

COMMAND	TEC:LIMit:TLO		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Sets the low temperature limit of the sensor in the currently active units		
SYNTAX	TEC:LIMit:TLO <limit>		
DETAILS	Limit is a temperature. Range limits from -99 to 250°C.		
EXAMPLES	TEC:LIMit:TLO -5 sets a minimum temperature of -5°C, if the TEC:UNITS command set the units to °C.		
SEE ALSO	TEC:LIMit:TLO?, TEC:UNITS		
MORE INFO	A QCL or Laser Diode shutdown can be triggered if the temperature limits are exceeded.		

COMMAND	TEC:LIMit:TLO?
INSTRUMENT	TC LAB, LDTC LAB
DESCRIPTION	Queries the low temperature limit of the sensor, in the currently active units
SYNTAX	TEC:LIMit:TLO?
DETAILS	Returns the low temperature limit of the sensor, in the currently active units. Range limits from -99 to 250°C.
EXAMPLES	If 75 is returned and the units are Fahrenheit, the low temperature limit is 75° F.
SEE ALSO	TEC:LIMit:TLO, TEC:UNITS

COMMAND	TEC:LIMit:VLIM
INSTRUMENT	LDTC LAB
DESCRIPTION	Sets the maximum TEC internal voltage limit.
SYNTAX	TEC:LIMit:VLIM <limit>
DETAILS	Limit is set in Volts. More details in TEC:VLIM.
SEE ALSO	TEC:LIMit:VLIM?, TEC:VLIM, TEC:VLIM?

COMMAND	TEC:LIMit:VLIM?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries the maximum TEC internal voltage limit for the specified profile.
SYNTAX	TEC:LIMit:VLIM?
DETAILS	Limit is returned in Volts. More details in TEC:VLIM
SEE ALSO	TEC:LIMit:VLIM, TEC:VLIM, TEC:VLIM?

COMMAND	TEC:OUTput									
INSTRUMENT	TC LAB, LDTC LAB									
DESCRIPTION	Sets the thermoelectric output current state									
SYNTAX	TEC:OUTput <state>									
DETAILS	<p>The values are as follows:</p> <table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td><i>state</i></td> <td>0</td> <td>Turn the thermoelectric output current OFF</td> </tr> <tr> <td></td> <td>1</td> <td>Turn the thermoelectric output current ON</td> </tr> </tbody> </table> <p>The default value is set at 0.</p>	ARGUMENT	VALUE	DESCRIPTION	<i>state</i>	0	Turn the thermoelectric output current OFF		1	Turn the thermoelectric output current ON
ARGUMENT	VALUE	DESCRIPTION								
<i>state</i>	0	Turn the thermoelectric output current OFF								
	1	Turn the thermoelectric output current ON								
EXAMPLES	TEC:OUT 1 turns thermoelectric output current on.									
SEE ALSO	TEC:OUTput?, TEC:INTPOL, TEC:INTSTAT?									
MORE INFO	This command is overridden by the voltage on the Remote Enable Input (Pin 1 on the DSUB 9 of the TC LAB, or Pin 5 on the 15+2 DSUB of the LDTC LAB).									

COMMAND	TEC:OUTput?
INSTRUMENT	TC LAB, LDTC LAB
DESCRIPTION	Queries the state of the thermoelectric output current
SYNTAX	TEC:OUTput?
DETAILS	Returns the value of the thermoelectric output current state. See the TEC:OUT command for a definition of the response.
SEE ALSO	TEC:OUTput

COMMAND	TEC:PID		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Sets the PID parameters used by the control stage		
SYNTAX	TEC:PID < <i>p</i> > -or- TEC:PID < <i>p</i> [<i>i</i>]> -or- TEC:PID < <i>p</i> [<i>i</i> [<i>d</i>]]>		
DETAILS	The available arguments are: <i>p</i> or <i>p</i> [<i>i</i>] or <i>p</i> [<i>i</i> [<i>d</i>]]. The first value set is always the <i>P</i> value and must be set to 1 or more, the second is always the <i>I</i> value, and the third value is always the <i>D</i> value. If one value is set, it is always the <i>P</i> value. If two values are set, they are always the <i>P</i> and <i>I</i> values. If three values are set, then <i>P</i> , <i>I</i> , and <i>D</i> values are set. Decimal values are acceptable values.		
	ARGUMENT	VALUE	DESCRIPTION
	<i>p</i>	Proportional	0.1 to 1000
	<i>i</i>	Integral	0 to 200
	<i>d</i>	Derivative	OFF or 1 to 100
FACTORY DEFAULT			12
			0.1
			0 (OFF)
EXAMPLES	TEC:PID 30 sets the proportional value to 30. TEC:PID 30,0 sets the proportional value to 30 and the integral value to 0. TEC:PID 30,0,10 sets the proportional value to 30, the integral value to 0, and the derivative value to 10.		
SEE ALSO	TEC:PID?, TEC:AUTOTUNE		
MORE INFO	Automatically determine the optimal PID coefficients for your system using Active IntelliTune. For more information on PID control, see Technical Note TN-TC01 Optimizing Thermoelectric Temperature Control Systems <link to: https://www.teamwavelength.com/download/applicationtechnotes/tn-tc01.pdf >		

COMMAND	TEC:PID?		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Queries the PID parameters used by the control stage		
SYNTAX	TEC:PID?		
DETAILS	Returns the parameters used by the control stage. See the TEC:PID command for definition of the response.		
EXAMPLES	If TEC:PID? returns 5, 0, 1 , then the proportional value is 5, the integral value is 0, and the derivative value is 1.		
SEE ALSO	TEC:PID, TEC:AUTOTUNE		

COMMAND	TEC:POL:ENABle		
INSTRUMENT	LDTC LAB		
DESCRIPTION	Sets whether the polarity of the remote TEC enable input on the rear panel uses inverted logic.		
SYNTAX	TEC:POL:ENABle < <i>invert</i> >		
DETAILS	ARGUMENT	VALUE	DESCRIPTION
	<i>invert</i>	0	Default logic (enable high)
		1	Inverted logic (enable low)
SEE ALSO	TEC:POL:ENABle?		

COMMAND	TEC:POL:ENABle?		
INSTRUMENT	LDTC LAB		
DESCRIPTION	Queries whether the polarity of the remote TEC enable input on the rear panel uses inverted logic.		
SYNTAX	TEC:POL:ENABle?		
DETAILS	See TEC:POL:ENABle for interpretation of the returned boolean True/False response.		
SEE ALSO	TEC:POL:ENABle		

COMMAND	TEC:POL:STABLE		
INSTRUMENT	LDTC LAB		
DESCRIPTION	Sets whether the temperature stability status signal on the rear panel uses inverted logic.		
SYNTAX	TEC:POL:STABLE < <i>invert</i> >		
DETAILS	ARGUMENT	VALUE	DESCRIPTION
	<i>invert</i>	0	Default logic (stable high)
		1	Inverted logic (stable low)
SEE ALSO	TEC:POL:STABLE?		

COMMAND	TEC:POL:STABLE?		
INSTRUMENT	LDTC LAB		
DESCRIPTION	Queries whether the temperature stability status signal on the rear panel uses inverted logic.		
SYNTAX	TEC:POL:STABLE?		
DETAILS	See TEC:POL:STABLE for interpretation of the returned boolean True/False response.		
SEE ALSO	TEC:POL:STABLE		

COMMAND	TEC:POL:STAT		
INSTRUMENT	LDTC LAB		
DESCRIPTION	Sets whether the polarity of the TEC enable status output pin on the rear panel uses inverted logic.		
SYNTAX	TEC:POL:STAT < <i>invert</i> >		
DETAILS	ARGUMENT	VALUE	DESCRIPTION
	<i>invert</i>	0	Default logic (enabled high)
		1	Inverted logic (enabled low)
SEE ALSO	TEC:POL:STAT?		

COMMAND	TEC:POL:STAT?		
INSTRUMENT	LDTC LAB		
DESCRIPTION	Queries whether the polarity of the TEC enable status output pin on the rear panel uses inverted logic.		
SYNTAX	TEC:POL:STAT?		
DETAILS	See TEC:POL:STAT for interpretation of the returned boolean True/False response.		
SEE ALSO	TEC:POL:STAT		

COMMAND	TEC:SENSOR																																																	
INSTRUMENT	TC LAB, LDTC LAB																																																	
DESCRIPTION	Selects the sensor to be used as feedback for the control loop																																																	
SYNTAX	TEC:SENSOR < <i>sensor name</i> >																																																	
DETAILS	<p>The sensor can be a user-configured sensor or a factory-defined sensor. Factory defined sensors include:</p> <table border="1"> <thead> <tr> <th>ARGUMENT</th> <th>DESCRIPTION (Shown on screen)</th> <th>NAME (Used with remote commands)</th> </tr> </thead> <tbody> <tr> <td><i>sensor name</i></td> <td>Thermistor 5 kΩ, 10 μA</td> <td>TCS605-10</td> </tr> <tr> <td></td> <td>Thermistor 5 kΩ, 100 μA</td> <td>TCS605-100</td> </tr> <tr> <td></td> <td>Thermistor 10 kΩ, 10 μA</td> <td>TCS610-10 (also used with TCS10K5)</td> </tr> <tr> <td></td> <td>Thermistor 10 kΩ, 100 μA</td> <td>TCS610-100 (also used with TCS10K5)</td> </tr> <tr> <td></td> <td>Thermistor 20 kΩ, 10 μA</td> <td>TCS620-10</td> </tr> <tr> <td></td> <td>Thermistor 20 kΩ, 100 μA</td> <td>TCS620-100</td> </tr> <tr> <td></td> <td>Thermistor 50 kΩ, 10 μA</td> <td>TCS650-10</td> </tr> <tr> <td></td> <td>Thermistor 50 kΩ, 100 μA</td> <td>TCS650-100</td> </tr> <tr> <td></td> <td>Thermistor 100 kΩ, 10 μA</td> <td>TCS651-10</td> </tr> <tr> <td></td> <td>Thermistor 100 kΩ, 100 μA</td> <td>TCS651-100</td> </tr> <tr> <td></td> <td>RTD 2-wire, 100 Ω DIN</td> <td>RTD 100 DIN</td> </tr> <tr> <td></td> <td>RTD 2-wire, 1 kΩ DIN</td> <td>RTD 1k DIN</td> </tr> <tr> <td></td> <td>*Optical, default</td> <td>*IR SENSOR</td> </tr> <tr> <td></td> <td>Voltage IC, LM335</td> <td>LM335</td> </tr> <tr> <td></td> <td>Current IC, AD590</td> <td>AD590</td> </tr> </tbody> </table> <p>Each sensor name pairs a sensor with a particular bias current range calibration. The calibration coefficients are used regardless of the actual bias current applied. * Only available on the TC LAB.</p>		ARGUMENT	DESCRIPTION (Shown on screen)	NAME (Used with remote commands)	<i>sensor name</i>	Thermistor 5 k Ω , 10 μ A	TCS605-10		Thermistor 5 k Ω , 100 μ A	TCS605-100		Thermistor 10 k Ω , 10 μ A	TCS610-10 (also used with TCS10K5)		Thermistor 10 k Ω , 100 μ A	TCS610-100 (also used with TCS10K5)		Thermistor 20 k Ω , 10 μ A	TCS620-10		Thermistor 20 k Ω , 100 μ A	TCS620-100		Thermistor 50 k Ω , 10 μ A	TCS650-10		Thermistor 50 k Ω , 100 μ A	TCS650-100		Thermistor 100 k Ω , 10 μ A	TCS651-10		Thermistor 100 k Ω , 100 μ A	TCS651-100		RTD 2-wire, 100 Ω DIN	RTD 100 DIN		RTD 2-wire, 1 k Ω DIN	RTD 1k DIN		*Optical, default	*IR SENSOR		Voltage IC, LM335	LM335		Current IC, AD590	AD590
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EXAMPLES	TEC:SENSOR TCS610-100 chooses a 10 k Ω thermistor calibrated for a 100 μ A bias current.																																																	
SEE ALSO	TEC:SENSOR?, CONST:ICV, CONST:OPT, CONST:RTDn, CONST:THERM, CONST:DEL, CONST:LIST?, TEC:SENSORDEL, TEC:SENSORLIST?																																																	
MORE INFO	The CONST:ICV, CONST:OPT, CONST:RTDn, CONST:THERM commands set the sensor name and calibration coefficients for user-configured sensors. TCSXXX-XX refers to Wavelength part numbers. See the TCS datasheet for the sensors' resistance vs. temperature charts.																																																	

COMMAND	TEC:SENSOR?									
INSTRUMENT	TC LAB, LDTC LAB									
DESCRIPTION	Queries the calibration coefficients for the specified sensor									
SYNTAX	TEC:SENSOR? [<i>sensor name</i>]									
DETAILS	<p>Returns the calibration coefficients for a specific sensor. If <i>sensor name</i> is omitted, returns the calibration coefficients for the currently selected sensor. Calibration coefficients returned are:</p> <table border="1"> <thead> <tr> <th>SENSOR</th> <th>COEFFICIENTS</th> </tr> </thead> <tbody> <tr> <td>Thermistor</td> <td>Steinhart-Hart coefficients</td> </tr> <tr> <td>RTD</td> <td>Either the D//A Curve Fit or the slope and offset values</td> </tr> <tr> <td>Optical, Voltage IC, Current IC</td> <td>Slope and offset values</td> </tr> </tbody> </table>		SENSOR	COEFFICIENTS	Thermistor	Steinhart-Hart coefficients	RTD	Either the D//A Curve Fit or the slope and offset values	Optical, Voltage IC, Current IC	Slope and offset values
SENSOR	COEFFICIENTS									
Thermistor	Steinhart-Hart coefficients									
RTD	Either the D//A Curve Fit or the slope and offset values									
Optical, Voltage IC, Current IC	Slope and offset values									
EXAMPLES	If and RTD is the active sensor and D, 100 is returned, the instrument is using a DIN Curve Fit for a 100 Ω RTD.									
SEE ALSO	TEC:SENSOR									

COMMAND	TEC:SENSORDEL
INSTRUMENT	TC LAB
DESCRIPTION	Deletes a user-created sensor
SYNTAX	TEC:SENSORDEL <sensor name>
DETAILS	The only sensors that can be deleted are user created ones. Factory-defined sensors cannot be deleted.
SEE ALSO	TEC:SENSOR, TEC:SENSOR?, CONST:DEL, CONST:LIST?
MORE INFO	Active sensors cannot be deleted. Use TEC:SENSORLIST? or CONST:LIST? for a full list of stored sensor names.

COMMAND	TEC:SENSORLIST?
INSTRUMENT	TC LAB
DESCRIPTION	Queries and returns a list of stored sensor names included in factory profiles and user-configured custom profiles
SYNTAX	TEC:SENSORLIST?
DETAILS	Returns a list of comma-separated sensor names.
EXAMPLES	TEC:SENSORLIST? returns all stored sensor names, including default profiles.
SEE ALSO	CONST:DEL, CONST:LIST?, TEC:SENSOR?, TEC:SENSORDEL

COMMAND	TEC:SET
INSTRUMENT	TC LAB, LDTC LAB
DESCRIPTION	Sets the temperature setpoint in the currently active units
SYNTAX	TEC:SET <setpoint>
DETAILS	Units for setpoint are determined by the units chosen by the TEC:UNITS command.
EXAMPLES	If the units are Celsius, as set by the TEC:UNITS command, then TEC:SET 25 sets the temperature setpoint to 25°C.
SEE ALSO	TEC:SET?, TEC:UNITS

COMMAND	TEC:SET?
INSTRUMENT	TC LAB, LDTC LAB
DESCRIPTION	Queries the setpoint value
SYNTAX	TEC:SET?
DETAILS	Returns the temperature setpoint in the units determined by the TEC:UNITS command
EXAMPLES	A response of 25 , when the units are set to Celsius by the TEC:UNITS command, means the setpoint value is 25°C.
SEE ALSO	TEC:SET, TEC:UNITS

COMMAND	TEC:STABLE?
INSTRUMENT	LDTC LAB
DESCRIPTION	Queries if the TEC power supply is stable.
SYNTAX	TEC:STABLE?
DETAILS	Returns a boolean True/False. True = stable, False = unstable.

COMMAND	TEC:STB?	
INSTRUMENT	TC LAB	
DESCRIPTION	Queries the status byte register	
SYNTAX	TEC:STB?	
DETAILS	Returns a summary of the enabled conditions within the Temperature Controller condition and event registers.	
	BIT	VALUE
	0	1
	1	2
	2	4
	3	8
	4	16
	5	32
	6	64
7	128	
DESCRIPTION	Temperature Controller Event Summary	
	Temperature Controller Condition Summary	
	Laser Event Summary (not used by the TC LAB instrument)	
	Laser Condition Summary (not used by the TC LAB instrument)	
	Message Available	
	Event Status Summary	
	Request Service/Master Status Summary	
	Error Message Available	
EXAMPLES	A response of 96 (64 + 32) specifies that the Request Service Summary and the Event Status Summary bits are set.	
SEE ALSO	TEC:STB, TEC:COND?, TEC:ENABLE:COND, TEC:ENABLE:EVEnt, TEC:EVEnt?, *STB?	
MORE INFO	See page 8 for the Status Reporting Structure diagram.	

COMMAND	TEC:STEP	
INSTRUMENT	TC LAB	
DESCRIPTION	Sets the temperature step size as a multiple of 0.01°C	
SYNTAX	TEC:STEP <size>	
DETAILS	The step size argument is an integer between 1 and 65000 and always in °C, therefore a step of 1 is equivalent to 0.01°C.	
EXAMPLES	TEC:STEP 1000 sets the temperature step size to 10°C.	
SEE ALSO	TEC:STEP?, TEC:DEC, TEC:INC	
MORE INFO	This is a legacy command. It is recommended that the scan functions accessed on the Control screen be used instead.	

COMMAND	TEC:STEP?	
INSTRUMENT	TC LAB	
DESCRIPTION	Queries the temperature step size	
SYNTAX	TEC:STEP?	
DETAILS	Returns the value of the temperature step size. See the TEC:STEP command for a definition of the size response value.	
SEE ALSO	TEC:STEP	

COMMAND	TEC:TOLerance		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Sets the temperature tolerance criteria for the in tolerance flag		
SYNTAX	TEC:TOLerance <tolerance>, <time>		
DETAILS	The TEC:TOLerance command sets the parameters for when the temperature of the load sensor is considered in tolerance (or stable).		
	ARGUMENT	VALUE	DESCRIPTION
	<i>tolerance</i>	0.01 to 10	Temperature tolerance, in °C
	<i>time</i>	0.1 to 50	Time window, in seconds
To be considered in tolerance, the measured temperature must be within the setpoint plus or minus the tolerance value (the tolerance window) for time seconds. Any time it leaves the tolerance window, the timer will reset to zero and begin counting the next time it enters the tolerance window. Bit 9 of the Temperature Controller Condition Status Register will be set if the temperature is in tolerance. Bit 9 of the Temperature Controller Event Status Register will be set if the temperature tolerance status changes.			
EXAMPLES	TEC:TOLerance 0.1, 10 is considered stable when the temperature reaches setpoint $\pm 0.1^{\circ}\text{C}$ for 10 seconds.		
SEE ALSO	TEC:TOLerance?, TEC:COND?, TEC:EVEnt?		
MORE INFO	The Target icon appears on the front panel when the actual temperature is within the tolerance window around the setpoint. Not supported in physical temperature units. The At Temperature Status signal (TC LAB: Pins 5 & 7 on the 9-pin DSUB; LDTC LAB: Pins 8 & 9 on the 15+2 DSUB) is HI when the actual temperature is within the tolerance window around the setpoint.		

COMMAND	TEC:TOLerance?		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Queries the temperature tolerance criteria		
SYNTAX	TEC:TOLerance?		
DETAILS	Returns the temperature window and time criteria for the tolerance criteria.		
SEE ALSO	TEC:TOLerance		

COMMAND	TEC:TUNEABORT		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Stops an in-progress IntelliTune		
SYNTAX	TEC:TUNEABORT		
DETAILS	If the session is aborted, the PID coefficients revert to the previously used coefficients.		
SEE ALSO	TEC:AUTOTUNE, TEC:TUNESTART		
MORE INFO	Active IntelliTune stops if the sensor is changed.		

COMMAND	TEC:TUNESTART		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Starts an IntelliTune in the mode defined by the TEC:AUTOTUNE command		
SYNTAX	TEC:TUNESTART		
DETAILS	Tune only in temperature mode. Resistance mode is not supported. When using the TEC:TUNESTART command, turn off the output current, adjust the setpoint off ambient temperature by at least 5°C, and make sure the setpoint will not cause a bias current range change. IntelliTune is completed at a single bias current level.		
SEE ALSO	TEC:AUTOTUNE, TEC:TUNEABORT		
MORE INFO	Once a system is run through the IntelliTune process, the PID coefficients are adjusted as the setpoint is changed. Adjustments are made even if bias current changes or setpoint approaches ambient temperature. During an IntelliTune process, the current limits are set temporarily to 10% of the initial values.		

COMMAND	TEC:UNITS										
INSTRUMENT	TC LAB, LDTC LAB										
DESCRIPTION	Sets which units the temperature is controlled and reported in										
SYNTAX	TEC:UNITS <value>										
DETAILS	<p>The values are as follows:</p> <table border="1"> <thead> <tr> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>0 or C</td> <td>Celsius (°C)</td> </tr> <tr> <td>1 or K</td> <td>Kelvin (°K)</td> </tr> <tr> <td>2 or F</td> <td>Fahrenheit (°F)</td> </tr> <tr> <td>3 or RAW</td> <td>Physical units for resistance: <ul style="list-style-type: none"> • Thermistors are in Ohms (Ω) • RTDs are in Ohms (Ω) • LM335, IR sensor and other voltage-based linear sensors are in Volts (V) • AD590 is displayed as the voltage of the current flowing through an internal 10 kΩ resistor. </td> </tr> </tbody> </table>	VALUE	DESCRIPTION	0 or C	Celsius (°C)	1 or K	Kelvin (°K)	2 or F	Fahrenheit (°F)	3 or RAW	Physical units for resistance: <ul style="list-style-type: none"> • Thermistors are in Ohms (Ω) • RTDs are in Ohms (Ω) • LM335, IR sensor and other voltage-based linear sensors are in Volts (V) • AD590 is displayed as the voltage of the current flowing through an internal 10 kΩ resistor.
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EXAMPLES	TEC:UNITS 2 or TEC:UNITS F sets the temperature units to Fahrenheit										
SEE ALSO	TEC:UNITS?, TEC:SET, TEC:ACT?										

COMMAND	TEC:UNITS?
INSTRUMENT	TC LAB, LDTC LAB
DESCRIPTION	Queries the units that temperature is set and reported in
SYNTAX	TEC:UNITS?
DETAILS	Returns the numeric values representing the temperature unit values are set and reported in. See the TEC:UNITS command for a definition of the response.
SEE ALSO	TEC:UNITS

COMMAND	TEC:V?
INSTRUMENT	TC LAB, LDTC LAB
DESCRIPTION	Queries the actual voltage across the thermoelectric
SYNTAX	TEC:V?
DETAILS	Returns the actual value across the thermoelectric voltage in Volts.
EXAMPLES	If 2.9 is returned, 2.9 Volts are measured between the TEC+ and TEC- pins.
SEE ALSO	TEC:I, TEC:CABLER
MORE INFO	The displayed voltage can be modified to account for cable and connector resistance with a non-zero TEC:CABLER setting.

COMMAND	TEC:VALID?						
INSTRUMENT	TC LAB, LDTC LAB						
DESCRIPTION	Queries whether valid IntelliTune data is stored for the current sensor						
SYNTAX	TEC:VALID?						
DETAILS	<p>Returns the status of the stored data for the current sensor.</p> <table border="1"> <thead> <tr> <th>VALUE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Invalid (no valid data found)</td> </tr> <tr> <td>1</td> <td>Data stored</td> </tr> </tbody> </table>	VALUE	DESCRIPTION	0	Invalid (no valid data found)	1	Data stored
VALUE	DESCRIPTION						
0	Invalid (no valid data found)						
1	Data stored						
SEE ALSO	TEC:AUTOTUNE						
MORE INFO	Changing the sensor or a failed IntelliTune causes the bit to set to 0.						

COMMAND	TEC:VLIM			
INSTRUMENT	TC LAB, LDTC LAB			
DESCRIPTION	Sets the maximum internal voltage supply limit			
SYNTAX	TEC:VLIM <limit>			
DETAILS	ARGUMENT	INSTRUMENT	VALUE	DESCRIPTION
	<i>limit</i>	TC5 LAB	9 to 18	
		TC10 LAB Rev. A - C	9 to 18	
		TC10 LAB Rev. D	10 to 27	
		TC 15 LAB	10 to 27	
		LD2TC5 LAB	9 to 18	
		LD5TC10 LAB	9 to 18	
EXAMPLES	TEC:VLIM 12 sets the internal supply to 12 V, reducing the compliance voltage available to the thermoelectric.			
SEE ALSO	TEC:VLIM?			
MORE INFO	IntelliTune sets the voltage limit during its process. To achieve minimum time to temperature or maximum Disturbance Rejection, use the VLIM that was established during IntelliTune.			

COMMAND	TEC:VLIM?		
INSTRUMENT	TC LAB, LDTC LAB		
DESCRIPTION	Queries the internal voltage limit setting		
SYNTAX	TEC:VLIM?		
DETAILS	Returns the value of the internal voltage limit in Volts. See the TEC:VLIM command for a definition of the response.		
SEE ALSO	TEC:VLIM		

ERROR MESSAGES

Not all error messages shown below are applicable to all instruments. The error message seen may vary slightly based on whether the message is shown on the front panel of the instrument or queried remotely. The error number will be the same regardless of the retrieval method.

ERROR #	ERROR MESSAGE	DESCRIPTION
0	"No error"	
102	"Message too long"	Message is too long to process (USB only)
104	"Invalid radix"	The radix type/base number was not valid
123	"Path not found"	Command path not found
124	"Invalid format"	Data didn't match expected format
126	"Wrong number of arguments"	Wrong argument count for command
201	"Out of range"	Data specified is out of range
204	"Invalid number base prefix"	Invalid number base prefix
217	"Recall error"	Error recalling profile or profile not found
218	"Save error"	Error saving profile or profile not found
220	"Script save error"	Error saving script or script number not found
221	"Script reference error"	A script referenced another script
222	"Script runtime error"	Error executing script
223	"Too many sensors defined"	Too many user sensors defined
224	"Sensor not defined"	Specified sensor name not found
226	"Sensor not calibrated"	Sensor is not calibrated
227	"Invalid curve"	RTD calibration curve specified is invalid
228	"Sensor could not be created"	User sensor couldn't be created
232	"Sensor name length invalid"	Sensor name invalid (too long)
233	"Sensor is active"	Specified sensor is active
303	"Buffer Overflow"	Too many characters in text string
499	"Laser output disabled due to key switch"	Laser output disabled due to key switch
500	"Laser output disabled due to BNC interlock"	Laser output disabled due to BNC interlock
501	"Output interlocked" -or- "Laser output disabled due to D-SUB interlock"	Output turned off due to interlock (QCL LAB). Laser output disabled due to D-SUB interlock (LDTC LAB).
502	"Output turned off due to TEC sensor short"	TEC output turned off due to TEC sensor short
503	"Output turned off due to TEC sensor open"	TEC output turned off due to TEC sensor open
504	"OUTOFF bit turned off output"	The LAS:ENAB:OUTOFF register triggered output to be disabled
505	"Load open" -or- "TEC load open"	Open circuit detected, output turned off. (TC LAB and LDTC LAB report TEC open circuit, while QCL LAB reports laser open circuit with this error)
509	"Load short" -or- "TEC load short"	Short circuit detected, output turned off. (TC LAB and LDTC LAB report TEC short circuit, while QCL LAB reports laser short circuit with this error)
510	"TEC load temperature out of tolerance"	TEC load temperature out of tolerance
511	"Hardware error"	Hardware control error shut off output
514	"Sensor change. Output current disabled"	Configuration/mode change required output shutdown
537	"Internal overtemperature condition"	Internal overtemperature condition
538	"TEC output disabled due to upper temperature limit"	TEC output disabled due to upper temperature limit
539	"TEC output disabled due to lower temperature limit"	TEC output disabled due to lower temperature limit
540	" +5V power failure. Please contact the factory."	+5V power failure
541	"Laser load power supply failure. Please contact the factory."	Laser load power supply failure
542	"Laser control power supply failure. Please contact the factory."	Laser control power supply failure

ERROR #	ERROR MESSAGE	DESCRIPTION
543	"TEC load power supply failure. Please contact the factory."	TEC load power supply failure
544	"TEC control power supply failure. Please contact the factory."	TEC control power supply failure
550	"Laser disabled due to TEC output state"	Laser disabled due to TEC output state
551	"Laser disabled due to shorted TEC"	Laser disabled due to shorted TEC condition
552	"Laser disabled due to open TEC"	Laser disabled due to open TEC condition
553	"Laser disabled because temperature is not stable"	Laser disabled because temperature is not stable
554	"Laser disabled due to shorted temperature sensor"	Laser disabled due to shorted temperature sensor
555	"Laser disabled due to open temperature sensor"	Laser disabled due to open temperature sensor
556	"Laser disabled because temperature is above max limit"	Laser disabled because temperature is above the maximum temperature setting
557	"Laser disabled because temperature is below min limit"	Laser disabled because temperature is below the minimum temperature setting
570	"Laser load open"	Laser load open
571	"Laser load short"	Laser load short
572	"Laser load current out of tolerance"	Laser load current out of tolerance
574	"No PD transfer function specified"	No photodiode transfer function specified
600	"IntelliTune in progress"	IntelliTune scan in progress
601	"IntelliTune aborted"	IntelliTune aborted by user
602	"Zero value TEC current limit"	Zero value TEC current limit
603	"Insufficient TEC current limit"	Insufficient current limit to reach temperature setpoint
605	"Temperature going in the wrong direction. IntelliTune aborted"	Temperature going in the wrong direction. IntelliTune aborted
606	"IntelliTune response timeout"	IntelliTune timeout error
609	"Start IntelliTune with TEC output off"	Output must be off when beginning an IntelliTune scan
610	"Can't run IntelliTune in Manual Tuning mode"	Invalid IntelliTune mode
611	"IntelliTune not supported in physical units"	Invalid temperature units for IntelliTune scan
612	"Starting actual temperature was too close to setpoint"	Setpoint and actual temperature were too close to successfully complete IntelliTune scan
990	"Power supply not stable"	Power supply has not stabilized
991	"Not allowed while TEC output is on"	Not allowed while TEC output is on
993	"Invalid mnemonic"	Invalid string mnemonic for argument
994	"Instrument busy"	Cannot initiate a scan, a scan is already in progress
995	"Incorrect password"	Password for super-user is incorrect
996	"Access denied"	Privilege denied, must be a super user.
998	"Not supported"	Recognized command not supported by this instrument

TROUBLESHOOTING

PROBLEM	POTENTIAL CAUSES	SOLUTION
Ethernet connection to the instrument is lost.	NIMAX has timed out the connection.	If in Ethernet mode, using NIMAX, check the Keep Alive box if the computer will be inactive but connection to the instrument is still desired, otherwise the connection will time out.
Path Not Found error returned on string of commands. For example: LAS:LDI 0.327; LAS:LDI 0.491	Repeating the LAS: in the command line sent the parser looking for command LAS:LAS:LDI which doesn't exist.	In scripts or multiple command strings, the initial command path is applied to subsequent nested commands. Leave out LAS: in later commands. For example: LAS:LDI 0.327; LDI 0.491 is correct.
With USB cable attached to the instrument, the unit automatically powers up in remote mode. With an Ethernet cable attached, it does not.	This is normal expected behavior.	USB automatically enumerates any found device. Ethernet waits for commands to be issued to detect devices.
I changed the IP address of the instrument, but NIMAX is still not communicating.	The Ethernet cable may not be in place. The unit was not powered down after changing the settings.	Replace the Ethernet cable. Reboot the instrument by powering down at the rear panel.
I sent LAS:CABLER? 0.5 to set the cable resistance to 0.5Ω, but nothing happened.	If you pressed <i>Write</i> while sending a query, the answer is still pending. Check *STB? to see if Bit 4 (value 16) a message is available.	Issue a <i>Read</i> command from NIMAX to return the cable resistance value. Press the NIMAX <i>Query</i> button when sending a command that includes a ?. Press the Write button when sending data to the unit. LAS:CABLER 0.5 is correct.
I sent SCRIPT:GET? and it returned an out of range error.	The syntax for the command is SCRIPT:GET? <index> . The lack of index was interpreted as a zero. Scripts can be indexed 1-4 only.	Resend the command with the appropriate index.
I experienced a load short error. It displayed on screen, but did not set Bit 8 of the Laser Condition Status Register.	The instrument set the bit for the short time between error detection and the output current turning off. Once the output current is turned off, the short across the load does not register.	Check the LAS:EVE register to track this transient condition. This also applies to the Load Open error.
An error was triggered while I was controlling the unit remotely. The error wrote to the front panel screen. How do I erase the error message?	This is normal, expected behavior.	Send ERRSTR? or ERR? to clear the error queue and erase the error from the front panel. Alternatively, send a *CLS command or press the CLEAR button in NIMAX to clear the error queue and other registers.

WARRANTY & CERTIFICATION

LIFE SUPPORT POLICY

CERTIFICATION

Wavelength Electronics, Inc. (Wavelength) certifies that this product met its published specifications at the time of shipment. Wavelength further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, to the extent allowed by that organization's calibration facilities, and to the calibration facilities of other International Standards Organization members.

WARRANTY

This Wavelength product is warranted against defects in materials and workmanship for a period of one (1) year from date of shipment. During the warranty period, Wavelength will, at its option, either repair or replace products which prove to be defective. Warranty is void if label is removed from back panel.

WARRANTY SERVICE

For warranty service or repair, this product must be returned to the factory. An RMA is required for products returned to Wavelength for warranty service. The Buyer shall prepay shipping charges to Wavelength and Wavelength shall pay shipping charges to return the product to the Buyer upon determination of defective materials or workmanship. However, the Buyer shall pay all shipping charges, duties, and taxes for products returned to Wavelength from another country.

LIMITATIONS OF WARRANTY

The warranty shall not apply to defects resulting from improper use or misuse of the product or operation outside published specifications. Warranty for the QCL instrument is invalid if the instrument cover has been removed for any reason. No other warranty is expressed or implied. Wavelength specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

EXCLUSIVE REMEDIES

The remedies provided herein are the Buyer's sole and exclusive remedies. Wavelength shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

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Buyer, End-User, or Third-Party Reseller are expressly prohibited from reverse engineering, decompiling, or disassembling this product.

NOTICE

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SAFETY

There are no user-serviceable parts inside this product. Return the product to Wavelength Electronics for service and repair to ensure that safety features are maintained.

This important safety information applies to all Wavelength electrical and electronic products and accessories:

As a general policy, Wavelength Electronics, Inc. does not recommend the use of any of its products in life support applications where the failure or malfunction of the Wavelength product can be reasonably expected to cause failure of the life support device or to significantly affect its safety or effectiveness. Wavelength will not knowingly sell its products for use in such applications unless it receives written assurances satisfactory to Wavelength that the risks of injury or damage have been minimized, the customer assumes all such risks, and there is no product liability for Wavelength. Examples of devices considered to be life support devices are:

neonatal oxygen analyzers, nerve stimulators (for any use), auto-transfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, ventilators of all types, and infusion pumps as well as other devices designated as "critical" by the FDA. The above are representative examples only and are not intended to be conclusive or exclusive of any other life support device.

TECHNICAL SUPPORT & CONTACT INFORMATION



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REVISION HISTORY

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REVISION	DATE	NOTES
D	August 2017	Updated for TC15 LAB
E	September 2019	Updated for LDTC LAB
F	February 2021	Updated *RST & *RCL commands
G	November 2023	Updated CONST:THERM command
H	February 2024	Updated TEC:VLIM command