Appendix – SCPI command
(Customer version)
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Amonics Limited
Tel: (852) 2428 9723 Fax: (852) 2428 9704 Email: contact@amonics.com

Revision History

Revision	Date (DD-MM-YYYY)	Summary
V2.02	22-9-2015	Examples for controlling device are included.
V2.03	8-4-2016	Updated in special function.

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Tel: (852) 2428 9723 Fax: (852) 2428 9704 Email: contact@amonics.com

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SCPI Command

The Remote Software Program serves as a Demonstration Program to facilitate quick access to the remote control and monitoring capabilities of the product. Advanced users may modify the Remote Software Program using LabVIEW™ SDK, or write a separate program using the following SCPI protocol. Since SCPI commands are ASCII String-based commands, users can use various kinds of programming languages, such as Visual Basic, C, Java, etc. to develop the program.

Definition

A packet of SCPI protocol begins with a Colon ':' (0x3A) and ends with a Carriage Return (0x0D).

Important Notes

1. Lower case letters are for reading only, they are **NOT** used in the protocol
2. Any command must be sent completely within 500ms (measured from ":" to Carriage Return "0x0D")
3. A delay should be inserted between successive SCPI commands. The recommended minimum delay time for is 10ms.

Application Design

1. When using commands that set parameters to certain states/values, you may use the corresponding read back command to determine whether the intended state/value has been successfully set.
2. Suggested implementation is as follows:

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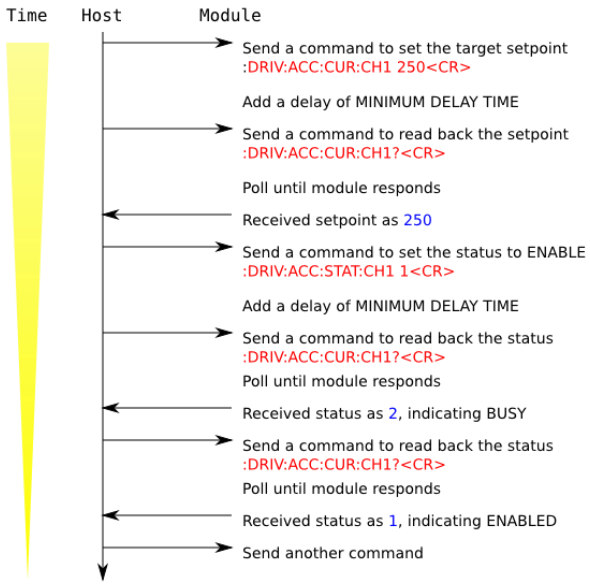

3. The polling time for querying the states/value varies with different commands but the recommended minimum polling time is 100ms.
4. User is recommended to implement a timeout procedure for SCPI replies. When there is no reply after the timeout, the program should consider that there is a communication problem with the product.

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1.DRIVing

1.1 SET-POINT

:DRIVing:<mode>:CURrent:CH1 <value>

Description	▪ Set the driving set-point (mA/mW) of the specified <mode> for the specified channel
Parameters	▪ Decimal Number (may be in scientific notation)
Response	▪ None
Remarks	▪ Get <mode> via :READ:MODE:NAMES? ▪ When switch mode is available, and current mode does not match the specified mode, the command is ignored

- Example:

```
:DRIV:ACC:CUR:CH1 104
```

:DRIVing:<mode>:CURrent:CH1?

Description	▪ Get the driving set-point (mA/mW) of the specified <mode> for the specified channel
Parameters	▪ None
Response	▪ Decimal Number in scientific notation
Remarks	▪ Get <mode> via :READ:MODE:NAMES? ▪ When switch mode is available, and current mode does not match the specified mode, the command is ignored

- Example:

```
:DRIV:ACC:CUR:CH1?
0.000000e+00
```


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:DRIVing:<mode>:STATus:CH1 <value>

Description	▪ Set the driving status of the specified <mode> for the specified channel
Parameters	▪ 0 means ON ▪ 1 means OFF
Response	▪ None
Remarks	▪ Get <mode> via :READ:MODE:NAMES? ▪ When switch mode is available, and current mode does not match the specified mode, the command is ignored ▪ Laser status may become BUSY for about 2 sec before the laser is fully enabled/disabled

- Example:

```
:DRIV:ACC:STAT:CH1 1
```

:DRIVing:<mode>:STATus:CH1?

Description	▪ Get driving status of the specified <mode> for the specified channel
Parameters	▪ None
Response	▪ 0 means OFF ▪ 1 means ON ▪ 2 means BUSY ▪ 4 means LOCK
Effect	▪ None
Remarks	▪ Get <mode> via :READ:MODE:NAMES? ▪ When switch mode is available, and current mode does not match the specified mode, the command is ignored ▪ LOCK state are caused by alarms such as Interlock, TEC overheat, Loss of Input ,Case Temp., and etc

- Example:

```
:DRIV:ACC:STAT:CH1?
0
```


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:DRIVing:INTERLOCK?

Description	▪ Get the interlock status
Parameters	▪ None
Response	▪ 0 means interlock is not active ▪ 1 means interlock is active

- Example:

```
:DRIV:INTERLOCK?
1
```

:DRIVing:MasterCTRL <value>

Description	▪ Set the master control switch
Parameters	▪ 0 means OFF ▪ 1 means ON
Response	▪ None
Remarks	▪ Master switch status may become BUSY for about several seconds before all lasers are fully enabled/disabled

- Example:

```
:DRIV:MCTRL 1
```

:DRIVing:MasterCTRL?

Description	▪ Get the master control switch status
Parameters	▪ None
Response	▪ 0 means switch is OFF ▪ 1 means switch is ON ▪ 2 means switch is BUSY

- Example:

```
:DRIV:MCTRL?
1
```


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:DRIVing:SEED_STablising?

Description	▪ Get the seed power stabilizing status
Parameters	▪ None
Response	▪ 0 means the seed power is stabled ▪ 1 means the seed power is stablizing

- Example:

```
:DRIV:SEED_ST?

1
```


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1.2 LIMIT

:DRIVing:LIMIT:POWer:OUTput:MAXimum <value>

Description	▪ Set the maximum limit for output power (mW)
Parameters	▪ Base-10 Integer (0 ~ 65535)
Response	▪ None
Remarks	▪ Changing this value will limit the adjustable range of driving set-point

- Example:

```
:DRIV:LIMIT:POW:OUT:MAX 10000
```

:DRIVing:LIMIT:POWer:OUTput:MAXimum?

Description	▪ Get the maximum limit for output power (mW)
Parameters	▪ None
Response	▪ Base-10 Integer (0 ~ 65535)

- Example:

```
:DRIV:LIMIT:POW:OUT:MAX?

10000
```


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1.3 PLL

:DRIVing:PLL:STATus <value>

Description	▪ Set the status of PLL
Parameters	▪ 0 means OFF ▪ 1 means ON
Response	▪ None
Remarks	▪ The command is currently available in "afsfl_pm_1560_r" project only

- Example:

```
:DRIV:PLL:STAT 0
```

:DRIVing:PLL:STATus?

Description	▪ Get the status of PLL
Parameters	▪ None
Response	▪ 0 means PLL is OFF ▪ 1 means PLL is ON ▪ 2 means PLL is LOCKED
Remarks	▪ The command is currently available in "afsfl_pm_1560_r" project only

- Example:

```
:DRIV:PLL:STAT?
1
```


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2. MODE

2.1 SWITCH

:MODE:SWitch:CH1 <string_value>

Description	▪ Switch the laser control mode of the specified channel
Parameters	▪ ASCII string, defined in :READ:MODE:NAMES?
Response	▪ None
Effect	▪ Switch mode status, Driving status and Driving values of lasers

- Example:

```
:MODE:SW:CH1 ACC
```

:MODE:SWitch:CH1?

Description	▪ Get the current laser control mode of the specified channel
Parameters	▪ None
Response	▪ ASCII string, defined in :READ:MODE:NAMES? ▪ When switch mode is in progress, the ASCII string "BUSY" is returned
Effect	▪ None

- Example:

```
:MODE:SW:CH1?
ACC
```


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3. READ

3.1 CHANNEL

:READ:CHannel:DRIVing:<mode>?

Description	▪ Get the maximum number of driving current channels accessible in the specified mode
Parameters	▪ None
Response	▪ Base-10 Integer (0 ~ 65535)
Remarks	▪ Get <mode> via :READ:MODE:NAMES?

- Example:

```
:READ:CH:DRIV:ACC?
2
```

:READ:CHannel:CURrent?

Description	▪ Get the maximum number of feedback current channels accessible
Parameters	▪ None
Response	▪ Base-10 Integer (0 ~ 65535)

- Example:

```
:READ:CH:CUR?
2
```


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:READ:CHannel:POWer:INput?

Description	▪ Get the maximum number of input power channels accessible
Parameters	▪ None
Response	▪ Base-10 Integer (0 ~ 65535)

- Example:

```
:READ:CH:POW:IN?
2
```

:READ:CHannel:POWer:OUTput?

Description	▪ Get the maximum number of output power channels accessible
Parameters	▪ None
Response	▪ Base-10 Integer (0 ~ 65535)

- Example:

```
:READ:CH:POW:OUT?
2
```

:READ:CHannel:POWer:PhotoDiode?

Description	▪ Get the maximum number of photo diode power (internal PD) channels accessible
Parameters	▪ None
Response	▪ Base-10 Integer (0 ~ 65535)

- Example:

```
:READ:CH:POW:PD?
2
```


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:READ:CHannel:TEMPerature:BOX?

Description	▪ Get the maximum number of Case Temperature accessible
Parameters	▪ None
Response	▪ Base-10 Integer (0 ~ 65535)

- Example:

```
:READ:CH:TEMP:BOX?
1
```

:READ:CHannel:TEMPerature:FiberChamber?

Description	▪ Get the maximum number of Fiber Chamber Temperature accessible
Parameters	▪ None
Response	▪ Base-10 Integer (0 ~ 65535)

- Example:

```
:READ:CH:TEMP:FC?
1
```


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:READ:CHannel:TEMPerature:TEC?

Description	▪ Get the maximum number of Pump TEC channels accessible
Parameters	▪ None
Response	▪ Base-10 Integer (0 ~ 65535)

- Example:

```
:READ:CH:TEMP:TEC?
2
```

:READ:CHannel:VOLTage:PowerSupply?

Description	▪ Get the maximum number of power supply voltage accessible
Parameters	▪ None
Response	▪ Base-10 Integer (0 ~ 65535)

- Example:

```
:READ:CH:VOLT:PS?
1
```


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3.2 DRIVING

:READ:DRIV:MAX:<mode>:CH1?

Description	▪ Get the maximum driving current of the specified channel in the specified mode
Parameters	▪ None
Response	▪ Decimal Number in scientific notation ▪ Unit is specified by :READ:DRIV:UNIT:<mode>:CH1?
Remarks	▪ Get <mode> via :READ:MODE:NAMES?

- Example:

```
:READ:DRIV:MAX:ACC:CH1?

2.500000e+02
```

:READ:DRIV:MIN:<mode>:CH1?

Description	▪ Get the minimum driving current of the specified channel in the specified mode
Parameters	▪ None
Response	▪ Decimal Number in scientific notation ▪ Unit is specified by :READ:DRIV:UNIT:<mode>:CH1?
Remarks	▪ Get <mode> via :READ:MODE:NAMES?

- Example:

```
:READ:DRIV:MIN:ACC:CH1?

0.000000e+00
```


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:READ:DRIV:STEP:<mode>:CH1?

Description	▪ Get the step size for which the driving set point should change
Parameters	▪ None
Response	▪ Decimal Number in scientific notation ▪ Unit is specified by :READ:DRIV:UNIT:<mode>:CH1?
Remarks	▪ Get <mode> via :READ:MODE:NAMES?

- Example:

```
:READ:DRIV:STEP:ACC:CH1?
1.000000e+00
```

:READ:DRIV:LO_MARGIN:<mode>:CH1?

Description	▪ Get the lower margin of driving current of the specified channel in the specified mode
Parameters	▪ None
Response	▪ Decimal Number in scientific notation ▪ Unit is specified by :READ:DRIV:UNIT:<mode>:CH1?
Remarks	▪ Get <mode> via :READ:MODE:NAMES?

- Example:

```
:READ:DRIV:LO_MARGIN:ACC:CH1?
1.000000e+02
```


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:READ:DRIV:NAME:<mode>:CH1?

Description	▪ Get the name of the driving channel (e.g. 0, 1, 2, ..., C, L, 1310, 1550)
Parameters	▪ None
Response	▪ ASCII String
Remarks	▪ Get <mode> via :READ:MODE:NAMES?

- Example:

```
:READ:DRIV:NAME:ACC:CH1?

C
```

:READ:DRIV:UNIT:<mode>:CH1?

Description	▪ Get the units of the driving channel
Parameters	▪ None
Response	▪ ASCII String
Remarks	▪ Get <mode> via :READ:MODE:NAMES?

- Example:

```
:READ:DRIV:UNIT:ACC:CH1?

mA
```


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4. MODE

:READ:MODE:NAMES?

Description	▪ Get the list of laser control mode names (e.g. ACC, APC, AGC, etc)
Parameters	▪ None
Response	▪ Space-separated ASCII string

- Example:

```
:READ:MODE:NAMES?

ACC APC AGC
```

:READ:MODE:CH?

Description	▪ Get the number of switchable channels
Parameters	▪ None
Response	▪ Base-10 Integer (0 ~ 65535)

- Example:

```
:READ:MODE:CH?

1
```


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5. THRESHOLD

:READ:THREShold:SET:CURrent:OVER?

Description	▪ Get the maximum number of current alarm set
Parameters	▪ None
Response	▪ Base-10 Integer (0 ~ 65535)

- Example:

```
:READ:THRES:SET:CUR:OVER?

1
```

:READ:THREShold:SET:POWer:INput?

Description	▪ Get the maximum number of Input Power Threshold set
Parameters	▪ None
Response	▪ Base-10 Integer (0 ~ 65535)

- Example:

```
:READ:THRES:SET:POW:IN?

2
```

:READ:THREShold:SET:POWer:OUTput?

Description	▪ Get the maximum number of OUTput Power Threshold set
Parameters	▪ None
Response	▪ Base-10 Integer (0 ~ 65535)

- Example:

```
:READ:THRES:SET:POW:OUT?

1
```


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6. SENSe

6.1 CURRENT

:SENSe:CURrent:CH1?

Description	▪ Get the existing current value (in mA) of the specified channel
Parameters	▪ None
Response	▪ Decimal Number in scientific notation

- Example:

```
:SENS:CUR:CH1?
7.180000e+02
```

6.2 POWER (For special functions such as SEED power, MID-STAGE power, power reflection, please refer to the SPECIAL FUNCTION)

:SENSe:POWer:INput:CH1?

Description	▪ Get the existing input power value (in mW) of the specified channel
Parameters	▪ None
Response	▪ Decimal Number in scientific notation

- Example:

```
:SENS:POW:IN:CH1?
9.010000e+02
```


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:SENSe:POWer:OUTput:CH1?

Description	▪ Get the existing output power value (in mW) of the specified channel
Parameters	▪ None
Response	▪ Decimal Number in scientific notation

- Example:

```
:SENS:POW:OUT:CH1?

3.060000e+02
```

:SENSe:POWer:PhotoDiode:CH1?

Description	▪ Get the existing photo diode power (Internal PD) value (in mW) of the specified channel
Parameters	▪ None
Response	▪ Decimal Number in scientific notation

- Example:

```
:SENS:POW:PD:CH1?

9.010000e+02
```


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6.3 TEMPERATURE

:SENSe:TEMPerature:BOX?

Description	▪ Get the existing Case Temperature value in (oC)
Parameters	▪ None
Response	▪ Decimal Number in scientific notation

- Example:

```
:SENS:TEMP:BOX?

3.131733e+01
```

:SENSe:TEMPerature:FiberChamber?

Description	▪ Get the existing Fiber Chamber Temperature value in (oC)
Parameters	▪ None
Response	▪ Decimal Number in scientific notation

- Example:

```
:SENS:TEMP:FC?

3.131733e+01
```

:SENSe:TEMPerature::TEC:CH1?

Description	▪ Get the existing TEC value of the specified channel in (oC)
Parameters	▪ None
Response	▪ Decimal Number in scientific notation

- Example:

```
:SENS:TEMP:TEC:CH1?

2.417492e+01
```


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6.4 INTERLOCK

:THREShold:INTERLOCK:UNLOCK <value>

Description	▪ Unlock lasers after a Interlock event
Parameters	▪ 1 means unlock
Response	▪ None
Effect	▪ Laser status can be adjusted by user again
Remarks	▪ Lasers can only be unlocked when Interlock is not in lock position

- Example:

```
:THRES:INTERLOCK:UNLOCK 1
```

:THREShold:INTERLOCK:UNLOCK?

Description	▪ Check whether lasers can be unlock from a Interlock event
Parameters	▪ None
Response	▪ 0 means cannot be unlocked ▪ 1 means can be unlocked

- Example:

```
:THRES:INTERLOCK:UNLOCK?

1
```


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6.5 VOLTAGE

:SENSe:VOLTage:PowerSupply?

Description	▪ Get the existing power supply voltage value (in V)
Parameters	▪ None
Response	▪ Decimal Number in scientific notation
Effect	▪ None

- Example:

```
:SENS:VOLT:PS?
5.217492e+00
```

6.6 THRESHOLD

:SENSe:THREShold:ALARM:POWer:INput:LOS:CH1?

Description	▪ Get the non-latched loss of input power alarm flag for the specified channel
Parameters	▪ None
Response	▪ 0 means alarm off ▪ 1 means alarm on
Remark	▪ This command should not be confused with :THREShold:POWer:INput:ACTive:CH1?, which indicates when IPD is active AND laser is disabled

- Example:

```
:SENS:THRES:ALARM:POW:IN:LOS:CH1?
1
```


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:SENSe:THREShold:ALARM:POWer:INput:LOS:CH1:LATCH?

Description	▪ Get the latched loss of input signal alarm flag for the specified channel
Parameters	▪ None
Response	▪ 0 means alarm off ▪ 1 means alarm on
Effect	▪ Latched flag will be auto-cleared upon read
Remark	▪ This command should not be confused with :THREShold:POWer:INput:ACTive:CH1?, which indicates when IPD is active AND laser is disabled

- Example:

```
:SENS:THRES:ALARM:POW:IN:LOS:CH1:LATCH?
1
```

:SENSe:THREShold:ALARM:POWer:INput:OVER:CH1?

Description	▪ Get the non-latched over input signal alarm flag for the specified channel
Parameters	▪ None
Response	▪ 0 means alarm off ▪ 1 means alarm on
Remark	▪ This command should not be confused with :THREShold:POWer:INput:ACTive:CH1?, which indicates when IPD is active AND laser is disabled

- Example:

```
:SENS:THRES:ALARM:POW:IN:OVER:CH1?
1
```


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:SENSe:THREShold:ALARM:POWer:INput:OVER:CH1:LATCH?

Description	▪ Get the latched over input signal alarm flag for the specified channel
Parameters	▪ None
Response	▪ 0 means alarm off ▪ 1 means alarm on
Effect	▪ Latched flag will be auto-cleared upon read
Remark	▪ This command should not be confused with :THREShold:POWer:INput:ACTive:CH1?, which indicates when IPD is active AND laser is disabled

- Example:

```
:SENS:THRES:ALARM:POW:IN:OVER:CH1:LATCH?
1
```

:SENSe:THREShold:ALARM:CURrent:OVER?

Description	▪ Get the non-latched current alarm flag
Parameters	▪ None
Response	▪ 0 means alarm off ▪ 1 means alarm on

- Example:

```
SENS:THRES:ALARM:CUR:OVER?
1
```


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:SENSe:THREShold:ALARM:CURrent:OVER:LATCH?

Description	▪ Get the latched current alarm flag
Parameters	▪ None
Response	▪ 0 means alarm off ▪ 1 means alarm on
Effect	▪ Latched flag will be auto-cleared upon read

- Example:

```
SENS:THRES:ALARM:CUR:OVER:LATCH?

1
```

:SENSe:THREShold:ALARM:TEMPerature:BOX?

Description	▪ Get the non-latched Case Temperature alarm flag
Parameters	▪ None
Response	▪ 0 means alarm off ▪ 1 means alarm on

- Example:

```
:SENS:THRES:ALARM:TEMP:BOX?

1
```

:SENSe:THREShold:ALARM:TEMPerature:BOX:LATCH?

Description	▪ Get the latched Case Temperature alarm flag
Parameters	▪ None
Response	▪ 0 means alarm off ▪ 1 means alarm on
Effect	▪ Latched flag will be auto-cleared upon read

- Example:

```
:SENS:THRES:ALARM:TEMP:BOX:LATCH?

1
```


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:SENSe:THREShold:ALARM:TEMPerature:FiberChamber?

Description	▪ Get the non-latched fiber chamber alarm flag
Parameters	▪ None
Response	▪ 0 means READY ▪ 1 means FAIL ▪ 2 means OFF

- Example:

```
:SENS:THRES:ALARM:TEMP:FC?

1
```

:SENSe:THREShold:ALARM:TEMPerature:TEC:WARN?

Description	▪ Get the non-latched TEC warning alarm flag
Parameters	▪ None
Response	▪ 0 means alarm off ▪ 1 means alarm on
Effect	▪ None

- Example:

```
:SENS:THRES:ALARM:TEMP:TEC:WARN?

1
```


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:SENSe:THREShold:ALARM:TEMPerature:TEC:WARN:LATCH?

Description	▪ Get the latched TEC warning alarm flag
Parameters	▪ None
Response	▪ 0 means alarm off ▪ 1 means alarm on
Effect	▪ Latched flag will be auto-cleared upon read

- Example:

```
:SENS:THRES:ALARM:TEMP:TEC:WARN:LATCH?

1
```

:SENSe:THREShold:ALARM:TEMPerature:TEC:OVER?

Description	▪ Get the non-latched TEC overheat alarm flag
Parameters	▪ None
Response	▪ 0 means alarm off ▪ >0 means alarm on for the specified channel
Effect	▪ None

- Example:

```
:SENS:THRES:ALARM:TEMP:TEC:OVER?

1
```


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:SENSe:THREShold:ALARM:TEMPerature:TEC:OVER:LATCH?

Description	▪ Get the latched TEC overheat alarm flag
Parameters	▪ None
Response	▪ 0 means alarm off ▪ >0 means alarm on for the specified channel
Effect	▪ Latched flag will be auto-cleared upon read

- Example:

```
:SENS:THRES:ALARM:TEMP:TEC:OVER:LATCH?

1
```

:SENSe:THREShold:ALARM:VOLTage:PowerSupply?

Description	▪ Get the non-latched power supply alarm flag
Parameters	▪ None
Response	▪ 0 means alarm off ▪ 1 means alarm on

- Example:

```
:SENS:THRES:ALARM:VOLT:PS?

1
```

:SENSe:THREShold:ALARM:VOLTage:PowerSupply:LATCH?

Description	▪ Get the latched power supply alarm flag
Parameters	▪ None
Response	▪ 0 means alarm off ▪ 1 means alarm on
Effect	▪ Latched flag will be auto-cleared upon read

- Example:

```
:SENS:THRES:ALARM:VOLT:PS:LATCH?

1
```


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7. THREShold

7.1 INPUT POWER

:THREShold:POWer:INput:ACTive:CH1?

Description	▪ Check whether Input Power Detection is active for the specified channel (i.e. laser is disabled due to IPD)
Parameters	▪ None
Response	▪ 1 means IPD is active ▪ 0 means IPD not active
Remarks	▪ This command should not be confused with ▪ :SENS:THRES:ALARM:POW:IN:LOS:CH1?, ▪ :SENS:THRES:ALARM:POW:IN:LOS:CH1:LATCH?, ▪ :SENS:THRES:ALARM:POW:IN:OVER:CH1?, ▪ :SENS:THRES:ALARM:POW:IN:OVER:CH1:LATCH?, which indicate whether IPD is active only (laser may not be disabled)

- Example:

```
:THRES:POW:IN:ACT:CH1?
1
```


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:THREShold:POWer:INput:STATus:SET1 <value>

Description	▪ Enable/Disable Input Power Detection Features for the specified set
Parameters	▪ 1 means enable IPD ▪ 0 means disable IPD
Response	▪ None
Effect	▪ Lasers under monitored will be disabled when input power exceed the threshold level ▪ The IPD status will be saved in non-volatile memory

- Example:

```
:THRES:POW:IN:STAT:SET1 1
```

:THREShold:POWer:INput:STATus:SET1?

Description	▪ Get the IPD Status for the specified set
Parameters	▪ None
Response	▪ 1 means IPD enabled ▪ 0 means IPD disabled

- Example:

```
:THRES:POW:IN:STAT:SET1?
1
```


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:THREShold:POWer:INput:LEVel:SET1 <value>

Description	▪ Set the IPD Threshold level for the specified set in dBm (to the nearest discrete level)
Parameters	▪ Decimal Number (may be in scientific notation)
Response	▪ None
Effect	▪ Lasers under monitored will be disabled when input power exceed the threshold level ▪ The IPD Threshold level will be saved in non-volatile memory

- Example:

```
:THRES:POW:IN:LEV:SET1 -15
```

:THREShold:POWer:INput:LEVel:SET1?

Description	▪ Get the IPD Threshold level for the specified set in dBm
Parameters	▪ None
Response	▪ Decimal Number in scientific notation

- Example:

```
:THRES:POW:IN:LEV:SET1?

-1.500000E-01
```


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7.2 OUTPUT POWER

:THREShold:POWer:OUTput:STATus:SET1 <value>

Description	▪ Enable/Disable Output Power Detection Features for the specified set
Parameters	▪ 1 means enable OPD ▪ 0 means disable OPD
Response	▪ None
Effect	▪ Lasers under monitored will be disabled when output power exceed the range setting
Remarks	▪ The current output power level will be saved as the reference power level ▪ User is expected to correctly set the output power level before activating this function

- Example:

```
:THRES:POW:out:STAT:SET1 1
```

:THREShold:POWer:OUTput:STATus:SET1?

Description	▪ Get the OPD Status for the specified set
Parameters	▪ None
Response	▪ 1 means OPD enabled ▪ 0 means OPD disabled

- Example:

```
:THRES:POW:OUT:STAT:SET1?
0
```


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:THREShold:POWer:OUTput:RANGE:SET1 <value>

Description	▪ Set the OPD Range in % of the reference power for the specified set
Parameters	▪ Decimal Number (may be in scientific notation) from 0.0 to 100.0
Response	▪ None
Effect	▪ Lasers under monitored will be disabled when output power exceed the range setting

- Example:

```
:THRES:POW:OUT:RANGE:SET1 20
```

:THREShold:POWer:OUTput:RANGE:SET1?

Description	▪ Get the OPD range setting in % for the specified set
Parameters	▪ None
Response	▪ Decimal Number in scientific notation

- Example:

```
:THRES:POW:OUT:RANGE:SET1?

2.000000E+01
```


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:THREShold:POWer:OUTput:RANGE_MINimun:SET1 <value>

Description	▪ Set the minimum value of OPD Range (in % of the reference power) for the specified set
Parameters	▪ Decimal Number (may be in scientific notation) from 0.0 to 100.0
Response	▪ None
Effect	▪ The OPD range (in %) can not be less than the value set by this command

- Example:

```
:THRES:POW:OUT:RANGE_MIN:SET1 10
```

:THREShold:POWer:OUTput:RANGE_MINimum:SET1?

Description	▪ Get the minimum OPD range setting in % for the specified set
Parameters	▪ None
Response	▪ Decimal Number in scientific notation (0.0 - 100.0)

- Example:

```
:THRES:POW:OUT:RANGE_MIN:SET1?

1.000000E+01
```


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:THREShold:POWer:OUTput:RANGE_MAXimun:SET1 <value>

Description	▪ Set the maximum value of OPD Range (in % of the reference power) for the specified set
Parameters	▪ Decimal Number (may be in scientific notation) from 0.0 to 100.0
Response	▪ None
Effect	▪ The OPD range (in %) can not be larger than the value set by this command

- Example:

```
:THRES:POW:OUT:RANGE_MAX:SET1 80
```

:THREShold:POWer:OUTput:RANGE_MAXimum:SET1?

Description	▪ Get the maximum OPD range setting in % for the specified set
Parameters	▪ None
Response	▪ Decimal Number in scientific notation (0.0 - 100.0)

- Example:

```
:THRES:POW:OUT:RANGE_MAX:SET1?
8.000000E+01
```


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:THREShold:POWer:OUTput:REFerence:SET1?

Description	▪ Get the OPD reference power setting in mW for the specified set
Parameters	▪ None
Response	▪ Decimal Number in scientific notation

- Example:

```
:THRES:POW:OUT:REF:SET1?
```

:THREShold:POWer:OUTput:TIME <value>

Description	▪ Set the OPD auto-start time (in seconds)
Parameters	▪ Decimal Number (may be in scientific notation)
Response	▪ None
Effect	▪ The OPD module will be automatically started after the set time upon last change in set-point.

- Example:

```
:THRES:POW:OUT:TIME 60
```

:THREShold:POWer:OUTput:TIME?

Description	▪ Get the OPD auto-start time (in seconds)
Parameters	▪ None
Response	▪ Decimal Number in scientific notation

- Example:

```
:THRES:POW:OUT:TIME?
6.000000E+01
```


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7.3 CURRENT

:THREShold:CURrent:OVER:STATus <value>

Description	▪ Enable/Disable Current Alarm Features
Parameters	▪ 1 means enable detection ▪ 0 means disable detection
Response	▪ None

- Example:

```
:THRES:CUR:OVER:STAT 1
```

:THREShold:CURrent:OVER:STATus?

Description	▪ Get the status of Current Alarm Detection
Parameters	▪ None
Response	▪ 1 means enabled ▪ 0 means disabled

- Example:

```
:THRES:CUR:OVER:STAT?
1
```


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:THREShold:CURrent:OVER:LEVel:SET1 <value>

Description	▪ Set the current alarm threshold level in mA for the specified set
Parameters	▪ Decimal Number (may be in scientific notation)
Response	▪ None

- Example:

```
:THRES:CUR:OVER:LEV:SET1 280
```

:THREShold:CURrent:OVER:LEVel:SET1?

Description	▪ Get the current alarm threshold level in mA for the specified set
Parameters	▪ None
Response	▪ Decimal Number in scientific notation
Effect	▪ None

- Example:

```
:THRES:CUR:OVER:LEV:SET1?
2.800000e+02
```


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7.4 OUTPUT BACK REFLECTION (OBR)

:THREShold:OBR:OVER:STATus <value>

Description	▪ Enable/Disable OBR Alarm Features
Parameters	▪ 1 means enable detection ▪ 0 means disable detection
Response	▪ None

- Example:

```
:THRES:OBR:OVER:STAT 1
```

:THREShold:OBR:OVER:STATus?

Description	▪ Get the status of OBR Alarm Detection
Parameters	▪ None
Response	▪ 1 means enabled ▪ 0 means disabled

- Example:

```
:THRES:OBR:OVER:STAT?
1
```


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:THREShold:OBR:OVER:LEVel:SET1 <value>

Description	▪ Set the OBR alarm threshold level in dBm for the specified set
Parameters	▪ Decimal Number (may be in scientific notation)
Response	▪ None

- Example:

```
:THRES:OBR:OVER:LEV:SET1 -15
```

:THREShold:OBR:OVER:LEVel:SET1?

Description	▪ Get the OBR alarm threshold level in dBm for the specified set
Parameters	▪ None
Response	▪ Decimal Number in scientific notation
Effect	▪ None

- Example:

```
:THRES:OBR:OVER:LEV:SET1?
-1.500000e+01
```


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7.5 CASE TEMPERATURE

:THREShold:TEMPerature:BOX:STATus <value>

Description	▪ Enable/Disable Case Temperature Detection Features
Parameters	▪ 1 means enable detection ▪ 0 means disable detection
Response	▪ None

- Example:

```
:THRES:TEMP:BOX:STAT 1
```

:THREShold:TEMPerature:BOX:STATus?

Description	▪ Get the status of Case Temperature Detection
Parameters	▪ None
Response	▪ 1 means enabled ▪ 0 means disabled

- Example:

```
:THRES:TEMP:BOX:STAT?
1
```

:THREShold:TEMPerature:BOX:MINimum <value>

Description	▪ Set the minimum threshold for Case Temperature Detection in (oC)
Parameters	▪ Decimal Number (may be in scientific notation)
Response	▪ None

- Example:

```
:THRES:TEMP:BOX:MIN 10
```


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:THREShold:TEMPerature:BOX:MINimum?

Description	▪ Get the minimum threshold for Case Temperature Detection in (oC)
Parameters	▪ None
Response	▪ Decimal Number in scientific notation
Effect	▪ None

- Example:

```
:THRES:TEMP:BOX:MIN?
1.000000e+01
```

:THREShold:TEMPerature:BOX:MAXimum <value>

Description	▪ Set the maximum threshold for Case Temperature Detection in (oC)
Parameters	▪ Decimal Number (may be in scientific notation)
Response	▪ None

- Example:

```
:THRES:TEMP:BOX:MAX 60
```

:THREShold:TEMPerature:BOX:MAXimum?

Description	▪ Get the maximum threshold for Case Temperature Detection in (oC)
Parameters	▪ None
Response	▪ Decimal Number in scientific notation

- Example:

```
:THRES:TEMP:BOX:MAX?
6.000000e+01
```


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7.6 FIBER CHAMBER TEMPERATURE

:THREShold:TEMPerature:FiberChamber:STATus <value>

Description	▪ Enable/Disable Fiber Chamber Temperature Features
Parameters	▪ 1 means turn ON ▪ 0 means turn OFF
Response	▪ None

- Example:

```
:THRES:TEMP:FC:STAT 1
```

:THREShold:TEMPerature:FiberChamber:STATus?

Description	▪ Get the status of Fiber Chamber Temperature
Parameters	▪ None
Response	▪ 1 means ON ▪ 0 means OFF

- Example:

```
:THRES:TEMP:FC:STAT?
1
```


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:THREShold:TEMPerature:FiberChamber:MAXimum <value>

Description	▪ Set the maximum threshold for Fiber Chamber Temperature Detection in (oC)
Parameters	▪ Decimal Number (may be in scientific notation)
Response	▪ None

- Example:

```
:THRES:TEMP:FC:MAX 50
```

:THREShold:TEMPerature:FiberChamber:MAXimum?

Description	▪ Get the maximum threshold for Fiber Chamber Temperature Detection in (oC)
Parameters	▪ None
Response	▪ Decimal Number in scientific notation

- Example:

```
:THRES:TEMP:FC:MAX?

5.000000e+01
```


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7.7 TEC

:THREShold:TEMPerature:TEC:OVER:UNLOCK <value>

Description	▪ Unlock lasers after a TEC overheat event
Parameters	▪ 1 means unlock
Response	▪ None
Effect	▪ Laser status can be adjusted by user again
Remarks	▪ Lasers can only be unlocked when no lasers are overheating

- Example:

```
:THRES:TEMP:TEC:OVER:UNLOCK 1
```

:THREShold:TEMPerature:TEC:OVER:UNLOCK?

Description	▪ Check whether lasers can be unlock from a TEC overheat
Parameters	▪ None
Response	▪ 0 means cannot be unlocked ▪ 1 means can be unlocked

- Example:

```
:THRES:TEMP:TEC:OVER:UNLOCK?
 1
```


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7.8 VOLTAGE

:THREShold:VOLTage:PowerSupply:STATus <value>

Description	▪ Enable/Disable Power Supply Detection Features
Parameters	▪ 1 means enable detection ▪ 0 means disable detection
Response	▪ None

- Example:

```
:THRES:VOLT:PS:STAT 1
```

:THREShold:VOLTage:PowerSupply:STATus?

Description	▪ Get the status of Power Supply Detection
Parameters	▪ None
Response	▪ 1 means enabled ▪ 0 means disabled

- Example:

```
:THRES:VOLT:PS:STAT?
1
```


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8. SCPI Web Commands

:WEB:CONNection <numeric_value>

Description	▪ Set the connection status to the Internet
Parameters	▪ Integer ▪ 0 means Down (Disconnected) ▪ 1 means Up (Connected)
Response	▪ None
Effect	▪ The connection status of the Internet

- Example:

```
:WEB:CONN 1
```

:WEB:CONNection?

Description	▪ Get the current connection status to the Internet
Parameters	▪ None
Response	▪ Integer ▪ -2 means Internal Error (No LAN Card) ▪ -1 means No (Ethernet Cable is unplugged) ▪ 0 means Down (Disconnected) ▪ 1 means Up (Connected) ▪ 3 means Busy
Effect	▪ None

- Example:

```
:WEB:CONN?
1
```


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:WEB:MODE <numeric_value>

Description	▪ Set the connection mode of IP configuration
Parameters	▪ Integer ▪ 0 means Static IP Addressing ▪ 1 means DHCP
Response	▪ None
Effect	▪ The connection mode of IP configuration ▪ The connection mode will be saved in non-volatile memory
Remarks	▪ Mode of connection can only be changed when the connection status is either UP or DOWN ▪ Upon changing the mode of connection, the unit will automatically attempt to connect to the Internet (i.e. Up status)

- Example:

```
:WEB:MODE 1
```

:WEB:MODE?

Description	▪ Get the connection mode of IP configuration
Parameters	▪ None
Response	▪ Integer ▪ 0 means Static IP Addressing ▪ 1 means DHCP
Effect	▪ None

- Example:

```
:WEB:MODE?
1
```


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:WEB:IPaddress <string_value>

Description	▪ Set the IP address in Static IP mode
Parameters	▪ Dot-separated ASCII String ▪ 192.168.1.100
Response	▪ None
Effect	▪ The IP Address in Static IP mode is changed ▪ The IP Address in Static IP mode will be saved in non-volatile memory
Remarks	▪ The IP address can only be changed when the unit is in Static IP mode and Internet connection is Down

- Example:

```
:WEB:IP 192.168.1.100
```

:WEB:IPaddress?

Description	▪ Get the current IP address
Parameters	▪ None
Response	▪ Dot-separated ASCII String ▪ 192.168.1.100
Effect	▪ None

- Example:

```
:WEB:IP?

192.168.1.100
```


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:WEB:SubnetMask <string_value>

Description	▪ Set the Subnet Mask in Static IP mode
Parameters	▪ Dot-separated ASCII String ▪ 255.255.255.0
Response	▪ None
Effect	▪ The Subnet Mask in Static IP mode is changed ▪ The Subnet Mask in Static IP mode will be saved in non-volatile memory
Remarks	▪ The Subnet Mask can only be changed when the unit is in Static IP mode and Internet connection is Down

- Example:

```
:WEB:SM 255.255.255.0
```

:WEB:SubnetMask?

Description	▪ Get the current Subnet Mask
Parameters	▪ None
Response	▪ Dot-separated ASCII String ▪ 255.255.255.0
Effect	▪ None

- Example:

```
:WEB:SM?

255.255.255.0
```


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:WEB:GateWay <string_value>

Description	▪ Set the Gateway in Static IP mode
Parameters	▪ Dot-separated ASCII String ▪ 192.168.1.1
Response	▪ None
Effect	▪ The Gateway in Static IP mode is changed ▪ The Gateway in Static IP mode will be saved in non-volatile memory
Remarks	▪ The Gateway can only be changed when the unit is in Static IP mode and Internet connection is Down

- Example:

```
:WEB:GW 192.168.1.1
```

:WEB:GateWay?

Description	▪ Get the current Gateway
Parameters	▪ None
Response	▪ Dot-separated ASCII String ▪ 192.168.1.1
Effect	▪ None

- Example:

```
:WEB:GW?

192.168.1.1
```


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:WEB:DomainNameServer <string_value>

Description	▪ Set the Domain Name Server (DNS) in Static IP mode
Parameters	▪ Dot-separated ASCII String ▪ 192.168.1.1
Response	▪ None
Effect	▪ The Domain Name Server (DNS) in Static IP mode is changed ▪ The Domain Name Server (DNS) in Static IP mode will be saved in non-volatile memory
Remarks	▪ The Domain Name Server (DNS) can only be changed when the unit is in Static IP mode and Internet connection is Down

- Example:

```
:WEB:DNS 192.168.1.1
```

:WEB:DomainNameServer?

Description	▪ Get the current Domain Name Server (DNS)
Parameters	▪ None
Response	▪ Dot-separated ASCII String ▪ 192.168.1.1
Effect	▪ None

- Example:

```
:WEB:DNS?

192.168.1.1
```


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:WEB:MACaddress?

Description	▪ Get the MAC address of the unit
Parameters	▪ None
Response	▪ Hyphen-separated ASCII String ▪ 00-6E-80-8E-0F-95
Effect	▪ None

- Example:

```
:WEB:MAC?

00-6E-80-8E-0F-95
```

9. Special function

SCPI command between Light Source and Amplifier		
	Light Source	Amplifier
Mid-Stage	SENS:POW:OUT:CH2	SENS:POW:OUT:CH2
Output Power	SENS:POW:OUT:CH1	SENS:POW:OUT:CH1
Seed Power	SENS:POW:OUT:CH(Max. No. of Power)	N/A
Input Power	N/A	SENS:POW:IN:CH1
Reflection	SENS:POW:PD:CH1/2/3/4	SENS:POW:PD:CH1/2/3/4

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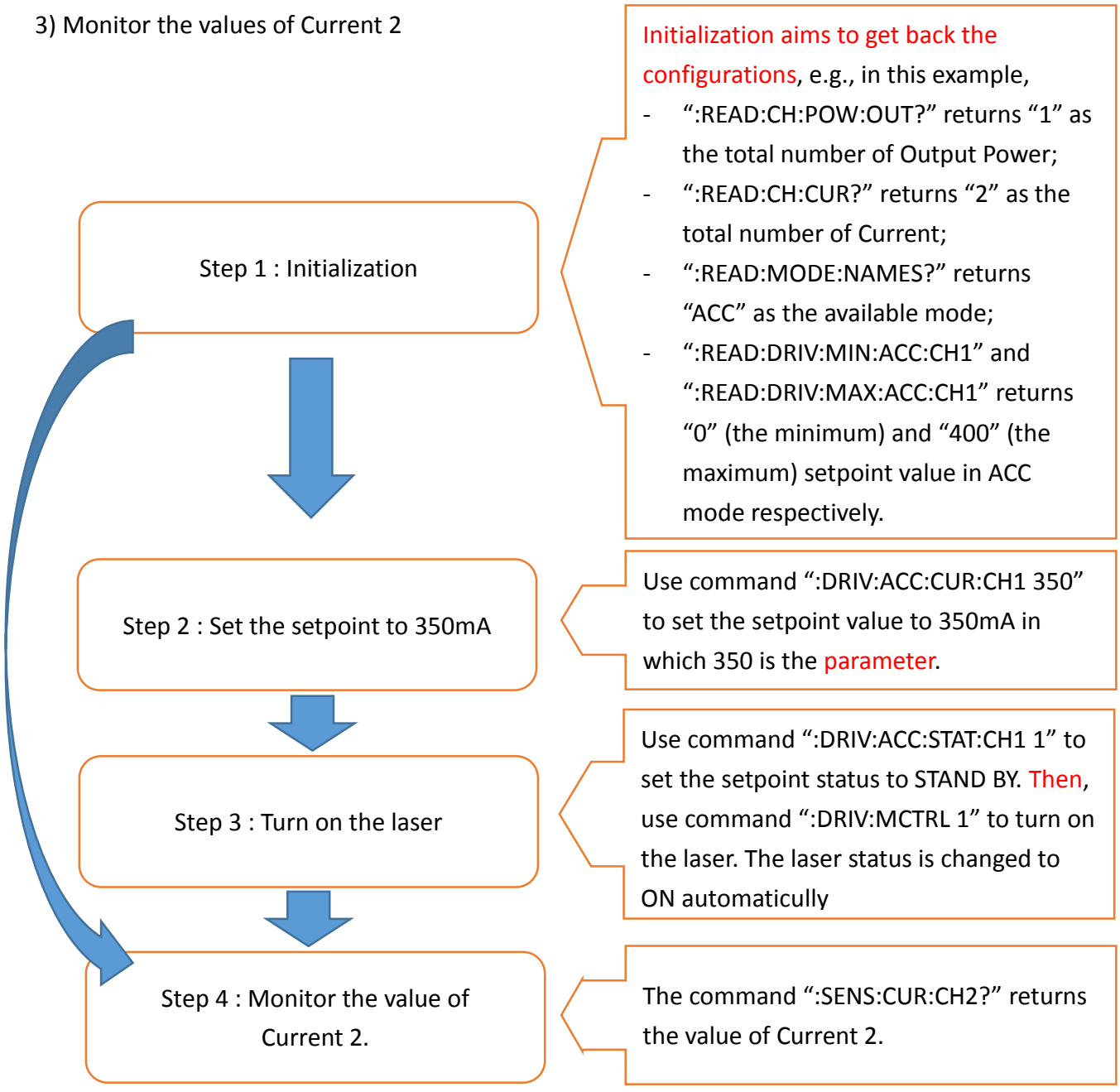
10. Example – A

Device Configuration : Input Power x 1 TEC x 1
Output Power x 1 Setpoint x 1 (Range: 0mA – 400mA)
Current x 2 ACC MODE

Target :

1) To set the setpoint from initial value to 350mA
2) Turn on the laser
3) Monitor the values of Current 2



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Step 5 : Check alarm status

In this example, TEC overheat alarm, SEED alarm should be checked continuously to make sure the device is in normal operation.

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Example – B

Device Configuration : Input Power x 0 TEC x 2

Setpoint x 1 (0 – 900mA, the first 1mA is SEED)

Current x 2 ACC MODE

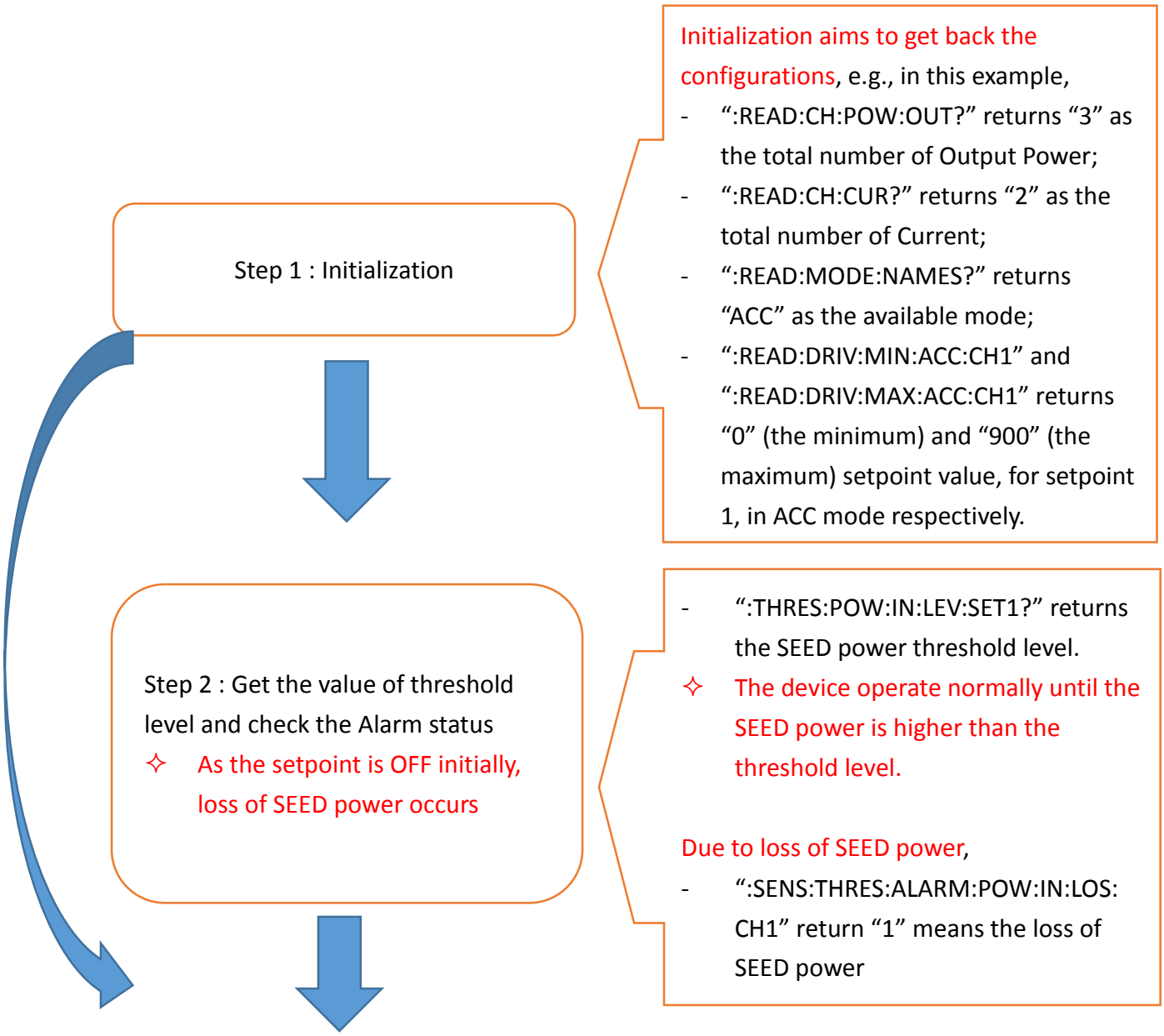
Output Power x 3 (Seed power+ Mid-stage power +Output)

Target : (Assume loss of SEED power occurs at the beginning)

1) To set the setpoint from initial value to 850mA

2) Turn on the laser

3) Monitor the value of Output Power and Seed Power



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Step 3 : Turn on the SEED and Laser

- ✧ Normally, SEED power is fully turned ON when using command ":DRIV:ACC:STAT:CH1 1" and ":DRIV:MCTRL 1".

Send ":DRIV:ACC:STAT:CH1 1" to set the setpoint (CH1) status to STANDBY. Once in STANDBY status, the SEED and laser can then be turn on by using ":DRIV:MCTRL 1" The laser status is changed to ON automatically.

- ✧ SEED power need a stabilizing time to become stable(ON)

Step 4 : To set the setpoint from initial value to 850mA

- ✧ Assume the SEED power is higher than the threshold level.

Due to existing of SEED power, ":SENS:THRES:ALARM:POW:IN:LOS:CH1" return "0" means SEED power is high enough and ":DRIV:ACC:STAT:CH1" returns "1" means the setpoint status in ON state.

Use command ":DRIV:ACC:CUR:CH1 850" to set the setpoint value to 850mA in which 850 is the parameter.

Step 5 : Monitor the value of Output Power, Seed Power.

The command ":SENS:POW:OUT:CH1?" returns the value of Output Power.
The command ":SENS:POW:OUT:CH3?" returns the value of SEED power.

- ✧ Using CH3 is base on the number of total output power

Step 6 : Check alarm status

In this example, TEC overheat alarm, SEED alarm and Mid-stage alarm should be checked continuously to make sure the device is in normal operation.

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Example – C

Device Configuration : Input Power x 0 TEC x 2
Setpoint x 2 (Range: 50 – 2000mA) where 50 is the low margin
Current x 2 ACC APC MODE
Output Power x 2 (Mid-stage power + Output)

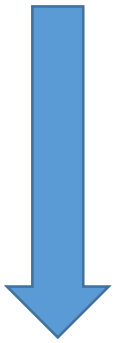
Target :

1) To set the setpoint from initial value to 400mA
2) Turn on both setpoint and turn on the laser in APC mode

Step 1 : Initialization

Initialization aims to get back the configurations, e.g., in this example,

- ":READ:CH:POW:OUT?" returns "2" as the total number of Output Power;
- ":READ:CH:TEMP?" returns "2" as the total number of TEC;
- ":READ:MODE:NAMES?" returns "ACC APC " as the available modes;
- ":READ:DRIV:MIN:ACC:CH1" and ":READ:DRIV:MAX:ACC:CH1" returns "0" (the minimum) and "2000" (the maximum) setpoint value in ACC mode respectively.



Step 2 : Check Alarm status

✧ The lasers are locked if any alarm, such as INTERLOCK, TEC overheat, mid-stage and so on, occurs.

- ":DRIV:INTERLOCK" returns the INTERLOCK alarm status.
  "1" means INTERLOCK is active and the laser is LOCKed.
  ":THRES:INTERLOCK:UNLOCK" can UNLOCK the laser.
- Use command ":SENS:THRES:ALARM:POW:IN:LOS:CH2" returns MID-STAGE alarm status.

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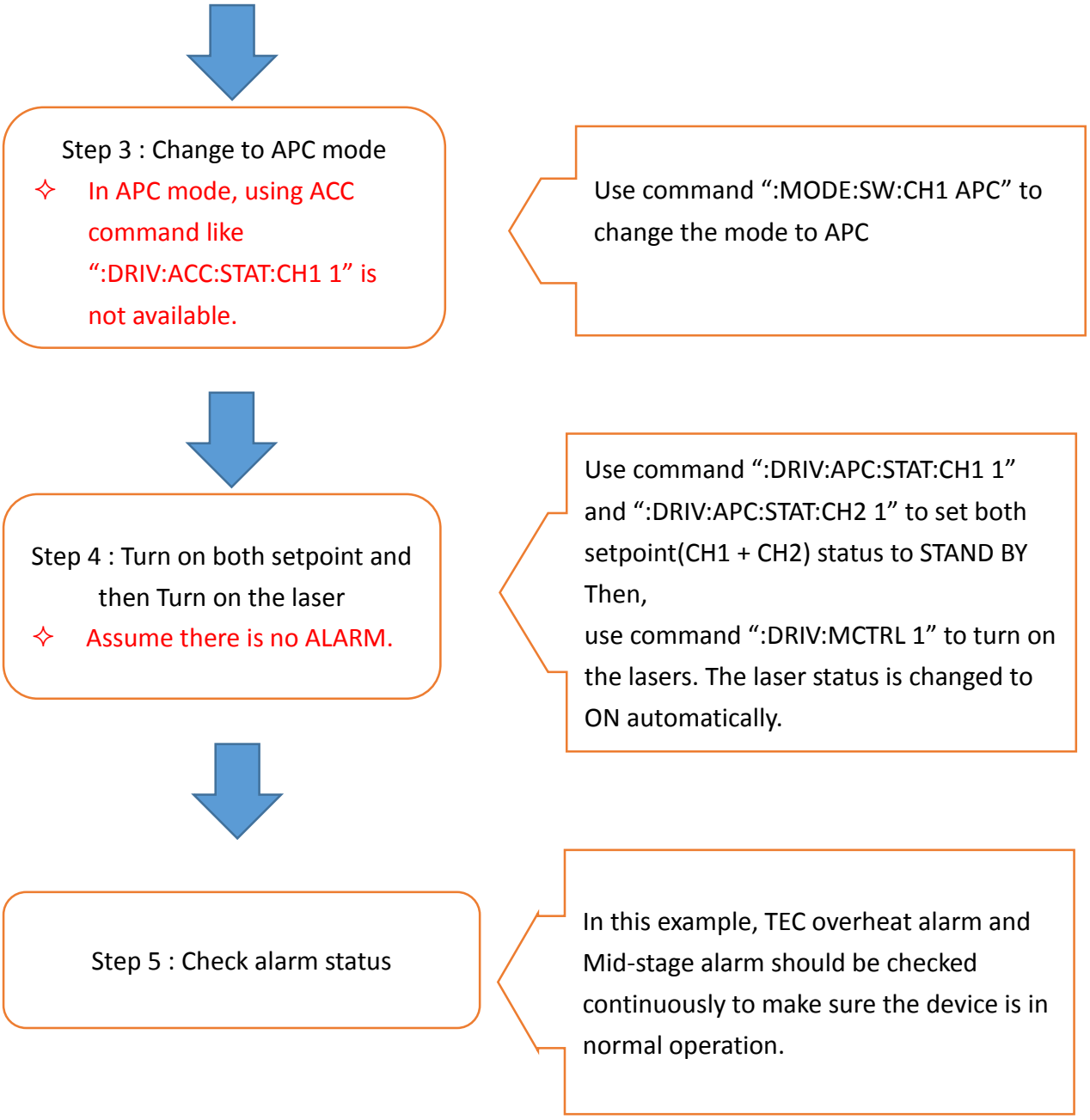

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