



Compact ICE API	
<b>AUTHOR:</b> K. Knabe and D. Tooley	<b>DATE:</b> 06/22/2020
<b>REPORT NUMBER:</b> SDI-005	<b>REVISION:</b> 01

## 1. Executive Summary

The application programming interface (API) for the Compact ICE electronics are detailed in this document. If functionality is not present in this document that the user suspects may be missing, please email Vescent for additional information.

## 2. Command List

### 2.1. Slot 1 (Peak Lock and Current Controller)

More information is located at:

<https://www.vescent.com/manuals/doku.php?id=ice:commands:peaklock>.

Table 1. Peak Lock and Current Controller Command List

Command	Arguments	Description
LASER?	NONE	Query if laser is on
LASER	ON/OFF	Toggle Laser Current on and Off
CURRSET?	NONE	Query Laser Current Setpoint
CURRSET	FLOAT	Set Laser Current Value
CURRLIM?	NONE	Query Laser Current Limit
CURRLIM	FLOAT	Set Laser Current Limit
SERVO?	NONE	Query status of servo (on/off)
PHASE?	NONE	Query phase shift on dither
PHASE	INT	Set phase shift on dither
DITHERA?	NONE	Query dither amplitude
DITHERA	INT (0-63)	Set dither amplitude
DITHER?	NONE	Query if dither is on/off
DITHER	ON/OFF	Toggle dither on/off
READVOLT	INT	Reports the modulation voltage of the master laser
SERVO	ON/OFF	Toggle servo on/off
DCOFFST?	NONE	Query DC Error offset value



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Command	Arguments	Description
<b>DCOFFST</b>	INT	Set DC Error offset value
<b>GAIN?</b>	NONE	Query lock loop gain setting
<b>GAIN</b>	INT ()	Set lock loop gain
<b>OPOFFST?</b>	NONE	Query lock loop op amp offset value
<b>OPOFFST</b>	INT ()	Set lock loop op amp offset value
<b>SVOFFST?</b>	NONE	Query servo offset value
<b>SVOFFST</b>	FLOAT	Set servo offset value
<b>DATACHN?</b>	NONE	Query channel set for data reading
<b>DATACHN</b>	INT (1-3)	Set data to read
<b>RAMPSPW?</b>	NONE	Query voltage range for ramp
<b>RAMPSPW</b>	FLOAT	Set Voltage range for ramp
<b>RAMPNUM?</b>	NONE	Query number of steps in ramp
<b>RAMPNUM</b>	INT	Set number of steps in ramp
<b>RAMPRUN</b>	ON/OFF	Toggle ramp on/off
<b>POLES?</b>	NONE	Query frequency lock corner settings
<b>POLES</b>	INT (1-4) INT (0-1)	Set frequency lock corners
<b>EVTLOFF?</b>	NONE	Query event address for turning laser current off
<b>EVTLOFF</b>	ON/OFF	Set event address for turning laser current off.

## 2.2. Slot 3 (Offset Phase Lock)

Similar information is located at:

<https://www.vescent.com/manuals/doku.php?id=ice:commands:opls>

Command	Arguments	Description
<b>N?</b>	NONE	Query divide by value



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<b>N</b>	INT (8,16,32,64)	Set divide by value
<b>INVERT?</b>	NONE	Query if invert is on/off
<b>INVERT</b>	ON/OFF	Toggle invert on/off
<b>INTREF?</b>	NONE	Query internal reference frequency on/off
<b>INTREF</b>	ON/OFF	Toggle internal reference frequency on/off
<b>INTCLK?</b>	NONE	Query internal clock on/off
<b>INTFREQ?</b>	NONE	Query internal reference frequency
<b>INTFREQ</b>	FLOAT	Set internal reference frequency
<b>INTCLK</b>	ON/OFF	Toggle internal clock on/off
<b>SERVO?</b>	NONE	Query if servo is on/off
<b>SERVO</b>	ON/OFF	Toggle Servo on/off
<b>GAIN?</b>	NONE	Query PLL lock gain setting
<b>GAIN</b>	INT (0-31)	Set PLL lock gain
<b>SVOFFST?</b>	NONE	Query servo offset value
<b>SVOFFST</b>	INT ()	Set servo offset value
<b>READVOLT</b>	INT	Reports the modulation voltage of the slave laser
<b>RAMPSWP?</b>	NONE	Query voltage range on ramp output
<b>RAMPSWP</b>	FLOAT	Set voltage range on ramp output
<b>RAMPNUM?</b>	NONE	Query number of steps in ramp
<b>Command</b>	<b>Arguments</b>	<b>Description</b>
<b>RAMPNUM</b>	INT ()	Set number of steps in ramp



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<b>RAMPDLY?</b>	NONE	Query ramp delay
<b>RAMPDLY</b>	INT ()	Set ramp delay
<b>RAMPRUN</b>	ON/OFF	Toggle ramp on/off
<b>POLES?</b>	NONE	Query PLL lock corner frequencies
<b>POLES</b>	INT (1-4) INT (0-1)	Set PLL lock corner frequencies
<b>DDSPLL?</b>	NONE	Query if DDS PLL lock is good
<b>EVTADDR?</b>	NONE	Query event change address
<b>EVTADDR</b>	INT ()	Set event change address
<b>DDSRESET</b>	NONE	Reset PLL lock on DDS chip

### 2.3. Slot 4 (Temperature Controller)

The temperature controller is similar to the ICE-QT1, and additional information is located at: <https://www.vescent.com/manuals/doku.php?id=ice:commands:quadtemp>

Command	Arguments	Description
<b>TEMPSET?</b>	INT (1-5)	Query channel temperature setpoint
<b>TEMPSET</b>	INT (1-5) FLOAT	Set channel temperature setpoint
<b>BIPOLAR?</b>	INT (1-5)	Query channel bipolar on/off
<b>BIPOLAR</b>	INT (1-5) ON/OFF	Toggle channel bipolar on/off
<b>SERVO?</b>	INT (1-5)	Query if temperature servo is engaged on channel



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<b>SERVO</b>	INT (1-5) ON/OFF	Toggle temperature servo on channel
<b>TEMP?</b>	INT (1-5)	Query temperature of plant under control
<b>TERROR?</b>	INT (1-5)	Query temperature error of plant under control
<b>CURRENT?</b>	INT (1-5)	Query current out to plant
<b>TEMPMIN?</b>	INT (1-5)	Query minimum temperature setting on channel
<b>TEMPMIN</b>	INT (1-5) FLOAT	Set minimum temperature setting on channel
<b>TEMPMAX?</b>	INT (1-5)	Query maximum temperature setting on channel
<b>TEMPMAX</b>	INT (1-5) FLOAT	Set maximum temperature settings on channel
<b>MAXCURR?</b>	INT (1-5)	Query maximum current allowed to plant
<b>MAXCURR</b>	INT (1-5) FLOAT	Set maximum current allowed to plant
<b>PID?</b>	INT (1-5) INT (1-3)	Query PID settings (1=PGain, 2=ITC, 3=DTC)
<b>PID</b>	INT (1-5) INT (1-3) INT	Set PID settings
<b>Command</b>	<b>Arguments</b>	<b>Description</b>
<b>POWER?</b>	INT (1-5)	Query power used for temperature stabilization
<b>PERIOD?</b>	INT (1-5) INT	Query period of time between sampling on temperature loop (ms)



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<b>PERIOD</b>	INT (1-5) INT	Set period of time between sampling
<b>POLARITY</b>	INT (1-5) ON/OFF	Set polarity of temperature loop to positive or negative
<b>TEMPSET?</b>	INT (1-5)	Query channel temperature setpoint
<b>TEMPSET</b>	INT (1-5) FLOAT	Set channel temperature setpoint
<b>BIPOLAR?</b>	INT (1-5)	Query channel bipolar on/off
<b>BIPOLAR</b>	INT (1-5) ON/OFF	Toggle channel bipolar on/off
<b>SERVO?</b>	INT (1-5)	Query if temperature servo is engaged on channel
<b>SERVO</b>	INT (1-5) ON/OFF	Toggle temperature servo on channel
<b>TEMP?</b>	INT (1-5)	Query temperature of plant under control
<b>TERROR?</b>	INT (1-5)	Query temperature error of plant under control
<b>CURRENT?</b>	INT (1-5)	Query current out to plant

#### 2.4. Slot 5 (SOA Current Controller)

Similar information at: [https://www.vescent.com/manuals/doku.php?id=ice:dual-current:icedc1\\_-\\_dual\\_current\\_controller](https://www.vescent.com/manuals/doku.php?id=ice:dual-current:icedc1_-_dual_current_controller)

Command	Arguments	Description
<b>LASER?</b>	INT (1-2)	Query if laser is on
<b>LASER</b>	INT (1-2) ON/OFF	Toggle Laser Current on and Off



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<b>CURRSET?</b>	INT (1-2)	Query Laser Current Setpoint
<b>CURRSET</b>	INT (1-2) FLOAT	Set Laser Current Value
<b>CURRLIM?</b>	INT (1-2)	Query Laser Current Limit
<b>CURRLIM</b>	INT (1-2) FLOAT	Set Laser Current Limit
<b>CLRFLTS</b>	NONE	Clear faults on laser current drive
<b>FASTOFF?</b>	INT (1-2)	
<b>LVOLT?</b>	INT (1-2) FLOAT	Query voltage to the laser diode
<b>LVOLT</b>	INT (1-2)	
<b>EVTDATA?</b>	INT (1-2) INT	Query event values in table
<b>EVTDATA</b>	INT (1-2) INT INT INT	Set event values in table
<b>EVTNUM?</b>	INT (1-2)	Read the number of events (rows) in table
<b>EVTNUM</b>	INT (1-2) INT	Set number of events in table
<b>EVTJROW?</b>	INT (1-2)	Query the next row to be set with an event trigger
<b>EVTJROW</b>	INT (1-2) INT	Set the next row to occur after an event trigger
<b>EVTJUMP?</b>	INT (1-2)	Query address for event trigger
<b>EVTJUMP</b>	INT (1-2) INT (1-8)	Set address for event trigger
<b>LASER?</b>	INT (1-2)	Query if laser is on
<b>Command</b>	<b>Arguments</b>	<b>Description</b>
<b>LASER</b>	INT (1-2) ON/OFF	Toggle Laser Current on and Off
<b>CURRSET?</b>	INT (1-2)	Query Laser Current Setpoint



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<b>CURRSET</b>	INT (1-2) FLOAT	Set Laser Current Value
<b>CURRLIM?</b>	INT (1-2)	Query Laser Current Limit
<b>CURRLIM</b>	INT (1-2) FLOAT	Set Laser Current Limit
<b>CLRFLTS</b>	NONE	Clear faults on laser current drive
<b>FASTOFF?</b>	INT (1-2)	
<b>LVOLT?</b>	INT (1-2) FLOAT	Query voltage to the laser diode
<b>LVOLT</b>	INT (1-2)	
<b>EVTDATA?</b>	INT (1-2) INT	Query event values in table
<b>EVTDATA</b>	INT (1-2) INT INT INT	Set event values in table

## 2.5. Slot 7 (Laser Current Controller)

More information at: [https://www.vescent.com/manuals/doku.php?id=ice:dual-current:ice-dc1\\_dual\\_current\\_controller](https://www.vescent.com/manuals/doku.php?id=ice:dual-current:ice-dc1_dual_current_controller)

Command	Arguments	Description
<b>LASER?</b>	INT (1-2)	Query if laser is on
<b>LASER</b>	INT (1-2) ON/OFF	Toggle Laser Current on and Off
<b>CURRSET?</b>	INT (1-2)	Query Laser Current Setpoint
<b>CURRSET</b>	INT (1-2) FLOAT	Set Laser Current Value
<b>CURRLIM?</b>	INT (1-2)	Query Laser Current Limit
<b>CURRLIM</b>	INT (1-2) FLOAT	Set Laser Current Limit





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<b>EVTDATA?</b>	INT (1-2)	Query event values in table
<b>EVTDATA</b>	INT (1-2)	Set event values in table
<b>EVTNUM?</b>	INT (1-2)	Read the number of events (rows) in table
<b>EVTNUM</b>	INT (1-2)	Set number of events in table
<b>EVTJROW?</b>	INT (1-2)	Query the next row to be set with an event trigger
<b>EVTJROW</b>	INT (1-2)	Set the next row to occur after an event trigger
<b>EVTJUMP?</b>	INT (1-2)	Query address for event trigger
<b>EVTJUMP</b>	INT (1-2)	Set address for event trigger
<b>Pulse?</b>	INT (1-2)	Query if laser current is shunted
<b>Pulse</b>	INT (1-2) ON/OFF	Toggle laser current shunt on/off
<b>LASER?</b>	INT (1-2)	Query if laser is on
<b>LASER</b>	INT (1-2) ON/OFF	Toggle Laser Current on and Off
<b>CURRSET?</b>	INT (1-2)	Query Laser Current Setpoint
<b>Command</b>	<b>Arguments</b>	<b>Description</b>
<b>CURRSET</b>	INT (1-2) FLOAT	Set Laser Current Value
<b>CURRLIM?</b>	INT (1-2)	Query Laser Current Limit
<b>CURRLIM</b>	INT (1-2) FLOAT	Set Laser Current Limit



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<b>EVTDATA?</b>	INT (1-2)	Query event values in table
<b>EVTDATA</b>	INT (1-2)	Set event values in table
<b>EVTNUM?</b>	INT (1-2)	Read the number of events (rows) in table
<b>EVTNUM</b>	INT (1-2)	Set number of events in table
<b>EVTJROW?</b>	INT (1-2)	Query the next row to be set with an event trigger
<b>EVTJROW</b>	INT (1-2)	Set the next row to occur after an event trigger
<b>EVTJUMP?</b>	INT (1-2)	Query address for event trigger
<b>EVTJUMP</b>	INT (1-2)	Set address for event trigger

## 2.6. Master Commands

More information at: <https://www.vescent.com/manuals/doku.php?id=ice:commands:master>

Command	Arguments	Description
<b>#Slave</b>	INT	Sets board number the master will talk to
<b>#Devices</b>	NONE	Returns boards connected to master controller
<b>#Enumerate</b>	None	Returns device ID in a single line
<b>#Shutdown</b>	NONE	Shuts down the system
<b>#Sleep</b>	NONE	Sets system into low power mode
<b>#PowerOn</b>	NONE	Turns system on



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<b>#PowerOff</b>	NONE	Turns system off
<b>#RawMode</b>	BOOL	Turns on/off ASCII commands to use only integer FRPPDQG,'TV
<b>#Status</b>	NONE	Returns if power to slaves is on or off
<b>#Version</b>	INT	Returns software version of slave board
<b>#Interactive</b>	BOOL	Sets communication to have echo and prompts
<b>#BulkRead</b>	INT	Reads block of RAM from current slave device
<b>#SaveSettings</b>	NONE	Save user settings on all slave devices
<b>#ShadowUSART</b>	BOOL	Sets all serial commands to be echoes on USB and TTL
<b>#AutoPower</b>	BOOL	Sets if power will automatically get sent to slave devices after bootup
<b>#Slave</b>	INT	Sets board number the master will talk to
<b>#Devices</b>	NONE	Returns boards connected to master controller
<b>#Enumerate</b>	None	Returns device ID in a single line
<b>#Shutdown</b>	NONE	Shuts down the system
<b>#Sleep</b>	NONE	Sets system into low power mode
Command	Arguments	Description
<b>#PowerOn</b>	NONE	Turns system on
<b>#PowerOff</b>	NONE	Turns system off



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<b>#RawMode</b>	BOOL	Turns on/off ASCII commands to use only integer FRPPDQG, 'V
<b>#Status</b>	NONE	Returns if power to slaves is on or off
<b>#Version</b>	INT	Returns software version of slave board
<b>#Interactive</b>	BOOL	Sets communication to have echo and prompts
<b>#BulkRead</b>	INT	Reads block of RAM from current slave device
<b>#SaveSettings</b>	NONE	Save user settings on all slave devices
<b>#ShadowUSART</b>	BOOL	<b>Sets all serial commands to be echoes on USB and TTL</b>
<b>#AutoPower</b>	BOOL	<b>Sets if power will automatically get sent to slave devices after bootup</b>

### 3. Change History

Release Date	Revision	Description of Changes
06/22/2020	01	Initial release