



Compact ICE API	
AUTHOR: K. Knabe and D. Tooley	DATE: 06/22/2020
REPORT NUMBER: SDI-005	REVISION: 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 Kevin Knabe (kknabe@vescent.com) 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		
SERVO	ON/OFF	Toggle servo on/off
DCOFFST?	NONE	Query DC Error offset value



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



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



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Command	Arguments	Description
RAMPNUM	INT ()	Set number of steps in ramp
RAMPDLY?	NONE	Query ramp delay
RAMPDLY	INT ()	Set ramp delay
RAMPRUN	ON/OFF	Toggle ramp on/off
POLES?	NONE	Query PLL lock corner frequencies
POLES	INT (1-4) INT (0-1)	Set PLL lock corner frequencies
DDSPLL?	NONE	Query if DDS PLL lock is good
EVTADDR?	NONE	Query event change address
EVTADDR	INT ()	Set event change address
DDSRESET	NONE	Reset PLL lock on DDS chip



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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
TEMPSET?	INT (1-5)	Query channel temperature setpoint
TEMPSET	INT (1-5) FLOAT	Set channel temperature setpoint
BIPOLAR?	INT (1-5)	Query channel bipolar on/off
BIPOLAR	INT (1-5) ON/OFF	Toggle channel bipolar on/off
SERVO?	INT (1-5)	Query if temperature servo is engaged on channel
SERVO	INT (1-5) ON/OFF	Toggle temperature servo on channel
TEMP?	INT (1-5)	Query temperature of plant under control
TERROR?	INT (1-5)	Query temperature error of plant under control
CURRENT?	INT (1-5)	Query current out to plant
TEMPMIN?	INT (1-5)	Query minimum temperature setting on channel
TEMPMIN	INT (1-5) FLOAT	Set minimum temperature setting on channel
TEMPMAX?	INT (1-5)	Query maximum temperature setting on channel
TEMPMAX	INT (1-5) FLOAT	Set maximum temperature settings on channel
MAXCURR?	INT (1-5)	Query maximum current allowed to plant
MAXCURR	INT (1-5) FLOAT	Set maximum current allowed to plant
PID?	INT (1-5) INT (1-3)	Query PID settings (1=PGain, 2=ITC, 3=DTC)
PID	INT (1-5) INT (1-3) INT	Set PID settings



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



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2.4. Slot 5 (SOA Current Controller)

Similar information at: <https://www.vescent.com/manuals/doku.php?id=ice:dual-current:ice-dc1 - dual current controller>

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



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Command	Arguments	Description
LASER	INT (1-2) ON/OFF	Toggle Laser Current on and Off
CURRSET?	INT (1-2)	Query Laser Current Setpoint
CURRSET	INT (1-2) FLOAT	Set Laser Current Value
CURRLIM?	INT (1-2)	Query Laser Current Limit
CURRLIM	INT (1-2) FLOAT	Set Laser Current Limit
CLRFLTS	NONE	Clear faults on laser current drive
FASTOFF?	INT (1-2)	
LVOLT?	INT (1-2) FLOAT	Query voltage to the laser diode
LVOLT	INT (1-2)	
EVTDATA?	INT (1-2) INT	Query event values in table
EVTDATA	INT (1-2) INT INT INT	Set event values in table



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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

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



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Command	Arguments	Description
CURRSET	INT (1-2) FLOAT	Set Laser Current Value
CURRLIM?	INT (1-2)	Query Laser Current Limit
CURRLIM	INT (1-2) FLOAT	Set Laser Current Limit
EVTDATA?	INT (1-2)	Query event values in table
EVTDATA	INT (1-2)	Set event values in table
EVTNUM?	INT (1-2)	Read the number of events (rows) in table
EVTNUM	INT (1-2)	Set number of events in table
EVTJROW?	INT (1-2)	Query the next row to be set with an event trigger
EVTJROW	INT (1-2)	Set the next row to occur after an event trigger
EVTJUMP?	INT (1-2)	Query address for event trigger
EVTJUMP	INT (1-2)	Set address for event trigger



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2.6. Master Commands

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

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



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



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3. Change History

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