### Debugging SY4527 Mainframe and A7030TN High Voltage Boards with EPICS CSS-BOY

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Hall C plans to use the CAEN SY4527 with A7030TN high voltage boards for the photo multiplier tubes of the calorimeter of the Neutral Particle Spectrometer. Initial tests [1, 2] indicated issues with the high voltage system. This note presents the results of a single board retested using CSS-BOY for controls and monitoring; CSS-BOY monitored values were verified by data logging the results independently with CAEN's proprietary software, GECO 2020.

Results of tests to set process variable (PV) values simultaneously on sixteen A7030TN high voltage boards (576 channels) installed in the SY4527 mainframe showed the same issues observed for the A1535 high voltage boards [2].

To debug the problem, a *single* board was retested with CSS-BOY, which was used for controls and monitoring. To verify the obtained results monitored by CSS-BOY, GECO 2020 was used for data logging. The steps performed to set up and run the tests is given in Appendix A. Board specifications are given in Table I; targeted PV set points for the tests are given in Table II.

Mainframe model	SY4527
Mainframe S/N	400
Board model/S/N	A7030TN/304
CPU model/SN	A4528/760
Total channels tested	36
Channel load	0 Ω

Table I. SY4527 and board specifications.

PV Name	Description	Set point
Pw	power on/off	0/1
SVMax	set voltage maximum	1800 V
V0Set	set voltage	1500 V
RUp	ramp up rate	25 V/s
RDWn	ramp down rate	25 V/s
I0Set	maximum current set	1000 uA
Trip	trip time	3 s

Table II. Targeted set points for test.

To set PV values at the targeted set points, six JavaScript programs were written to send the commands simultaneously to the 36 channels of the board. These JavaScript programs were executed via the CSS-BOY screen, *HV CAEN Expert Controls*. Results of the tests for 15 ramp ups and ramp downs are summarized below.

#### 1. Issue setting *RUp*

Channels 11, 12, 17 and 18 did not go to the targeted set point of 25 V/s after the JavaScript program to set RUp values was executed. Data log by GECO confirmed the results. See Appendix B, Figs. 1 and. 2.

#### 2. Issue with *Pw*

Channel 2 did not ramp down because its Pw value did not change from 1 to 0 after the JavaScript program was executed. GECO data logs confirmed CSS-BOY results. See Appendix B, Figs. 3 and 4.

After the JavaScript program was executed to set Pw of all 36 channels to 1 simultaneously, Pw did not change from 0 to 1 for channels 14, 16, and 19; hence, these channels did not ramp up. GECO data logs confirmed CSS-Boy readings. See Appendix B, Figs. 5–10.

Voltage ramp up/down graphs for all 36 channels are shown in Appendix B, Figs. 11–13.

To conclude, after execution of the JavaScript programs to turn on/off 36 channels simultaneously, using the *HV CAEN Expert Controls* CSS-BOY screen, random channels did not turn on/off. Some channels' parameters did not get to the set value. Preset PV values did not arbitrarily change. There were no discrepancies between GECO 2020 and CSS-BOY monitored PVs.

- [1] P. Campero, et. al. Screens to test the CAEN SY4527 High Voltage Power Supply System's Built-in EPICS Server, DSG Note 2019-22, 2019.
- [2] P. Campero, et. al. Test Results of CAEN SY4527 System Installed with A1535 High Voltage Boards for Hall C, DGS Note 2019-30, 2019.

## **APPENDIX A: TEST STEPS**

- 1. Installed an A7030TN HV board into CAEN SY4527 mainframe's slot 0 (remaining 15 slots were empty).
- 2. Enabled System Advanced Features in GECO 2020.
- 3. Enabled GECO logging options for *V0Set, SVMax, I0Set, RUp, RDWn, Pw, VMon, IMon, and Trip* parameters of all 36 channels.
- 4. Enabled CAEN EPICS server built-in to allow controls and monitoring from EPICS CSS-BOY screens (EPICS Client).
- 5. Verified communication between CAEN EPICS server and EPICS client.
- 6. Used HV CAEN Expert Controls CSS-BOY screen to set and read above-mentioned parameters.
- 7. Took screenshots for initial conditions displayed in GECO 2020 and EPICS/CSS-BOY screens.
- 8. Started ramp up for all 36 channels by clicking "All Turn On/Off" button on HV CAEN Expert Controls CSS-BOY screen.
- 9. Ran HV CAEN Voltage Ramp Test CSS-BOY screen to monitor voltage readouts.
- 10. Saved datalog files and screenshots with the results.

# **APPENDIX B: SCREENSHOTS**

GECO2020	M5 1 111																-	o ×
File Settings Groups	window Help	kaal aa ak		_	_	_	_	_	_	_	_	_	_	_				
GEED: GE	neral coni	IT OL SOFI	ware															
SYSTEM					hvcaentest2											BOARDS		
hycaentest2 Discor	nnect Configure	Custom	Name	10Set	- V0Set	IMon	VMon	Pw	Status	RUp	RDWn	Trip	V1Set	11Set	SVMax	-		
		00.000	DSG-Lab	1000.00 uA	1500.00 V	0.974 uA	1.67 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	• Board	00 - A7030TN - [3	04]
SY4527 UNIVERSAL MUL	TICHANNEL	00.001	DSG-Lab	1000.00 uA	1500.00 V	-0.044 uA	0.84 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
129.57.86.124	STSTER	00.002	DSG-Lab	1000.00 uA	1500.00 V	-0.130 uA	1.35 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		Module	•
SETTINGS		00.003	DSG-Lab	1000.00 uA	1500.00 V	0.910 uA	1.28 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
ADVANCED FEAT	TURES	00.004	DSG-Lab	1000.00 uA	1500.00 V	-0.108 uA	1.38 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	BdStatus		2147 V
SCRIPT	OG ON	00.005	DSG-LAB	1000.00 uA	1500.00 V	-0.044 uA	1.56 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	HIMax		1118 UA
CRATE TE	OFF	00.006	DSG-LAB	1000.00 uA	1500.00 V	-0.060 uA	1.85 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	Temp		26 °C
SESSIONS MAP IN	FO INFO	00.007	DSG-LAB	1000.00 uA	1500.00 V	0.902 uA	1.52 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	Cir Alarm		NU
FLAG CFG CFG KI	ILL ALARM	800.00	DSG-LAB	1000.00 uA	1500.00 V	-0.134 uA	1.39 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
Channel ON		00.009	DSG-LAB	1000.00 uA	1500.00 V	-0.048 uA	1.93 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
OVV	:	00.010	DSG-LAB	1000.00 uA	1500.00 V	-0.062 uA	1.70 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
OVC		00.011	DSG-LAB	1000.00 uA	1500.00 V	2.916 uA	1.51 V	Off		30 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
Trip	•	00.012	DSG-LAB	1000.00 uA	1500.00 V	-0.116 uA	0.70 V	Off		30 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
Fan1 e	3432	00.013	DSG-LAB	1000.00 uA	1500.00 V	-0.092 uA	1.21 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
HVFanStat Fan3 #	3397 3432	00.014	DSG-LAB	1000.00 uA	1500.00 V	-0.048 uA	1.34 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
Fan4 e	3254	00.015	DSG-LAB	1000.00 uA	1500.00 V	-0.046 uA	1.31 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
Sumbal diama	Server	00.016	DSG-LAB	1000.00 uA	1500.00 V	-0.042 uA	1.65 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
HilfanSneed 10	MID H	00.017	DSG-LAB	1000.00 uA	1500.00 V	-0.046 uA	1.38 V	Off		30 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
Fanl #	1788	00.018	DSG-LAB	1000.00 uA	1500.00 V	-0.088 uA	1.54 V	Off		30 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
PWFanStat Fan1 0	1716	00.019	DSG-LAB	1000.00 uA	1500.00 V	-0.010 uA	2.05 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
Fan2 e	1716	00.020	DSG-LAB	1000.00 uA	1500.00 V	-0.030 uA	1.29 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
DHCPUStatus	Disabled	00.021	DSG-LAB	1000.00 uA	1500.00 V	Au 000.0	1.66 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
		00.022	DSG-LAB	1000.00 uA	1500.00 V	-0.058 uA	1.19 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
		00.023	DSG-LAB	1000.00 uA	1500.00 V	0.922 uA	1.11 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
		00.024	DSG-LAB	1000.00 uA	1500.00 V	-0.126 uA	1.66 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
		00.025	DSG-LAB	1000.00 uA	1500.00 V	-0.020 uA	0.71 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
		•						1							•			
hvcaentest2 129.57.86.12	14																CONNECTED	

FIG. 1. GECO 2020 screenshot shows channels 11, 12, 17 and 18 with incorrect RUp values (30 V/s).

			-		TEST	HV CA	AEN - Ex	opert C	ontrols	- Slot	0						
	Novice					Board Mo	del A70	30TN - [S/N:	304]						AL	L ON/O	FF
Ch#	Location	Click to Turn	Status	VMon [V]	lmon [uA]	Vset Readback	t [V] Set	lset Reathack	[uA] Set	Vmax Readback	([V] Set	RUp [	V/s] Set	RDwn Reschack	[V/s]	Trip	[s] Set
00	DSG-Lab	ON	OFF	1.67	0.974	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
01	DSG-Lab	ON	OFF	0.84	-0.044	1500.00	1500 1	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
02	DSG-Lab	ON	OFF	1.35	-0.128	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
03	DSG-Lab	ON	OFF	1.78	0.910	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
04	DSG-Lab	ON	OFF	1.38	-0.108	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
05	DSG-LAB	ON	OFF	1.56	-0.042	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
06	DSG-LAB	ON	OFF	1.85	-0.058	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
07	DSG-LAB	ON	OFF	1.52	0.906	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
08	DSG-LAB	ON	OFF	1.39	-0.134	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
09	DSG-LAB	ON	OFF	1.93	-0.046	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
10	DSG-LAB	ON	OFF	1.70	-0.062	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
11	DSG-LAB	ON	OFF	1.51	2.916	1500.00	1500 - (	1000.00	1000.00	1800	1800	30	30	25	25	3.0	3.0
12	DSG-LAB	ON	OFF	0.69	-0.114	1500.00	1500 🗧	1000.00	1000.00	1800	1800	30	30	25	25	3.0	3.0
13	USG-LAB	ON	OFF	1.21	-0.090	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
14	DSG-LAB	ON	OFF	1.34	-0.048	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
15	DSG-LAB	ON	OFF	1.31	-0.044	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
16	DSG-LAB	ON	OFF	1.65	-0.038	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
17	DSG-LAB	ON	OFF	1.37	-0.044	1500.00	1500	1000.00	1000.00	1800	1800	30	30	25	25	3.0	3.0
18	DSG-LAB	ON	OFF	1.54	-0.088	1500.00	1500	1000.00	1000.00	1800	1800	30	30	25	25	3.0	3.0
19	DSG-LAB	ON	OFF	2.05	-0.010	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
20	DSG-LAB	ON	OFF	1.29	-0.026	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
21	DSG-LAB	ON	OFF	1.65	0.000	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
22	DSG-LAB	ON	OFF	1.18	-0.054	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
23	DSG-LAB	ON	OFF	1.11	0.926	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
24	DSG-LAB	ON	OFF	1.65	-0.122	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
25	DSG-LAB	ON	OFF	0.71	-0.020	1500.00	1500 - (	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
26	DSG-LAB	ON	OFF	0.24	0.934	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
27	DSG-LAB	ON	OFF	1.56	0.992	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
28	DSG-LAB	ON	OFF	1.46	0.008	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
29	DSG-LAB	ON	OFF	1.56	-0.094	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
30	DSG-LAB	ON	OFF	1.40	-0.072	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
31	DSG-LAB	ON	OFF	0.38	-0.100	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
32	DSG-LAB	ON	OFF	1.54	-0.070	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
33	DSG-LAB	ON	OFF	1.03	-0.038	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
34	DSG-LAB	ON	OFF	0.29	0.880	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
35	DSG-LAB	ON	OFF	1.27	0.952	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
	1	Max Curre	ent Hrwd	1118 microAm						All Channel	s						
HV- CA	AEN MAIN	Max Volta	age Hrwd	3147 Volt		VSei	+ M	L-Cot	[uA]	\/M->>	M	Rue	N//e1	RDow	n[\//s]	Tein	ſel
		Board Ter	mperature	27 Celsius		150	00.0	100	0.0	180	0.0	25	.0	25	.0	3.	.0
I &	Instruct Processe Processe Processes   Note Control Processes   Section Note Control Processes   Section Note Control Processes   Section Note <td>ext Slot :</td> <td>&gt; 1</td>						ext Slot :	> 1									
		Unde	er Temp er Temp												< Pre	vious S	lot

FIG. 2. Expert Controls CSS-BOY screen shows channel 11, 12, 17 and 18 with incorrect RUp values (30 V/s).

0 GEC 02020																- 0	×
File Settings Groups Window Help	aal aa chu		_	_	_	_	_	_	_	_	_	-	-	_	-		
💮 Geco: General conti	rol softu	Jare															
SYSTEM				hvcaentest2											BOARDS		
hvoaentest2 Disconnect Configure	Custom	Name	- IOSet		IMon	VMon	Pw	Status	RUp	RDWn	Trip	V1Set	11Set	SVMax	· Board	00 - A7030TN - [304]	
100011 SY4527	00.000	DSG-Lab	1000.00 uA	1500.00 V	0.900 uA	403.93 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
UNIVERSAL MULTICHANNEL POWER SUPPLY SYSTEM	00.001	DSG-Lab	1000.00 uA	1500.00 V	-0.140 uA	405.45 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		A7030TN	
129.57.86.124	00.002	DSG-Lab	1000.00 uA	1500.00 V	-0.084 uA	1499.75 V	On		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		Module	
SETTINGS	00.003	DSG-Lab	1000.00 uA	1500.00 V	0.852 uA	405.20 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
ADVANCED FEATURES	00.004	DSG-Lab	1000.00 uA	1500.00 V	-0.164 uA	404.69 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	BdStatus HVMax	3147	v
SCRIPT LOG ON	00.005	DSG-LAB	1000.00 uA	1500.00 V	-0.116 uA	405.96 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	HIMax	1118	uA
CRATE TECH SYS	00.006	DSG-LAB	1000.00 uA	1500.00 V	-0.110 uA	407.79 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	Temp	30	°C
SESSIONS MAP INFO INFO	00.007	DSG-LAB	1000.00 uA	1500.00 V	0.842 uA	406.29 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	Cir Alarm	NU	
FLAG OFG CFG KILL ALARM	00.008	DSG-LAB	1000.00 uA	1500.00 V	-0.196 uA	407.48 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
Channel ON 😐	00.009	DSG-LAB	1000.00 uA	1500.00 V	-0.106 uA	408.54 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
ow •	00.010	DSG-LAB	1000.00 uA	1500.00 V	-0.132 uA	408.47 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
ovc •	00.011	DSG-LAB	1000.00 uA	1500.00 V	2.864 uA	408.64 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
Trip	00.012	DSG-LAB	1000.00 uA	1500.00 V	-0.172 uA	410.66 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
Fan0 # 3432 Fan1 # 3289	00.013	DSG-LAB	1000.00 uA	1500.00 V	-0.144 uA	410.86 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
HWFanStat Fan2 0 3361	00.014	DSG-LAB	1000.00 uA	1500.00 V	-0.106 uA	412.64 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
Fan4 # 3218	00.015	DSG-LAB	1000.00 uA	1500.00 V	-0.120 uA	412.08 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
Fan5 🖶 3432	00.016	DSG-LAB	1000.00 uA	1500.00 V	-0.110 uA	413.82 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
SymbolicName SystemOne	00.017	DSG-LAB	1000.00 uA	1500.00 V	-0.104 uA	412.51 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
HVFanSpeed LOW MID HI	00.018	DSG-LAB	1000.00 uA	1500.00 V	-0.150 uA	412.79 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
Fan0 0 1788 PWFanStat Fan1 0 1716	00.019	DSG-LAB	1000.00 uA	1500.00 V	-0.076 uA	414.07 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
Fan2 🛛 1716	00.020	DSG-LAB	1000.00 uA	1500.00 V	-0.114 uA	416.03 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
DHCPDStatus Disabled	00.021	DSG-LAB	1000.00 uA	1500.00 V	-0.094 uA	415.38 V	Off	Down	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			
	00.022	DSG-LAR	1000.00	1500.00 V	-0.120 uA	416 18 V	Off	Down	25 Vos	25 Vos	30 sec	0.00 V	101.00.04	1800 V			
	00.022	DSG-LAP	1000.00	1500.00 V	0.959	419.66 V	0#	Down	25 Ver	25 Vps	20 cm	0.00 V	101.00.00	1900 V			
	00.024	DSG-LAR	1000.00 uA	1500.00 V	-0.174.uA	410.00 ¥	0#	Down	25 Vps	25 Vps	2.0 and	0.00 V	101.00 uA	1800 V			
	00.024	DIGLAD	1000.00 04	1500.00 V	0.174 0A	415.22 ¥	011	Down	25 Vps	25 Vps	5.0 SEC	0.00 V	101.00 44	1000 V			
	00.025	DSG-LAB	1000.00 UA	1500.00 V	-0.112 UA	421.09 V	Uff	Down	25 Vps	25 Vps	5.0 sec	0.00 V	101.00 UA	1800 V	-		
	•													•	1.1		
hvcaentest2 129.57.86.124																CONNECTED 🔒	6.6

FIG. 3. GECO 2020 screenshot shows channel 2 stayed on after all channels were set to turn off by the JavaScript program via CSS-BOY.

					TEST	HV CA	EN - E	pert C	ontrols	- Slot	0						
	Novice	Í				Board Mo	del A70	30TN - [S/N:	304]						AL	L ON/O	FF
CL#	The section of	Click to	Chatan	VM D/1	Image Full	Vset	t [V]	lset	[uA]	Vmax	<[V]	RUp	V/s]	RDwn	[V/s]	Trip	5 [s]
Cn#	Location	Turn	Status	A MOU [A]	Imon [uA]	Readback	Set	Readback	Set	Readback	Set	Readback	Set	Readback	Set	Readback	Set
00	DSG-Lab	ON	OFF	903.14	0.930	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
01	DSG-Lab	ON	OFF	904.50	-0.072	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
02	DSG-Lab	OFF	ON	1499.74	-0.084	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
03	DSG-Lab	ON	OFF	904.32	0.884	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
04	DSG-Lab	ON	OFF	904.06	-0.128	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
05	DSG-LAB	ON	OFF	905.20	-0.086	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
06	DSG-LAB	ON	OFF	906.36	-0.074	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
07	DSG-LAB	ON	OFF	905.41	0.870	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
08	DSG-LAB	ON	OFF	906.56	-0.160	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
09	DSG-LAB	ON	OFF	907.76	-0.072	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
10	DSG-LAB	ON	OFF	907.69	-0.098	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
11	DSG-LAB	ON	OFF	907.83	2.898	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
12	DSG-LAB	ON	OFF	909.57	-0.142	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
13	DSG-LAB	ON	OFF	909.78	-0.108	1500.00	1500 🛨	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
14	DSG-LAB	ON	OFF	911.26	-0.076	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
15	DSG-LAB	ON	OFF	910.92	-0.084	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
16	DSG-LAB	ON	OFF	912.52	-0.076	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
17	DSG-LAB	ON	OFF	911.77	-0.078	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
18	DSG-LAB	ON	OFF	912.29	-0.122	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
19	DSG-LAB	ON	OFF	913.18	-0.048	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
20	DSG-LAB	ON	OFF	914.70	-0.088	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
21	DSG-LAB	ON	OFF	914.15	-0.054	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
22	DSG-LAB		OFF	915.14	-0.086	1500.00	1500	1000.00	1000.00	1800	1800	25	25	_25	25	3.0	3.0
23	DSG-LAB	ON	OFF	917.68	0.886	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
24	DSG-LAB	ON		918.55	-0.140	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
25	DSG-LAB		OFF	921.05	-0.078	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
26	DSG-LAB	ON	OFF	923.04	0.896	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
2/	DSG-DAB	ON	OFF	924.60	-0.014	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
28	DSG-DAB		OFF	926.95	-0.014	1500.00	1500	1000.00	1000.00	1800	1800	25	20	20	25	3.0	3.0
25	DSG-DAB		OFF	920.19	-0.100	1500.00	1500	1000.00	1000.00	1000	1800	25	25	25	25	3.0	3.0
30	DSG-LAB	ON	OFF	930.83	-0.100	1500.00	1500	1000.00	1000.00	1800	1800	25	20	25	25	3.0	3.0
37	DSG-LAB	ON	OFF	933.67	-0.106	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
32	DSG-LAB	ON	OFF	936.75	-0.082	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
20	DSG-LAB	ON	OFF	937.76	0.856	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	2.0	3.0
35	DSG-LAB	ON	OFF	939.97	0.922	1500.00	1500 +	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
HV- CA	AEN MAIN	Max Curre	ent Hrwd	1118 microAm						All Channel	s						
		Max volta	ige Hrwa	3147 Volt	-	VSe	t [V]	l Set	[uA]	VMax	< [V]	Rup	[V/s]	RDow	/n[V/s]	Trip	) [s]
		Board Ter	nperature	30 Celsius		15	00.0	100	0.0	180	0.0	25	5.0	2!	5.0	3.	0
I &	V Plots	Bd St Pov Firmw HV1 Te Unde	tatus wer Fail are Errors Max Cal mp Cal er Temp												N	ext Slot	>
		Ove	s remp												< Pr	evious S	lot

FIG. 4. Expert Controls CSS-BOY screen shows channel 02 status as "on" after all channels were set to turn off.

Number   Numer   Numer   Numer <th>🔚 Geco: Ge</th> <th>neral <mark>co</mark>nt</th> <th>rol soft</th> <th>tware</th> <th></th>	🔚 Geco: Ge	neral <mark>co</mark> nt	rol soft	tware														
	SYSTEM					hvcaentest2	_										BOARD	x
Norm Original Ori	hvcaentest2 Disco	nnect Configure	Custom	Name	IOSet	→ V0Set	IMon	VMon	Pw	Status	RUp	RDWn	Trip	V1Set	11Set	SVMax		2
Max M			00.007	DSG-LAB	1000.00 uA	1500.00 V	1.008 uA	647.01 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		10ar000 - M70301N - [304]
All of a region Open A Open	SY4527 Universal Mut Powers Sumers	TICHANNEL	00.008	DSG-LAB	1000.00 uA	1500.00 V	-0.016 uA	645.59 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		1702078
STTE   000   050.4   0000   050.0   050	129.57.86.124	Jian	00.009	DSG-LAB	1000.00 uA	1500.00 V	0.068 uA	646.22 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		Module
ADVANCED FUNCTION ORD ORG/T	SETTINGS		00.010	DSG-LAB	1000.00 uA	1500.00 V	0.050 uA	644.90 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
Dest   Lot   Serie   Dest   Dest <th< td=""><td>ADVANCED FEAT</td><td>TURES</td><td>00.011</td><td>DSG-LAB</td><td>1000.00 uA</td><td>1500.00 V</td><td>3.058 uA</td><td>772.57 V</td><td>On</td><td>Up</td><td>30 Vps</td><td>25 Vps</td><td>3.0 sec</td><td>0.00 V</td><td>101.00 uA</td><td>1800 V</td><td>BdSt</td><td>latus (av. 3147 V</td></th<>	ADVANCED FEAT	TURES	00.011	DSG-LAB	1000.00 uA	1500.00 V	3.058 uA	772.57 V	On	Up	30 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	BdSt	latus (av. 3147 V
No. 0   PRO-LA   DODO UA   DSO UV   OLZO V   OLZO V<	SCRIPT L	OG	00.012	DSG-LAB	1000.00 uA	1500.00 V	0.016 uA	771.90 V	On	Up	30 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	HIM	ax 1118 uA
No.   No. <td>CRATE TE</td> <td>CH SYS</td> <td>00.013</td> <td>DSG-LAB</td> <td>1000.00 uA</td> <td>1500.00 V</td> <td>0.028 uA</td> <td>641.98 V</td> <td>On</td> <td>Up</td> <td>25 Vps</td> <td>25 Vps</td> <td>3.0 sec</td> <td>0.00 V</td> <td>101.00 uA</td> <td>1800 V</td> <td>Temp</td> <td>o 30 ℃</td>	CRATE TE	CH SYS	00.013	DSG-LAB	1000.00 uA	1500.00 V	0.028 uA	641.98 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	Temp	o 30 ℃
ngl color   Note	DESET CENSION	IFO INFO	00.014	DSG-LAB	1000.00 uA	1500.00 V	-0.032 uA	1.34 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	Cr A	Jarm NU
Change	FLAG OFG CFG K	ILL ALARM	00.015	DSG-LAB	1000.00 uA	1500.00 V	0.068 uA	638.52 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	1	
ONV   Image: Second	Channel ON		00.016	DSG-LAB	1000.00 uA	1500.00 V	0.068 uA	637.04 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
OPC TO OPC OP	UNV		00.017	DSG-LAB	1000.00 uA	1500.00 V	0.066 uA	770.83 V	On	Up	30 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
mp   mp<	ovc	•	00.018	DSG-LAB	1000.00 uA	1500.00 V	0.036 uA	769.63 V	On	Up	30 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
Inferrit Inferit Inferit I	Inp Baco H	2422	00.019	DSG-LAB	1000.00 uA	1500.00 V	0.102 uA	632.64 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
Meridige March	Fan1 e	3218	00.020	DSG-LAB	1000.00 uA	1500.00 V	0.076 uA	630.09 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
Image <th< td=""><td>HVFanStat Fan2 #</td><td>3397 3432</td><td>00.021</td><td>DSG-LAB</td><td>1000.00 uA</td><td>1500.00 V</td><td>0.098 uA</td><td>640.80 V</td><td>On</td><td>Up</td><td>25 Vps</td><td>25 Vps</td><td>3.0 sec</td><td>0.00 V</td><td>101.00 uA</td><td>1800 V</td><td></td><td></td></th<>	HVFanStat Fan2 #	3397 3432	00.021	DSG-LAB	1000.00 uA	1500.00 V	0.098 uA	640.80 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
Hull   Link   Link <th< td=""><td>Fan4 e</td><td>3218</td><td>00.022</td><td>DSG-LAB</td><td>1000.00 uA</td><td>1500.00 V</td><td>0.046 uA</td><td>639.71 V</td><td>On</td><td>Up</td><td>25 Vps</td><td>25 Vps</td><td>3.0 sec</td><td>0.00 V</td><td>101.00 uA</td><td>1800 V</td><td></td><td></td></th<>	Fan4 e	3218	00.022	DSG-LAB	1000.00 uA	1500.00 V	0.046 uA	639.71 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
Number   Number<	SymbolicName	SwitemOne	00.023	DSG-LAB	1000.00 uA	1500.00 V	1.034 uA	639.86 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
Image of the state of	HVEanSpeed	MID HI	00.024	DSG-LAB	1000.00 uA	1500.00 V	-0.016 uA	639.73 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
Polifying in	Fan() #	1788	00.025	DSG-LAB	1000.00 uA	1500.00 V	0.082 uA	637.11 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
Invite   Invit   Invit   Invit <td>PWFanStat Fan1 😐</td> <td>1752</td> <td>00.026</td> <td>DSG-LAB</td> <td>1000.00 uA</td> <td>1500.00 V</td> <td>1.038 uA</td> <td>657.74 V</td> <td>On</td> <td>Up</td> <td>25 Vps</td> <td>25 Vps</td> <td>3.0 sec</td> <td>0.00 V</td> <td>101.00 uA</td> <td>1800 V</td> <td></td> <td></td>	PWFanStat Fan1 😐	1752	00.026	DSG-LAB	1000.00 uA	1500.00 V	1.038 uA	657.74 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
Outcom   Operation   O	Fanz •	1716	00.027	DSG-LAB	1000.00 uA	1500.00 V	1.094 uA	635.12 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
00.03   D5G-LAB   1000.00 uA   1500.00 V   0.020 uA   621.40 V   Om   Up   25 Vps   2.5 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     00.03   D5G-LAB   1000.00 uA   1500.00 V   0.046 uA   622.99 V   Om   Up   25 Vps   2.5 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     00311   D5G-LAB   1000.00 uA   1500.00 V   0.014 uA   619.44 V   Om   Up   25 Vps   2.5 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     00311   D5G-LAB   1000.00 uA   1500.00 V   0.014 uA   619.44 V   Om   Up   2.5 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     0032   D5G-LAB   1000.00 uA   1500.00 V   0.038 uA   648.48 V   Om   Up   2.5 Vps   3.0 sec   0.00 V   101.00 uA   1800 V      0   D5G-LAB   1000.00 uA   1500.00 V   0.038 uA   648.48 V   Om   Up   2.5 Vps   3.0 sec	UNCPOStatus	Disabled	00.028	DSG-LAB	1000.00 uA	1500.00 V	0.120 uA	633.55 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
00330   DSG-LAB   1000.00 uA   1500.00 V   0.046 uA   629.59 V   On   Up   25 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     00331   DSG-LAB   1000.00 uA   1500.00 V   0.014 uA   619.44 V   On   Up   25 Vps   25 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     00332   DSG-LAB   1000.00 uA   1500.00 V   0.036 uA   648.48 V   On   Up   25 Vps   2.0 sec   0.00 V   101.00 uA   1800 V     0.032   DSG-LAB   1000.00 uA   1500.00 V   0.036 uA   648.48 V   On   Up   25 Vps   2.0 sec   0.00 V   101.00 uA   1800 V			00.029	DSG-LAB	1000.00 uA	1500.00 V	0.020 uA	621.40 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
00.031   DSG-LAB   1000.00 uA   1500.00 V   0.014 uA   619.44 V   On   Up   25 Vps   23 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     00012   DSG-LAB   1000.00 uA   1500.00 V   0.036 uA   648.48 V   On   Up   25 Vps   25 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     4   -   -   -   -   -   -   -   -			00.030	DSG-LAB	1000.00 uA	1500.00 V	0.046 uA	629.59 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
00032 DSG-LAB 1000.00 uA 1500.00 V 0.036 uA 648.48 V On Up 25 Vps 25 Vps 3.0 sec 0.00 V 101.00 uA 1800 V ✓			00.031	DSG-LAB	1000.00 uA	1500.00 V	0.014 uA	619.44 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
			00.032	DSG-LAB	1000.00 uA	1500.00 V	0.036 uA	648.48 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
			1															
hycantest2 129.57.86.124 COWIECTED	hvcaentest2 129.57.86.12	24																CONNECTED 😝 😝 🖗

FIG. 5. GECO 2020 screenshot shows channel 14 is off after Pw for all channels was set to 1 (turn on) simultaneously.

					TEST	THV CA	AEN - Ex	(pert C	ontrols	- Slot	0						
	Novice	1				Board Mo	del A70	30TN - [S/N:	304]						AL	ON/O	FF
Ch#	Location	Click to Turn	Status	VMon [V]	lmon [uA]	Vse Readback	t [V] Set	lset Readback	[uA] Set	Vmax Readback	[ <b>V]</b> Set	RUp Readback	[V/s] Set	RDwn Readback	[V/s] Set	Trip Readback	[s] Set
00	DSG-Lab	OFF	ON	1499.81	1.002	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
01	DSG-Lab	OFF	ON	1499.69	-0.008	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
02	DSG-Lab	OFF	ÓN	1499.74	-0.090	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
03	DSG-Lab	OFF	ON	1499.77	0.958	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
04	DSG-Lab	OFF	ON	1499.78	-0.066	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
05	DSG-LAB	OFF	ON	1499.88	-0.016	1500.00	1500 🕂	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
06	DSG-LAB	OFF	ON	1499.89	0.004	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
07	DSG-LAB	OFF	ON	1499.71	0.932	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
08	DSG-LAB	OFF	ON	1499.73	-0.088	1500.00	1500 🔆	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
09	DSG-LAB	OFF	ON	1499.75	-0.006	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
10	DSG-LAB	OFF	ON	1499.77	-0.024	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
11	DSG-LAB	OFF	ON	1499.56	2.974	1500.00	1500 🗧	1000.00	1000.00	1800	1800	30	30	25	25	3.0	3.0
12	DSG-LAB	OFF	ON	1499.78	-0.074	1500.00	1500 - (-	1000.00	1000.00	1800	1800	30	30	25	25	3.0	3.0
13	DSG-LAB	OFF	ON	1499.25	-0.030	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
14	DSG-LAB	ON	OFF	6.35	-0.034	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
1 12	DISCHAR	OFF	UN	1450.15	0.014	1300.00	1.000	1000.00	1000.00	1800	1800	1.7	23	2.2	2.5	3.0	5.0
16	DSG-LAB	OFF	ON	1497.19	0.010	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
17	DSG-LAB	OFF	ON	1499.84	-0.018	1500.00	1500	1000.00	1000.00	1800	1800	30	30	25	25	3.0	3.0
18	DSG-LAB	OFF	ON	1499.80	-0.054	1500.00	1500	1000.00	1000.00	1800	1800	30	30	25	25	3.0	3.0
19	DSG-LAB	OFF	ON	1494 99	0.060	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
20	DSG-LAB	OFF	ON	1492.61	0.040	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
20	DSG-LAB	OFF	ON	1499.01	0.078	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
22	DSG-LAB	OFF	ON	1498.72	-0.012	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
72	DSG-LAB	OFF	ON	1498 75	0.974	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
24	DSG-LAB	OFF	ON	1498.68	-0.070	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
24	DSG-LAB	OFF	ON	1497.92	0.030	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	2.0	2.0
25	DSG-LAB	OFF	ON	1499.97	0.970	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
20	DSG-LAB	OFF	ON	1495.07	1.040	1500.00	1500	1000.00	1000.00	1800	1800	25	23	25	25	3.0	3.0
2/	DSG-LAB	OFF	ON	1496.96	0.080	1500.00	1500	1000.00	1000.00	1800	1800	20	20	20	25	3.0	3.0
20	DECIAD	OFF	ON	1493.00	-0.013	1500.00	1500	1000.00	1000.00	1800	1800	25	23	20	20	3.0	3.0
23	DSC LAD	OFF	ON	1463.60	-0.012	1500.00	1500	1000.00	1000.00	1800	1800	25	23	25	25	3.0	5.0
30	DSG-LAB	OFF		1493.80	-0.019	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
31	DSGJAR	OFF	ON	1402.00	-0.016	1500.00	1500	1000.00	1000.00	1800	1800	25	20	25	20	3.0	3.0
32	DSC-LAD	OFF	ON	1455.77	0.040	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
33	DSG-LAB	OFF	UN	1489.17	0.040	1500.00	1500	1000.00	1000.00	1800	1000	25	25	25	25	3.0	3.0
34	DSG-LAB	OFF	ON	1488.19	0.958	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
35	DSG-DAB		ON	1485.46	1.036	1500.00	1300	1000.00	1000.00	1800	1000	25	25	25	25	3.0	3.0
HV- CA		Max Curre	ent Hrwd	3147 Volt		115-		1.5-1	. [	All Channel	S D.O.	Dur	D//-1		-0//-1	Tala	[-1
			ige i nord	3147 Volt	-	vse	t [v]	I Set	t [UA]	VIMAD	: [V]	кир	[v/s]	RDOW	n[v/s]	Trip	[5]
		Board Ter	nperature	29 Celsius		15	00.0	100	0.0	180	0.0	25	5.0	25	.0	3.	0
I & '	Up Test	Bd St Pav Firmw HV 1 Te Unde Ove	atus ver Fail are Errors Max Cal mp Cal sr Temp r Temp												Ne < Pre	<u>ext Slot</u>	>

FIG. 6. Expert Controls CSS-BOY screen shows status of channel 14 is off after Pw for all channels was set to 1 (turn on) simultaneously.

	GEC 02020																- a ×
Conc. Security Securit	File Settings Groups Window Help		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
Control   Function	🏭 eeco: eeneral con	trol softi	ngle														
	SYSTEM				hvcaentest2											BOARDS	
Norm	Invegentest2 Discorpect Configure	Custom	Name ~	10Set	V0Set	IMon	VMon	Pw	Status	RUp	RDWn	Trip	V1Set	I1Set	SVMax		the second second second
Image: Participant Part Part Part Part Part Part Part Par		00.004	DSG-Lab	1000.00 uA	1500.00 V	-0.024 uA	863.33 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	• Boar	d00 - A7030TN - [304]
market   markt   markt   markt <td>SY4527 Universal Multichannel</td> <td>00.005</td> <td>DSG-LAB</td> <td>1000.00 uA</td> <td>1500.00 V</td> <td>0.046 uA</td> <td>870.67 V</td> <td>On</td> <td>Up</td> <td>25 Vps</td> <td>25 Vps</td> <td>3.0 sec</td> <td>0.00 V</td> <td>101.00 uA</td> <td>1800 V</td> <td></td> <td></td>	SY4527 Universal Multichannel	00.005	DSG-LAB	1000.00 uA	1500.00 V	0.046 uA	870.67 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
string   string   000   0	129.57.86.124	00.006	DSG-LAB	1000.00 uA	1500.00 V	0.040 uA	868.24 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		A7030TN Module
AUNCLE FAIRING 000	SETTINGS	00.007	DSG-LAB	1000.00 uA	1500.00 V	0.990 uA	867.66 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
Sinity   Los   One   Op   Sinity   Sinity   <	ADVANCED FEATURES	00.008	DSG-LAB	1000.00 uA	1500.00 V	-0.042 uA	865.10 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	BdStatu	s
Los   Co	ON	00.009	DSG-LAB	1000.00 uA	1500.00 V	0.046 uA	865.72 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	HIMax	3147 V 1118 UA
Norm   Norm <th< td=""><td>SCRIPT LOG OFF</td><td>00.010</td><td>DSG-LAB</td><td>1000.00 uA</td><td>1500.00 V</td><td>0.026 uA</td><td>860.91 V</td><td>On</td><td>Up</td><td>25 Vps</td><td>25 Vps</td><td>3.0 sec</td><td>0.00 V</td><td>101.00 uA</td><td>1800 V</td><td>Temp</td><td>27 °C</td></th<>	SCRIPT LOG OFF	00.010	DSG-LAB	1000.00 uA	1500.00 V	0.026 uA	860.91 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	Temp	27 °C
NEXT   NEX   NEX <td>SESSIONS MAP INFO INFO</td> <td>00.011</td> <td>DSG-LAB</td> <td>1000.00 uA</td> <td>1500.00 V</td> <td>3.014 uA</td> <td>880.99 V</td> <td>On</td> <td>Up</td> <td>25 Vps</td> <td>25 Vps</td> <td>3.0 sec</td> <td>0.00 V</td> <td>101.00 uA</td> <td>1800 V</td> <td>Cir Alarr</td> <td>n NO</td>	SESSIONS MAP INFO INFO	00.011	DSG-LAB	1000.00 uA	1500.00 V	3.014 uA	880.99 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	Cir Alarr	n NO
Convert OV 0011 DSG-LAB 10000 LA 19000 V 0.002 LA 863.71 V 0n Up 23 Vps 23 Vps 30 sec 0.00 V 101.0LuA 1800 V   OV 0011 DSG-LAB 10000 LA 190.0V 0.038 LA 662.2 V 0n Up 23 Vps 23 Vps 30 sec 0.00 V 101.0LuA 1800 V   OV 10011 DSG-LAB 10000 LA 190.0V 0.038 LA 662.2 V 0n Up 23 Vps 23 Vps 30 sec 0.00 V 101.0LuA 1800 V   OV 10011 10000 LA 190.0V 0.046 LA 665.6 V 0n Up 23 Vps 30 sec 0.00 V 101.0LuA 1800 V   MVINTS 30025 DSG-LAB 10000 LA 190.0V 0.044 LA 662.32 V 0n Up 23 Vps 30 sec 0.00 V 101.0LuA 1800 V   MVINTS Signa DSG-LAB 10000 LA 190.0V 0.062 LA 660.5 V 0n Up 23 Vps 30 sec 0.00 V 101.0LuA 1800 V 100.0LuA 1800 V	RESET GEN SIGN FLAG CFG CFG KILL ALARM	00.012	DSG-LAB	1000.00 uA	1500.00 V	-0.022 uA	863.79 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
000 0000 000 000	Channel ON ·	00.013	DSG-LAB	1000.00 uA	1500.00 V	-0.002 uA	863.71 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
UN   UN<	ovv •	00.014	DSG-LAB	1000.00 uA	1500.00 V	0.038 uA	862.25 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
Tp To To< To< <	OVC .	00.015	DSG-LAB	1000.00 uA	1500.00 V	0.046 uA	856.64 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
Find 9432 Find 1000 1000004 15000V 0.000 00004 000004	Trip 😁	00.016	DSG-LAB	1000.00 uA	1500.00 V	-0.036 uA	2.22 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
mind mind 0.00 0.000 0.	Fan0 0 3432	00.017	DSG-LAB	1000.00 µA	1500.00 V	0.042	861.68 V	00	IIn	25 Vos	25 Vine	3.0 sec	0.00 V	101.00.04	1800 V		
Number Pards Pards Observals	Fan2 9 3397	00.018	DSG-LAB	1000.00 uA	1500.00 V	0.004.04	862 32 V	00	Up.	25 Vor	25 Vor	30 rec	0.00 V	101.00.04	1800 V		
Fund Outo	Fan3 # 3468 Fan4 # 3254	00.010	DEGLAR	1000.00	1500.00 V	0.0920	RED SE V	0	U-	25 Ver	25 Ver	20	0.00 V	101.000	1900 1/		
System   System<	Fan5 # 3432	00.019	DIGILAD	1000.00 04	1500.00 V	0.002 UA	¥ 06.000	OII OII	op	25 Vps	25 Vps	5.0 sec	0.00 ¥	101.00 04	1000 V		
H-Wardspeed Low	SymbolicName SystemOne	00.020	DSG-LAB	1000.00 UA	1500.00 V	0.058 UA	853.11 V	Un	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 UA	1800 V		
Field   IB23 Field   Obsc LA8   Obsc Udd	HVFanSpeed LOW MID. HI	00.021	USG-LAB	1000.00 UA	1500.00 V	0.082 uA	858.93 V	Un	Up	25 Vps	20 Vps	3.U sec	0.00 V	101.00 UA	1800 V		
PM-West Part # 1716 OD.00.1 OSG-LAB 100000 uA 1500.00 V 1.016 uA 858.06 V On Up 25 typ: 25 typ: 3.0 sec 0.00 V 101.00 uA 1500 V   DevODStatur Devalued 000.00 uA 1500.00 V 1.016 uA 858.05 V On Up 25 typ: 25 typ: 3.0 sec 0.00 V 101.00 uA 1500 V   DevODStatur Devalued 000.00 uA 1500.00 V -0.038 uA 858.05 V On Up 25 typ: 25 typ: 3.0 sec 0.00 V 101.00 uA 1500 V   ORX DSG-LAB 1000.00 uA 1500.00 V 0.062 uA 855.67 V On Up 25 typ: 25 typ: 3.0 sec 0.00 V 101.00 uA 1500 V   ORX DSG-LAB 1000.00 uA 1500.00 V 1.052 uA 855.67 V On Up 25 typ: 25 typ: 3.0 sec 0.00 V 101.00 uA 1500 V   ORX DSG-LAB 1000.00 uA 1500.00 V 1.052 uA 854.68 V On Up 25 typ: 25 typ: 3.0 sec 0.00 V 101.00	Fan0 0 1823	00.022	DSG-LAB	1000.00 uA	1500.00 V	0.032 uA	857.89 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
Disabled   06.024   056-LAB   00000 uA   150.00 V   -0.038 uA   855.65 V   0n   Up   25 Vps   25 Vps   3.0 sec   0.00 V   101.00 uA   1500 V     00.052   D56-LAB   1000.00 uA   150.00 V   0.062 uA   855.65 V   0n   Up   25 Vps   25 Vps   3.0 sec   0.00 V   101.00 uA   1500 V   -     00.052   D56-LAB   1000.00 uA   1500.00 V   0.062 uA   855.76 V   0n   Up   25 Vps   25 Vps   3.0 sec   0.00 V   101.00 uA   1500 V   -     00.057   D56-LAB   1000.00 uA   1500.00 V   1.678 uA   854.68 V   0n   Up   25 Vps   3.0 sec   0.00 V   101.00 uA   1500 V   -     00.057   D56-LAB   1000.00 uA   1500.00 V   1.678 uA   854.68 V   0n   Up   25 Vps   3.0 sec   0.00 V   101.00 uA   1500 V     00.05   D56-LAB   1000.00 uA   150.00 V   0.090 uA   853.94 V   0n   Up	PWFanStat Fan1 # 1716 Fan2 # 1680	00.023	DSG-LAB	1000.00 uA	1500.00 V	1.016 uA	858.09 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
ORX25 OS5-LAB 1000.00 uA 1500.00 V 0.062 uA 855.65 V On Up 25 Vpr 25 Vpr 3.0 sec 0.00 V 101.00 uA 1800 V -   00.025 DS5-LAB 1000.00 uA 1500.00 V 1.020 uA 855.65 V On Up 25 Vpr 25 Vpr 3.0 sec 0.00 V 101.00 uA 1800 V   00.025 DS5-LAB 1000.00 uA 1500.00 V 1.078 uA 854.63 V On Up 25 Vpr 25 Vpr 3.0 sec 0.00 V 101.00 uA 1800 V 1800 V   00.028 DS6-LAB 1000.00 uA 1500.00 V 0.096 uA 854.68 V On Up 25 Vpr 25 Vpr 3.0 sec 0.00 V 101.00 uA 1800 V   00.028 DS6-LAB 1000.00 uA 1500.00 V 0.096 uA 853.94 V On Up 25 Vpr 3.0 sec 0.00 V 101.00 uA 1800 V   00.05 DS6-LAB 1000.00 uA 1500.00 V 0.000 uA 833.94 V On Up 25 Vpr 3.0 sec 0.00 V 101.00 uA 1800 V V V <	DHCPDStatus Disabled	00.024	DSG-LAB	1000.00 uA	1500.00 V	-0.038 uA	858.05 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
00.056   D5G-LAB   1000.00 uA   1520 uA   855.79 V   On   Up   25 Vps   23.0 sec   0.00 V   101.00 uA   1800 V     00.027   D5G-LAB   1000.00 uA   1500.00 V   1.078 uA   854.63 V   On   Up   25 Vps   25 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     00.027   D5G-LAB   1000.00 uA   1500.00 V   1.078 uA   854.63 V   On   Up   25 Vps   25 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     00.028   D5G-LAB   1000.00 uA   1500.00 V   0.099 uA   854.08 V   On   Up   25 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     00.059   D5G-LAB   1000.00 uA   1500.00 V   0.000 uA   853.94 V   On   Up   25 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     0.050-LAB   1000.00 uA   1500.00 V   0.000 uA   833.94 V   On   Up   25 Vps   3.0 sec   0.00 V   101.00 uA   1800 V   V		00.025	DSG-LAB	1000.00 uA	1500.00 V	0.062 uA	855.65 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
00.027   DSG-LAB   1000.00 uA   1500.00 V   1.078 uA   854.68 V   On   Up   25 Vps   25 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     00.028   DSG-LAB   1000.00 uA   1500.00 V   0.096 uA   854.08 V   On   Up   25 Vps   25 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     00.029   DSG-LAB   1000.00 uA   1500.00 V   0.000 uA   853.94 V   On   Up   25 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     0   0   Up   25 Vps   25 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     0   Up   25 Vps   25 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     0   Up   25 Vps   25 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     0   Up   Up   25 Vps   3.0 sec   0.00 V   101.00 uA   1800 V		00.026	DSG-LAB	1000.00 uA	1500.00 V	1.020 uA	855.79 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
0.028   DSG-LAB   1000.00 uA   1500.00 V   0.096 uA   854.08 V   Om   Up   25 Vps   2.5 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     0.028   DSG-LAB   1000.00 uA   1500.00 V   0.000 uA   853.94 V   Om   Up   25 Vps   2.5 Vps   3.0 sec   0.00 V   101.00 uA   1800 V     4   Image: Contract Structure St		00.027	DSG-LAB	1000.00 uA	1500.00 V	1.078 uA	854.63 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
00009 D5G-LAB 1000.00 uA 1500.00 V 0.000 uA 853.94 V On Up 25 Vps 25 Vps 3.0 sec 0.00 V 101.00 uA 1800 V		00.028	DSG-LAB	1000.00 uA	1500.00 V	0.096 uA	854.08 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
		00.029	DSG-LAB	1000.00 uA	1500.00 V	0.000 uA	853.94 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		
		4														•	
hraentest2 128-5766.124 COVIECTED @ 0 0	hvcaentest2 129.57.86.124																

FIG. 7. GECO 2020 screenshot shows channel 16 off after Pw for all channels was set to 1 (turn on) simultaneously.

					TEST	HV C/	AEN - Ex	(pert C	ontrols	- Slot	0						
1	Novice	l				Board Mo	del A70	30TN - [S/N:	304]						AL	L ON/O	FF
Ch#	Location	Click to	Status	VMon [V]	Imon [uA]	Vse	t [V]	Iset	[uA]	Vmax	« [V]	RUp	[V/s]	RDwn	[V/s]	Trip	[s]
		Turn				Readback	Set	Readback	Set	Readback	Set	Readback	Set	Readback	Set	Readback	Set
00	DSG-Lab	OFF	ON	1401.53	1.044	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
01	DSG-Lab	OFF	ON	1411.97	0.030	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
02	DSG-Lab	OFF	ON	1412.24	-0.056	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
03	DSG-Lab	OFF	ON	1410.00	0.990	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
04	DSG-Lab	OFF	ON	1400.90	-0.034	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
05	DSG-DAB	OFF	ON	1408.34	0.032	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
06	DSG-LAB	OFF	ON	1404.95	0.024	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
07	DSG-LAB	OFF	ON	1405.06	0.972	1500.00	1500 :	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
08	DSG-LAB	OFF	ON	1402.50	-0.058	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
09	DSG-LAB	OFF	ON	1403.21	0.030	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
10	DSG-LAB	OFF	ON	1398.37	0.010	1500.00	1500 ,	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
11	DSG-LAB	OFF	ON	1418.10	3.000	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
12	DSG-LAB	OFF	ON	1400.72	-0.036	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
13	DSG-LAB	OFF	ON	1400.44	-0.016	1500.00	1500	1000.00	1000.00	1800	1800	_25_	25	25	25	3.0	3.0
14	DSG-LAB	OFF	ON	1398.77	0.026	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
15	DSG-LAB	OFF	CIN	1393.57	0.026	1500.00	1500	1000.00	1000.00	1800	1800	25	25	- 25	25	30	3.0
16	DSG-LAB	ON	OFF	2.75	-0.036	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
17	DSG-LAB	OFF	ON	1398.89	0.024	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
18	DSG-LAB	OFF	ON	1400.10	-0.014	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
19	DSG-LAB	OFF	ON	1397.46	0.064	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
20	DSG-LAB	OFF	ON	1389.78	0.050	1500.00	1500 .	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
21	DSG-LAB	OFF	ON	1396.07	0.066	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
22	DSG-LAB	OFF	ON	1395.19	0.020	1500.00	1500 ;	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
23	DSG-LAB	OFF	ON	1395.26	1.000	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
24	DSG-LAB	OFF	ON	1395.39	-0.048	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
25	DSG-LAB	OFF	ON	1393.05	0.054	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
26	DSG-LAB	OFF	ON	1392.59	1.014	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
27	DSG-LAB	OFF	ON	1392.14	1.064	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
28	DSG-LAB	OFF	ON	1390.65	0.082	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
29	DSG-LAB	OFF	ON	1390.17	-0.016	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
30	DSG-LAB	OFF	ON	1392.09	0.004	1500.00	1500 、	1000.00	1000.00	1800	1800	_25	25	25	25	3.0	3.0
31	DSG-LAB	OFF	ON	1389.35	-0.024	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
32	DSG-LAB	OFF	ON	1388.12	0.004	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
33	DSG-LAB	OFF	ON	1386.04	0.034	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
34	DSG-LAB	OFF	ON	1405.34	0.954	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
35	DSG-LAB	OFF	ON	1381.32	1.028	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
		Max Curre	nt Hrwd	1118 microAm		2		-1		All Channel	s			-			
110 02	CIN PORTS	Max Volta	ge Hrwd	3147 Volt		VSe	t [V]	I Set	[uA]	VMa	< [M]	Rup	[V/s]	RDow	m[V/s]	Trip	[s]
		Board Ten	nperature	28 Celsius		15	00.0	100	0.0	180	0.0	25	.0	2!	5.0	3,	0
<u>I&amp;</u>	V Plots	Bd St Pov Firmw HV M Tei Unde Ove	atus er Fail are Errors Max Cal mp Cal r Temp r Temp												N	<u>ext Slot</u>	>
															-		

FIG. 8. Expert Controls CSS-BOY screen shows status of channel 16 is off after Pw for all channels was set to1 (turn on) simultaneously.

																	-	-
File Settings Groups Window Help		_	_	_		_			_				_					
🍈 eeco: eeneral con	itrol soft	mare																
SYSTEM				hvcaentest2											804	RDS		
hvoaentest2 Disconnect Configure	Custom	Name	IOSet +	→ V0Set	IMon	VMon	Pw	Status	RUp	RDWn	Trip	V1Set	I1Set	SVMax	÷ .	Board00 -	47030TN - [304]	
SY4527 Universal Multichannel	00.009	DSG-LAB DSG-LAB	1000.00 uA 1000.00 uA	1500.00 V 1500.00 V	-0.012 uA -0.052 uA	1499.75 V 1499.78 V	On On	Up Up	25 Vps 25 Vps	25 Vps 25 Vps	3.0 sec 3.0 sec	0.00 V 0.00 V	101.00 uA	1800 V 1800 V				
POWER SUPPLY SYSTEM	00.011	DSG-LAB	1000.00 uA	1500.00 V	2.956 uA	1499.56 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V			A7030TN Module	
SETTINGS	00.012	DSG-LAB	1000.00 uA	1500.00 V	-0.084 uA	1499.80 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	1.1.2	1		
ADVANCED FEATURES	00.013	DSG-LAB	1000.00 uA	1500.00 V	-0.058 uA	1499.84 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	B	dStatus		
	00.014	DSG-LAB	1000.00 uA	1500.00 V	-0.018 uA	1499.76 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	н	vmax IMax	3147	uA
OFF	00.015	DSG-LAB	1000.00 uA	1500.00 V	-0.032 uA	1499.88 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	Te	emp	28	°C
SESSIONS MAP INFO INFO	00.016	DSG-LAB	1000.00 uA	1500.00 V	-0.026 uA	1499.84 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V		ir Alarm	NU	-
FLAG CFG CFG KELL ALARM	00.017	DSG-LAB	1000.00 uA	1500.00 V	-0.022 uA	1499.84 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V				
Channel ON P	00.018	DSG-LAB	1000.00 uA	1500.00 V	-0.058 uA	1499.82 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V				
UNV .	00.019	DSG-LAB	1000.00 uA	1500.00 V	-0.002 uA	3.15 V	Off		25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V				
OVC *	00.020	DSG-LAB	1000.00 uA	1500.00 V	-0.030 uA	1499.82 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V				
Fan0 # 3432	00.021	DSG-LAB	1000.00 uA	1500.00 V	0.010 uA	1499.78 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V				
Fan1 0 3289	00.022	DSG-LAB	1000.00 uA	1500.00 V	-0.028 uA	1499.72 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V				
HWFanStat Fan3 # 3432	00.023	DSG-LAB	1000.00 uA	1500.00 V	0.936 uA	1499.76 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V				
Fan4 6 3218 Fan5 6 3397	00.024	DSG-LAB	1000.00 uA	1500.00 V	-0.096 uA	1499.59 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V				
SymbolicName SystemOne	00.025	DSG-LAB	1000.00 uA	1500.00 V	-0.026 uA	1499.79 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V				
HVFanSpeed LOW MID. HI	00.026	DSG-LAB	1000.00 uA	1500.00 V	0.956 uA	1499.91 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V				
Fan0 e 1823	00.027	DSG-LAB	1000.00 uA	1500.00 V	1.016 uA	1499.83 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V				
PWFanStat Fan1 # 1716 Fan2 # 1716	00.028	DSG-LAB	1000.00 uA	1500.00 V	0.026 uA	1499.96 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V				
DHCPDStatus Disabled	00.029	DSG-LAB	1000.00 uA	1500.00 V	-0.068 uA	1499.69 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V				
	00.030	DSG-LAB	1000.00 uA	1500.00 V	-0.060 uA	1499.83 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V				
	00.031	DSG-LAB	1000.00 uA	1500.00 V	-0.072 uA	1499.80 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V				
	00.032	DSG-LAB	1000.00 uA	1500.00 V	-0.048 uA	1499.78 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V				
	00.033	DSG-LAB	1000.00 uA	1500.00 V	-0.020 uA	1499.81 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	- 11			
	00.034	DSG-LAB	1000.00 uA	1500.00 V	0.902 uA	1499.82 V	On	Up	25 Vps	25 Vps	3.0 sec	0.00 V	101.00 uA	1800 V	•			
	1								_			_						
																_		
hvcaentest2 129.57.86.124																	CONNECTED	

FIG. 9. GECO 2020 screenshot shows channel 19 is off after Pw for all channels was set to 1 (turn on) simultaneously.

					TEST	' HV CA	AEN - E>	(pert C	ontrols	- Slot	0						
	Novice					Board Mo	del A70	30TN - [S/N:	304]						AL	L ON/OF	FF
Ch#	Location	Click to Turn	Status	VMon [V]	Imon [uA]	Vset Readback	t [V] Set	lset Readback	[uA] Set	Vma: Readback	< [V] Set	RUp [ Readback	V/s] Set	RDwn Readback	[V/s] Set	Trip Readback	[s] Set
00	DSG-Lab	OFF	ON	1117.30	1.050	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
01	DSG-Lab	OFF	ON	1126.74	0.046	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
02	DSG-Lab	OFF	ON	1124.44	-0.046	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
03	DSG-Lab	OFF	ON	1123.38	0.996	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
04	DSG-Lab	OFF	ON	1120.18	-0.024	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
05	DSG-LAB	OFF	ON	1140.72	0.038	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
06	DSG-LAB	OFF	ON	1139.06	0.034	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
07	DSG-LAB	OFF	ON	1118.42	0.980	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
08	DSG-LAB	OFF	ON	1111.06	-0.048	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
09	DSG-LAB	OFF	ON	1117.72	0.040	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
10	DSG-LAB	OFF	ON	1117.66	0.002	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
11	DSG-LAB	OFF	ON	1116.04	3.004	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
12	DSG-LAB	OFF	ON	1115.51	-0.022	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
13	DSG-LAB	OFF	ON	1114.09	-0.008	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
14	DSG-LAB	OFF	ON	1134.23	0.032	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
15	DSG-LAB	OFF	ON	1113.16	0.018	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
16	DSG-LAB	OFF	ON	1112.56	0.030	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
17	DSG-LAB	OFF	ON	1112.41	0.030	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
18	DSG-LAB	OFF	ON	1106.03	-0.010	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
19	DSG-LAB	ON	OFF	1.61	0.002	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
20	DSG-LAB	OFF	ON	1110.66	0.012	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
21	DSG-LAB	OFF	ON	1109.53	0.062	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
22	DSG-LAB	OFF	ON	1109.86	0.012	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
23	DSG-LAB	OFF	ON	1109.92	0.996	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
24	DSG-LAB	OFF	ON	1108.78	-0.044	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
25	DSG-LAB	OFF	ON	1107.56	0.026	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
26	DSG-LAB	OFF	ON	1107.55	1.010	1500.00	1500 5	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
27	DSG-LAB	OFF	ON	1128.28	1.062	1500.00	1500 ;	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
28	DSG-LAB	OFF	ON	1102.06	0.076	1500.00	1500 5	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
29	DSG-LAB	OFF	ON	1098.25	-0.016	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
30	DSG-LAB	OFF	ON	1099.03	-0.010	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
31	DSG-LAB	OFF	ON	1094.39	-0.022	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
32	DSG-LAB	OFF	ON	1091.57	0.004	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
33	DSG-LAB	OFF	ON	1089.92	0.030	1500.00	1500	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
34	DSG-LAB	OFF	ON	1087.50	0.956	1500.00	1500 5	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
35	DSG-LAB	OFF	ON	1083.07	1.016	1500.00	1500 🗧	1000.00	1000.00	1800	1800	25	25	25	25	3.0	3.0
101 5		Max Curr	ent Hrwd	1118 microAm						All Channel	s					_	
nv-C/	HEIN MAIN	Max Volta	age Hrwd	3147 Volt		VSet	t [V]	I Set	[uA]	VMa	× [V]	Rup	[V/s]	RDow	n[V/s]	Trip	[s]
· ·		Board Ter	nperature	28 Celsius		150	00.0	100	0.0	180	0.0	25	.0	25	.0	3.	0
Ramp	V Plots	Bd Si Por Firmw HV Te Unda	tatus wer Fail ware Errors Max Cal mp Cal er Temp er Temp												Ne < Pre	ext Slot : evious S	> lot

FIG. 10. Expert Controls CSS-BOY screen shows status of channel 19 is off after Pw for all channels was set to 1 (turn on) simultaneously.



FIG. 11. Voltage Ramp Test CSS-BOY screen. Red rounded rectangle indicates channel 16 failed to ramp up .



FIG. 12. Voltage Ramp Test with CSS-BOY. Red rounded rectangles show that Rup does not go to the set point, 25 V/s, but stays at 30 V/s.



FIG. 13. Voltage Ramp Test CSS-BOY screen. Red rounded rectangles show that channel 19 failed to ramp up.