

FAST^{track} Validation

Date: 19th October 2004

Instrument: 182043

Calibrated by: Robert De Paoli

Found from the average of 16 flashes

Experiment	Concentration (ug/l)	Gain Range	Given Values			Pass/Fail	
			Mean	Std	%CV	Signal	Noise
1	0.000	1	16	3	18.8	Pass	Pass
2	0.000	4	47	10	21.3	Pass	Pass
3	0.000	16	104	17	16.3	Pass	Pass
4	0.000	64	424	64	15.1	Pass	Pass
5	0.000	256	1464	176	12.0	Pass	Pass
6	0.099	256	4174	366	8.8	Pass	Pass
7	0.291	256	7757	273	3.5	Pass	Pass
8	0.291	64	2797	154	5.5	Pass	Pass
9	0.991	64	7728	186	2.4	Pass	Pass
10	0.991	16	2465	85	3.4	Pass	Pass
11	3.236	16	7340	149	2.0	Pass	Pass
12	3.236	4	2536	57	2.2	Pass	Pass
13	9.911	4	7885	114	1.4	Pass	Pass
14	9.911	1	2568	45	1.8	Pass	Pass
15	31.528	1	7907	101	1.3	Pass	Pass

Gains for Gain Ranges	
Gain Range	Actual
1	1.04
4	3.21
16	9.29
64	29.11
256	80.74

Dark Chamber

Experiment	Concentration (ug/l)	Gain Range	Given Values			Pass/Fail	
			Mean	Std	%CV	Signal	Noise
16	31.528	1	6378	108	1.7	Pass	Pass

Light Intensity

ND Filter Absorbance (ODs)	1.3
Voltage (mV) for Dark Chamber	1060
Voltage (mV) for Light Chamber	1200
Reference Counts on the Dark Chamber	4904
Reference Counts on the Light Chamber	3640
Light Chamber/Dark Chamber	1.240
Excitation Light per Count for Dark Chamber Ref	392.20 E+10 q/m ² /count
Excitation Light per Count for Light Chamber Ref	598.18 E+10 q/m ² /count
Excitation Light for Dark Chamber	19.23 E+21 q/m ² /s
Excitation Light for Light Chamber	21.77 E+21 q/m ² /s

Calibration Certificate

Irradiance Meter : 46059
Calibration Date : 10 Sep 04



**Plymouth
Marine Laboratory**

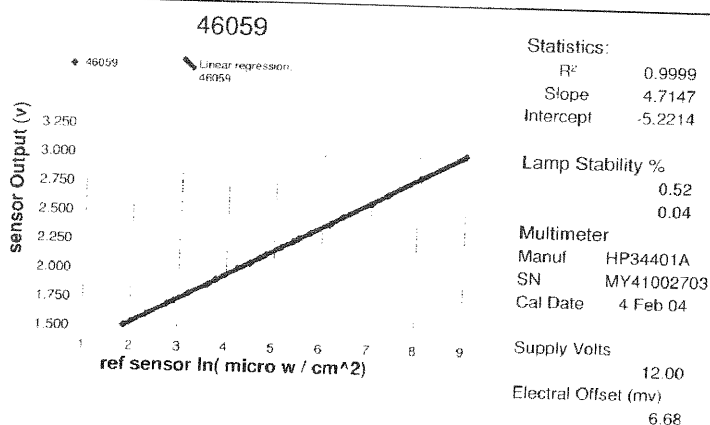
Calibration Equations

$$\text{PAR (ln } \mu\text{W.cm}^{-2}) = -5.2214 + 0.004715 \times \text{mv}$$

$$\text{PAR}(\mu\text{W.cm}^{-2}) = \text{Exp}[\text{PAR (ln } \mu\text{W.cm}^{-2})]$$

$$\text{PAR(W.m}^{-2}) = 0.01 \times \text{PAR}(\mu\text{W.cm}^{-2})$$

$$\text{PAR}(\mu \text{ mole quanta m}^{-2} \text{ s}^{-1}) = 0.04234 \times \text{PAR}(\mu\text{W.cm}^{-2})$$



Observations:

Sensor Condition: Minor Dirt Marks
Accessories: Sensor cap, Bolts

This instrument has been calibrated at Plymouth Marine Laboratory in the manner described in section 3 of the PAR sensor handbook.

Signed

Issue Date 10/09/04

Gerald Moore
Marine Optics Calibration Facility
Plymouth Marine Laboratory optics@pml.ac.uk

Chelsea Instruments Quality Assurance

FAST^{track} Pressure Gauge Calibration Sheet

Serial No. FAST^{track} 182043
Serial No. Pressure Sensor 1265906

Step	Pressure dB	ADC Value
2.3.7	-0.003	601
2.4.1 h	49.74	1198
2.4.2 h	108.24	1901
2.4.3 h	166.72	2604
2.4.4 h	201.82	3027

Date 2nd March 2004

Calibrated by:

Approved by:

John Allrye

Chelsea Instruments Quality Assurance

FAST^{track} Calibration Sheet

2.3.1 No. of Instrument: 182043 Customer: SOC

Step	Gain Range	PMT DAC Value
2.3.3	256	174
2.3.4	64	149
2.3.5	16	128
2.3.6	4	112
2.3.7	1	97

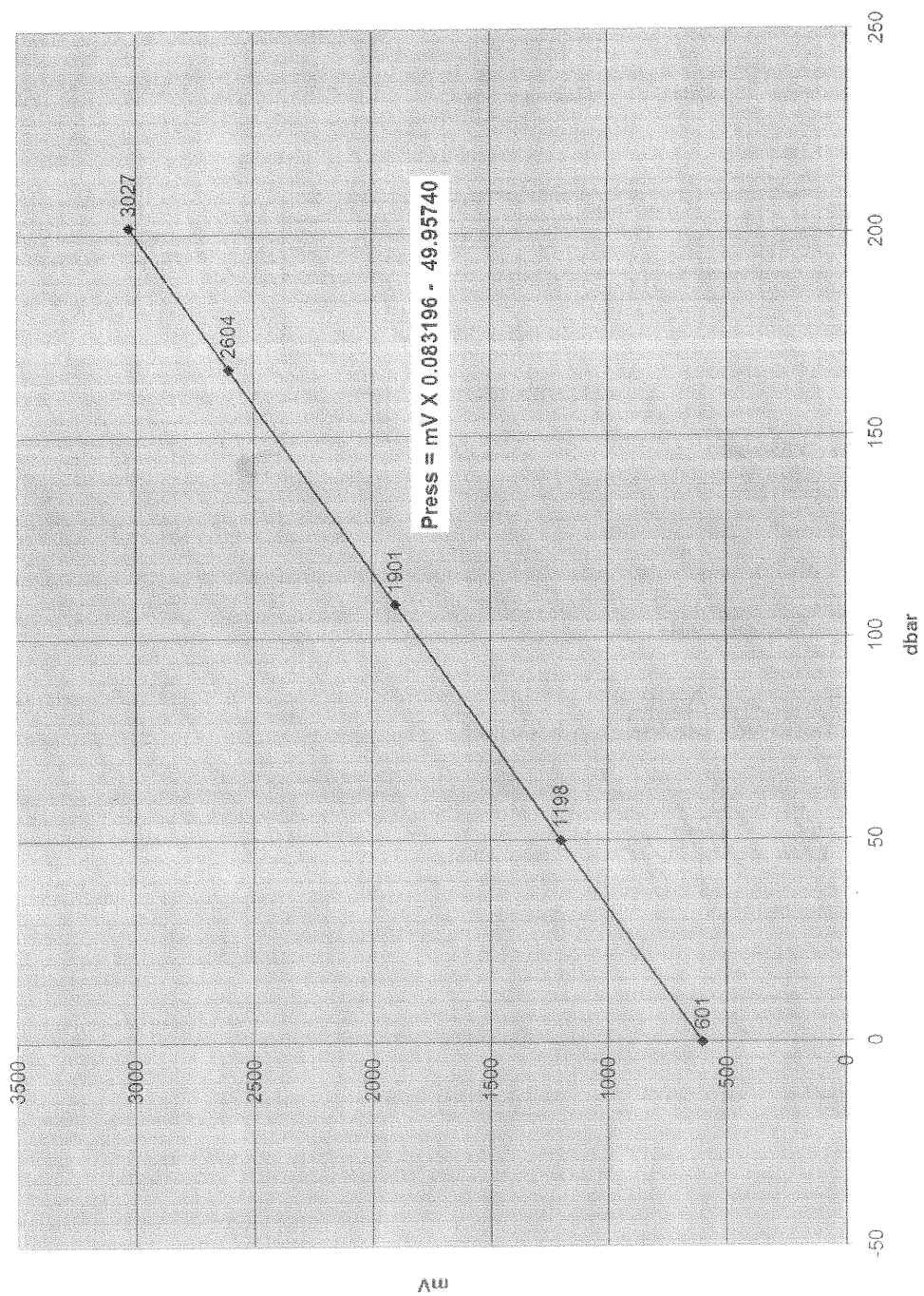
2.3.7 Completed YES/NO ☒

Date: 19th October 2004

Calibrated by: R. De Paoli R. De Paoli

Approved by: John Attridge Dr. J Attridge

FRRF Serial No. 182043
Pressure Sensor Serial No. 1265906



FACSIMILE TRANSMISSION



To: James Fishwick
Company:
Country:
Fax: 00 871600 261610
Tel:
From: Robert De Paoli
Company: Chelsea Technologies Group
Tel: +44(0)20 8481 9000
Fax: +44(0)20 8941 9319
Date: 28 April 2004
Ref:
Page: 1 of

Chelsea
Technologies
Group

55 Central Avenue
West Molesey
Surrey KT8 2QZ
United Kingdom
Tel: +44 (0)20 8481 9000
Fax: +44 (0)20 8941 9319
sales@chelsea.co.uk
www.chelsea.co.uk

Privileged/Confidential information may be contained in this facsimile and is intended only for the use of the addressee. If you are not the addressee, or the person responsible for delivering it to the person addressed, you may not copy or deliver this to anyone else. If you receive this facsimile by mistake please notify us immediately by telephoning +44 (0)20 8481 9000.

Dear James

METHOD FOR EXITING AUTO ACQUIRE MODE & TT7 PROMPT

From the TT7 prompt try typing RUN ! (that is run, space and exclamation mark) and press return.

Switch FRRF off using magnet and wait several seconds for LEDs to flash.

Wait say 10 seconds.

Switch FRRF on using magnet and simultaneously continue tapping the 0 key, or try pressing it continuously, until the Main Menu appears.

If this does not work switch off and on using Deck Unit switch after typing RUN !

This procedure may require several attempts.

When in Main Menu select System Startup & Setup.

From the System Setup Menu disable auto acquire by selecting C option.

Kind regards

Robert



Group Companies

Chelsea Technologies Ltd
Chelsea Instruments Ltd
Chelsea Environmental Ltd
Marine Acoustics Ltd

Registered at the above address

Chelsea Instruments Quality Assurance

FAST^{track} Final Test & Validation Result Sheet

- 3.3 PASS/~~FAIL~~
- 3.5 PASS/~~FAIL~~
- 3.7 Serial No. of Instrument 182043
- 3.8 Customer SOC
- 3.9 a. PASS/~~FAIL~~
b. PASS/~~FAIL~~
c. PASS/~~FAIL~~
- 3.10 Electronics Serial Number
TT7 datalogger: 00016886
Controller PCB: 00034969
Interface PCB: 00034970
Detector PCB: 00034851
LED Drive PCB: 00034856
Power PCB: 00034926
Battery PCB: 00034273
Reference PCB: 00034279
Deck Unit: 182043
- 3.11 System Software Version: 1.18
PIC Supervisor Software: 0.4
PIC PMT Software: 0.2
Flashcard Memory size: 20MB
Channel A Reference threshold: 200
Channel B Reference threshold: 200
PMT HV threshold: 10
Ref Offset: 117
PMT Offset: 125
- 3.12 PAR Sensor serial No.: 046059 (Calibrated Sept 2004)
m coeff.: 0.004715 c coeff.: -5.2214
- 3.13 Pressure Sensor serial No.: 1265906 (Calibrated March 2004)
m coeff.: 0.083196 c coeff.: -49.9574
- 3.14 PASS/~~FAIL~~
- 3.15 PASS/~~FAIL~~
- 3.16 a. PASS/~~FAIL~~
b. PASS/~~FAIL~~
- 3.17 Completed? ~~YES~~/NO
- 3.18 PASS/~~FAIL~~
- 3.19 PASS/~~FAIL~~
- 3.20 PASS/~~FAIL~~
- 3.21 PASS/~~FAIL~~
- 3.22 PASS/~~FAIL~~

Chelsea Instruments Quality Assurance

Serial No. of Instrument 182043

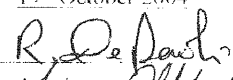
Light Chamber			Given Values	
Step	Conc	Gain	Mean	Std
4.3.1	0.000	1	16	3
4.3.2	0.000	4	47	10
4.3.3	0.000	16	104	17
4.3.4	0.000	64	424	64
4.3.5	0.000	256	1464	176
4.3.7	0.099	256	4174	366
4.3.8	0.291	256	7757	273
4.3.9	0.291	64	2797	154
4.3.10	0.991	64	7728	186
4.3.11	0.991	16	2465	85
4.3.12	3.236	16	7340	149
4.3.13	3.236	4	2536	57
4.3.14	9.911	4	7885	114
4.3.15	9.911	1	2568	45
4.3.16	31.528	1	7907	101
Dark Chamber			Given Values	
Step	Conc	Gain	Mean	Std
4.3.19	31.528	1	6378	108

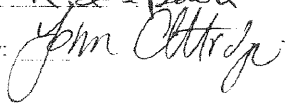
- 4.3.20 **Dark** Chamber 2nd flashlet Photometer Pulse height: 1060mV
 4.3.22 **Light** Chamber 2nd flashlet Photometer Pulse height: 1200mV
 4.3.24 **Dark** Chamber 2nd flashlet Reference channel count: 4904
 4.3.25 **Light** Chamber 2nd flashlet Reference channel count: 3640

4.4.4 PASS/~~FAIL~~
 4.4.6 Completed? YES/~~NO~~

- 4.5.1 PMT HV Calibration pulse height: 2535 background: 5
 4.5.2 Completed? YES/~~NO~~
 4.5.3 PASS/~~FAIL~~
 4.5.4 Completed? YES/~~NO~~
 4.5.5 Completed? YES/~~NO~~
 4.5.6 Completed? YES/~~NO~~
 4.5.7 Completed? YES/~~NO~~
 4.5.8 Completed? YES/~~NO~~
 4.5.9 Completed? YES/~~NO~~
 4.5.10 Completed? YES/~~NO~~

Date: 19th October 2004

Tested by:  R De Paoli

Approved by:  Dr J Attridge

Validation Results

Prior to repair and re calibration

3.7 Serial No. of Instrument 182043

3.8 Customer SOC

3.10 Electronics Serial Number

TT7 datalogger:	00016886
-----------------	----------

Controller PCB: 00034969

Interface PCB: 00034970

Detector PCB: 00034851

LED Drive PCB: 00034856

Power PCB: 00034926

Battery PCB: 00034273

Reference PCB: 00034279

Deck Unit: 182043

3.11 System Software Version: 1.18

PIC Supervisor Software:	0.4
--------------------------	-----

PIC PMT Software:	0.2
-------------------	-----

Flashcard Memory size: 20MB

Channel A Reference threshold:	200
--------------------------------	-----

Channel B Reference threshold:	200
--------------------------------	-----

PMT HV threshold: 10

Ref Offset: 117

PMT Offset: 125

3.12 PAR Sensor serial No.: 046059

m coeff.: 0.004753 c coeff.: -5.3053

3.13 Pressure Sensor serial No.: 1265906

m coeff.: 0.083196 c coeff.: - 49.9574

Customer . SOC

30751/30443

Item	Description	Qty	CI Part No	Packed
01	Handbook - FastTracka	1	HB0179-7	✓
02	Handbook - PostProcessing Software	1	HB0190-1	✓
03	PostProcessing Software Disk V1.8	2	918272951	✓
04	FastTracka Head Unit S/N: 182043	1	918268351	✓
05	Handbook - PAR Irradiance Meter	1	HB071-2	✓
06	Battery Cable Assy	2	CA7274	✓
07	Battery Pack S/N: 182043	1	918264871	✓
08	Head Cover	1	918267760	✓
09	Deck Interface Unit S/N: 182043	1	FIU7259	✓
10	Interface Cable Assy	1	918272601	✓
11	Sun Block	1	918266641	X
12	Host/Charge Extension Cable Assy	1	CA7201	✓
13	Dark Chamber Elbow Assy	2	918272021	✓
14	Battery Charge Cable Assy	1	918272611	✓
15	PAR Sensor S/N: 046059	1	PAR3097	✓
16	PAR Sensor Lead	1	CA6489	✓
17	Dummy Socket, Impulse DC-3-FS	1	681403509	✓
18	Dummy Socket, Impulse DC-8-FS	1	681208109	✓
19	Dummy Plug, Impulse DC-4-MP	1	681204209	✓
20	Dummy Plug, Impulse DC-8-MP	1	681208209	✓
21	Locking Sleeve DLSA-M	1	681204000	✓
22	Locking Sleeve DLSA-F	1	681204002	✓
23	Locking Sleeve DLSB-M	1	681206000	✓
24	Locking Sleeve DLSB-F	1	681206002	✓
25	PC Cable 9W/9W -2M	1	841120020	✓
26	1/2" Hose Connector	2	825000122	✓
27	External Aperture with no LED holes	1	918278670	X
28	Screw M4 x 16 CSK ST STL	8	873615016	✓
29	Screw M4 x 30 Cap Head ST STL	2	873315030	✓
30	Operating Magnet	1	850254159	✓
31	Shipping Case	1	823028720	✓
32	Connecting Chamber	1	918267750	✓
33	Spare 2 Amp anti surge fuse for use in Deck Unit	2	831214200	✓
34	Pressure Sensor S/N: 1265906	1	CA7243	✓
35	CROSSCUT SOFTWARE	1		✓
36				
37				

Packed:

R. DePaulis

Witness::

/

20 OCTOBER 2004

Chelsea Instruments Quality Assurance

Serial No. of Instrument 182043

Light Chamber			Given Values	
Step	Conc	Gain	Mean	Std
4.3.1	0.000	1	23	4
4.3.2	0.000	4	34	5
4.3.3	0.000	16	60	14
4.3.4	0.000	64	217	53
4.3.5	0.000	256	722	148
4.3.7	0.099	256	1604	238
4.3.8	0.291	256	3347	340
4.3.9	0.291	64	997	116
4.3.10	0.991	64	2856	183
4.3.11	0.991	16	813	61
4.3.12	3.236	16	2583	98
4.3.13	3.236	4	846	31
4.3.14	9.911	4	2616	58
4.3.15	9.911	1	859	19
4.3.16	31.528	1	2690	48
Dark Chamber			Given Values	
Step	Conc	Gain	Mean	Std
4.3.19	31.528	1	2260	45

- 4.3.20 **Dark** Chamber 2nd flashlet Photometer Pulse height: 1040 mV
 4.3.22 **Light** Chamber 2nd flashlet Photometer Pulse height: 1160 mV
 4.3.24 **Dark** Chamber 2nd flashlet Reference channel count: 4463
 4.3.25 **Light** Chamber 2nd flashlet Reference channel count: 3133
- 4.5.1 PMT HV Calibration pulse height: 3423 background: 4

Date: 22nd September 2004

Tested by :

R. De Paoli

R De Paoli

Approved by:

John Attridge

Dr. J Attridge

FAST^{tracka} Validation

Date: 22nd September 2004

Instrument: 182043

Calibrated by: Robert De Paoli

Found from the average of 16 flashes

Experiment	Concentration (ug/l)	Gain Range	Given Values			Pass/Fail	
			Mean	Std	%CV	Signal	Noise
1	0.000	1	23	4	17.4		
2	0.000	4	34	5	14.7		
3	0.000	16	60	14	23.3		
4	0.000	64	217	53	24.4		
5	0.000	256	722	148	20.5		
6	0.099	256	1604	238	14.8		
7	0.291	256	3347	340	10.2		
8	0.291	64	997	116	11.6		
9	0.991	64	2856	183	6.4		
10	0.991	16	813	61	7.5		
11	3.236	16	2583	98	3.8		
12	3.236	4	846	31	3.7		
13	9.911	4	2616	58	2.2		
14	9.911	1	859	19	2.2		
15	31.528	1	2690	48	1.8		

Gains for Gain Ranges	
Gain Range	Actual
1	0.36
4	1.08
16	3.31
64	11.61
256	38.98

Dark Chamber

Experiment	Concentration (ug/l)	Gain Range	Given Values			Pass/Fail	
			Mean	Std	%CV	Signal	Noise
16	31.528	1	2260	45	2.0	** Fail **	Pass

Light Intensity

ND Filter Absorbance (ODs)	1.3	
Voltage (mV) for Dark Chamber	1040	
Voltage (mV) for Light Chamber	1160	
Reference Counts on the Dark Chamber	4463	
Reference Counts on the Light Chamber	3133	
Light Chamber/Dark Chamber	1.190	
Excitation Light per Count for Dark Chamber Ref	422.82	E+10 q/m ² /count
Excitation Light per Count for Light Chamber Ref	671.81	E+10 q/m ² /count
Excitation Light for Dark Chamber	18.87	E+21 q/m ² /s
Excitation Light for Light Chamber	21.05	E+21 q/m ² /s

