USCGC HEALY
WAGB-20

CTD / MET Systems

July 2008

Aftconn CTD system on USCGC Healy

Both CTD deck units in the rack are Version II units.
CTD computer #1 is used for acquisition and CTD computer #2 is used for admin work

CTD computer #1

Comm 7 = CTD serial data
Comm 3 = Carousel modem channel
Comm 4 = 4800 baud GPS Nobletech Navigation software input
Comm 5 = MET depth/winch wire widget for Seasave display

Note: two different GPS serial lines feed Aftconn with GPS info.
P-Code and POSMV gps data. Everything in Aftconn runs on POSMV gps data. POSMV and P-Code gps are both set at 9600 N,8,1.
(There is a B&B 9600 to 4800 baud converter to feed the Nobletch Nav software the 4800 baud GPS that it requires). GPS data runs through STS serial splitter boxes in the back of the rack in Aftconn.
The Mocness system is the only system so far that required P-Code GPS. Mocness software could not handle the POSMV strings.

Normal CTD deployment procedure:

1. Rosette bottles cocked (30l-12 place rosette)
2. Turn on the deck unit. Seasave started. (raw data should go in C:\CTD)
   Fill in every line of the header form when prompted. Information from this form is used to created the "ctd.log" file.
3. MSTs will put the rosette in the water – down to 10 meters and back.
4. On the way back to the surface, start acquiring data with Seasave. (The software will talk to the CTD, talk to the Carousel and check for valid NMEA data… if these three items are good, acquisition will begin and data will be collected)
5. Red circle icon on the bottom of the screen starts a small labview program (HW.exe) This program creates 4 small windows at the top of the screen displaying depth, winch wire out, speed and tension. This window can be moved around if needed.
5. Back at the surface, if the sensors look okay (fixed display in Seasave), have the winch operator take the rosette down. Record the scan number from the fixed display when the rosette starts going down.
6. Take the rosette down to 5-10 meters off the bottom and trip bottles as directed on the upcast. When the rosette/ctd is back out of the water, stop the data acquisition.
7. Turn off the deck unit.
8. Open a MSDOS prompt (black icon from the bottom of the computer screen) and from the C:\CTD directory, process the CTD data.
   Type "p 001 340". This runs a batch file that will process the data and put a copy on server for all to see and use.
   "p.bat %1 %2" - where %1 is the ctd cast number and %2 is the beginning scan number of where you want to start processing data (the scan number you wrote down at the beginning of the cast).

Current copy of "P.BAT" for processing and moving CTD data:

```
copy %1.hex c:\ctd\raw
copy %1.hdr c:\ctd\raw
copy %1.con c:\ctd\raw
copy %1.bl c:\ctd\raw
copy %1.hex z:\raw
copy %1.hdr z:\raw
copy %1.con z:\raw
copy %1.bl z:\raw
sbebatch c:\ctd\prcasth.txt %1 %2
mkdir c:\ctd\%1
mkdir z:\%1
copy c:\ctd\%1*.jpg z:\plots\
move c:\ctd\%1*.jpg c:\ctd\plots\
copy c:\ctd\%1*.* z:\%1\
copy c:\ctd\d%1*.* z:\%1\
copy c:\ctd\%1avg.cnv current.txt
move c:\ctd\%1*.* c:\ctd\%1\
move c:\ctd\d%1*.* c:\ctd\%1\
c:\ctd\ctdlog.exe
copy c:\ctd\ctd.log z:\
c:\ctd\sbedump.exe
c:\ctd\sbereset.exe
move c:\ctd\sbe35.txt c:\ctd\sbe35\%1.dat
```

Note: ctdlog.exe uses current.txt to create ctd.log
sbedump.exe and sbereset.exe are used if the SBE35 is on the ctd.
sbedump.exe writes data to sbe35.txt which is moved to %1.dat
the "Z:\" drive is on the server (mapped network drive)

Current copy of "prcasth.txt" :

```
datcnv /ic:\ctd\%1.hex /pc:\ctd\datcnv.psa /xdatcnv:skip%2 /cc:\ctd\HLY0803.con /f%1
loopedit /ic:\ctd\%1.cnv
seaplot /ic:\ctd\%1.cnv /pc:\ctd\seaplot.psa /a_1
bottlesum /ic:\ctd\%1.ros /pc:\ctd\bottlesum.psa /cc:\ctd\HLY0803.con
binavg /ic:\ctd\%1.cnv /pc:\ctd\binavg.psa /aavg
split /ic:\CTD\%1.cnv
seaplot /ic:\ctd\%1.cnv /pc:\ctd\sea2.psa /a_2
```

Note: at least one bottle should be tripped on each cast or p.bat will crash
split.exe produces a file that the Seabeam folks grab after every cast

The CTD monitor has a remote monitor display in the main lab. Normally if there is not a ctd cast on the screen, then Nobeltech Navigation is displayed showing ETA to the next station. On the network, anyone can see this screen by typing http://192.168.10.66:5850 in a browser.

SIO-MET System on USCGC HEALY

SIO-MET supplies sensor data from MET sensors and Seawater sensors. This data is passed to the SCS NOAA logging computer in the computer lab. The SCS NOAA system is responsible for data storage and delivery to scientists, as well as transmission of daily SAMOS messages.

SIO-MET is responsible for the following sensors: (July 2008)

Forward MET mast:
- MET-3A (Baro, Humidity, Air Temp)
- Ultrasonic Anemometer
- Precipitation

Main Ship's Mast:
- Ultrasonic Anemometer

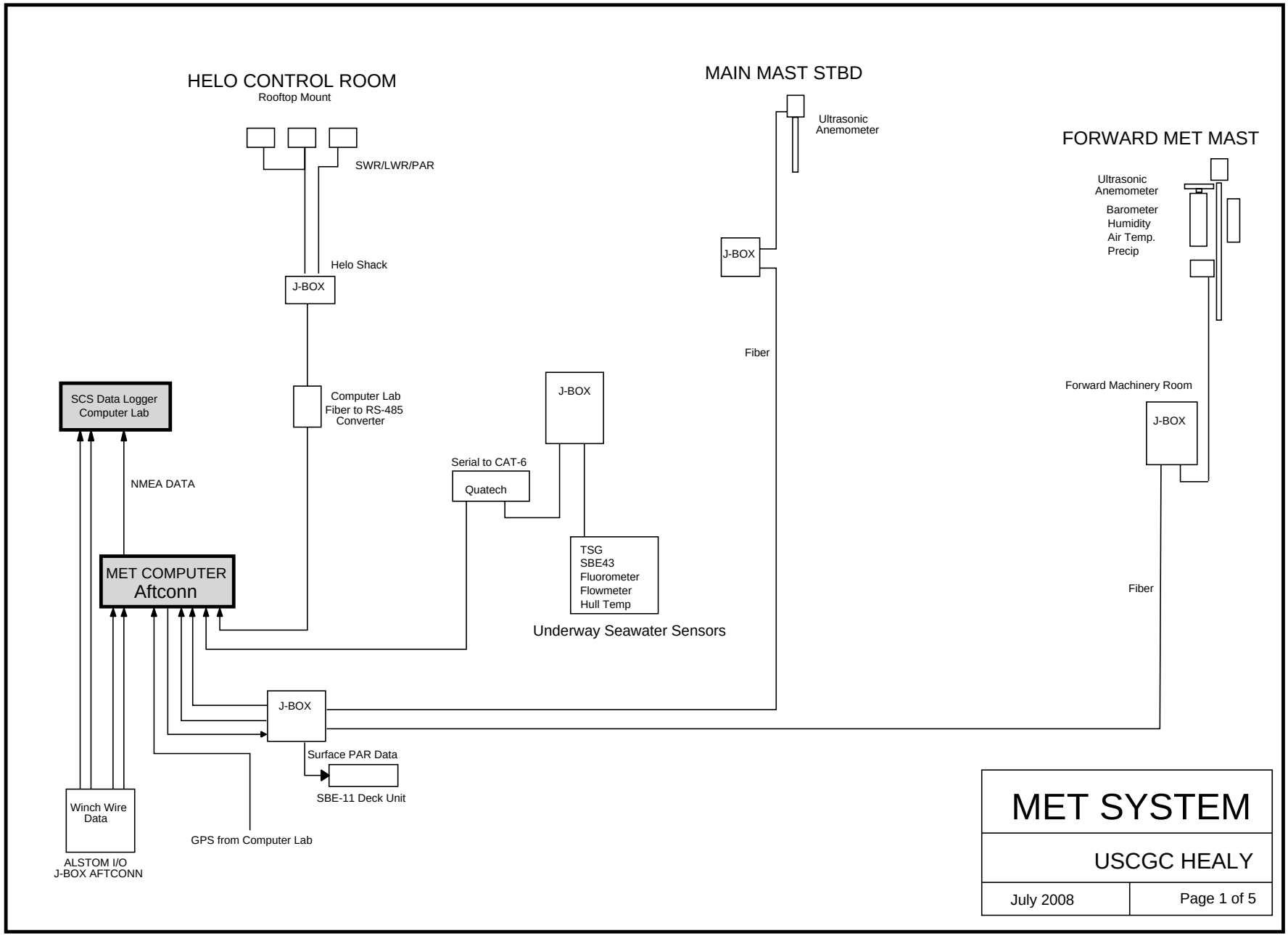
Helo Control Room Rooftop:
- SWR, LWR, Surface PAR

Science Seawater System:
- SBE45 TSG
- SBE3S Hull Temp
- SBE43 Oxygen
- Seapoint Fluorometer
- Flowmeter
- Visiting Equip. (ISUS, ACS)

All of the above sensors feed the MET computer located in AFTCONN. The MET computer uses the SIO/STS Metacq.exe Labview met acquisition software to acquire the data, apply calibration coefficients and pass the data to the SCS NOAA computer. The data is passed via a single comm port and the data is formatted in NMEA style sentences.

The current .ACQ file for the METacq.exe program is attached. (page 15-30) This file shows the current comm port configurations for the MET computer and lists the sensors attached and their appropriate calibration configurations. Page 12-13 explains the format of the single output (comm1) to the SCS NOAA computer. Page 14 is an example of the NMEA MET data output on comm1.

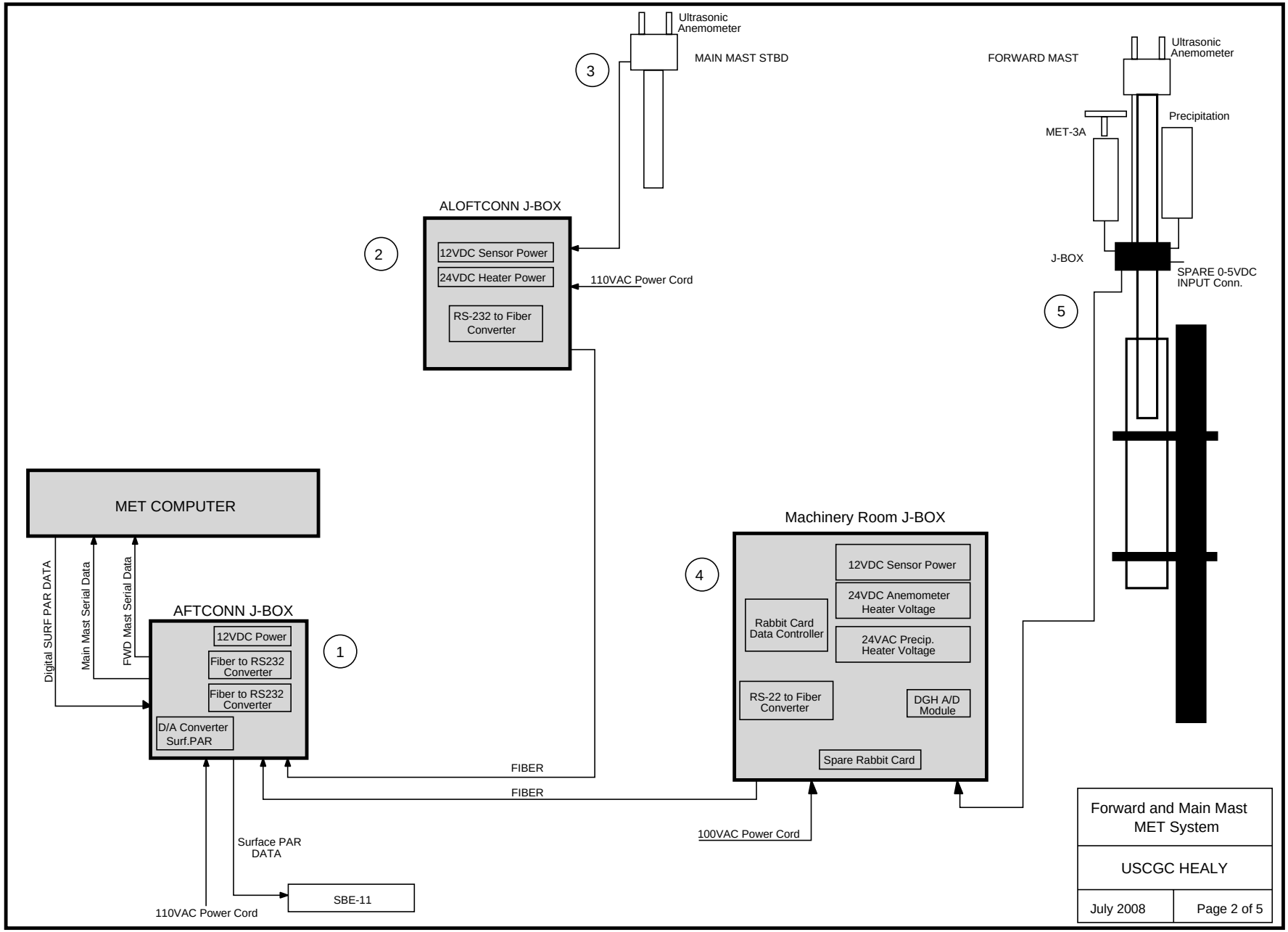
There are drawings attached of the entire SIO-MET system installed on Healy. There are corresponding numbered photos to go with each drawing denoted by a number in a circle located on each drawing.



MET SYSTEM

USCGC HEALY

July 2008


Ultrasonic Anemometer
MAIN MAST STBD
3
ALOFTCONN J-BOX
2
12VDC Sensor Power
24VDC Heater Power
RS-232 to Fiber Converter
110VAC Power Cord
FORWARD MAST
Ultrasonic Anemometer
Precipitation
MET-3A
J-BOX
SPARE 0-5VDC INPUT Conn.
5
MET COMPUTER
Digital SURF PAR DATA
Main Mast Serial Data
FWD Mast Serial Data
AFTCONN J-BOX
12VDC Power
Fiber to RS232 Converter
Fiber to RS232 Converter
D/A Converter Surf.PAR
1
Machinery Room J-BOX
4
12VDC Sensor Power
24VDC Anemometer Heater Voltage
Rabbit Card Data Controller
24VAC Precip. Heater Voltage
RS-22 to Fiber Converter
DGH A/D Module
Spare Rabbit Card
FIBER
FIBER
100VAC Power Cord
Surface PAR DATA
SBE-11
110VAC Power Cord
Forward and Main Mast MET System
USCGC HEALY
July 2008
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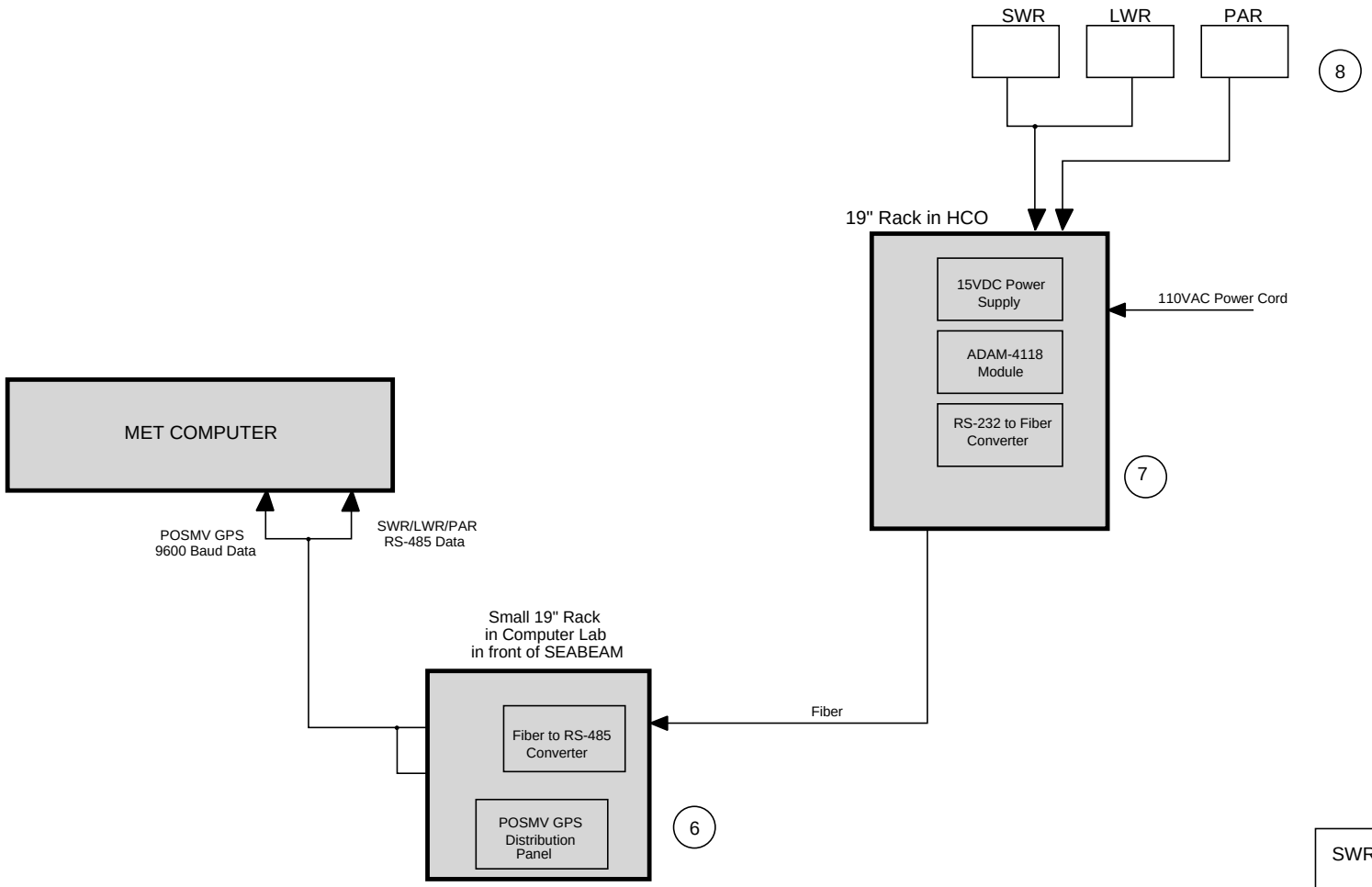
HELO CONTROL ROOM
Rooftop Mount



SWR/LWR/PAR on HCO MET System	
USCGC HEALY	
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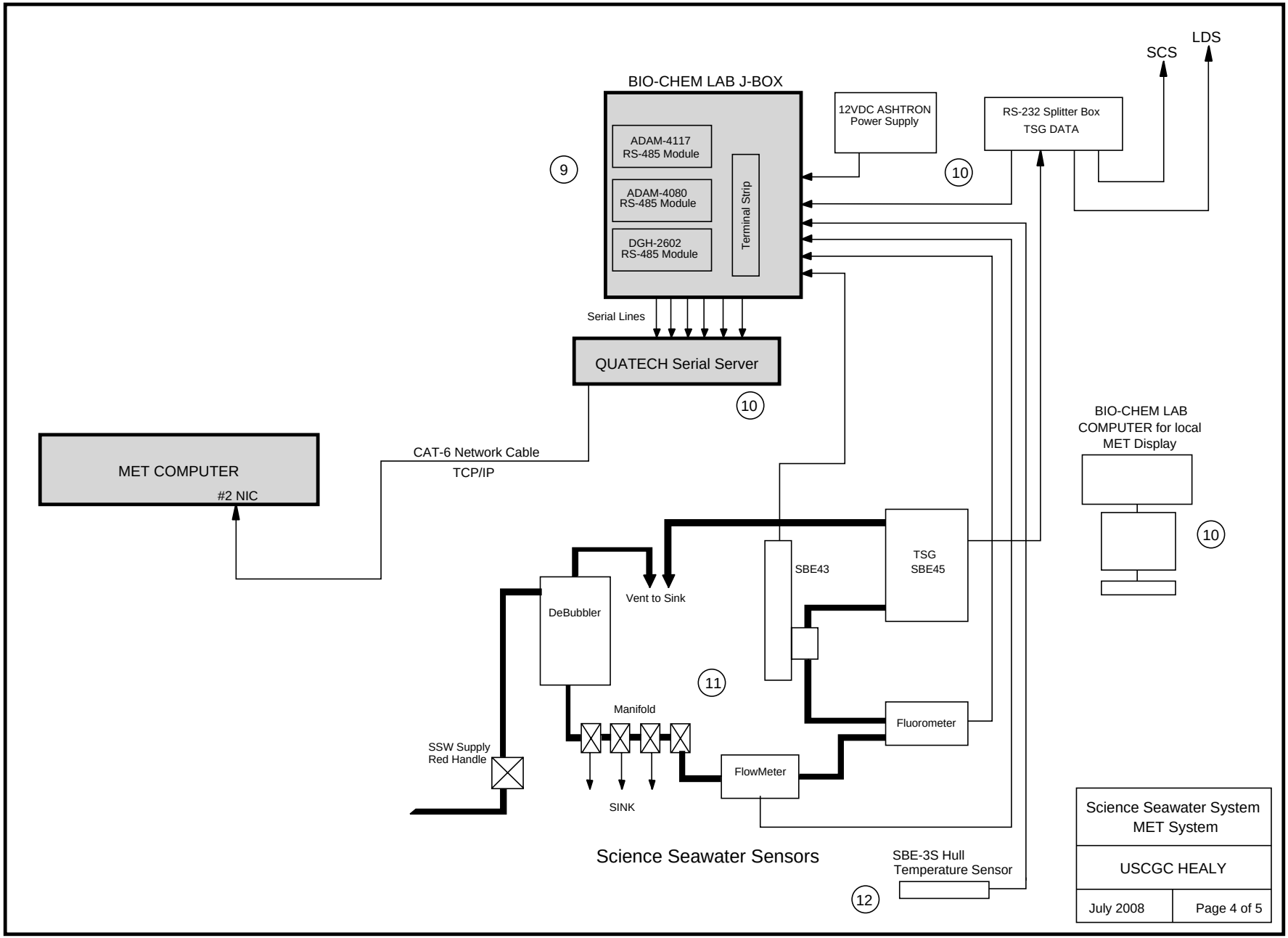
LDS
SCS
BIO-CHEM LAB J-BOX
12VDC ASHTRON Power Supply
RS-232 Splitter Box TSG DATA
ADAM-4117 RS-485 Module
ADAM-4080 RS-485 Module
DGH-2602 RS-485 Module
Terminal Strip
9
10
Serial Lines
QUATECH Serial Server
10
BIO-CHEM LAB COMPUTER for local MET Display
MET COMPUTER
#2 NIC
CAT-6 Network Cable
TCP/IP
10
SBE43
TSG SBE45
Vent to Sink
DeBubbler
11
Manifold
Fluorometer
SSW Supply Red Handle
FlowMeter
SINK
Science Seawater Sensors
SBE-3S Hull Temperature Sensor
12
Science Seawater System
MET System
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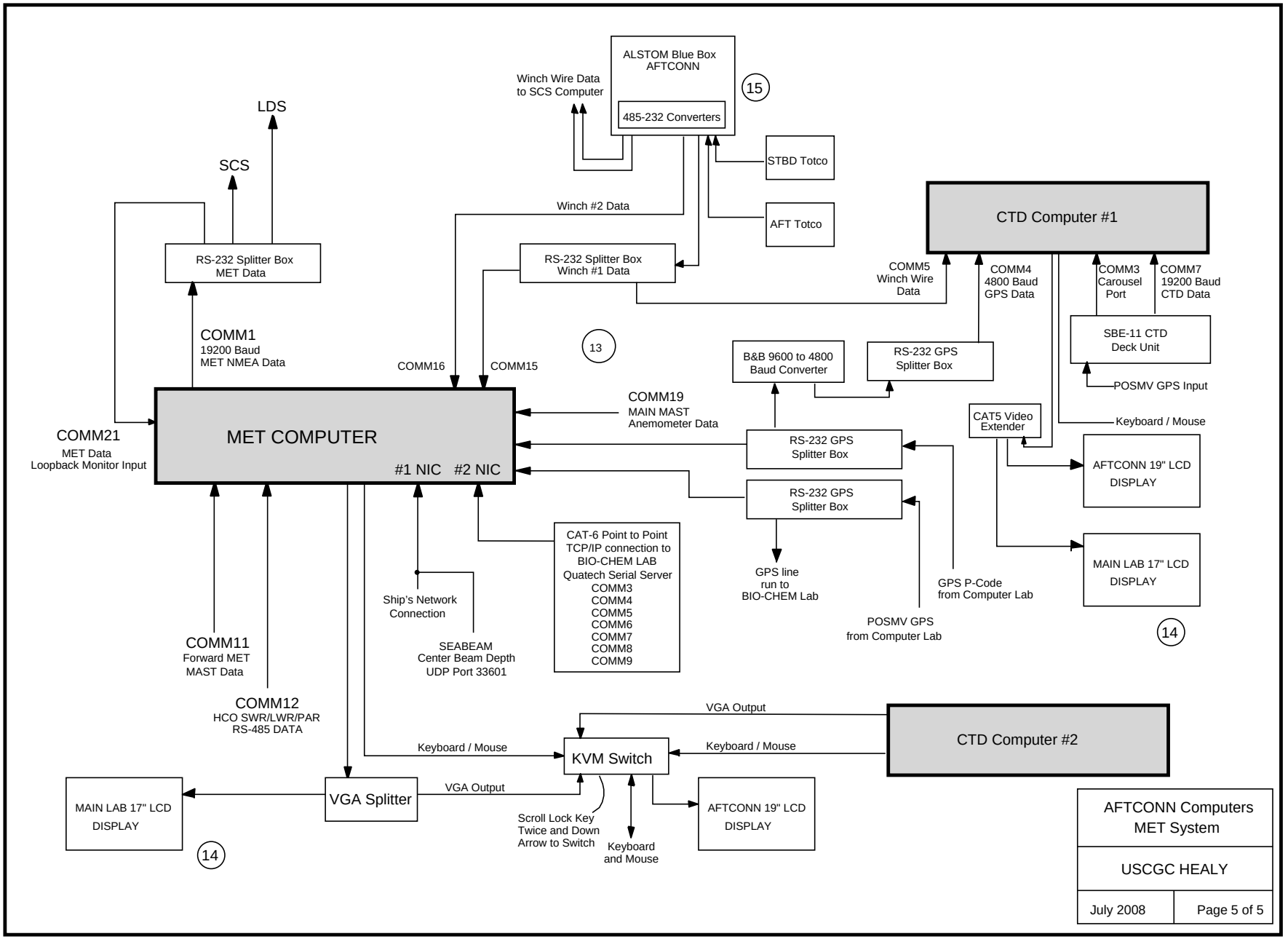
Page 4 of 5


ALSTOM Blue Box
AFTCONN
485-232 Converters
15
Winch Wire Data
to SCS Computer
LDS
SCS
STBD Totco
AFT Totco
Winch #2 Data
CTD Computer #1
RS-232 Splitter Box
MET Data
RS-232 Splitter Box
Winch #1 Data
COMM5
Winch Wire
Data
COMM4
4800 Baud
GPS Data
COMM3
Carousel
Port
COMM7
19200 Baud
CTD Data
COMM1
19200 Baud
MET NMEA Data
13
SBE-11 CTD
Deck Unit
POSMV GPS Input
COMM16
COMM15
B&B 9600 to 4800
Baud Converter
RS-232 GPS
Splitter Box
COMM19
MAIN MAST
Anemometer Data
CAT5 Video
Extender
Keyboard / Mouse
COMM21
MET Data
Loopback Monitor Input
MET COMPUTER
#1 NIC #2 NIC
RS-232 GPS
Splitter Box
AFTCONN 19" LCD
DISPLAY
RS-232 GPS
Splitter Box
CAT-6 Point to Point
TCP/IP connection to
BIO-CHEM LAB
Quatech Serial Server
COMM3
COMM4
COMM5
COMM6
COMM7
COMM8
COMM9
GPS line
run to
BIO-CHEM Lab
GPS P-Code
from Computer Lab
MAIN LAB 17" LCD
DISPLAY
Ship's Network
Connection
POSMV GPS
from Computer Lab
14
COMM11
Forward MET
MAST Data
SEABEAM
Center Beam Depth
UDP Port 33601
COMM12
HCO SWR/LWR/PAR
RS-485 DATA
VGA Output
CTD Computer #2
Keyboard / Mouse
KVM Switch
Keyboard / Mouse
MAIN LAB 17" LCD
DISPLAY
VGA Splitter
VGA Output
AFTCONN 19" LCD
DISPLAY
Scroll Lock Key
Twice and Down
Arrow to Switch
Keyboard
and Mouse
14
AFTCONN Computers
MET System
USCGC HEALY
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Thermosalinograph Operating Procedure on USCGC Healy

The thermosalinograph (TSG) on Healy is part of the Science Seawater System located in the Bio-Chem Lab. The TSG is a Seabird model SBE-45 device that measures water temperature and conductivity and outputs corrected salinity values as serial data.

The TSG has 6 components for proper operation.

1. the TSG mounted on the wall above the sink
2. the seawater system that supplies water to the TSG
3. a 12 volt DC power supply
4. a Data transmission device (Quatech serial server)
5. a local computer monitor for displaying TSG data and water flow rate
6. the SIO-MET computer in Aftconn that receives the data and sends it to SCS.

3 easy steps for starting the TSG:

1. turn on the seawater flow
2. turn on the 12 volt power supply
3. turn on the SIO-MET computer in Aftconn

Detailed steps for TSG operation:

1. make sure the SIO-MET computer is running Aftconn
2. turn on the local computer monitor in the Bio-Chem Lab
3. turn on the Ashtron 12 volt supply on the top shelf above the Bio-Chem Lab computer monitor.
4. make sure the power strip on the shelf behind the 12 volt supply is on.
5. make sure the power cord to the Quatech Serial Server is plugged in. (This small box is on the shelf next to the 12 volt power supply. The plug is a wall-wart style power cord plugged in to an outlet to the right of the Quatech)
6. Turn on the seawater supply (red handled valve). Seawater should be going through the Debubbler and to the 4-valve manifold at the sink. Turn on the spigot at the manifold that supplies the flowmeter, fluorometer, oxygen sensor, and TSG.
7. While looking at the TSG Display (MET data screen), adjust the flow rate for approx. 2 liters per minute.
8. Let the IT in charge of SCS and the tech in charge of Seabeam that TSG data is being sent to the computer lab.

Equipment on Healy - July 2008

CTD EQUIPMENT
CTD - 638, 639
SBE3plus - 2796,2824,2841,2855 (2945 at Isaacs)
SBE35 - 0011
SBE4C - 2545,2561,2568,2619 (2575 at Isaacs)
SBE43 - 0456,0458,0459
SBE5T - 3112,3114,3115,3116
Transmissometers - CST-390DR,436DR,596DR
Altimeters - PSA-916D 843,872,1062 ST200/20-S6K8 968-8011,968-8012
Fluorometers - Chelsea 088233,088234,088191
PAR QSP-2300 - 70115
SBE32 - 12pl. 0347, 24pl. 0348
SBE-11 - 0416,0417 (both Ver.2 deck units)
2 ctd computers

SCIENCE SEAWATER SENSORS
SBE45 - 0215,0228
SBE21 - 1864,3107
SBE3S - 2694,4063,4469
SBE43 - 1307,1333 (600 meter models)
Fluorometers - SCF 2956,2957 Scufa 584,600
Flowmeters - 09061005,02030692

MET SENSORS
MET-3A - 101757, 103943
RM Young Precipitation MDL.50202 - 1567
RM Young Anemometers MDL.85004 - 00703,00704
LWR (PIR) - 34955F3
SWR (PSP) - 35032F3
PAR QSR2200 - 20270
2 met computers

USCGC HEALY - MET Sensor Output Format

July 2008

SOLAR RADIOMETERS
$PSSRA,1197.60,10.000,827.58,1.250,300.30,0.500,299.75,0.510*4D
1. $PSSRA
2. SWR W/M^2
3. SWR Raw millivolts
4. LWR W/M^2
5. LWR Raw millivolts
6. LWR Dome Temperature (Deg K)
7. LWR Dome Temperature Raw Volts
8. LWR Body Temperature (Deg K)
9. LWR Body Temperature Raw Volts

SURFACE PAR SENSOR
$PSSPA,1656.26,1.000*40
1. $PSSPA
2. Surface PAR uE/Sec/M^2
3. Surface PAR Raw Volts

MET3A SENSOR
$PSMEA,20.00,50.00,1000.00,0.02*7E
1. $PSMEA
2. Air Temperature (Deg C)
3. Relative Humidity (%)
4. Barometric Pressure millibars
5. Precipitation (mm) millimeters total accumulation

WIND SENSORS
$PSWNA,10.00,3.09,266.67,9.23*61
1. $PSWDA
2. Relative Wind Direction (deg)
3. Relative Wind Speed (m/s)
4. True Wind Direction (deg)
5. True Wind Speed (m/s)
$PSWNB,10.00,3.09,266.67,9.23*61
1. $PSWDB
2. Relative Wind Direction (deg)
3. Relative Wind Speed (m/s)
4. True Wind Direction (deg)
5. True Wind Speed (m/s)

THERMOSALINOGRAPH
$PSTSA,20.000,50.0000,36.713,1523.39*73
1. $PSTSA
2. Thermosalinograph Water Temperature (Deg C)
3. Thermosalinograph Water Conductivity (mS/cm) millisiemens/centimeter
4. Thermosalinograph Water Salinity (PSU)
5. Thermosalinograph Sound Velocity (m/s)

SURFACE SEAWATER TEMPERATURE
$PSSTA,7.003,3282.400*7E
1. $PSSTA
2. Sea Surface Water Temperature (Deg C)
3. Sea Surface Water Temperature Raw Value

OXYGEN SENSOR
$PSOXA,3.137,2.000,20.000,20.000*51
1. $PSOXA
2. Oxygen ml/l (Computed with Salinity value from the thermosalinograph)
3. Oxygen Raw Value
4. Oxygen Temperature (Deg C)
5. Oxygen Temperature Raw Volts

FLUOROMETER
$PSFLA,21.000,2.100,5.200,5.200*78
1. $PSFLA
2. Fluorometer ug/l
3. Fluorometer Raw Volts
4. Turbidity NTU
5. Turbidity Raw Volts

ISUS NITRATE SENSOR
$PSNTA,0.300,1.100*6E
1. $PSNTA
2. Isus Aux 1 Volts
3. Corrected Nitrate concentration Mmol

FLOWMETER
$PSFMA,0.13,2.000*79
1. $PSFMA
2. FlowMeter LPM LitersPerMinute
3. FlowMeter Raw Frequency

PRESSURE GUAGE
$PSPSA,25.00,2.500*42
1. $PSPSA
2. Pressure PSI
3. Pressure Raw Volts

Example output from SIO-MET computer: (July 2008)

Comm1 - 19200,N,8,1

```
$PSSRA,376.05,3.140,417.22,0.092,285.41,0.855,285.97,0.838*4B
$PSSPA,1160.14,0.700*45
$PSMEA,7.32,91.50,1003.70,1.77*45
$PSWDA,99.58,1.98,264.75,5.97*65
$PSWDB,91.59,1.66,266.90,6.01*6B
$PSSTA,6.634,3256.500*75
$PSTSA,6.984,31.4118,30.780,1473.32*74
$PSOXA,6.409,2.841,6.984,6.984*51
$PSFLA,0.170,0.017,0.000,0.010*49
$PSNTA,0.001,-8.363*7A
$PSFMA,2.05,31.000*4C
$PSPSA,25.97,2.597*41
$GPZDA,203957.00,12,07,2008,00,00*62
$PSSRA,376.05,3.140,417.22,0.092,285.41,0.855,285.97,0.838*4B
$PSSPA,1160.97,0.701*4F
$PSMEA,7.32,91.50,1003.70,1.76*44
$PSWDA,97.92,2.02,265.97,6.04*69
$PSWDB,91.59,1.68,267.74,6.11*6F
$PSSTA,6.637,3256.700*74
$PSTSA,6.983,31.4116,30.781,1473.32*7C
$PSOXA,6.409,2.841,6.983,6.983*51
$PSFLA,0.170,0.017,0.000,0.010*49
$PSNTA,0.001,-8.363*7A
$PSFMA,2.05,31.000*4C
$PSPSA,25.93,2.593*41
$GPZDA,203959.00,12,07,2008,00,00*6C
```

```
# HLY8D.ACQ
#
# STS Meteorological Acquisition Program
# Serial Port and Sensor Configuration/Calibrations file
# USCGC HEALY 14-Feb-2008
#
# Serial Ports Configuration
#
UNIT1  20 COMM1 19200  NONE 8 1   RS232 Output - Data output to SCS
UNIT2   0 COMM2  9600  NONE 8 1   Spare
UNIT3   1 COMM3  9600  NONE 8 1   RS485 Input - ADAM Wetlab
UNIT4   1 COMM4  9600  NONE 8 1   RS232 Input - SBE45 TSG WetLab
UNIT5   0 COMM5  9600  NONE 8 1   RS232 Input - Scufa Fluorometer
UNIT6   1 COMM6  9600  NONE 8 1   RS232 Input - Optode 3835 Wetlab
UNIT7   0 COMM7  9600  NONE 8 1   RS232 Input - ISUS Wetlab
UNIT8   0 COMM8  9600  NONE 8 1   RS232 Input - Wetlabs ACS Wet Lab
UNIT9   1 COMM9  9600  EVEN 7 1   RS232 Input - Seabird SBE21
UNIT10  0 COMM10 9600  NONE 8 1   Spare
UNIT11  1 COMM11 9600  NONE 8 1   RS232 Input - MET data Forward MAst
UNIT12  1 COMM12 9600  NONE 8 1   RS485 Input - Surface PAR, LWR, SWR
UNIT13  0 COMM13 9600  NONE 8 1   RS232 Input - GPS Pcode
UNIT14  0 COMM14 4800  NONE 8 1   RS232 Input - Gyro
UNIT15  1 COMM15 9600  NONE 8 1   RS232 Input - Winch CTD OT-1 .322
UNIT16  1 COMM16 9600  NONE 8 1   RS232 Input - Winch Aft Tw .680
UNIT17 14 COMM17 9600  NONE 8 1   RS232 Output - Surf PAR to SBE11
UNIT18  1 COMM18 19200 NONE 8 1   RS232 Input  - CTD Depth,Spd,Alt
UNIT19  1 COMM19 9600  NONE 8 1   RS232 Input - RM Young 85004 Wind sensor Main
mast
UNIT20  1 COMM20 9600  NONE 8 1   RS232 Input - POSMV GPS
UNIT21  0 COMM21 9600  NONE 8 1   Spare
UNIT22  0 COMM22 9600  NONE 8 1   Spare
UNIT23  0 COMM23 9600  NONE 8 1   Spare
UNIT24  0 COMM24 9600  NONE 8 1   Spare
UNIT25  0 COMM25 9600  NONE 8 1   Spare
UNIT26  0 COMM26 9600  NONE 8 1   Spare
UNIT27  0 COMM30 33101 NONE 8 1   UDP Port GPS, Gyro, Ashtech
UNIT28  0 COMM30 33402 NONE 8 1   UDP Port SBE21
UNIT29 80 COMM30 33601 NONE 8 1   UDP Port Seabeam Depth

STARTMOD
USP25 LWR22 SWR22 PAR22 WND25 WND26 PRC25 TSG22 FLW22 PRS22
FLU22 FLW23 USP22 NME23 SST22 OXY22 GYR01
PDR02
WCH01 WCH02
OUT01
ENDMOD

[GENERAL]
TITLE = Healy MET
PRINT_EN = FALSE
MK_COR = TRUE
MK_UNC = FALSE
MK_MET = TRUE
MK_UCR = TRUE
MK_LOG = TRUE
FileWriteInterval = 15.0
SerialWriteInterval = 15.0
```

```
SPARSCL = 1000.0 0.0
TIMEOUT = 400
MAX_SCAN_RATE = 2.0

# MET Corrected Data
[OUT01]
SERUNITNUM= 1
MKOUTFILE = FALSE
INTERVAL = 2.0
ADDCRC = FALSE
ADDTIMESTAMP= FALSE
NMEA =
PSSRA,PSSPA,PSMEA,PSWDA,PSWDB,PSSTA,PSTSA,PSOXA,PSFLA,PSNTA,PSFMA,PSPSA,ZDA

[USP25]
SENSOR = MET3A
MODEL = MET3A
SERIAL = 101757
MFG = Paroscientific
CAL_LAB = Paroscientific
CAL_DATE = 27-Jun-2007
LOCATION = Forward Jackstaff 85'above MWL
INSTALL_DATE = 15-Oct-2007
OWNER = SIO/STS
TAGS-C = BP, AT, RH, DP
TAGS-R = BP, AT, RH
PRC-R = 2 2 2
PRC-C = 2 2 2 2
RANGE = 800.0 1100.0
RANGE2 = -50.0 50.0
RANGE3 = 0.0 110.0
RANGE4 = -50.0 50.0
# Module setup parameters
MSP = 11 8 0 0 10 0 3  1 2 3 0 0 0 0 0
MCP = 1 1 4 0  0 0 0 15 0 0 0 0
# Emulation value
Emulation = 1000.0 20.0 50.0
AVGTYPE=1 1 1 0
SECSTOAVG=60.0
# A/D Calibration
ADCAL = 1.0, 0.0

[PRC25]
SENSOR = Precipitation
MODEL = 50202
SERIAL = 1567
MFG = RM Young
CAL_LAB = RM Young
CAL_DATE = 15-Jan-07
OWNER = SIO/STS
LOCATION = Forward Jackstaff 85'above MWL
INSTALL_DATE = 15-Oct-2007
SENSORTYPE=10
# Module setup parameters
MSP = 11 8 0 0 10 0 1  1 0 0 0 0 0 0 0
MCP = 1 1 1 0  3 0 0 0 0 0 0 0
# Emulation value
```

```
# mm/min, mm/hr, mm
Emulation = 12.0
# A/D Calibration
ADCAL = 1.0 0.0
# Corrections
COR = 0.01, 0.0

[LWR22]
SENSOR = Long Wave Radiation
MODEL = PIR
SERIAL = 34955F3
MFG = Eppley Labs
CAL_LAB = Eppley
CAL_DATE = 17-Aug-07
LOCATION = Helo Hangar Crossbar
OWNER = SIO/STS
INSTALL_DATE = 15-Oct-2007
# ADAM 4118 Module
# CH 0 PIR Thermopile
# CH 1 PSP Thermopile
# CH 2 LWR Dome
# CH 3 LWR Body
CMD = #02\r
# Module setup parameters
MSP = 12 2 0 0 13 0 3  4 5 2 0 0 0 0 0
MCP = 1 0 4 0  9 9 3 8 0 0 0 0
# Emulation values
Emulation = 0.5 0.51 0.114
# A/D Calibration
ADCAL = 1.0, 0.0
# Corrections for Dome Glass Temp sensor
COR = 5.0, 82500, 0.0010295, 0.0002391, 1.568e-7, 1.0, 0.0
# Corrections for Body Temp sensor
COR2 = 5.0, 82500, 0.0010295, 0.0002391, 1.568e-7, 1.0, 0.0
# Eppley correction factors
# Thermopile Slope Offset to get the value (in uv)
COR3 = 1000.0, 0.0
# Cal Factor, absorption/dome glass IR (IMET=2.0, Stock Eppley=3.5)
COR4 = 3.32e-6 3.5

[SWR22]
SENSOR = Short Wave Radiation
MODEL = PSP
SERIAL = 35032F3
MFG = Eppley Labs
CAL_LAB = Eppley
CAL_DATE = 01-Aug-07
LOCATION = Helo Hangar Crossbar
OWNER = SIO/STS
INSTALL_DATE = 15-Oct-2007
# Module address
CMD = #022\r
# Module setup parameters
MSP = 12 2 0 0 13 0 1  1 0 0 0 0 0 0 0
MCP = 1 0 1 0  26 0 0 0 0 0 0 0
# Emulation value
Emulation = 10.0
```

```
# A/D Calibration
ADCAL = 1.0, 0.0
# Slope, Offset, Cal Factor
COR = 0.001, 0.0, 8.35e-6

[PAR22]
SENSOR = Surface PAR
MODEL = QSR-2200
SERIAL = 20270
MFG = Bisopherical Instruments
CAL_LAB = Bisopherical Instruments
CAL_DATE = 09-Jan-07
LOCATION = Helo Hangar Crossbar
INSTALL_DATE = 15-Oct-2007
OWNER = SIO/STS
CMD = #020\r
# Module setup parameters
MSP = 12 2 0 0 13 0 1  1 0 0 0 0 0 0 0
MCP = 1 1 1 0  13 0 0 0 0 0 0 0
#Emulation value
Emulation = 1.0
AVGTYPE = 1
SECSTOAVG = 30.0
# AD Volts Module DGH D5132
# A/D Calibration
ADCAL = 1.0, 0.0
# Corrections  Surface PAR  V/(MicroEinsteins/sec/cm2)
# Output in Air 0.01566 *10000 / Probe Net Response 0.09455
# Slope, Offset, scale
COR = 1656.26, 0.0, 1.0

[WND25]
SENSOR = WIND
MODEL = 85004
SERIAL = 00703
MFG = RM Young
CAL_LAB = RM Young
CAL_DATE = 20-Sep-07
LOCATION = Forward Jackstaff 85'above MWL
OWNER = SIO/STS
INSTALL_DATE = 14-Oct-2007
# Module address
# Module setup parameters
MSP = 11 8
MCP = 1 1 4 0  0 0 19 20 0 0 0 0
# Emulation value
Emulation = 6.0 10.0
AVGTYPE=1 2 0 0
SECSTOAVG=15.0
# A/D Calibration
ADCAL = 1.0 0.0
# Corrections Wind Speed
COR = 0.51444, 0.0
# Corrections Wind Direction
COR2 = 1.0, 0.0

[WND26]
```

```
SENSOR = WIND
MODEL = 85004
SERIAL = 00704
MFG = RM Young
CAL_LAB = RM Young
CAL_DATE = 20-Sep-07
LOCATION = Main Mast yardarm
OWNER = SIO/STS
INSTALL_DATE = 25-Jan-2008
# Module address
# Module setup parameters
MSP = 19 8
MCP = 1 1 4 0  0 0 19 20 0 0 0 0
# Emulation value
Emulation = 6.0 10.0
AVGTYPE=1 2 0 0
SECSTOAVG=15.0
# A/D Calibration
ADCAL = 1.0 0.0
# Corrections Wind Speed
COR = 0.51444, 0.0
# Corrections Wind Direction
COR2 = 1.0, 0.0

[TSG22]
SENSOR = Thermosalinograph
MODEL = SBE45
SERIAL = 0215
MFG = Seabird
CAL_LAB = Seabird
CAL_DATE = 01-Aug-2007
LOCATION = Wet Lab
INSTALL_DATE = 01-Feb-2008
OWNER = SIO/STS
# Module setup parameters
MSP = 4 3 0 0 10 0 2 1 2 0 0 0 0 0 0
MCP = 1 1 5 0 0 3 16 17 18 0 0 0
# Emulation value
EMULATION = 20.0 5.0
# A/D Calibration
ADCAL = 1.0 0.0
# polynomial max coeffecients 8
# Temp corrections
# a0, a1, a2, a3
COR = 1.0, 0.0
# g,h,i,j,CPcor,CTcor,WBOTC
COR2 = 10.0, 0.0

[SST22]
SENSOR = Sea Surface Temperature
MODEL = SBE3S
SERIAL = 4063
MFG = Seabird
CAL_LAB = Seabird
CAL_DATE = 13-Dec-07
LOCATION = UCW Intake
OWNER = SIO/STS
```

```
INSTALL_DATE = 31-Jan-2008
CMD = $v\r
RANGE = -1000000.0 1000000.0
#DGH D1602 1-20Khz RS485
# Module setup parameters
MSP = 3 1 0 0 10 0 1  1 0 0 0 0 0 0 0
MCP = 1 1 1 0  11 0 0 0 0 0 0 0
# Emulation value
Emulation = 5000.0
# A/D Calibration
ADCAL = 1.0 0.0
# g,h,i,j,f0,slope,offset
COR = 4.29921671e-3 6.36406488e-4 2.06912541e-5 1.52019386e-6 1000.0 1.0 0.0

[FLW22]
SENSOR = FlowMeter
MODEL = C-ES45-B003
SERIAL = 09061005
MFG = Flocat
CAL_LAB =STS
CAL_DATE = 07-Jan-2008
LOCATION = FLO-Thru system Wet Lab
OWNER = SIO/STS
CMD = #010\r
# Module setup parameters
MSP = 3 17 0 0 13 0 1  1 0 0 0 0 0 0 0
MCP = 1 1 1 0  3 0 0 0 0 0 0 0
#AVGTYPE=1
#SECSTOAVG=60.0
# Emulation value
Emulation = 2.0
# A/D Calibration
ADCAL = 1.0 0.0
# Corrected K factor 3/8" 910 Pulses Per Liter Coef=1.0/(910*(1/60))
COR = 6.6e-2, 0.0

[FLW23]
SENSOR = FlowMeter
MODEL = C-ES45-B003
SERIAL = 02030692
MFG = Flocat
CAL_LAB =STS
CAL_DATE = 07-Jan-2008
LOCATION = FLO-Thru system Wet Lab
OWNER = SIO/STS
CMD = #011\r
# Module setup parameters
MSP = 3 17 0 0 13 0 1  1 0 0 0 0 0 0 0
MCP = 1 1 1 0  3 0 0 0 0 0 0 0
#AVGTYPE=1
#SECSTOAVG=60.0
# Emulation value
Emulation = 2.3
# A/D Calibration
ADCAL = 1.0 0.0
# Corrected K factor 3/8" 310 Pulses Per Liter Coef=1.0/(310*(1/60))
COR = 0.1941 0.0
```

```
[FLU22]
SENSOR = Fluorometer
MODEL =  SCF
SERIAL = SCF2957
MFG = Seapoint
CAL_LAB = Seapoint
CAL_DATE = 15-Dec-2007
LOCATION = FLO-Thru system Wet Lab
INSTALL_DATE = 01-Feb-2008
OWNER = SIO/STS
CMD = #02\r
# ADAM 4117 CH0
TAGS-C = FL, TB
TAGS-R = FL, TB
PRC-C = 4, 4
PRC-R = 3, 3
# Module setup parameters
MSP = 3 2 0 0 13 0 2  1 8 0 0 0 0 0 0
MCP = 1 1 2 0  3 3 0 0 0 0 0 0
# Emulation value
Emulation = 1.1, 4.0
# A/D Calibration
ADCAL = 1.0,0.0
# 0-5V
# 30X Range 0-5g/l  COR=1.0 0.0
# 10X Range 0-15g/l COR=3.0 0.0
# 3X Range 0-50g/l  COR=10.0 0.0
# 1X Range 0-150g/l COR=30.0 0.0
# Currently on 3X range
COR = 10.0, 0.0
COR2 = 0.0, 0.0

[FLU23]
SENSOR = Fluorometer
MODEL =  SCUFA
SERIAL = 0600
MFG = Turner
CAL_LAB = Turner
CAL_DATE = 15-Dec-2007
LOCATION = FLO-Thru system Wet Lab
INSTALL_DATE = 07-Feb-2008
OWNER = SIO/STS
CMD = #02\r
TAGS-C = FL, TB
TAGS-R = FL, TB
PRC-C = 4, 4
PRC-R = 3, 3
RANGE = -10.0 15000.0
RANGE2 = -200.0 200.0
# ADAM 4117 CH2 CH3
# Module address
# Module setup parameters
MSP = 3 2 0 0 13 0 8  3 4 0 0 0 0 0 0
MCP = 1 1 2 0  3 3 0 0 0 0 0 0
# Emulation value
Emulation = 2.0, 6.0
```

```
# A/D Calibration
ADCAL = 1.0 0.0
# 0-5V
# 0 - 50 ug/l of chlorophyll a (SCUFA II)
# 0  200 ppb of Rhodamine (SCUFA III)
# 0  200 NTU (turbidity, SCUFA II or SCUFA III)
COR = 10.0, 0.0
COR2 = 10.0, 0.0

[FLU20]
# Fluorometer #2 FL-2
SENSOR = Fluorometer
MODEL =  10-AU-005
SERIAL = 5110FXXD
MFG = Turner
CAL_LAB = Turner
CAL_DATE = ??
LOCATION = FLO-Thru system Wet Lab
OWNER = Calcofi 04-2003
# Module setup parameters
MSP = 0 3 0 0 10 0 1  7 0 0 0 0 0 0 0
MCP = 1 1 1 0  0 0 0 0 0 0 0 0
PRC-R = 3
PRC-C = 3
# Emulation value
EMULATION = 2.0
# A/D Calibration
ADCAL = 1.0 0.0
COR = 1.0, 0.0

[OXY22]
SENSOR = Oxygen
MODEL = SBE-43
SERIAL = 1307
MFG = Seabird
CAL_LAB = Seabird
CAL_DATE = 28-Sep-2007
LOCATION = FLO-Thru system Wet Lab
INSTALL_DATE = 01-Feb-2008
OWNER = SIO/STS
CMD = #021\r
CMD2 = 0
# ADAM 4117 CH1
# Module setup parameters
MSP =  3 2 0 0 13 0 1  1 0 0 0 0 0 0 0
MSP2 = 4 3 0 0 10 0 1  1 0 0 0 0 0 0 0
MCP = 1 1 4 0  1 0 22 23 0 0 0 0
# Emulation value
Emulation = 2.0 20.0
#SECSTOAVG=30.0
# A/D Calibration
ADCAL = 1.0, 0.0
# Voffset
COR = -0.4781
# Corrections Oxygen Temp
COR2 = 1.0 0.0
# Corrections Oxygen
```

```
# soc, boc, tcor, pcor, tau, wt
COR3 = 0.3834 0.0 0.0025 1.35e-4 0.0 0.0

[USP35]
SENSOR = Oxygen
MODEL = Optode 3835
SERIAL = 719
MFG = Aanderaa
CAL_LAB = Aanderaa
CAL_DATE = 21-Nov-2007
LOCATION = FLO-Thru system Wet Lab
INSTALL_DATE = 01-Feb-2008
OWNER = SIO
CMD = 0
TAGS-C= XX XX XX XX XX XX XX XX
TAGS-R= XX XX XX XX XX XX XX XX
PRC-C = 2 2 2 2 2 2 2 2
PRC-R = 2 2 2 2 2 2 2 2
RANGE = -10000.0 10000.0
RANGE2 = -10000.0 10000.0
RANGE3 = -10000.0 10000.0
RANGE4 = -10000.0 10000.0
RANGE5 = -10000.0 10000.0
RANGE6 = -10000.0 10000.0
RANGE7 = -10000.0 10000.0
RANGE8 = -10000.0 10000.0
# mmol/l Sat% Tmp Dphase Bphase Bamp Bpot RawTem
# Module setup parameters
MSP =  6 3 0 0 10 0 8  3 4 5 6 7 9 10 12
MCP = 1 1 8 0  0 0 0 0 0 0 0 0
# Emulation value
#Emulation = 2500.0 2500.0 0 0 22.16 26.54
Emulation = 277.04 98.12 20.22 26.90 27.40 319.97 222.0 -18.81
# A/D Calibration
ADCAL = 1.0, 0.0
COR = 0.0
COR2 = 0.0
COR3 = 0.0

[OXY35]
SENSOR = Oxygen
MODEL = Optode 3835
SERIAL = 719
MFG = Aanderaa
CAL_LAB = Aanderaa
CAL_DATE = 21-Nov-2007
LOCATION = FLO-Thru system Hydro Lab
INSTALL_DATE = 01-Feb-2008
OWNER = SIO
TAGS-C= OT OC OX OS
TAGS-R= OT OC
PRC-C = 3 3 3 3
PRC-R = 3 3
RANGE = -10000.0 10000.0
RANGE2 = -10000.0 10000.0
RANGE3 = -10000.0 10000.0
RANGE4 = -10000.0 10000.0
```

```
DELIMITERS = \t \s :
# Module setup parameters
MSP =  6 3 0 0 10 0 11  9 5 0 0 0 0 0 0
MCP = 1 1 4 0  0 0 31 23 0 0 0 0
# Emulation value
#Emulation = 2500.0 2500.0 0 0 22.16 26.54
Emulation = 22.16 26.54 0 0 0 0 0
# A/D Calibration
ADCAL = 1.0, 0.0

[XMS22]
SENSOR = Transmissometer
MODEL =  Cstar
SERIAL = ??
MFG = Wetlabs
CAL_LAB = Wetlabs
CAL_DATE = ???
LOCATION = FLO-Thru system Wet Lab
OWNER = ???
INSTALL_DATE = ??
# Wetlabs Cstar
# Module address
CMD = #l\r
# Module setup parameters
MSP = 3 3 0 0 10 0 1  1 0 0 0 0 0 0 0
MCP = 1 1 2 0  3 24 0 0 0 0 0 0
# Emulation value
Emulation = 2500.0
# A/D Calibration
ADCAL = 1.0 0.0
COR = 20.0, 0.0
COR2 = 0.25

[USP22]
SENSOR = NITRATE
MODEL =  ISUS
SERIAL = 141
MFG = MBARI
CAL_LAB = SATLANTIC
CAL_DATE = 11-OCT-2007
LOCATION = FLO-Thru system Wet Lab
INSTALL_DATE = 01-Feb-2008
OWNER = NOAA
TAGS-C = XX
TAGS-R = XX
PRC-C = 3
PRC-R = 3
LABELS-TAB = ISUS
LABELS-SC = ISUS
CMD = #02\r
# Module address
# Module setup parameters
MSP = 3 2 0 0 13 0 8  5 6 0 0 0 0 0 0
MCP = 1 1 1 0  13 0 0 0 0 0 0 0
#AVGTYPE=1
#SECSTOAVG=60.0
# Emulation value
```

```
Emulation = 3.0
# A/D Calibration
ADCAL = 1.0,0.0
COR = 25.634765625, -5.0

[IST01]
SENSOR = CTD Depth
MODEL = SBE11
SERIAL = XXXX
MFG = Seabird
CAL_LAB = n/a
CAL_DATE = n/a
LOCATION = 01 Lab
OWNER = SIO/STS
# Module address
CMD = 0
# CTD Depth, Rate of descent, Altimeter
TAGS-C = IP, IV, IA
TAGS-R = IP, IV, IA
PRC-C = 2, 4, 1
PRC-R = 2, 4, 1
RANGE = -10.0 15000.0
RANGE2 = -200.0 200.0
RANGE3 = -10.0 500.0
# Module setup parameters
MSP = 18 3 0 0 10 0 3  1 2 3 4 5 0 0 0
MCP = 0 1 3 0  0 3 0 0 0 0 0 0
AVGTYPE=0 1 0
SECSTOAVG=10.0
# Emulation Value
# Depth, Speed, Altimeter
Emulation =  1500.0 0.95 45.0
# A/D Calibration
ADCAL = 1.0 0.0
# Corrections
COR = 0.0 0.0
COR2 = 60.0 0.0
COR3 = 0.0 0.0

[NME23]
SENSOR = GPS
MODEL = POSMV
SERIAL =
MFG = Applanix - HCO
CAL_LAB = n/a
CAL_DATE = n/a
LOCATION = Healy
INSTALL_DATE =
OWNER = Healy
# Module setup parameters
MSP = 20 8
AVGTYPE=0 0 0 2 1 0 0 0
SECSTOAVG=60.0
# Emulation Value
Emulation = 32.3456 -117.5678 4000.0 90.0 12.0 1018724200.0 25.0 220.0

[NME22]
```

```
SENSOR = GPS
MODEL = P-CODE
SERIAL =
MFG = Computer Lab
CAL_LAB = n/a
CAL_DATE = n/a
LOCATION = Computer Lab
INSTALL_DATE =
OWNER = Healy
# Module setup parameters
MSP = 13 8
AVGTYPE=0 0 0 2 1 0 0 0
SECSTOAVG=60.0
# Emulation Value
Emulation = 32.3456 -117.5678 4000.0 90.0 12.0 1018724200.0 25.0 220.0

[GYR22]
SENSOR = Gyro
MODEL = MK37
SERIAL = ???
MFG = Sperry
CAL_LAB = n/a
CAL_DATE = n/a
LOCATION = Bridge
INSTALL_DATE = 95
OWNER = Healy
ADDTOFILE = FALSE
# Module setup parameters
MSP = 14 8
AVGTYPE = 2
SECSTOAVG=60.0
# Emulation Value
Emulation = 250.0

[TSG90]
SENSOR = Thermosalinograph
MODEL = SBE21
SERIAL = ????
MFG = Seabird
CAL_LAB = Seabird
CAL_DATE = 22-Sep-06
LOCATION = Forward TSG
INSTALL_DATE = ??
OWNER = Ship
TAGS-R = TT TC SA SV ST
TAGS-C = TT TC SA SV ST
PRC-R = 2 3 2 2 2
PRC-C = 2 3 2 2 2
RANGE = -20.0 50.0
RANGE2 = -20.0 80.0
RANGE3 = -20.0 80.0
RANGE4 = 0.0 2000.0
RANGE5 = -20.0 50.0
# Module setup parameters
MSP = 28 15 0 0 10 0 5 5 7 8 4 6 0 0 0
#MCP = 1 1 5 0  0 3 16 17 18 0 0 0
MCP = 1 1 5 0  0 3 0 0 0 0 0 0
```

```
# Emulation value
EMULATION = 20.0 50.0 35.0 15.0
#ftsgauss    2007:114:22:02:32.2955    1518631F0A993122E47D 1434.63 1.08 -1.64
2.60 29.87
#  1434.63 = sound velocity
#  1.08 = TSG Temp sensor (SBE21)
#  -1.64 = TSG Hull Temp sensor
#  2.60 = TSG Conductivity
#  29.87 = TSG Salinity
#AVGTYPE=1 1 0 0 0
#SECSTOAVG=60.0
# A/D Calibration
ADCAL = 1.0 0.0
# polynomial max coeffecients 8
# Temp corrections
# a0, a1, a2, a3
COR = 1.0, 0.0
# g,h,i,j,CPcor,CTcor,WBOTC
COR2 = 10.0, 0.0

[NME02]
SENSOR = GPS
MODEL = GPS
SERIAL = ??
MFG = GPS
CAL_LAB = n/a
CAL_DATE = n/a
LOCATION = Ship
INSTALL_DATE = ??
OWNER = Ship
# Module setup parameters
MSP = 27 14
# Emulation Value
Emulation = 32.3456 -117.5678 4000.0 90.0 12.0 1018724200.0 25.0 220.0

[GYR01]
SENSOR = Gyro
MODEL = MK37
SERIAL = ???
MFG = Sperry
CAL_LAB = n/a
CAL_DATE = n/a
LOCATION = Bridge
INSTALL_DATE = 95
OWNER = Ship
ADDTOFILE = TRUE
# Module setup parameters
MSP = 20 8
# Emulation Value
Emulation = 250.0

[PDR02]
SENSOR = Depth
MODEL = Seabeam 2100
SERIAL =
MFG = Seabeam
CAL_LAB = n/a
```

```
CAL_DATE = n/a
LOCATION = Computer Lab
INSTALL_DATE =
COMMENT = Center Beam Depth
OWNER = Ship
# Module setup parameters
MSP = 29 14
# Emulation Value
#Emulation = $SBCTR,2007,4,24,20:55:13.890,59.929585,-170.380448,44.44,20*00
Emulation = 1021.2
# A/D Calibration
ADCAL = 1.0 0.0
# Corrections
COR = 0.0

[ASH01]
SENSOR = Attitude
MODEL = ADU2
SERIAL = ??
MFG = Ashtech
CAL_LAB = n/a
CAL_DATE = n/a
LOCATION = Ship
OWNER = Ship
INSTALL_DATE = ??
# Module setup parameters
MSP = 27 14
#AVGTYPE = 2 0 0
#SECSTOAVG = 30.0
# Emulation Value
Emulation = 270.0 10.0 5.0

[WCH01]
SENSOR = Winch Readouts
MODEL = Markey
SERIAL = OT-1
MFG =
CAL_LAB = n/a
CAL_DATE = n/a
LOCATION = CTD wire
OWNER = Healy
ADDTOFILE = TRUE
CMD = 0
# Module setup parameters
MSP = 15 3 0 0 10 0 8 4 6 2 0 0 0 0 0
MCP = 0 1 3 0  0 0 0 0 0 0 0 0 0
DELIMITERS=,
# Emulation Value
Emulation =  1500.0 59.0 2350.0
# A/D Calibration
ADCAL = 1.0 0.0
# Corrections
COR = 1.0 0.0

[WCH02]
SENSOR = Winch Readouts
MODEL = Markey
```

```
SERIAL = OTW2
MFG =
CAL_LAB = n/a
CAL_DATE = n/a
LOCATION = Aft A-Fram wire
OWNER = Healy
ADDTOFILE = TRUE
CMD = 0
# Module setup parameters
MSP = 16 3 0 0 10 0 8 4 6 2 0 0 0 0 0
MCP = 0 1 3 0  0 0 0 0 0 0 0 0
DELIMITERS=,
# Emulation Value
Emulation =  1500.0 59.0 2350.0
# A/D Calibration
ADCAL = 1.0 0.0
# Corrections
COR = 1.0 0.0

[TSG07]
SENSOR = Thermosalinograph
MODEL = SBE21
SERIAL = 3107
MFG = Seabird
CAL_LAB = Seabird
CAL_DATE = 16-Jan-08
LOCATION = AFT LAB-UCW line
OWNER = SIO/STS
INSTALL_DATE = 01-Feb-2008
# Module setup parameters
MSP = 9 6 1 0 10 0 2  1 2 0 0 0 0 0 0
MCP = 1 0 5 0  11 12 16 17 18 0 0 0
# Emulation values T=18.5 C=46.1270 S=34.7685
Emulation = 3459.333 9953.81
# A/D Calibration
ADCAL = 1.0 0.0
# Temp Corrections
# G, H, I, J, F0, Slope, Offset
COR = 4.17247463e-003 6.20503326e-004 1.84513429e-005 1.06226845e-006 1000.0 1.0
0.0
# Cond Corrections
# G, H, I, J, Ctcor, Cpcor, Slope, Offset
COR2 = -4.30844123e+000 5.08760573e-001 -4.37311950e-004 4.71047367e-005 3.25e-
06 -9.57e-08 1.0 0.0

[PRS22]
SENSOR = Pressure
MODEL =  Hiller1
SERIAL = 001P
MFG = Hiller
CAL_LAB = Hiller
CAL_DATE = 15-Dec-2007
LOCATION = FLO-Thru system Wet Lab
INSTALL_DATE = 01-Feb-2008
OWNER = SIO/STS
CMD = #026\r
# ADAM 4117 CH6
```

```
# Module setup parameters
MSP = 3 2 0 0 13 0 1  1 0 0 0 0 0 0 0
MCP = 1 1 1 0  3 0 0 0 0 0 0 0
# Emulation value
Emulation = 2.6
AVGTYPE = 1
SECSTOAVG = 15.0
# A/D Calibration
ADCAL = 1.0,0.0
COR = 10.0, 0.0
??

??

??

??

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```

Picture # 1

AFTCONN J-BOX and MET Computer

Winch wire J-BOX

Notes:

A temporary connection is hanging out of the side of the Aftconn J-Box. This connection will be fixed when the ship returns to Seattle.

Picture # 2 and 3

Aloftconn J-Box and Main Mast anemometer (stbd side)

Picture # 4

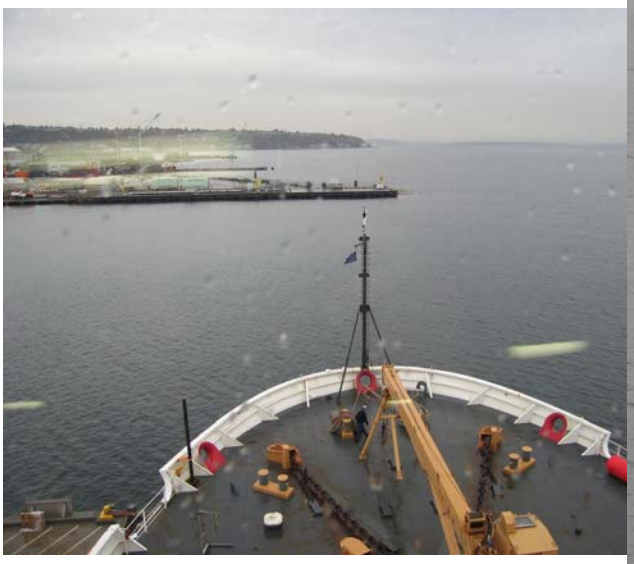
Machinery Room J-Box (Forward MET mast interface)

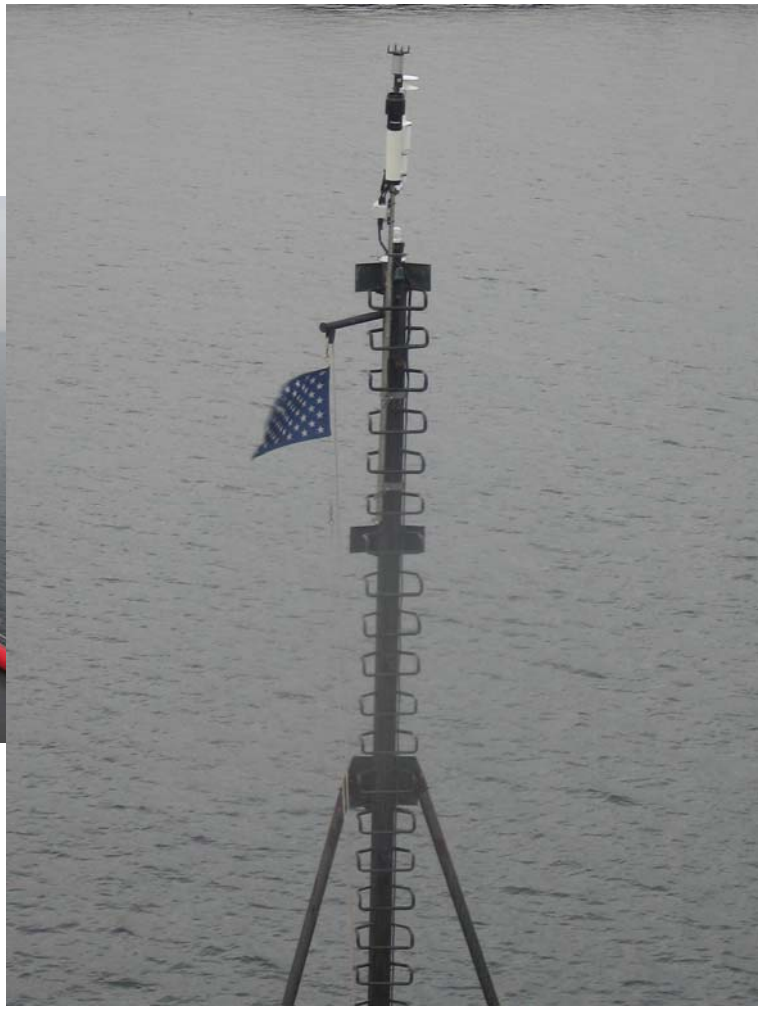
Notes:

This J-Box is tied up with a rope. The J-Box is temporary and will be moved in the fall of 2008. The yellow extension cord is power for the box.

Picture # 5

Forward MET Mast





Notes:

There is a small J-Box on the mast that just has a terminal strip inside. The cable that feeds the J-Box is routed from the big Machinery Room J-Box, through a goose-neck in the deck and tie-wrapped to the mast. In the fall of 2008, this cable is going to be internal to the mast with kick-pipe feed throughs into the deck below.

Picture # 6

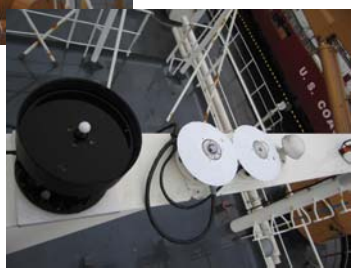
Small Computer Lab 19” Rack

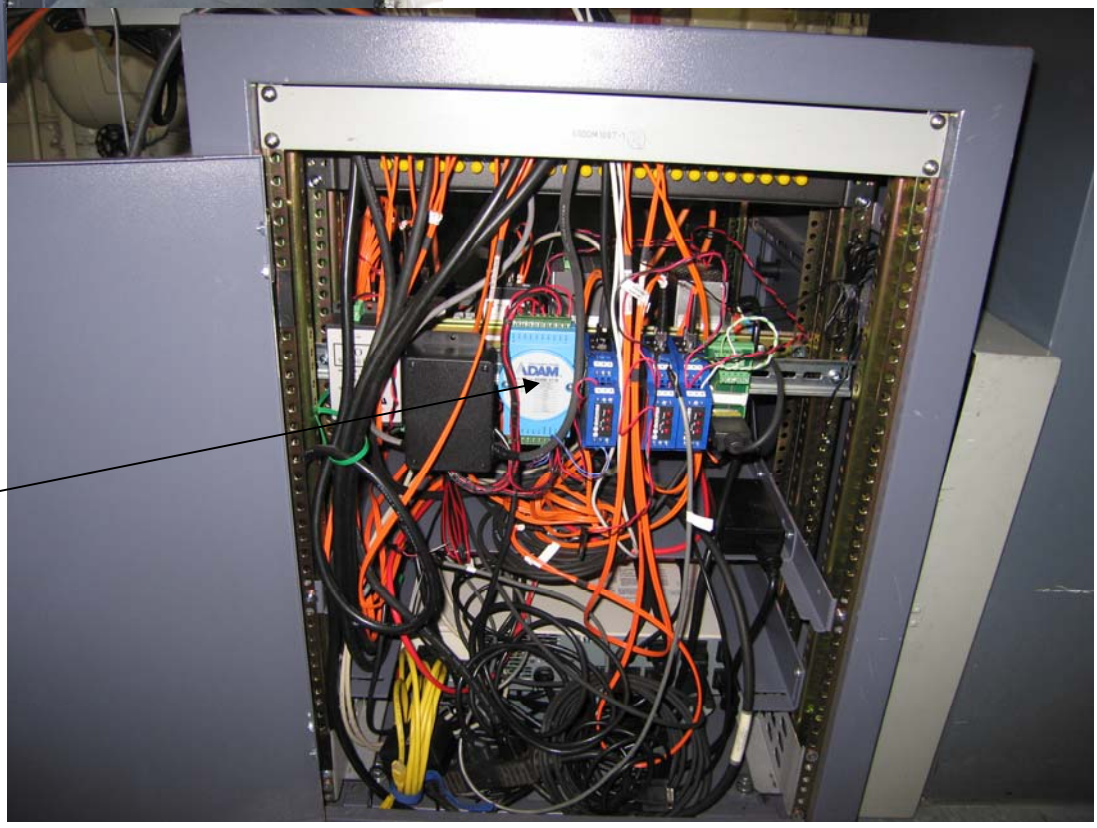
PAR / LWR / SWR interface

Picture # 7 and 8

PAR / LWR / SWR

Helo Control Room



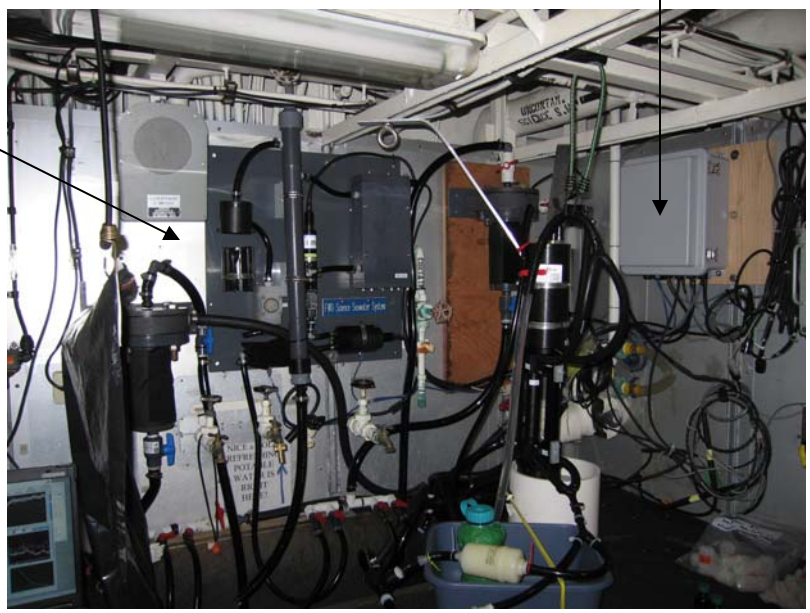


Picture # 9, 10, 11

Science Seawater Sensors

9

11



10

Power

Power

Picture # 12

Hull Temperature
SBE-3S

(below the deck plates
in the Motor Room)

Picture # 13, 14, 15

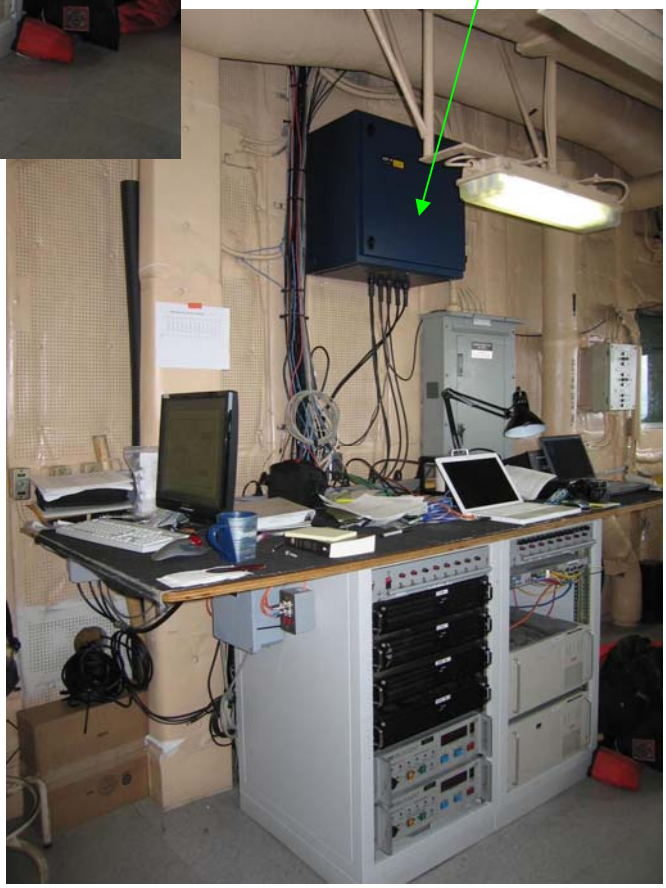
Aftconn Computers

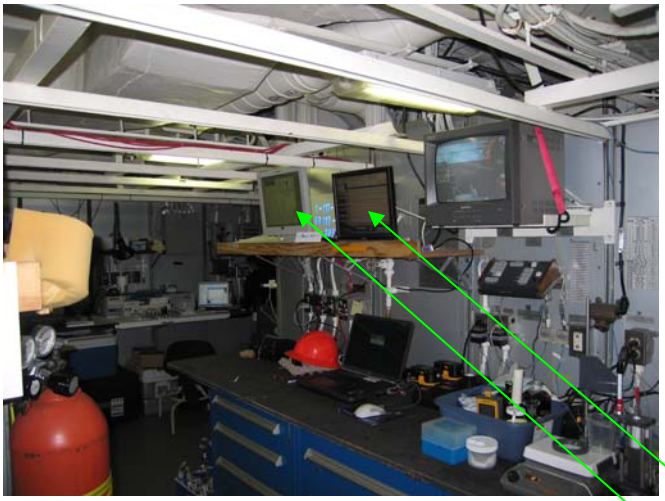
CTD #1
CTD #2
MET
MET backup

CTD #1 monitor

Alstom J-Box
winch wire data

MET and CTD #2
monitor/mouse/keyboard





Main Lab - remote monitors

MET

CTD