

```
////////////////////////////////////
// 2015 swFOCE
// operation reference
////////////////////////////////////
```

```
////////////////////////////////////
// Contacts
////////////////////////////////////
```

```
headley    x1822 M 831.224.0113
herlien    x1750
salamy     x1820
ruston     x1997 M 831.277.4708
braccio    x1924 M 831.594.9074
```

```
////////////////////////////////////
// General Use Notes
// Please Read First
////////////////////////////////////
```

When a gateway is running, the gq utility must be used to change settings and send commands to devices. Other command line utils must be used when the gateway is not running, and will interfere with operation if used when the gateway is running. To determine whether gateway is running, use

```
xsvc show
```

More documentation about all of the gateway utilities is available on project library:

```
smb://atlas.shore.mbari.org/ProjectLibrary/901412.swFOCE_Science/Software
```

On the science gateway nodes or kelpbed, for commands that require root permissions, login as ops and use

```
sudo <the command>
```

password is the user (ops) password

On Fangtooth, sudo is not available, use

```
su -c "<the command>"
```

and use the root password (see karen, bob, kent)

Tip: Use the -h option to get help with any gateway utility

Tip: use a different window for each gateway ssh session, with different background colors

Tip: cut and paste commands from this document into terminal sessions to run them

Tip: use these terminal features and utils to make ssh sessions easier:

```
up/down arrow
```

```
tab
```

```
history
```

```
tail/tail -f
```

```
grep
```

```
history|grep <search>
```

```
tail -f <file>|grep <search>
```

```
////////////////////////////////////
// swFOCE Network Devices
////////////////////////////////////
```

```
MAC                IP                hostname
```

00:15:60:10:82:02	134.89.13.4	fangtooth.shore.mbari.org	
	134.89.91.1	swFOCE router	
D8:D3:85:5F:15:BE	134.89.91.2	kelpbed.swfoce.mbari.org	gw0
00:02:AB:3F:A4:1C	134.89.91.3	swfoce-serial.swfoce.mbari.org	
00:40:9D:36:26:FE	134.89.91.4	swfoce2.swfoce.mbari.org	
00:02:AB:0E:27:7A	134.89.91.5	oe1.swfoce.mbari.org	
00:02:AB:0D:18:C9	134.89.91.6	oe2.swfoce.mbari.org	
00:20:4A:F0:2F:39	134.89.91.7	cn.swfoce.mbari.org	
D0:FF:50:54:72:84	134.89.91.32	gw1.swfoce.mbari.org	gw1
00:40:9D:6A:E7:6A	134.89.91.33	gw1serial.swfoce.mbari.org	
54:53:ed:16:3c:70	134.89.91.34	gw1camera.swfoce.mbari.org	
7C:66:9D:3C:E4:EA	134.89.91.64	gw2.swfoce.mbari.org	gw2
00:40:9D:6A:E7:B5	134.89.91.65	gw2serial.swfoce.mbari.org	
FC:F1:52:17:48:E0	134.89.91.66	gw2camera.swfoce.mbari.org	

```

////////////////////////
// Gateway shutdown
// (gw1,gw2)
////////////////////////

```

```

# login as ops
ssh ops@<gateway>
login [ops:brynnner]

```

```

cd swfoce
xsvc stop gw

```

```

# OPTIONAL: shut down sensor node power
gwdio -s all:0
# read back to confirm
gwdio -r all

```

```

# OPTIONAL: turn off camera...
# [!!! only use this util if gateway is not running !!!]
gwmeh -T /dev/ttyME00,115200 -s 4:L
# lights...
gwmeh -T /dev/ttyME00,115200 -s 5:L/6:L/7:L
# thruster controller...
gwmeh -T /dev/ttyME00,115200 -s 2:L
# read back to confirm
gwmeh -T /dev/ttyME00,115200 -q -i

```

```

# stop linux
# !!! kills ssh session, must power cycle gateway to restart !!!
sudo /sbin/shutdown now

```

```

////////////////////////

////////////////////////
// Gateway power cycle
// (gw1,gw2)
////////////////////////

```

```

# login to kelpbed
ssh ops@kelpbed.swfoce.mbari.org
login [ops:brynnner]

```

```

# set environment
xfh
xfe
cd ~/swfoce

```

```
# check to see if gateway is running
xsvc show
```

```
#####
# If kelpbed gateway RUNNING (typical)
#####
# gateway1, gateway2 OFF
# !!! be sure to stop linux on the gateway first !!!
gq -d act.sysmvc.0.set=2:L/3L
# wait for 10 seconds or so...
# gateway1,gateway2 ON
gq -d act.sysmvc.0.set=2:H/3:H
```

```
#####
# If kelpbed gateway NOT RUNNING
#####
# gateway1, gateway2 OFF
# !!! be sure to stop linux on the gateway first !!!
gwmvc -T /dev/ttyCN,115200 -L 2,3
# wait for 10 seconds or so...
# gateway1 ON
gwmvc -T /dev/ttyCN,115200 -H 2,3
```

```
# check to see if power is on
#####
# If kelpbed gateway RUNNING (typical)
#####
# use skim to view latest data
# (updates at sample rate, ~ 1 min)
# or use quick look plots (updates every 5 min)
```

```
# see last 3 min of MVC data
skim -M 3 -a ~/swfoce/arch -s 1841
```

```
# MVC data
```

```
# data format
# timestamp,sid,strid,pow_vec(decimal),gfseq,gf[0:5],h2o_vec,stat_vec,adc[0:13]
```

```
// Power Channels (vicor power sense inverted)
// VICOR_01 0
// VICOR_02 1
// FOCE_01 2
// FOCE_02 3
// FAN_01 4
// FAN_02 5
// e.g. pow_vec=0060 -> 0x3C
// i.e. 0011 1100 (vicors (bits 0:1 inverted), foce, fans all ON)
```

```
// ADC Map
// AD_VICOR_01_TEMP 0
// AD_VICOR_02_TEMP 1
// AD_VICOR_03_TEMP 2
// AD_HEATSINK_TEMP 3
// AD_48V_01_CURR 4
// AD_48V_01_VOLT 5
// AD_48V_02_CURR 6
// AD_48V_02_VOLT 7
// AD_24V_CURR 8
// AD_24V_VOLT 9
// AD_3V_CURR 10
// AD_3V_VOLT 11
```

```
// AD_AMB_HUMID      12
// AD_AMB_TEMP        13
```

```
// Status Vector Map
// FAN_01_STATE        0x01
// FAN_02_STATE        0x02
// VICOR_01_STATE      0x04
// VICOR_02_STATE      0x08
// FOCE_01_RELAY_STATE 0x10
// FOCE_02_RELAY_STATE 0x20
```

```
#####
```

```
# If kelpbed gateway NOT RUNNING
```

```
#####
```

```
# use gwmeH to query MVC
```

```
# !!! use only if gateway is not running !!!
```

```
gwmvc -T /dev/ttyCN,115200 -q -i
```

```
# see below for gateway startup procedures
```

```
////////////////////////////////////
```

```
////////////////////////////////////
```

```
// Gateway start
```

```
// (gw1,gw2)
```

```
////////////////////////////////////
```

```
# login
```

```
ssh ops@gw1.swfoce.mbari.org
```

```
login [ops:brynnner]
```

```
# check date
```

```
date
```

```
# should get time from network, but if not
```

```
# use procedure described separately below
```

```
# to set time before starting gateway
```

```
# start in swfoce deployment directory
```

```
cd swfoce
```

```
# start gw1
```

```
# note: use appropriate config file (<gateway>-yymmdd-n)
```

```
# generally, use latest date, highest number (n)
```

```
# gateway config files are in ~/swfoce/conf
```

```
gwstart -i gw1 -f conf/gw1-150611-1.conf
```

```
# start gw2
```

```
gwstart -i gw2 -f conf/gw2-150611-1.conf
```

```
# it takes several minutes for the gateway to
```

```
# complete initialization of the instruments.
```

```
# to see gateway activity during startup,
```

```
# tail the standard out log
```

```
# (use CTRL-C to stop tail)
```

```
tail -f ~/swfoce/logs/gw-out.log
```

```
# Once the gateway is running,
```

```
# use gq to see gateway service status
```

```
gq -q svstat
```

```

////////////////////////////////////
//
////////////////////////////////////
// HOWTO: set gateway node date
////////////////////////////////////
login as ops
sudo date -u -s "2014-08-06 12:00"
////////////////////////////////////

////////////////////////////////////
// HOWTO: stop/start MVC virtual serial port
// (gw0)
// !!! requires gw0 software restart !!!
////////////////////////////////////
login as ops
sudo /etc/init.d/socatd-cn stop
sudo /etc/init.d/socatd-cn start
////////////////////////////////////

////////////////////////////////////
// HOWTO: manual start/stop MEH virtual serial port (digi)
// (gw1,gw2)
// !!! requires gw software restart !!!
////////////////////////////////////
login as ops
# gw1
sudo digicfg -a 134.89.91.33 -i ME -c init
sudo digicfg -a 134.89.91.33 -i ME -c uninit
# gw2
sudo digicfg -a 134.89.91.65 -i ME -c init
sudo digicfg -a 134.89.91.65 -i ME -c uninit
////////////////////////////////////

////////////////////////////////////
// HOWTO: cycle/check camera power
// (gw1,gw2)
////////////////////////////////////
login as ops
#####
# If gateway RUNNING
#####
gq -q act.sysmeh.0.set=4:H
gq -q act.sysmeh.0.set=4:L
# check
skim -M 3 -a ~/swfoce/arch -s 1844
skim -M 3 -a ~/swfoce/arch -s 1845

# MEH data format
# timestamp,src,str,relays,relay_vec,adc_channels,
# MC1_raw,MC1,MC2_raw,MC2,temp,rh,h2o.1,h2o.2

// Relays:
// 0 : N/C
// 1 : thruster 1
// 2 : N/C [was thruster 2]
// 3 : N/C [was gateway node power]
// 4 : camera
// 5 : light
// 6 : light
// 7 : light

// ADC Channels:
// ADC0: MC_1

```

```
// ADC1: MC_2
// ADC2: TEMP
// ADC3: RH
// ADC4: H2O_1
// ADC5: H2O_2
// ADC6: NC
// ADC7: NC
```

```
#####
```

```
# If gateway NOT RUNNING
```

```
#####
```

```
# camera ON
```

```
gwmeh -T /dev/ttyME00,115200 -s 4:H
```

```
# camera OFF
```

```
gwmeh -T /dev/ttyME00,115200 -s 4:L
```

```
# check power
```

```
gwmeh -T /dev/ttyME00,115200 -q -i
```

```
////////////////////////////////////
```

```
////////////////////////////////////
```

```
// HOWTO: console to instruments on sensor
```

```
// node ports
```

```
// (gw1,gw2)
```

```
// !!! use only if gateway software is not running !!!
```

```
////////////////////////////////////
```

```
CTD
```

```
snTerm -p /dev/tty01 -t 2 -b 9600
```

```
PH
```

```
snTerm -p /dev/tty01 -t 0 -b 38400
```

```
snTerm -p /dev/tty01 -t 1 -b 38400
```

```
PAR
```

```
snTerm -p /dev/tty04 -t 0 -b 19200
```

```
snTerm -p /dev/tty04 -t 1 -b 19200
```

```
THRUSTER
```

```
minicom -D /dev/ttyME01 -b 115200
```

```
////////////////////////////////////
```

```
////////////////////////////////////
```

```
// HOWTO: use gateway CLI utils
```

```
// (gw0,gw1,gw2)
```

```
// !!! use only if gateway software is not running !!!
```

```
////////////////////////////////////
```

```
#####
```

```
# MVC (gw0)
```

```
#####
```

```
# mvc status
```

```
gwmvc -T /dev/ttyCN,115200 -q -i
```

```
# vicors, fans ON
```

```
gwmvc -T /dev/ttyCN,115200 -H 0,1,4,5
```

```
# vicors, fans OFF
```

```
gwmvc -T /dev/ttyCN,115200 -L 0,1,4,5
```

```
# gw1,2 power ON
```

```
gwmvc -T /dev/ttyCN,115200 -H 2,3
```

```
# gw1,2 power OFF
```

```
gwmvc -T /dev/ttyCN,115200 -L 2,3
```

```
# set GF mode
```

```
gwmvc -T /dev/ttyCN,115200 -G GFC_NORM
```

```
gwmvc -T /dev/ttyCN,115200 -G GFC_ALL
```

```
gwmvc -T /dev/ttyCN,115200 -G GFC_TEST
```

```
gwmvc -T /dev/ttyCN,115200 -G GFC_OFF
```

```
#####
# MEH (gw1,gw2)
#####
# meh status
gwmeh -T /dev/ttyME0,115200 -q -i
# thruster controller ON/OFF
gwmeh -T /dev/ttyME0,115200 -s 2:H
gwmeh -T /dev/ttyME0,115200 -s 2:L
# camera ON/OFF
gwmeh -T /dev/ttyME0,115200 -s 4:H
gwmeh -T /dev/ttyME0,115200 -s 4:L
# lights ON/OFF
gwmeh -T /dev/ttyME0,115200 -s 5:H,6:H,7:H
gwmeh -T /dev/ttyME0,115200 -s 5:L,6:L,7:L
```

```
#####
# Gateway Digital IO
# (power to sensor nodes)
# (gw1,gw2)
#####
# read DIO states
gwdio -r all
# set all DIO ON/OFF
gwdio -s all:H
gwdio -s all:L
# set DIO n ON/OFF
gwdio -s 0:H
gwdio -s 1:H
gwdio -s 2:H
gwdio -s 3:H
gwdio -s 0:L
gwdio -s 1:L
gwdio -s 2:L
gwdio -s 3:L
# may also mix, e.g.
gwdio -s 0:H,2:L
```

```
#####
# SensorNode Control
# (gw1,gw2)
#####
# snode status
gwsn -S 0,/dev/tty01 -q =i
# snode port power ON/OFF
gwsn -S 0,/dev/tty01 -H 0
gwsn -S 0,/dev/tty01 -H 1
gwsn -S 0,/dev/tty01 -H 2
gwsn -S 0,/dev/tty01 -H 3
gwsn -S 0,/dev/tty01 -L 0
gwsn -S 0,/dev/tty01 -L 1
gwsn -S 0,/dev/tty01 -L 2
gwsn -S 0,/dev/tty01 -L 3
# may also mix, e.g.
gwdio -S 0,/dev/tty01 -H 0,2 -L 1,4
```

```
#####
# Thruster Control
# (gw1,gw2)
#####
# thruster status
moco -T /dev/ttyME01,115200 -q
# set thruster speed (counts, -1023:1023)
# stop thruster
```

```
moco -T /dev/ttyME01,115200 -c 0
# set thruster speed (200 counts)
moco -T /dev/ttyME01,115200 -c 200
```

```
#####
# Valve Control
# (gw1,gw2)
#####
# valve status
vaco -S 3,/dev/tty05 -q
# set valve position (%,0.0:1.0)
# valve 0 open
vaco -S 3,/dev/tty05 -p 0,9600 -c 0,1.0
# valve 0 closed
vaco -S 3,/dev/tty05 -p 0,9600 -c 0,0.0
# valve 1 open
vaco -S 3,/dev/tty05 -p 0,9600 -c 1,1.0
# valve 1 closed
vaco -S 3,/dev/tty05 -p 0,9600 -c 1,0.0
```

```
#####
# gateway software
# Manual Start/Stop
# (gw1,gw2)
# !!! restarting sds, sbr requires !!!
# !!! gw service restart          !!!
#####
# show services
xsvc show
# start shared data service
xsvc -l ~/swfoce/logs start sds -p
# start service broker
xsvc -l ~/swfoce/logs start sbr
# start gateway
xsvc -l ~/swfoce/logs start gw -f ~/swfoce/conf/<config_file> -a ~/swfoce/arch
# stop sds
xsvc stop sds
# stop sbr
xsvc stop sbr
# stop gw
xsvc stop gw
```

```
////////////////////////////////////
```

```
////////////////////////////////////
// HOWTO: use gq service control
// (gw0,gw1,gw2)
// !!! use if gateway software is running !!!
////////////////////////////////////
```

```
#####
# Gateway General
# (gw0,gw1,gw2)
#####
```

```
# show service status
gq -q svstat
```

```
# show service properties
gq -q svprop
gq -q svprop,<service>
```

```
# show device properties
```



```
gq -q saprop
```

```
# show debug config
```

```
gq -q debug
```

```
# set debug level for <MODULE>
```

```
# MODULE: SBE18S, SBE52MP, SATPAR,
```

```
# THRUSTER, ESWV SYSMEH, SYSGW, SYSSN...
```

```
# debug level: DEBUG, INFO, WARN, ERROR, FATAL
```

```
# !!! set to INFO when not in use !!!
```

```
gq -s debug_level.<MODULE>=DEBUG
```

```
gq -s debug_level.<MODULE>=INFO
```

```
# set sample period for <service>
```

```
gq -s worker_period_msec.<service>.0.GETD.0
```

```
# set sample start delay for <service>
```

```
gq -s sdel.<service>.0=0
```

```
# set power policy for <service>
```

```
gq -s pow_policy.<service>.0=0 //0:never,1:always,2:as-needed
```

```
#####
```

```
# Gateway DIO
```

```
# sensor node power
```

```
# (gw1,gw2)
```

```
# !!! cycling power to snode requires gw restart !!!
```

```
#####
```

```
# set gateway DIO bits
```

```
gq -d act.sysgw.0.set=0:L
```

```
gq -d act.sysgw.0.set=0:H
```

```
gq -d act.sysgw.0.set=0:L/1/H
```

```
#####
```

```
# SensorNode IO
```

```
# snode port power
```

```
# (gw1,gw2)
```

```
# !!! cycling power to snode port may !!!
```

```
# !!! require gw restart depends on device !!!
```

```
#####
```

```
# set snode:port:state
```

```
gq -d act.syssn.0.set=0:0:L
```

```
# set snode:port ON
```

```
gq -d act.syssn.0.pon=0:0
```

```
# set snode:port OFF
```

```
gq -d act.syssn.0.poff=0:0
```

```
#####
```

```
# MEH relays
```

```
# power to cam, lights, thruster(s)
```

```
# (gw1,gw2)
```

```
# [1:thruster 4:cam 5-7:lights]
```

```
#####
```

```
gq -d act.sysmeh.0.set=5:L
```

```
gq -d act.sysmeh.0.set=5:H
```

```
#####
```

```
# ESW valves
```

```
# (gw1,gw2)
```

```
#####
```

```
# set <valve> to position (0.0-1.0)
```

```
# valve 0 closed
```

```
gq -d act.eswv.0.set=0:0.0
# valve 0 open
gq -d act.eswv.0.set=0:1.0
# valve 1 closed
gq -d act.eswv.0.set=1:0.0
# valve 1 open
gq -d act.eswv.0.set=1:1.0
```

```
#####
# Thruster speed
# (gw1,gw2)
#####
# set thruster speed (counts, -1023-1023)
# stop thruster
gq -d act.thruster.0.cspeed=0
# set thruster speed 200 counts
gq -d act.thruster.0.cspeed=200
```

```
////////////////////////////////////
```

```
////////////////////////////////////
// HOWTO: see recent data with skim/skimm
// use -M for minutes, -H for hours
// (gw0,gw1,gw2)
////////////////////////////////////
#####
# gateway0 streams
#####
# MVC
skimm -a ~/swfoce/arch -M 3 -s 1841
```

```
#####
# gateway1 streams
#####
# CTD
skimm -a ~/swfoce/arch -M 3 -s 1642,1733
# PH
skimm -a ~/swfoce/arch -M 3 -s 1812,1813,1817,1818
# PAR
skimm -a ~/swfoce/arch -M 3 -s 1824,1851
# ESWV
skimm -a ~/swfoce/arch -M 3 -s 1846
# SYSSN
skimm -a ~/swfoce/arch -M 3 -s 1842
# SYSGW
skimm -a ~/swfoce/arch -M 3 -s 1839
# SYSMEH
skimm -a ~/swfoce/arch -M 3 -s 1844
# THRUSTER
skimm -a ~/swfoce/arch -M 3 -s 1814
```

```
#####
# gateway1 streams
#####
# CTD
skimm -a ~/swfoce/arch -M 3 -s 1752
# PH
skimm -a ~/swfoce/arch -M 3 -s 1848,1833
# PAR
skimm -a ~/swfoce/arch -M 3 -s 1820
# THRUSTER
skimm -a ~/swfoce/arch -M 3 -s 1821
# ESWV
```

```
skimm -a ~/swfoce/arch -M 3 -s 1847  
# SYSSN  
skimm -a ~/swfoce/arch -M 3 -s 1843  
# SYSGW  
skimm -a ~/swfoce/arch -M 3 -s 1840  
# SYSMEH  
skimm -a ~/swfoce/arch -M 3 -s 1845
```