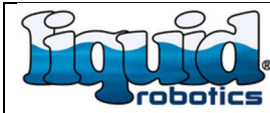


REVISION HISTORY

Revision Level	Effective Date	Initiator	ECO Number
C		M. Cookson	
Section Number	Description and Justification of Changes		
All	Release for review		

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1 PURPOSE

This document indicates how to install SMC application software such as those listed on the SMC specific configurations BOM (02795), starting with the introduction of RegulusOS

2 SCOPE

This procedure applies to SMC application software, such as those listed on the SMC specific configurations BOM, starting with the introduction of RegulusOS

3 RESPONSIBILITIES

It is the responsibility of manufacturing technicians and engineers to test and record measured data per the procedures outlined in this document. Any measurement logs will be kept for future use.

4 REFERENCES

05855 MPI, MICRO SD CARD SMC KERNEL INSTALLER WITH OPTIONAL CRYPTO
05859-XX KIT, MICRO SD CARD 16GB WITH KERNEL, REGULUSOS, XX

5 REQUIRED MATERIALS AND EQUIPMENT

A Windows PC loaded with Ubuntu Linux in a virtual environment like VMWare or a PC running Ubuntu Linux natively; the user must have administrative rights via sudo

A micro-SD card programmer attached to the PC

An applicable micro-SD card of at least 4Gb (for example, 01366 "MICRO SD CARD, 16 GB") that has been programmed with an operating system (kernel and root filesystem) that is compatible with the application; the application BOM indicates the correct version.

For SD card programmers that work only with full-sized SD cards, an interface carrier may be required

A SMC assembled with a PIB (01288) and interconnected with a Float C&C as a payload; the Float C&C should be accessible to WGMS via XBee *Note that for some tests, the Float C&C needs to be receiving GPS and the RUDICS modem (if included) needs antenna connectivity and a view of the sky.*

A USB console cable (02638)

6 SAFETY REQUIREMENTS

TBD

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	Installing SMC Application Software	

7 INSTALLATION PROCEDURE

7.1 Setup of Tools on Ubuntu

7.1.1 Install *cryptsetup* to support encrypted partitions (one-time setup):

```
sudo aptitude install cryptsetup
```

If you don't have aptitude installed, you can use **apt-get**: `sudo apt-get install cryptsetup`

7.2 Copy the SMC Software to the SD Card

7.2.1 With Ubuntu active, Insert the freshly-programmed micro SD card (i.e. with operating system) into reader.

- SD cards with an unencrypted XDATA partition will mount **BOOT**, **LINUX** and **XDATA**.
- SD cards prepared with an encrypted XDATA partition will only mount the **BOOT** and **LINUX** partitions; in this case, the matching encryption *passphrase* must be available in order to proceed.

* In the following cases, the SMC software tarball is referred to as *nnnnn-nn_REV_A.tar.bz2*; make adjustments to the name and path as necessary.

7.2.2 With Unencrypted XDATA Partition¹

```
mike@dsk-sv-mikedev:~$ sudo cp nnnnn-nn REV A.tar.bz2 /media/LINUX/root
mike@dsk-sv-mikedev:~$ sudo umount /media/{BOOT,LINUX,XDATA}
```

7.2.3 With Encrypted XDATA Partition²

```
mike@dsk-sv-mikedev:~$ echo 'passphrase' | sudo cryptsetup create --cipher aes-
cbc-essiv:sha256 --key-size 256 --hash sha256 secsd /dev/sdf3
mike@dsk-sv-mikedev:~$ sudo mkdir --parents /mnt/secsd
mike@dsk-sv-mikedev:~$ sudo mount /dev/mapper/secsd /mnt/secsd
mike@dsk-sv-mikedev:~$ sudo cp nnnnn-nn REV A.tar.bz2 /mnt/secsd
mike@dsk-sv-mikedev:~$ sudo umount /mnt/secsd
mike@dsk-sv-mikedev:~$ sudo cryptsetup remove secsd
mike@dsk-sv-mikedev:~$ sudo umount /media/{BOOT,LINUX}
```

¹ In the fixed font sections, the underlined text is typed by the user; items in italics may require some interpretation. For example, *nnnnn-nn* is the part number of the SMC software being installed.

² The RC3 kernel (05859-01) does not support encrypted partitions; support is scheduled for -02.

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7.3 Initial Power Up

7.3.1 With the SMC power off, insert the micro SD card into the card slot and slide the metal clamp into the locked position.

7.3.2 Install the console cable (02638) and open a terminal session to the console serial port at 115,200 baud, 8 data bits, 1 stop bit and no parity. For example, from an Ubuntu terminal session you can use `screen`³ (adjust the port name according to your hardware configuration):

```
screen /dev/ttyS2 115200
```

7.3.3 Apply power to the SMC payload and watch the output.

- If the terminal displays a 'losh>' prompt, the boot process has stopped at the Logic Loader, so it is likely that the SD card was not read or that the SD card was not correctly formatted with the kernel and root filesystem. Power off the SMC payload and verify connection or check the SD card, then re-apply power.

```
*****
```

```
LogicLoader
```

```
(c) Copyright 2002-2011, Logic PD, Inc. All Rights Reserved.
```

```
LoLo Version:      2.5.1
SOM Model Number:  SOMDM3730-20-2780AGCR-A
SOM Part Number:   1017878
SOM Serial Number: 5011M00265
```

```
*****
```

```
losh>
```

- If SMC starts to boot up, but stops while it is loading the kernel, continue at **Configuring U-Boot** (sometimes this is required when upgrading from an older kernel version.)

```
Texas Instruments X-Loader 1.42 for dm3730logic (2013-11-28 06:25:24)
DRAM: 256MB (MT29C4G48MAZAPAKQ5)
Starting U-boot on MMC
Reading boot sector
444900 bytes read from MMC to 80400000
```

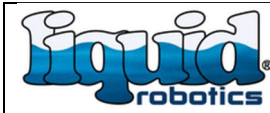
```
U-Boot 2011.06-00006-gb1b89e0-dirty (Nov 28 2013 - 06:24:53)
```

```
OMAP3630/3730-GP ES2.1, CPU-OPP2, L3-200MHz, Max CPU Clock 1 Ghz
Logic DM37x/OMAP35x reference board + LPDDR/NAND
I2C: ready
DRAM: 256 MiB
```

```
Board: DM37xx Torpedo
```

```
Enable battery backup charger (BB_CFG = 0x1c)
NAND: 512 MiB
NAND: Internal to NAND ECC selected
No 'display' variable found in environment; suppress splashimage
In: serial
Out: serial
Err: serial
Product ID data cached to: 40200000
Die ID #5cb400029ff800000163810c14021014
```

³ Note that you can exit **screen** with `ctrl-A \`



```
OTG_SYSCONFIG: 00001008 - needs to be 00002001
```

```
ID data ROM : Gen 1
Part Number : 1017878
Model Name : SOMDM3730-20-2780AGCR-A
Serial Number: 5011M00265
```

```
Data (writethrough) Cache is ON
```

```
Net: smc911x-0
Hit any key to stop autoboot: 1
```

```
mmc1 is available
```

```
reading uImage
```

← SMC hangs while booting kernel

- Otherwise, if the output stops at the following prompt, then the kernel has started up and you can continue at **Configuring Users**

```
Generating public/private ecdsa key pair.
Your identification has been saved in /etc/openssh/ssh_host_ecdsa_key.
Your public key has been saved in /etc/openssh/ssh_host_ecdsa_key.pub.
The key fingerprint is:
6b:c3:f7:88:42:b4:60:ff:53:ff:31:87:aa:28:46:8d root@dm3730_zoom_torpedo
The key's randomart image is:
+--[ECDSA 256]--+
|
|      o .
|    . + +S
|      E.... .
|    o . =... + .
|      +.O= o.. +
|      . oo.o.o..
+-----+
Starting /usr/sbin/sshd: [ OK ]

Distribution built using LinuxLink by Timesys
Kernel 3.0.0-ts-armv7l-RegulusOS-1.0.0-RC3 for armv7l
dm3730_zoom_torpedo login:
```

Note that if “Generating public/private ecdsa key pair” is not shown, then the card is not freshly formatted.

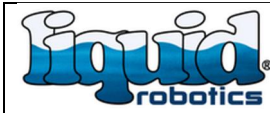
7.4 Configuring U-Boot

7.4.1 Cycle power to the payload and watch the startup.

7.4.2 Hit Enter during the countdown, then execute the following commands:

```
Texas Instruments X-Loader 1.42 for dm3730logic (2013-11-28 06:25:24)
DRAM: 256MB (MT29C4G48MAZAPAKQ5)
Starting U-boot on MMC
Reading boot sector
444900 bytes read from MMC to 80400000
```

```
U-Boot 2011.06-000006-gb1b89e0-dirty (Nov 28 2013 - 06:24:53)
```



```
OMAP3630/3730-GP ES2.1, CPU-OPP2, L3-200MHz, Max CPU Clock 1 Ghz
Logic DM37x/OMAP35x reference board + LPDDR/NAND
I2C:   ready
DRAM:  256 MiB
Board: DM37xx Torpedo
Enable battery backup charger (BB_CFG = 0x1c)
NAND:  512 MiB
NAND: Internal to NAND ECC selected
No 'display' variable found in environment; suppress splashimage
In:     serial
Out:    serial
Err:    serial
Product ID data cached to: 40200000
Die ID #5cb400029ff800000163810c14021014
OTG_SYSCONFIG: 00001008 - needs to be 00002001
```

```
ID data ROM   : Gen 1
Part Number   : 1017878
Model Name    : SOMDM3730-20-2780AGCR-A
Serial Number : 5011M00265
```

```
Data (writethrough) Cache is ON
Net:   smc911x-0
```

```
Hit any key to stop autoboot: 1    ← Hit Enter to stop the count down
```

```
OMAP Logic # env default -f
## Resetting to default environment
OMAP Logic # run makelriboot
Saving Environment to NAND...
Erasing Nand...
Erasing at 0x220000 -- 33% complete.
Erasing at 0x240000 -- 66% complete.
Erasing at 0x260000 -- 100% complete.
Writing to Nand... done
OMAP Logic # reset
resetting ...
```

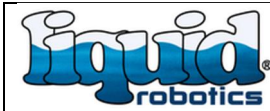
← SMC reboots

```
Texas Instruments X-Loader 1.42 for dm3730logic (2013-11-28 06:25:24)
DRAM: 256MB (MT29C4G48MAZAPAKQ5)
Starting U-boot on MMC
Reading boot sector
444900 bytes read from MMC to 80400000
```

7.5 Configuring Users

Execute the following script to set up the system users. By convention, the password is set to "1329moffet" for all accounts.

```
Distribution built using LinuxLink by Timesys
Kernel 3.0.0-ts-armv7l-RegulusOS-1.0.0-RC3 for armv7l
dm3730_zoom_torpedo login: root
```



No mail.

```
root@dm3730_zoom_torpedo:~$ useradd smc
root@dm3730_zoom_torpedo:~$ useradd smc0
root@dm3730_zoom_torpedo:~$ usermod -a -G dialout smc
root@dm3730_zoom_torpedo:~$ usermod -a -G dialout smc0
root@dm3730_zoom_torpedo:~$ passwd
```

Changing password for root

Enter the new password (minimum of 5, maximum of 8 characters)

Please use a combination of upper and lower case letters and numbers.

New password:

← Enter password (not echoed)

Re-enter new password:

← Re-enter password (not echoed)

passwd: password changed.

```
root@dm3730_zoom_torpedo:~$ passwd smc
```

Changing password for smc

Enter the new password (minimum of 5, maximum of 8 characters)

Please use a combination of upper and lower case letters and numbers.

New password:

← Enter password (not echoed)

Re-enter new password:

← Re-enter password (not echoed)

passwd: password changed.

```
root@dm3730_zoom_torpedo:~$ passwd smc0
```

Changing password for smc0

Enter the new password (minimum of 5, maximum of 8 characters)

Please use a combination of upper and lower case letters and numbers.

New password:

← Enter password (not echoed)

Re-enter new password:

← Re-enter password (not echoed)

passwd: password changed.

```
root@dm3730_zoom_torpedo:~$
```

7.6 Decompressing the Software Archive

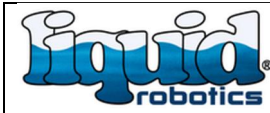
7.6.1 With Unencrypted XDATA Partition

```
root@dm3730_zoom_torpedo:~$ tar xvjpf /root/nnnnn-nn REV A.tar.bzip2 -C /
etc/
etc/init.d/
etc/init.d/S98-smc
etc/sudoers
etc/network/
etc/network/interfaces
etc/cron.deny
etc/ppp/
etc/ppp/pap-secrets
etc/hosts
home/
```

← Archive is expanded (continues)

7.6.2 With Encrypted XDATA Partition

```
root@dm3730_zoom_torpedo:~$ echo 'passphrase' | cryptsetup create --cipher aes-
cbc-essiv:sha256 --key-size 256 --hash sha256 secsd /dev/mmcblk0p3
root@dm3730_zoom_torpedo:~$ mount /dev/mapper/secsd /home/smc
kjournald starting. Commit interval 5 seconds
EXT3-fs (dm-0): using internal journal
```



```
EXT3-fs (dm-0): mounted filesystem with writeback data mode
root@dm3730_zoom_torpedo:~$ tar xvjpf /home/smc/nnnnn-nn REV A.tar.bzip2 -C /
etc/
etc/init.d/
etc/init.d/S98-smc
etc/sudoers
etc/network/
etc/network/interfaces
etc/cron.deny
etc/ppp/
etc/ppp/pap-secrets
etc/hosts
home/
```

← Archive is expanded (continues)

7.7 Reboot the SMC

```
home/smc/roots/200_LogListener/.disabled
home/smc/roots/200_Sharctail/
home/smc/roots/200_Sharctail/.disabled
home/smc/roots/000_EthernetSwitch/
home/smc/roots/000_EthernetSwitch/.disabled
home/smc/roots/200_WHOIMM/
home/smc/roots/200_WHOIMM/.disabled
root@dm3730_zoom_torpedo:/$ shutdown -r now
```

← SMC restarts

7.8 Starting up the SMC with Encrypted XDATA Partition

If the SMC starts up and there is no /home/smc/startup script available, it defaults to /home/smc0/startup and displays a message like:

```
=====
Starting SMC (wait)
=====
```

A message is sent to the WGMS indicating that software needs a decryption passphrase to continue; this is the passphrase that was created when the SD card was formatted. The passphrase can be provided by sending a Write Console Script command to the board address of the SMC (8192 in the case of a board ID of 0x20.) The format of the message should be:

```
CRYPTMNT 'passphrase' - /dev/mmcblk0p3 secsd /home/smc su -lc /home/smc/startup smc
```



gliders.liquidr.com/related/relatedDialog.aspx?id=&entitytype=44&orgid=1&newEntity=0&VehicleId=234&ParentType=48&ParentId=2.

Related Record

Select a related record. Simple Command Form

Vehicle Command Related Info

Vehicle Command Info

Command Reason	Send passphrase to SMC		
Vehicle	SW_1733	Command Type	Write Console Script
Command Status	Created	Target Waypoint	
From Waypoint		To Waypoint	
Heading (deg)		Status	
Course		Vehicle Rudder Controls	
Function	0	Board Address	8192
File Type	Unspecified	Operation Type	Current Image
Com Channel	Iridium Communication Channel	Upload File	
Read File Name		Security Manifest	
Disposition		Time Field	
Script Buffer	CRYPTMNT 7V3KeCx87S87dUtSUTswSkxzEhh3Ye8GVAYGoDmKokL - /dev/mmcbk0p3 secsd /home/smc su -lc /home/smc/startup smc		

Copy ... Send Cancel

The encrypted partition is then decrypted and an attempt is made to execute the startup command as the smc user.

7.9 Complete the Standard Configuration⁴

The following message is displayed during a non-encrypted startup or after the encryption key is provided:

```
=====
Starting SMC applications
=====
```

```
no crontab for smc
Automatic startup disabled: to enable it, run "touch ~/autostart"
```

⁴ Sections 8-10 contain other configurations that are not always required; complete those configurations before completing the standard configuration.

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Continue the standard configuration as follows:

```
Distribution built using LinuxLink by Timesys
Kernel 3.0.0-ts-armv7l-RegulusOS-1.0.0-RC3 for armv7l
dm3730_zoom_torpedo login: smc
Password:
No mail.
smc@dm3730_zoom_torpedo:~$ sudo SetupXDATA
/dev/mmcblk0p3 is already mounted at /mnt/XDATA
mkdir --parents /mnt/XDATA
mv /home/smc/log /mnt/XDATA
ln -s /mnt/XDATA/log /home/smc
mkdir --parents /mnt/XDATA
mv /home/smc/sc /mnt/XDATA
ln -s /mnt/XDATA/sc /home/smc
mkdir --parents /mnt/XDATA/PPPHost
mv /home/smc/roots/200_PPPHost/NewFiles /mnt/XDATA/PPPHost
ln -s /mnt/XDATA/PPPHost/NewFiles /home/smc/roots/200_PPPHost
mkdir /mnt/XDATA/GPS
chown smc /mnt/XDATA/GPS
chgrp smc /mnt/XDATA/GPS
mkdir /mnt/XDATA/MAM
chown smc /mnt/XDATA/MAM
chgrp smc /mnt/XDATA/MAM
mkdir /mnt/XDATA/AQUAT
chown smc /mnt/XDATA/AQUAT
chgrp smc /mnt/XDATA/AQUAT
mkdir /mnt/XDATA/C3
chown smc /mnt/XDATA/C3
chgrp smc /mnt/XDATA/C3
mkdir /mnt/XDATA/Microstrain
chown smc /mnt/XDATA/Microstrain
chgrp smc /mnt/XDATA/Microstrain
mkdir /mnt/XDATA/GPSWaves
chown smc /mnt/XDATA/GPSWaves
chgrp smc /mnt/XDATA/GPSWaves
smc@dm3730_zoom_torpedo:~$
```

← **Complete any additional setup items (like RUDICS; see §8 -10)**

```
smc@dm3730_zoom_torpedo:~$ touch autostart
smc@dm3730_zoom_torpedo:~$ sudo shutdown -r now
```

← **SMC restarts**

7.10 Verification Checks

- ☒ Verify that the application starts up (details will vary, depending on the configuration):

```
=====
Starting SMC applications
=====
```

```
no crontab for smc
Starting omniNames
Starting EventManager
```



Manufacturing Process Instructions

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Revision: C

Installing SMC Application Software

Starting PayloadManager
Starting PayloadInterface
Starting GPSListener
Starting PPPHost

- ☒ (SV2) Verify that the SMC enumeration is displayed in the XBee console window along with the PIB enumeration (details of the versions will vary, depending on the configuration); note that there is not always a PIB present for SV3 payloads using a shim:

Description: Base PIB@57600N82
Address: 0200 Major: 1 Minor: 0 Build: 5182
Payload 2 Port

Description: Sensor mgmt compute
Address: 2000 Major: 1 Minor: 0 Build: 10
Payload 2 Port

- ☑ (SV3, Sensor Port) Pull down the Operate menu and select SV2 Payload Ports; verify that the SMC enumeration is displayed

payloadPort1

Payload is On, Payload Port is On

Turn offEnumerate Payload

Enumeration Delay: 15 sec

Submit

Set Enumeration Delay (sec):

Payload Name	Payload Status/Last Payload Message	Time Since Last Message
Sensor mgmt compute (0x2000)	Payload Response {Header=PayloadMsg Header (30 bytes). Dest=0x0000, Src=0x2000. TransID=0x000A. MsgType = ACK. OrigMsg=REQUEST_STATUS, HaveQueuedMessages=false, Data=01 00 01 00 01 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00, CRC=0x572D} [1E 00 00 00 00 20 0A 00 01 00 22 00 01 00 01 00 01 00 00 00 00 00 00 00 00 2D 57]	12 sec
Full PIB (0x0200)	T=23C, P=103kPa, H=45%. Alarms=0x0000, Leak1=0x00, Leak2=0x00	16 sec

- ☑ (SV3, Expansion Port⁵) Pull down the Operate menu and select SV3 Payloads; verify that the SMC payloads (each process) are shown

Refresh

Expansion Ports

T1 is On	Turn Off Port	Unplug Integrator Payload	
G2 is On	Turn Off Port	Unplug Integrator Payload	
G3 is Off	Turn On Port	Turn On SV3 Integrator Payload	Unplug Integrator Payload
G0 is Off	Turn On Port	Turn On SV3 Integrator Payload	Unplug Integrator Payload
G1 is Off	Turn On Port	Turn On SV3 Integrator Payload	Unplug Integrator Payload

G2_PayloadInterface
192_168_105_103_2000

Controlled by G2 On

```

template %tgetmodules
method GetModules
label Get Modules
timeout 600
tooltip Report the configured modules running on the SMC
        
```

```

template %trunshell %p
paramLabels [Command]
method RunShell
label Run Shell Command
paramTypes [java.lang.String]
timeout 600
tooltip Run shell command and return result as a console ack
        
```

```

template file:%trunshell %p
paramLabels [Command]
method RunShellReturnFile
label Run Shell (Return File)
paramTypes [java.lang.String]
timeout 600
tooltip Run shell command and return result as a file transfer
        
```

reportingAddress 8192

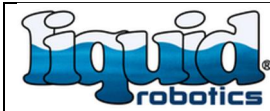
description Payload interface

- ☒ Log in as 'smc' and issue the 'date' command; verify that the date and time are correct (UTC):

```
smc@omap35x_torpedo:~$ date
Wed Sep 14 21:59:03 UTC 2011
smc@omap35x_torpedo:~$
```

If the date and time are incorrect, either the GPSTListener program is not running or GPS NMEA strings are not reaching the SMC, which may indicate a wiring problem or a component failure.

⁵ Complete section 9 configuration for SMC software running on an expansion port



- ☒ Verify that the SMC reports its encrypted partition status (this happens on each enumeration request.)
Verify the board ID for the SMC is correct.

System

▼ System

Alarms

Lists

Macros

Email Templates

▼ Reports

Record Exports

Custom Reports

▼ Data

Packet Reflectors

▼ System Info

System Info Data

Thermistor Array Data

System Info Events

AMPS Output Port ...

▼ Collision

Obstacles

☐ AIS NMEA Strings

System Info Data

TimeStamp	Vehicle	Structure Type	System Informati...	Board Id	Task Id
2014/03/07 10:18:56	Abalone	System Informati...	Encrypted Partiti...	32	0
2014/03/07 10:16:12	Its-It	System Informati...	AMPS Status Me...	0	0
2014/03/07 10:16:12	Its-It	System Informati...	AMPS Status Me...	0	0
2014/03/07 10:16:03	Its-It	System Informati...	AMPS Status Me...	0	0
2014/03/07 10:16:03	Its-It	System Informati...	AMPS Status Me...	0	0
2014/03/07 10:16:03	Its-It	System Informati...	AMPS Status Me...	0	0
2014/03/07 10:16:02	Its-It	System Informati...	AMPS Status Me...	0	0
2014/03/07 10:15:55	Its-It	System Informati...	AMPS Status Me...	0	0
2014/03/07 10:12:28	SpongeBob	System Informati...	Event Message	0	0
2014/03/07 10:10:19	SV3-014	System Informati...	AMPS Status Me...	0	0
2014/03/07 10:10:19	SV3-014	System Informati...	AMPS Status Me...	0	0
2014/03/07 10:10:18	SV3-014	System Informati...	AMPS Status Me...	0	0
2014/03/07 10:10:18	SV3-014	System Informati...	AMPS Status Me...	0	0
2014/03/07 10:10:18	SV3-014	System Informati...	AMPS Status Me...	0	0
2014/03/07 10:10:18	SV3-014	System Informati...	AMPS Status Me...	0	0
2014/03/07 10:10:11	SV3-014	System Informati...	AMPS Status Me...	0	0
2014/03/07 10:07:55	DB3.5C_EN...	System Informati...	DB 3.5 Acc Pow...	0	254
2014/03/07 10:00:54	LROG18 (S...	System Informati...	DB 3.5 Acc Pow...	0	254
2014/03/07 09:56:24	LROG16 (S...	System Informati...	DB 3.5 Acc Pow...	0	254
2014/03/07 09:55:44	SO 4023-4 -...	System Informati...	DB 3.5 Acc Pow...	0	254
2014/03/07 09:54:40	HLR-2 - VID...	System Informati...	DB 3.5 Acc Pow...	0	254
2014/03/07 09:53:49	HLR-1 - VID...	System Informati...	DB 3.5 Acc Pow...	0	254
2014/03/07 09:53:14	Veh ID 872 -...	System Informati...	DB 3.5 Acc Pow...	0	254
2014/03/07 09:51:50	SO 4023-2 -...	System Informati...	DB 3.5 Acc Pow...	0	254
2014/03/07 09:51:39	Veh ID 889 -...	System Informati...	DB 3.5 Acc Pow...	0	254

Home

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- ☒ Turn off power to the payload: verify that the SMC console shows that the SMC is shutting down and displays 'System halted'

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8 RUDICS CONFIGURATION

Make sure all sensor applications are not running at this point. If they are, kill all processes with this command 'sudo killsmc'

8.1 Configure the RUDICS modem

8.1.1 Power on the modem.

```
smc@omap35x_torpedo:~$ sudo SetPowerSwitch 1 1
SetPowerSwitch: 0x11
```

8.1.2 With the modem connected to an available serial port, establish a terminal session to the modem using HyperTerminal or putty (Windows) or GkTerm, minicom or screen (Linux) The default configuration should be able to operate at 19,200 baud, 8 data bits, 1 stop bit and no parity.

Screen⁶ example: `screen /dev/ttyLX0 19200`

8.1.3 Reset the modem to factory default configuration by typing AT&F0 (enter) and verify that the modem answers with OK or 0

8.1.4 Set the baud rate to a fixed 19,200 baud by typing AT+IPR=6, 0 (enter) and verify that the modem answers with OK or 0

8.1.5 Set 'verbose' mode by typing ATV1 (enter) and verify that the modem answers with OK

8.1.6 Set echo off by typing ATE0 (enter) and verify that the modem answers with OK

8.1.7 Save the configuration first typing AT&W0 (enter) and then AT&W1 (enter), verifying that the modem answer with OK after each command.

8.1.8 Cycle power to the modem and then type AT+IPR? (enter), verifying that it is still configured as set above (6,0)

8.1.9 Read the IMEI number from the modem by typing AT+CGSN (enter); if desired, record the resulting number for reference and compare with billing or provisioning records.

8.1.10 Read the ICC ID (Integrated Circuit Card Identification) or SIM card number by typing AT+CICCID (enter); the response should be a 19 or 20 digit number. Various errors may be returned if the SIM card is not properly installed: a SIM card is required for RUDICS. If desired, record the SIM card number for reference and compare with billing or provisioning records.

8.2 Configure the dialup script

The PPP daemon uses a dialer script to interact with the modem and establish the phone call. I used the chat program and the following script (/home/smc/roots/200_PPPHost/chat-iridium) to establish connection:

```
ABORT    'BUSY'
ABORT    'NO CARRIER'
ABORT    'ERROR'
ABORT    'NO DIALTONE'
ABORT    'NO ANSWER'
''       AT
OK       AT+CGSN
OK       AT+CICCID
OK       AT+CSQF
```

⁶ You can exit the SMC's **screen** program with ctrl-A ctrl-\ However, if you're working within a **screen** interface from Ubuntu, the sequence is ctrl-A A ctrl-\

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```

OK      AT+CREG?
OK      AT+CPIN?
OK      AT+CBST=71,0,1
OK      ATDT0088169999999
CONNECT \d\c

```

Correct the telephone number to match the RUDICS gateway number provided by the Iridium vendor for use with this modem using your preferred editor.

8.3 Configure the PPP connection script

The PPP connection script (/home/smc/200_PPPhost/runppp) uses the dialer script (above) to contact the Iridium gateway and then implements the Point-To-Point Protocol over the established connection to connect to the Internet. It contains the serial port name to be used when establishing the connection (typically /dev/ttyLX0) Edit this script to change the port name if necessary.

8.4 Manual connection to Iridium network

The following script is normally executed by PPPHost during connection, but it can be executed manually to set the system up via a terminal program. Note that the modem must be connected to an antenna with an unobstructed view of the sky.

- 8.4.1 With the modem connected the SMC (assuming port /dev/ttyLX0 and electrical switch 1), turn on power to the modem:

```

smc@omap35x_torpedo:~$ sudo SetPowerSwitch 1 1
SetPowerSwitch: 0x11

```

- 8.4.2 Enable RTS/CTS flow control by typing `AT&K3` and verify that the modem answers with `OK`
- 8.4.3 Configure the modem to hang up on DTR transition from ON to OFF by typing `AT&D2` (enter) and verify that the modem answers with `OK`
- 8.4.4 Prevent the modem from answering incoming calls by `ATS0=0` (enter) and verify that the modem answers with `OK`
- 8.4.5 Disable the SBD ring indicator by typing `AT+SBDMTA=0` (enter) and verify that the modem answers with `OK`
- 8.4.6 Stop automated signal strength reports by typing `AT+CIER=0,0,0` (enter) and verify that the modem answers with `OK`
- 8.4.7 Enable automated network registration reports by typing `AT+CREG=2` (enter) and verify that the modem answers with `OK`
- 8.4.8 Get an immediate registration report by typing `AT+CREG?` and verify that the modem answers with a string formatted like `+CREG:002,001,"891","ffff"` followed by `OK`

The status number, which is the second number in the response, '001' in the example above should be interpreted as follows:

- 0 (not registered, not searching for new operator) or 3 (registration denied) indicate failure
- 1 (registered, home network) or 5 (registered, roaming) indicate success

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- 2 (not registered, searching for new operator) or 4 (unknown/initial state) are normal waiting values: continue to monitor automated reports. Note that the Iridium network has some gaps that can delay registration for 5-10 minutes.

In case of failure, verify antenna connection or check modem provisioning with Iridium.

- 8.4.9 Disable automated registration reports by typing `AT+CREG=0` (enter) and verify that the modem answers with `OK`
- 8.4.10 Get the status of the SIM card by typing `AT+CPIN?` (enter) and verify that the modem responds with `+CPIN:SIM PIN2` message followed by `OK`. Other responses indicate that the SIM card is not usable and troubleshooting is required.
- 8.4.11 From the Linux command prompt, run the PPP connection script (`./runppp &`) and wait for the connection to be made.

```
smc@omap35x_torpedo:~/roots/200_PPPhost$ ./runppp &
[1] 361
smc@omap35x_torpedo:~/roots/200_PPPhost$ abort on (BUSY)
abort on (NO CARRIER)
abort on (ERROR)
abort on (NO DIALTONE)
abort on (NO ANSWER)
send (AT^M)
expect (OK)
^M
OK
-- got it

send (AT+CGSN^M)
expect (OK)
^M
^M
300025019999999^M
^M
OK
-- got it

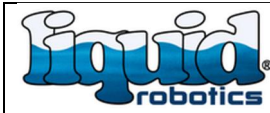
send (AT+CICCID^M)
expect (OK)
^M
^M
898899999999999999^M
^M
OK
-- got it

send (AT+CSQF^M)
expect (OK)
^M
^M
+CSQF:5^M
^M
OK
-- got it

send (AT+CREG?^M)
expect (OK)
^M
^M
+CREG:000,001^M
^M
OK
```

← IMEI number/modem serial #, different for each modem

← SIM card number, different for each modem



```
-- got it

send (AT+CPIN?^M)
expect (OK)
^M
^M
+CPIN:SIM PIN2^M
^M
OK
-- got it

send (AT+CBST=71,0,1^M)
expect (OK)
^M
^M
OK
-- got it

send (ATDT0088169999999^M)
expect (CONNECT)
^M
^M
CONNECT
-- got it

send (\d)
Serial connection established.
using channel 1
Using interface ppp0
Connect: ppp0 <--> /dev/ttyLX0
.
.
.
... A large number of lines omitted ...
.
.
.
local IP address 192.168.13.51
remote IP address 192.168.13.254
```

← Gateway phone # varies per Iridium vendor

8.4.12 Test the connection by pinging a well-known internet server; for example, `sudo ping www.google.com`

```
smc@omap35x_torpedo:~/roots/200_PPPhost$ sudo ping www.google.com
PING www.l.google.com (74.125.153.104) 56(84) bytes of data.
64 bytes from ty-in-f104.1e100.net (74.125.153.104): icmp_seq=1 ttl=47 time=1543 ms
64 bytes from ty-in-f104.1e100.net (74.125.153.104): icmp_seq=2 ttl=47 time=1520 ms
64 bytes from ty-in-f104.1e100.net (74.125.153.104): icmp_seq=3 ttl=47 time=1522 ms
64 bytes from ty-in-f104.1e100.net (74.125.153.104): icmp_seq=4 ttl=47 time=1601 ms
^C
--- www.l.google.com ping statistics ---
5 packets transmitted, 4 received, 20% packet loss, time 8888ms
rtt min/avg/max/mdev = 1520.877/1547.182/1601.591/32.714 ms, pipe 2
```

8.4.13 When you are done with the connection, stop pppd (`sudo pkill pppd`)

8.4.14 Turn off power to the modem:

```
smc@omap35x_torpedo:~/roots/200_PPPhost$ sudo SetPowerSwitch 1 0
SetPowerSwitch: 0x00
```

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8.5 Setting up a key file for scp/ssh (dbclient) connection without password

The SMC provides the option to transfer files using scp and execute scripts using an embedded systems flavor of ssh called dbclient. The following procedure for creating an identity key file can be used to avoid using passwords:

8.5.1 Generate key file:

```
smc@dm3730_zoom_torpedo:~$ cd roots/200_PPPhost
smc@dm3730_zoom_torpedo:~/roots/200_PPPhost$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/smc/.ssh/id_rsa): keyfile
Enter passphrase (empty for no passphrase): ← Enter (no passphrase)
Enter same passphrase again: ← Enter again (no passphrase)
Your identification has been saved in keyfile.
Your public key has been saved in keyfile.pub.
The key fingerprint is:
... smc@dm3730_zoom_torpedo
The key's randomart image is:
+--[ RSA 2048 ]-----+
|XE o . . .          |
|@.. o. o            |
|o+   o .            |
|   . . o            |
|   o + S            |
|   . o B            |
|   . = .            |
|                     |
+-----+
smc@dm3730_zoom_torpedo:~/roots/200_PPPhost$
```

By convention, the name of the payload is used for *keyfile*. For example, if my payload is called "PSN001234", the resulting private key file is called "PSN001234" and the resulting public key file is called "PSN001234.pub"

Retrieve the public key from the SMC and store it on the server.

8.5.2 Make a connection to the Internet manually using runppp (see section 8.4.11)

8.5.3 Verify access to the server and update the known hosts

```
smc@dm3730_zoom_torpedo:~/roots/200_PPPhost$ ssh -i keyfile keyfile@ggsma
c date
The authenticity of host ... can't be established.
ECDSA key fingerprint is ...
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added ... (ECDSA) to the list of known hosts.
Thu Mar 6 05:55:04 UTC 2014
smc@dm3730_zoom_torpedo:~/roots/200_PPPhost$
```

Verify that known hosts were updated (that the message was displayed) and that the date command returned a date. No password should have been required if the key file was installed.

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8.5.4 Update PPPHost-config.xml

Using **nano** or **vi**, edit PPPHost-config.xml and change the parameter to the **runscp** command to match the keyfile name.

```

GNU nano 2.2.6      File: PPPHost-config.xml      Modified

    <fullyDescribeReceivedEvents>0</fullyDescribeReceivedEvents>
    <doNotDisplayList>
        <count>0</count>
        <item_version>0</item_version>
    </doNotDisplayList>
</eventTransceiverSettings>
<scpExecutorSettings class_id="8" tracking_level="0" version="0">
    <callInInterval>3600</callInInterval>
    <scpVerb>./runscp keyfile<u>    </u>/scpVerb>
    <runVerb>cd workspace && ./runme</runVerb>
    <queueCapacity>100</queueCapacity>
    <nextCallIntervalVerb>if [ -f callinTime ] ; then cat callinTime$
    <modemSerialNumberFilename>IMEI</modemSerialNumberFilename>
    <modemSimCardFilename>SIMCARD</modemSimCardFilename>
    <pppSettings class_id="9" tracking_level="0" version="0">
        <dialupTimeout>60</dialupTimeout>
        <modemRegistrationTimeout>180</modemRegistrationTimeout>

```

^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
 ^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell

8.5.5 Shut down the modem connection (see 8.4.13-14)

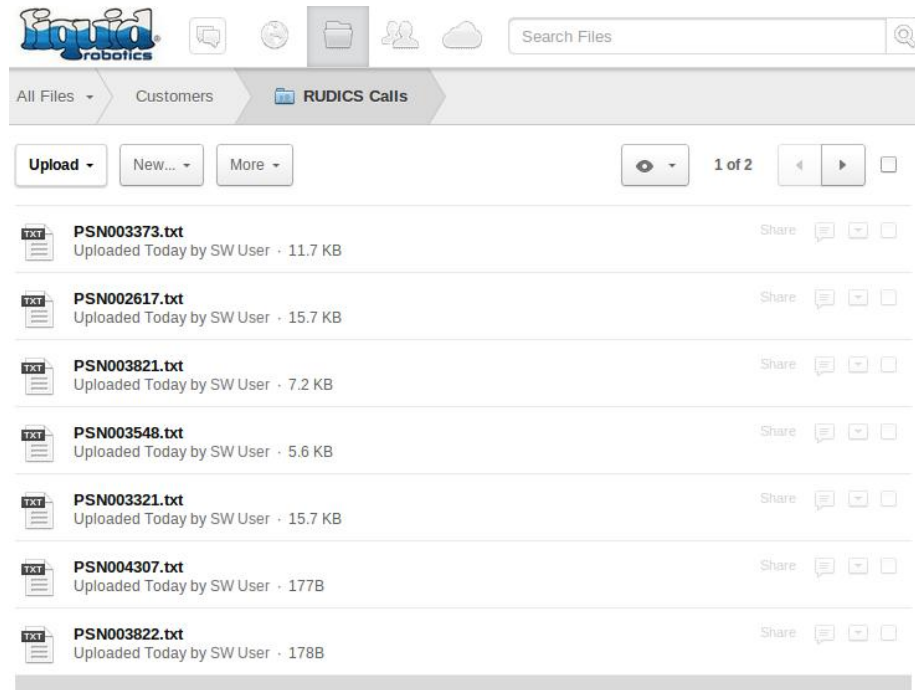
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8.5.6 Complete application installation and verify that PPPHost calls in and executes the expected behavior on the server.

The typical installation on ggsmac sends advisory information to be stored in the WGMS command log whenever a RUDICS call is received:

A's Commands						
☐ TimeStamp	Command Reason	Command	Comma...	Combined Acks	Created By	
2014/08/18 15:11:40	RUDICS call received from PSN002620	Comment	Created		RUDICS User	
2014/08/18 11:04:56	RUDICS call received from PSN002620	Comment	Created		RUDICS User	
2014/08/18 07:12:42	Float Battery Low	Retrieve Debug Buffer	Acked		System Admin	
2014/08/18 06:58:26	RUDICS call received from PSN002620	Comment	Created		RUDICS User	

The typical installation on SMACTest updates a file (responses.txt) for each vehicle, and the last 100 lines of each of those is stored in a file named for the key file under "/Customers/RUDICS Calls" on LRI's box.com account:

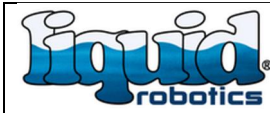


The screenshot shows a web-based file manager interface. At the top, there's a search bar and navigation tabs for 'All Files', 'Customers', and 'RUDICS Calls'. Below the tabs, there are buttons for 'Upload', 'New...', and 'More...'. A list of files is displayed, each with a 'TXT' icon, a filename, and a description of when it was uploaded and by whom. The files listed are:

- PSN003373.txt (Uploaded Today by SW User - 11.7 KB)
- PSN002617.txt (Uploaded Today by SW User - 15.7 KB)
- PSN003821.txt (Uploaded Today by SW User - 7.2 KB)
- PSN003548.txt (Uploaded Today by SW User - 5.6 KB)
- PSN003321.txt (Uploaded Today by SW User - 15.7 KB)
- PSN004307.txt (Uploaded Today by SW User - 177B)
- PSN003822.txt (Uploaded Today by SW User - 178B)

The last few lines of the file show recent logins and verify some information about the machine state; the fact that the SMC is calling into the server can indicate correct configuration:

```
Local time Wed Mar 5 06:05:03 PST 2014 : v-time=Wed Mar 5 14:04:30 UTC 2014 IMEI=300025010726580
SIM=8988169224001094995 UpTime=482555.01 Used=35% / 6% /mnt/XDATA GetResults4
Local time Wed Mar 5 18:07:17 PST 2014 : v-time=Thu Mar 6 02:06:43 UTC 2014 IMEI=300025010726580
SIM=8988169224001094995 UpTime=522583.28 Used=35% / 6% /mnt/XDATA GetResults4
Local time Thu Mar 6 06:09:28 PST 2014 : v-time=Thu Mar 6 14:08:52 UTC 2014 IMEI=300025010726580
SIM=8988169224001094995 UpTime=562519.67 Used=35% / 6% /mnt/XDATA GetResults4
Local time Thu Mar 6 18:11:47 PST 2014 : v-time=Fri Mar 7 02:11:12 UTC 2014 IMEI=300025010726580
SIM=8988169224001094995 UpTime=602412.11 Used=35% / 6% /mnt/XDATA GetResults4
```



9 SV3 EXPANSION PORT CONFIGURATION

9.1 Reconfigure PayloadInterface for Expansion Port protocol

Using **nano** or **vi**, edit `/home/smc/roots/100_PayloadInterface/PayloadInterface-config.xml` and change `sv3Enabled` to `true`.

```
GNU nano 2.3.1 File: ...ayloadInterface/PayloadInterface-config.xml
<?xml version="1.0" encoding="UTF-8" standalone="yes" ?>
<!DOCTYPE boost_serialization>
<boost_serialization signature="serialization::archive" version="10">
<rootlevel class_id="0" tracking_level="0" version="2">
  <loggerSettings class_id="1" tracking_level="0" version="0">
    <logLevel>LT_INFO</logLevel>
    <processName>PayloadInterface</processName>
    <isFileDes>1</isFileDes>
    <fileDes>1</fileDes>
    <fileName></fileName>
    <pipeName></pipeName>
  </loggerSettings>
  <sv3Enabled>true</sv3Enabled>
  <serialPortSettings class_id="2" tracking_level="0" version="0">
    <portName>/dev/ttyO2</portName>
    <baudRate>115200</baudRate>
    <parity>NONE</parity>
    <characterSize>8</characterSize>
    <stopBits>2</stopBits>
  </serialPortSettings>
</rootlevel>
^G Get Help  ^O WriteOut  ^W Where Is  ^V Next Page ^U UnCut TextM-? Last Line
^X Exit      ^R Read File ^Y Prev Page ^K Cut Text  M-| First Lin^_ Go To Line
```

The default algorithm for determining the VMC's address is to take the address on `eth0` and change the last octet to 1. For example, if the SMC's assigned address is 192.168.105.100, the VMC's address would be 192.168.105.1. The script "GetVMCAddress" performs this function (in the `hostAddressVerb`). If for some reason this algorithm doesn't work, clear out `hostAddressVerb` and enter the correct address for the VMC in `hostAddress`.

```
GNU nano 2.3.1 File: ...ayloadInterface/PayloadInterface-config.xml
  <rts>1</rts>
  <dtr>1</dtr>
  <breakTimeoutMultiplier>1</breakTimeoutMultiplier>
</serialPortSettings>
<sv3NetInterfaceSettings class_id="3" tracking_level="0" version="2">
  <hostAddress>192.168.103.1</hostAddress>
  <hostAddressVerb>GetVMCAddress eth0</hostAddressVerb>
  <connectTimeoutSec>30</connectTimeoutSec>
  <transactionTimeoutSec>120</transactionTimeoutSec>
</sv3NetInterfaceSettings>
<scSettings class_id="4" tracking_level="0" version="0">
  <stateFileName>/home/smc/sc/000/state.xml</stateFileName>
  <storageDirectory>/home/smc/sc/000/files</storageDirectory>
  <retainAllFiles>1</retainAllFiles>
  <maxFilesToRetain>100</maxFilesToRetain>
</scSettings>
<picSettings class_id="5" tracking_level="0" version="5">
  <description>Sensor mgmt computer</description>
  <deviceType>136</deviceType>
</picSettings>
^G Get Help  ^O WriteOut  ^W Where Is  ^V Next Page ^U UnCut TextM-? Last Line
^X Exit      ^R Read File ^Y Prev Page ^K Cut Text  M-| First Lin^_ Go To Line
```

9.2 Reconfigure the Network to Start Automatically and Set Static IP Address

If the SMC is connected via an expansion port, the network should be configured to start up automatically. Execute the following to enable the network at startup:

```
$ sudo EnableAutoEthernet
Auto ethernet enabled
```

To disable the network at startup (which it is by default after installation), execute the following:

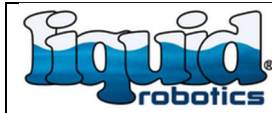
```
$ sudo DisableAutoEthernet
Auto ethernet disabled
```

By default, DHCP is used to assign Ethernet addresses, but this will not be appropriate if the IP address must be well known. For example, if another computer needs to contact the SMC, addresses must be manually-assigned. By convention, the VMC assigns subnets per expansion port are assigned as follows:

<u>Expansion Port</u>	<u>Subnet</u>
G1	192.168.103.*
G2	192.168.105.*
G3	192.168.104.*
T1 (thrudder)	192.168.101.*

The SV3 web page includes the actual assignments by name; for example:

● debugClient	OFF (ON), not AMPS Requires: ethernetSwitch
● debugServer	OFF (ON), not AMPS Requires: ethernetSwitch
● G1	Off ip=192.168.103.0 mask=255.255.255.0 no payloads found in box
● G2	Off ip=192.168.105.0 mask=255.255.255.0 no payloads found in box
● G3	Off ip=192.168.104.0 mask=255.255.255.0 no payloads found in box
● S2	Device is Off. Port is Off, []
● S3	Device is Off. Port is Off, []
● T1	On ip=192.168.101.0 mask=255.255.255.0 no payloads found in box



If required, choose a static IP address according to the port where the SMC is attached and assign the final octet uniquely in the range of 50 to 99; for example for port G1, an address of 192.168.103.99 would be a valid selection. Edit /etc/network/interfaces as the root user:

```
$ sudo nano /etc/network/interfaces
```

-- or --

```
$ sudo vi /etc/network/interfaces
```

Modify /etc/network/interfaces (“sudo nano /etc/network/interfaces”) as shown:

```
smc@dm3730_zoom_torpedo: ~
File Edit View Search Terminal Help
# auto eth0
# iface eth0 inet manual
#     up ifconfig $IFACE 0.0.0.0 up
#     up /usr/local/bin/myconfigscript
#     down ifconfig $IFACE down
### disabling can0 for the SMC
### iface can0 inet manual
###     pre-up ip link set $IFACE type can bitrate 125000 triple-sampling on
###     up /sbin/ifconfig $IFACE up
###     down /sbin/ifconfig $IFACE down
auto eth0
#iface eth0 inet dhcp
iface eth0 inet static
    address 192.168.103.99
    network 192.168.103.0
    netmask 255.255.255.0
    broadcast 192.168.103.255
    gateway 192.168.103.1
### disabling wlan0 for the SMC
### iface wlan0 inet dhcp
```

- Add a pound sign (#) in front of the DHCP line
- Insert the static definition, substituting the appropriate subnet on the address, network, broadcast and gateway lines.

Save the file. Reboot the SMC (sudo shutdown -r now)

- ☒ After the system reboots, run “ifconfig eth0” and verify that an Ethernet address has been assigned as required.

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9.3 Configure Expansion Switch Matrix

The SV3 allows the two auxiliary (aux) lines carried in the expansion port cable to be routed for different functions, depending on the application. The configuration item is currently on the AMPS page:

- **Slot 34:** Expansion Switch Module
Firmware Version: 0x000035f1, Boot Loader Version: 0x0000381e
Mfg. S/N=abalone434
HW ID=0x002c001b3533363305473131
Reported Arena Part Number = 4572A (matches manifest)
Module Type = 7
Found in Manifest by Serial Number.
[Configure Expansion Switches](#)

- #1: Umbilical Expansion Switch: Not Connected
- #2: Debug Expansion Switch: Not Connected
- #3: G1 Expansion Switch: Not Connected
- #4: G2 Expansion Switch: Not Connected
- #5: G3 Expansion Switch: Not Connected

Clicking the “Configure Expansion Switches” link brings up this configuration page:

Umbilical Aux Line Settings

☒ Aux Lines Are Not Used
☐ Someone (G1, G2, G3, or Debug) is Connecting to Me
☐ Aux Lines Connect To GPS and PPS signals
☐ Aux Lines Connect To the Serial Port on the VMC

G1 Aux Line Settings

☒ Aux Lines Are Not Used
☐ Aux Lines Connect To GPS and PPS signals
☐ Aux Lines Connect To The Umbilical

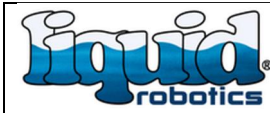
G2 Aux Line Settings

☒ Aux Lines Are Not Used
☐ Aux Lines Connect To GPS and PPS signals
☐ Aux Lines Connect To The Umbilical

G3 Aux Line Settings

☒ Aux Lines Are Not Used
☐ Aux Lines Connect To GPS and PPS signals
☐ Aux Lines Connect To The Umbilical/Towbody

Configuring the Aux lines to carry GPS and PPS signals allows the GPSTListener process to handle NMEA strings from the GPS on its own and set the time with some precision. If the GPS lines are not used or if they are being used for communication to a device attached to the sub, GPS information can be retrieved via the network interface.



- ☒ If you configure GPS to come in over the expansion port, verify that GPS strings are being received (note that the GPS receiver uses 9600 baud communication on SV3):

```
smc@dm3730_zoom_torpedo:~$ sudo killsmc
smc@dm3730_zoom_torpedo:~$ stty -F /dev/ttyO1 9600 raw
smc@dm3730_zoom_torpedo:~$ cat /dev/ttyO1
3724.65112,N,12200.26383,W,0.012,,080314,,,D*66
$GPVTG,,T,,M,0.012,N,0.022,K,D*25
$GPGGA,005034.00,3724.65112,N,12200.26383,W,2,12,0.75,10.7,M,-29.9,M,,0000*59
$GPGLL,3724.65112,N,12200.26383,W,005034.00,A,D*72
$GPGST,005034.00,15,,,,,0.65,0.47,1.8*58
$GPZDA,005034.00,08,03,2014,00,00*68
$GPRMC,005035.00,A,3724.65111,N,12200.26384,W,0.008,,080314,,,D*68
$GPVTG,,T,,M,0.008,N,0.015,K,D*2A
$GPGGA,005035.00,3724.65111,N,12200.26384,W,2,12,0.75,10.8,M,-29.9,M,,0000*53
$GPGLL,3724.65111,N,12200.26384,W,005035.00,A,D*77
$GPGST,005035.00,15,,,,,0.65,0.47,1.8*59
$GPZDA,005035.00,08,03,2014,00,00*69
```

9.4 Ethernet Switch Dependency

The current build of Regulus has a bug (REG-72) that prevents the payload from powering on if the cell modem is powered off. There is a workaround for this, which is to explicitly indicate a dependency between the expansion port and the Ethernet switch. To do this:

1. Log into the VMC with username "root" and password "1329moffet" over the console port at 115,200 baud.
2. Edit the appropriate file using **nano** or **vi** as follows:

Expansion Port	File Name
G1	Regulus/conf/devices/expansionPort1.cf
G2	Regulus/conf/devices/expansionPort2.cf
G3	Regulus/conf/devices/expansionPort3.cf
T1 (thrudder)	Regulus/conf/devices/expansionPortSub.cf

3. Add the "requires" line as shown:

```
Abalone
File Edit View Search Terminal Help
{"boundAmpsDomain":"","
  "class":"com.liquidr.regulus.SV3payloads.SV3PayloadDevice",
  "enable":true,
  "generateAlarms":false,
  "ip":"192.168.103.0",
  "name":"G1",
  "on":false,
  "payloadPortName":"G1",
  "postPowerOff":"ifdown eth0.103",
  "postPowerOn":"sleep 30;ifup eth0.103",
  "reportAmpsErrors":false,
  "reportAmpsWarnings":false,
  "requires":"ethernetSwitch",
  "smcInitialPower":true,
  "verbose":false,
  "wiring":{"connector":"G1",
    "domain":"host"}}
~
~
~
~
```

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4. Save the file and reboot the VMC to allow the changes to take effect (from the SMC web page, pull down the **Operate** menu and select **Reboot**.)

10 CONFIGURE SMC BOARD ADDRESS

The SV2 standardized on an addressing scheme for payloads using a 16-bit number or *board address*: the upper 8 bits are the *board ID* and the lower 8 bits are the *task ID*. The payload protocol, which runs on SV2's and over SV3 sensor ports, uses this addressing scheme and relies on each hardware component having a unique board ID; values 0 and 255 (0xFF) are reserved.

The task ID is meant to uniquely identify components, telemetry sources and command targets on the same board.

Even though payloads using SV3 expansion ports no longer use a protocol that relies on this addressing scheme, the messages sent back to WGMS still use the addresses to identify the components that reported telemetry, so unique board addresses are still required.

Conventions for assigning board ID's are:

Board ID	Base Board Address	Use
0	0	SV2 Float C&C or SV3 CCU
1	256 (0x100) ⁷	PIB #1 (aft payload on SV2)
2	512 (0x200)	PIB #2 (forward payload on SV2)
3	768 (0x300)	Towfish PIB
32 (0x20)	8192 (0x2000)	SMC #1 (aft payload on SMC; default board ID)
33 (0x21)	8448 (0x2100)	SMC #2 (forward payload)
48 (0x30)	12288 (0x3000)	Towfish SMC

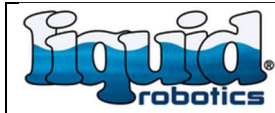
If the SMC is not going to use board ID 32, use **nano** or **vi** to change the **defaultBoardID** in `/home/smc/roots/050_PayloadManager/PayloadManager-config.xml`:

```

SMC
File Edit View Search Terminal Help
<?xml version="1.0" encoding="UTF-8" standalone="yes" ?>
<!DOCTYPE boost_serialization>
<boost_serialization signature="serialization::archive" version="7">
<rootlevel class_id="0" tracking_level="0" version="0">
  <serverName>PayloadManager</serverName>
  <serverKind></serverKind>
  <loggerSettings class_id="1" tracking_level="0" version="0">
    <logLevel>LT_DEBUG</logLevel>
    <processName>PayloadManager</processName>
    <isFileDes>1</isFileDes>
    <fileDes>1</fileDes>
    <fileName></fileName>
    <pipeName></pipeName>
  </loggerSettings>
  <defaultBoardID>33</defaultBoardID>
  <deviceAddedEventName>PayloadDeviceAdded</deviceAddedEventName>
  <deviceChangedEventName>PayloadDeviceChanged</deviceChangedEventName>
  <deviceRemovedEventName>PayloadDeviceRemoved</deviceRemovedEventName>
  <commonEventType>PayloadRegistrationEvent</commonEventType>
  <commonEventDomain>LiquidR-SMC</commonEventDomain>
  <eventTransceiverSettings class_id="2" tracking_level="0" version="2">
    <eventServiceKind></eventServiceKind>ServiceName>
  </eventTransceiverSettings>
</rootlevel>
</boost_serialization>

```

⁷ Numbers shown with a leading "0x" are in base-16 (hexadecimal) format.



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- ☒ The new value becomes effective on the next restart. Verify that the correct board ID comes up during enumeration (see XBee Console on SV2, SV2 Payload page on SV3)
- ☒ When the configuration is complete, verify that each device (PIB, SMC, 3rd party payload) has a unique board ID on the vehicle

END OF PROCEDURE