



Ultibuoy Controller Operating Manual

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1.1 Quick Start

The controller shipped sealed with new batteries, desiccant and SDHC memory card.

1.1.1 Cellular SIM Card

If your controller contains a cellular modem and was delivered outside of the United States then a SIM card must be installed. Refer to 2.2:Cellular SIM Card to obtain and install a SIM card. Controllers delivered within the United States have a SIM card pre-installed.

This is the factory configuration:

- 60 minute sample period
- Logging not started
- Program A measures battery and internal humidity



Figure 1: RS232 Serial Connection

1.1.2 With RS232 Interface

1. Connect the serial cable. In single-port controllers the serial connection is in the center, the modem coupler is to one side.
2. Open a terminal program and select the correct COM port. Set the baud rate to 115200, no parity, 1 stop bit, software flow control (xon/xoff).
3. Press enter a few times to get a S9 prompt from the controller.
4. Send the following commands:

Command	Action	Notes
period=60	Sets the sampling period in minutes (1 to 10080)	
time=2016-06-20T133000	Sets the time	
getsd	Displays status	verify the time was set properly and there are no warning messages
Getcd	Displays configuration	
Read A	Displays sample program A	
Run A	Take sample (runs program A)	
Read sdd	Retrieves data from the SD card data file	This might take a long time – the SD card can hold a lot of data!
Read sds	Retrieves data from the SD card status file	This might take a long time – the SD card can hold a lot of data!
start	Starts logging	

1.2 Data Recording

The controller records data in a text-based XML format. Data is first stored in a RAM buffer (the S file). This RAM buffer is periodically recorded to a circular FLASH memory buffer (the D file). This FLASH memory buffer is periodically recorded to the removable SDHC memory card. These multiple buffers allow fast, reliable low power operation.

While running a sample program the controller may write directly to the D file, skipping the S file. This means the READ S command may not display all data.

The READ SDD command is the best way to retrieve data without opening the housing.

1.2.1 Removing the SDHC Memory Card

Always press the button and wait for the green light to flash before removing the memory card. The yellow light will flash quickly while the controller transfers data. Three long yellow flashes indicate a problem writing to the memory card. One green flash means all data transferred and it is safe to remove the card.



1.2.2 Data Format

Data downloaded from the controller or stored on the SDHC memory card is in a text-based XML format, similar to the format used for the DANTE controller. Each sample is enclosed in a Sample tag and data recorded from each serial port (including the internal Ultimodem) are wrapped in one or more SampleData tags.

Depending on the sample program some data may not be recorded. The sample program can start and stop logging of data from any port at any time with the LOG command. Note that the DEBUGLEVEL setting overrides the sample program LOG command.

2 Opening and Closing the Housing

2.1.1 Opening

NOTE: If there is any indication of water inside the pressure housing then handle it with caution! Rattling or sloshing inside the housing, hissing or other noises may indicate water intrusion in the housing. If there is any chance the housing might contain water then please wear safety glasses and chemical resistant gloves – there could be pressure inside the housing or hazardous chemicals if the batteries leaked. Please do not ship or transport the housing if it may have water in it.

1. Upon recovery rinse the housing with fresh water and dry it off.
2. Wait for the housing to reach room temperature. If the housing is below room temperature when opened then water may condense on and damage the electronics.
3. Place the housing on a soft clean surface with the connectors facing up and solar panels facing down
4. Remove the six faceplate screws with 3/32" hex driver
5. Lift the faceplate off. A few drops of water may cling to the underside of the faceplate – take care not to let water drip into the electronics.
6. Gently wipe the o-ring groove and faceplate with a tissue to remove any water.
7. Remove the desiccant bags and set them aside. The desiccant cannot be reused unless properly recharged (heat to 60C for three hours).

2.1.2 Sealing

NOTE: The faceplate screws are titanium for optimal corrosion resistance. Screws of any other material will rapidly fail due to galvanic corrosion.

1. Remove the o-ring and inspect for tears or any irregularity. Wipe it clean if necessary – make sure there are no hairs, sand, water or dirt on the o-ring or in the o-ring groove.
2. If the o-ring is new or feels dry then lubricate it with a small amount of Molykote M44.
3. Place the o-ring in the o-ring groove. Make sure it is installed uniformly and not twisted.
4. Place a new or recharged desiccant bag over the battery.
5. The outside surface of the faceplate is flat, the inside is milled to match the opening in the housing. Align the faceplate to match the opening in the housing and gently press it in place.



+CSQ: 99,99

OK

AT+CMEE=2AT+CMEE=2

OK

AT+CCIDAT+CCID

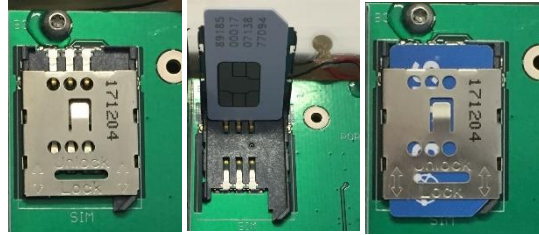
+CME ERROR: SIM not inserted

AT+CGSNAT+CGSN

357520073945178

2.2.4 Installing the SIM Card

Installing the SIM card requires opening the pressure housing. Refer to 2:Opening and Closing the Housing. After the housing is opened open the SIM card holder by pressing lightly on the silver piece and sliding towards the edge of the circuit board. Place the SIM card in the silver lid and close the lid while holding the card in position. Press gently and slide the lid towards the center of the circuit board to lock it in place.



Be careful to follow the instructions in 2.1.2:Sealing when closing the pressure housing.

Verifying SIM Installation

If the cellular modem can read the SIM card ICCID number then the SIM card is connected and operating. Use the following commands to read the SIM card ICCID number:

MOD MON

REPORT

The SIM ICCID number is highlighted in this example:

S9>**mod mon**

OK; 0 Events

S9>**report**

Starting report, use reset command to abort

␣ATATATATATATATATATATATATATATATATAT

OK

AT+CSQAT+CSQ

+CSQ: 99,99

OK

AT+CMEE=2AT+CMEE=2

OK

AT+CCIDAT+CCID

+CCID: 89185000170713877094

AT+CGSNAT+CGSN

357520073945178

Note the difference between this example and the example in 2.2.3:Reading the Cellular Modem IMEI where the SIM card is not installed.



2.3 Iridium SIM Card

If your controller is equipped with an Iridium 9523 modem for RUDICS telemetry it will have an Iridium SIM card pre-installed by the factory. The Iridium SIM card should not be replaced – firmware configuration and Iridium activation must match the SIM card for the system to transmit properly.

2.4 Internal Sensors

The controller has internal sensors for temperature, relative humidity, solar and battery voltages and currents. It also has a digital compass, accelerometer and gyroscope; each capable of sampling at tens of Hz.

At the S9> prompt use the ADC command to read internal temperature, humidity, voltages and currents. In sample programs use VBLOG or IRHLOG to log these data.

The compass, accelerometer and gyroscope firmware is still in development. Additional capabilities will be added with firmware updates.

2.5 Command Set

2.5.1 Commands

Commands are not case sensitive. All commands must end with a carriage return (CR, '\r') character (automatically generated by a terminal program when you press enter). If a line feed character follows (LF, '\n') it will be ignored.

Any arguments or parameters may be separated by either a space or an equals sign(=). Note the controller accepts '=' or a space, but not both.

2.5.2 Status Commands

2.5.2.1 GETCD

Displays configuration.

```
S9>getcd
<Config type='UBUOY' sn='17N' v='0'>
<Hardware>
  <Assembly></Assembly>
  <Firmware>UBUOY V1.0A</Firmware>
</Hardware>
<Cal>
  acx=0
  acy=0
  acz=0
  asx=16384
  asy=16384
  asz=16384
  bcx=0
  bcy=0
```



```

    bcz=0
    bsx=16384
    bsy=16384
    bsz=16384
</Cal>
<Settings>
    period=60
    debugLevel=5
    amode=2
    arate=4
    ascale=0
<X3GA>
    apn=neo.iot.net
    ip1=198.199.109.17
    ip2=198.199.109.17
</X3GA>
    STOPPED
</Settings></Config>

```

2.5.2.2 GETSD

Displays controller status. This includes the battery voltage, memory status, SD card status and status of the multiple command interfaces (serial A, serial B, inductive modem, cellular modem and Iridium modem (if installed)). It is common for the controller to pause for a moment during the GETSD command while the SD card initializes. This pause does not interrupt sampling.

Warnings are displayed in the GETSD response if the memory card is not installed or cannot be written to. These warnings mean the controller cannot save data to the memory card and data recording is limited to the 7 megabyte internal memory. These are the two warning messages:

No memory card installed:

```

S9>getsd
<Status type='UBUOY' sn='17N' v='0'>
<DataBuffer>
    nextWrite=720896
    not saved=0
    last sample=0
    not transmitted=0
    total=0
</DataBuffer>
<SDHC_CARD>
    ***WARNING:  SDHC MEMORY CARD NOT INSTALLED!***
</SDHC_CARD>
    lastSampleTime=2000-01-01T00:00:00
    TIME=2000-01-01T05:05:24
    Vbat=4.015
<ACTIVEPORTS>
    SERIAL B
</ACTIVEPORTS>

```



```
STOPPED
</Status>
```

Cannot write to memory card:

```
S9>getsd
<Status type='UBUOY' sn='17N' v='0'>
<DataBuffer>
  nextWrite=720896
  not saved=0
  last sample=0
  not transmitted=0
  total=0
</DataBuffer>
<SDHC_CARD>
  SDHC card installed
  ***WARNING: 71480 DATA BYTES NOT SAVED TO CARD!***
  ***WARNING: 603 STATUS BYTES NOT SAVED TO CARD!***
  <File Name='none' Size='0' />
  <File Name='none' Size='0' />
</SDHC_CARD>
  lastSampleTime=2000-01-01T00:00:00
  TIME=2000-01-01T05:05:24
  Vbat=4.015
<ACTIVEPORTS>
  SERIAL B
</ACTIVEPORTS>
  STOPPED
</Status>
```

This is the GETSD response when the memory card is working properly:

```
S9>getsd
<Status type='UBUOY' sn='17K' v='0'>
<DataBuffer>
  nextWrite=720896
  not saved=0
  last sample=0
  not transmitted=0
  total=0
</DataBuffer>
<SDHC_CARD>
  SDHC card installed
  <File Name='S917K.TXT' Size='0' />
  <File Name='S917KS.TXT' Size='0' />
</SDHC_CARD>
  lastSampleTime=2000-01-01T00:00:00
  TIME=2018-04-24T16:57:30
  Vbat=4.066
<ACTIVEPORTS>
  SERIAL B
</ACTIVEPORTS>
```



```
STOPPED
</Status>>
```

2.5.2.3 ADC

Reads all analog measurement channels and displays the results.

```
S9>adc
Tint=22.86
RHint=46.15
Isol=-0.03
Ibatt=5.44
Vbat=4.002
Vsol=0.00
```

These channels are internal temperature (C), internal relative humidity (%), solar current (mA), battery current (mA), battery voltage (V) and solar voltage (V). The solar charging system uses a switching power supply, so solar voltage is not very useful as a light sensor.

2.5.2.4 GETEC

Displays event counters. Event counters are a useful debugging tool for S9. Most events do not indicate a problem. If you are concerned about events recorded on your device please feel free to forward the GETEC response to S9, along with the status log file from the SD card.

```
S9>getec
<EventData>
numEvents = 1
nextAddr = 7040
    0, 0F9F45, Usart1.c:71-0
</EventData>
```

In the example above there was an single event recorded – a framing error on USART 1.

2.5.2.5 VER

Displays controller hardware and firmware version.

```
S9>ver
HTYPE
CD AB0B0AE0, 13000002
CODE TYPE UBUOY V0
FIRM UBUOY V1.0A
CDATE May 1 2018 11:03:18Configuration Commands
```

Refer to Configuration Settings for a full list of settings.

2.5.2.6 ERASE CONFIG



This command resets all configuration settings to default values, but does not change calibration coefficients or modem settings (in the X3GA section). Default settings from the GETCD response are listed here:

```
S9>getcd
<Config type='UBUOY' sn='17N' v='0'>
<Hardware>
  <Assembly></Assembly>
  <Firmware>UBUOY V1.0A</Firmware>
</Hardware>
<Cal>
  acx=0
  acy=0
  acz=0
  asx=16384
  asy=16384
  asz=16384
  bcx=0
  bcy=0
  bcz=0
  bsx=16384
  bsy=16384
  bsz=16384
</Cal>
<Settings>
  period=60
  debugLevel=5
  amode=2
  arate=4
  ascale=0
<X3GA>
  apn=
  ip1=
  ip2=
</X3GA>
  STOPPED
</Settings></Config>
```

2.5.2.7 TIME

The TIME command both sets and displays controller's current time. To display the time just enter the time command by itself:

```
S>time
time=2013-11-05T01:24:47
OK - 0 Events
```

To set the time include the current time in ISO-9601 format with no time zone. Multiple time formats are allowed:

```
time=2015-11-05T14:24:47
```



```
time 2015-11-05T14:24:47 (the = is optional)
time=20151105T142447
```

Note that controller accepts '=' or a space, but not both.
When the time is accepted the reply looks like this:

```
S9>time 2016-07-21T112000
Time changed to 2016-07-21T11:20:00
OK; 0 Events
```

2.5.3 Utility Commands

OPEN

Opens a serial pass through mode at specified port and baud rate. Press escape to exit the pass through mode.

```
OPEN IM 19200 --Opens the IM port at 19200 baud (default for Ultimodem)
OPEN 1 115200 --Opens serial port 1 at 115200 baud
OPEN A 115200 --Opens serial port A (same as 1) at 115200 baud
OPEN GPS      --Opens the GPS receiver at the default baud rate
```

2.5.3.1 PWROFF or SLEEP

Returns the controller to low-power sleep mode.

2.5.3.2 RESET

Forces a full reset (like a reboot). This forces the controller to return to low-power sleep mode, abandoning all in-process activity

It is best to send an ERASE MEM command after a reset to guarantee integrity of the file system. If the controller was writing to flash memory (D File or ST file) during the reset then up to 64kB of data may be corrupted.

2.5.3.3 RESETEC

Resets the event counters.

2.5.4 File Commands

The controller has several files in RAM, flash memory and the SDHC memory card. Files are identified by one or more letters (F, S, D, ST, STR, SDD, SDS).

2.5.4.1 Available Files



2.5.4.1.1 F File

The F file is used for scripts – most importantly firmware update scripts. Firmware update files are streamed to the F file, then the file is run with the RUN F command. The F file can may also be used for custom scripts where each line of the file is a modem command. Note that some commands cannot be used in scripts – check the ‘blocks’ section of the command table.

2.5.4.1.2 D File

The D file is a 7 Mbyte circular buffer for ASCII data. Data in the D file is periodically copied to the SDHC memory card. Pressing the button inside the housing forces a copy to the SD card.

2.5.4.1.3 S File

The S file is a short RAM buffer of recent samples, typically less than 2KB. Note that the GETSD command clears the S buffer, and the S buffer is automatically cleared periodically while running sample programs and when controller transfers data to the D file in flash memory.

2.5.4.1.4 STR File

The STR file is a short status log file stored in RAM. This log includes power cycling, time changes and notes of any hardware or firmware events. Note that the GETSD command clears the STR buffer, and the STR buffer is automatically cleared periodically when controller transfers data to the ST file in flash memory.

2.5.4.1.5 ST File

The ST file is a circular status log file in flash memory. Data in the ST file is periodically copied to the SDHC memory card.

2.5.4.1.6 SDD File

This is the data file on the SDHC memory card. This file may take tens of minutes to read through RS232.

2.5.4.1.7 SDS file

This is the data file on the SDHC memory card. This file may take tens of minutes to read through RS232.

2.5.4.2 WRITE

Writes data to a file. Not all files support this command.

2.5.4.3 READ

Retrieves data from a file



2.5.4.4 ERASE

Erases a file.

2.5.4.5 RUN

Runs a script file. Only allowed with the F file.

2.5.4.6 DUMPFLASH

A utility command to retrieve the entire contents of flash memory. This allows significant data recovery if the D file is accidentally erased. This command takes about ten minutes to run.

2.5.5 Command Table

(Not including calibration setting commands)

Command	Blocks	Parameters	Description
GETCD			Displays configuration settings
GETSD			Displays status data
GETEC			Displays event counters
VER			Displays hardware and firmware version
ADC			Reads all analog measurement channels: Internal temperature, internal relative humidity, solar and battery currents and voltages.
ERASE CONFIG			Resets all configuration to default values, does not change calibration values
PERIOD		1-10080	Sets the sample period in minutes
START			Starts logging
STOP			Stops logging
TIME		20180401T235959	Sets or reads the time in common ISO8601 formats 20180401T235959 2018-04-01T235959 2018-04-01T23:59:59
PWROFF			Same as SLEEP. Terminates active mode (IM Service or Host Service)
SLEEP			Same as PWROFF. Terminates active mode (IM Service or Host Service)
RESETEC			Resets (clears) the event counters
RESET			Resets the modem – ending all processes and forcing return to sleep mode.
WRITE	FILE	F, D, A	Writes to a file.
READ	FILE	F, D, A, S, ST, STR, SDD, SDS	Reads a file: F – F file (script / utility file) S – S file (data ram buffer) D – D file (sample data buffer) DL – D file last sample only A – A file (program script)



			ST – Status buffer STR – Status ram buffer SDD – SD card sample data file SDS – SD card status data file
ERASE	FILE	D, MEM, ST, CAL, CONFIG	Erases a file (ERASE MEM clears all files except those on the SDHC memory card)
RUN	FILE	F, A	Runs a file as a script. RUN F runs F file as a simple command script. RUN A runs the A file as a data collection script.
OPEN		Port, baud	Opens a serial pass through mode Port: 0, A, 1, B, 2, IM Baud: any multiple of 1200 up to 115200 Press escape to exit the pass through mode.
DUMPFLASH	FILE		Outputs the entire contents of the flash memory. May take tens of minutes to complete.
AMODE			Accelerometer mode - reserved for future use
ARATE		1-50	Accelerometer sample rate – reserved for future use
ASCALE		0-3	Sets full scale range of the accelerometer (in g- for gravity) 2g,4g,6g,8g
MSCALE		0-3	Sets full scale range of the magnetometer (in gauss) 2g, 4g, 8g, or 12g

2.6 Configuration Settings

Note the name of each configuration setting is also a command to modify that setting. Use a space or = between the command and parameter value:

ID 01

and

ID=01

Are both acceptable.

Command	Parameter default value in ()	Description
PERIOD	1-10080	Sets the sample period in minutes (10080 = 1 week)
AMODE		Accelerometer mode - reserved for future use
ARATE	1-50	Accelerometer sample rate – reserved for future use
ASCALE	0-3	Sets full scale range of the accelerometer (in g- for gravity) 0=+/- 2g 1=+/- 4g 2=+/- 6g 3=+/- 8g



MSCALE	0-3	Sets full scale range of the magnetometer (in gauss) 0=+/- 2g 1=+/- 4g 2=+/- 8g 3=+/- 12g
--------	-----	---

2.7 Calibration Settings

Note the name of each calibration setting is also a command to modify that setting. Use a space or = between the command and parameter value:

ASX 0

and

ASX=0

Are both acceptable.

Setting	Range	Description
ACX	-500 to 500	Accelerometer X offset
ACY	-500 to 500	Accelerometer Y offset
ACZ	-500 to 500	Accelerometer Z offset
ASX	500 to 31000	Accelerometer X offset
ASY	500 to 31000	Accelerometer Y scale
ASZ	500 to 31000	Accelerometer Z scale
BCX	-500 to 500	Magnetometer X offset
BCY	-500 to 500	Magnetometer Y offset
BCZ	-500 to 500	Magnetometer Z offset
BSX	10000 to 22000	Magnetometer X offset
BSY	10000 to 22000	Magnetometer Y scale
BSZ	10000 to 22000	Magnetometer Z scale

3 Sample Programming

3.1 Basic Sample Program Structure

Sample programs are little more than a list of commands representing a non-branching and non-looping algorithm. Each line of a program represents a single command. When a command is completed the next command is processed. This repeats until the end of the file is reached. Lines starting with a '/' or ';' are treated as comments.

3.2 Sample Program Commands

Command	Parameter	Description
Delay	Delay length in milliseconds	Pauses the program (open ports are monitored during the pause)
Open	Port, baud	Opens a serial port at the specified baud rate. Port: 0,1,2,A,B or IM Baud: any multiple of 1200 up to 115200 Ex: OPEN IM 19200
SEND	Port, string	Sends a string to an open serial port Ex: SEND IM "FCL\r"



WAITFOR	Port, String, max wait	Waits for a specified data string from an open port with a maximum wait time in milliseconds. Ex: WAITFOR IM "S9>" 10000
SAVE	Port	Records data logged from the specified port to the D file. No data is saved if logging is disabled on the specified port!
PARSER	Port, Parser name	Specifies a data parser for a port. The parser name tells analysis software how to process the data from the specified port. Ex: PARSER IM "IMTEST"
CLEARBUFFER	Port	Erases the contents of the serial receive buffer for the specified port. Data previously saved with the SAVE command is not erased.
LOG	Port, ON/START/OFF/STOP	Enables or disables data logging on the specified port. Note the logging setting is overridden by the debuglevel setting: debuglevel >1 forces continuous logging.
GPS ON		Turns on the GPS receiver
GPS OFF		Turns off the GPS receiver
GPS QOS		Logs the GPS quality of service data
GPS FIX		
GPS WFF	[1-300]	Waits for valid GPS fix up to optional number of seconds and logs the GPS position
GPS TIME		Logs the current GPS time
GPS SET TIME		Sets the controller time to the current gps time (if fix valid)

3.2.1 Example Sample Program

This is a sample program for collecting GPS and XTP data through the Ultimodem:

```

vblog
irhlog
gps on
send im "xtp 2\r"
waitfor im "S9>" 20000
send im "sleep"
delay 1000
close im
gps wff 30
gps set time

```

With this program the controller first logs battery voltages and currents and logs internal relative humidity. Then it enables the GPS and samples two XTP sensors while the GPS receiver initializes. After the XTP data is retrieved the controller waits for a valid GPS fix, logs the GPS data and sets the controller time to the current GPS time.



3.3 Serviceable Parts

3.3.1 Batteries

The controller uses up to six 18650 size rechargeable lithium ion batteries. Use Tenergy 2600mAh model 30005 or 30016 batteries with internal protection PCB or equivalent. Many commercially available batteries in this size have significantly overstated capacity claims, have high self-discharge and / or do not include internal protection PCBs. Please use only high quality replacement batteries from reputable sources. Be sure the polarity of the batteries match the orientation printed on the battery holders.

WARNING: Do not install primary (non-rechargeable) batteries in controllers equipped with solar cells! This may cause batteries to leak or explode causing risk of fire or chemical burns.

The solar charging system operates with only four batteries. The inner two batteries (closest to the SIM socket) are not connected to the solar charging system. These two inner batteries are often left out. All batteries connect through diodes to a single power bus.

For controllers without solar panels it is possible to use 2/3A size primary lithium batteries, such as Saft LS17330. Two batteries fit in each 18650 size battery holder. Be sure the orientations of both batteries match the orientation printed on the battery holder.

3.3.2 O-Ring

The controller uses an x-profile double-sealing o-ring. We recommend Molykote M44 lubricant on the o-ring. Excess lubricant is not desirable, use just enough to wet the surface of the o-ring on all sides.

3.3.3 Desiccant

The desiccant package should be replaced every time the housing is opened. Replacement desiccant is available from Soundnine or McMaster-Carr.

3.4 Replacement Parts List

Item	Description	Soundnine Part Number	McMaster-Carr Part Number
O-ring	Double-Seal X-Profile O-Ring, Buna-N, Number 264	2071A	90025K399
Desiccant	silica gel desiccant	206B6	3492T12
Battery	Tenergy #30005 or 30016; 18650 size lithium rechargeable		
Housing cover screw	Socket head cap screw, M4x0.7x30mm	2070A	92855A425
Washer for housing cover screw	Internal tooth lock washer	2070C	93925A250
Connector cap	M8 connector sealing cap	20749	
Connector pigtail	M8 connector pigtail	2071D	7138K15



3.5 Firmware Updates

Firmware update files are text files with firmware encoded in ASCII hex. They are sent to the modem through the RS232 serial connection. Follow these steps to perform a firmware update:

- 1) Connect the RS232 cable
- 2) Open a terminal program (we prefer TeraTerm) and select the appropriate COM port
- 3) Set the port flow control to Xon/Xoff or 'SOFTWARE HANDSHAKING' (under Setup->Serial Port in TeraTerm).
- 4) Press enter to get a S9> prompt from the controller.
- 5) Type the VER command to check the current firmware version of your controller
- 6) Send the firmware update file to the controller. (no encoding – in TeraTerm use File->Send File)
- 7) Wait for the file transmission to finish.
- 8) Enter the RUN F command to initiate parsing, integrity checking and device type verification. This may take 10 to 15 seconds. If the file is OK the controller will respond with:
`Confirmed - ready to program`
- 9) Enter the PROGRAM command to start the firmware update. The firmware update takes only a few seconds. Do not disconnect the battery within 10 seconds of sending the PROGRAM command, doing so may corrupt the firmware and disable the controller.
- 10) After the firmware update completes the controller will be in sleep mode. Press a key to wake the controller and use the VER command to verify the new firmware version.

