Embedded Monitor System

Overview

# The Suspect Devices Embedded Monitor System

## Overview of the Monitor.

The monitor exposes the inner workings of an embedded system for logging, diagnostics and test driven development. The embedded monitor system is designed to be light weight, flexible and usable both by users and programs. All interaction with the monitor is text based. The intention of the monitors syntax is to make it possible to create filterable interactions which can be used by both data-loggers and technicians connected via serial port or network gateways for diagnostics and configuration. A data logger would use the monitor language coming from the monitored device and use it to store the data to an sd-card or pass it on to the internet or to a connected computer. Similarly the data-logger could “expose” the monitored device passing configuration and diagnostic commands. *Most of the syntax used by the monitor system to communicate between devices and programs can be extended to an html based protocol in a straight forward manner as well.*

*(system diagram here)*

### Monitor Syntax:

Basic Syntax for the monitor is

XXX[?!:] <variable stuff> <CR>

where:

XXX is a 3 letter command or variable.

! execute command or store value

? get value

: value returned.

*(Note all returned values are timestamped)*

### Examples.

SHD! *(shut down the unit)*

TIM? *(return the time in human readable terms)*

TIM:10/21/2016 23:43:45,<-- see timestamp -- *(time returned by above command)*

TIM!02/29/2012 16:45:00

TIM:02/29/2012 16:45:00,<-- see timestamp -- *(time returned by above command)*

TS1? *(read temperature sensor 1)*

TS1:02/29/2012 16:45:00,19.02 *(returned temperature sensor 1)*

Filtering/Status Keywords.

Logging is broken down into filterable levels (FTL,ALT,WRN,INF,DBG) and the filters can be adjusted for both the console and the logger using the DVL *(debug level = console)*, and LVL *(log level)* keywords. To see all debugging information on the console you would set DVL to 5. To only see alerts and warnings you would set it to 3.

Status keywords (STC,PWR,FAN,TSn) are used to update changes in state (temperatures, settings, program states). Status changes are sent to both the console and logging devices *(unless the dumb logger flag is set (*DLG!1*) where as only log messages and fatal errors are sent to the logger).*

Actions and Diagnostic Keywords.

Most of the AMA units control functions can be tested using the monitor including the user interface, and system devices. The monitor can also be used to run processes , reboot and shut down the machine.

## Using the Monitor.

### Saying Hello.

the SYN *(Sync)* keyword is really here for programs like the simple updater to make sure the monitor is there but its good for us to make sure that the connection to the monitor works.

SYN?<CR>

ACK:02/29/2012 16:55:03,

### Getting Information.

Once we know the monitor is there we can check the version of the hardware and software.

SWV?<CR>

SWV:02/29/2012 16:57:10,2.0-S022012

HWV?<CR>

HWV:02/29/2012 16:58:24,2

### Checking Sensor Values.

Temperature sensors status messages will be sent to the debugging console and loggers whenever they change from their previous value. They can also be queried manually.

TS1:02/29/2012 17:00:01,20.03

TS2:02/29/2012 17:00:02,-2.75

TS3?<CR>

TS3:02/29/2012 17:02:56,-2.65

### Increasing the Debug Console / Logger verbosity.

To adjust up the amount of information sent to either the logger or debug console set them between 0 (only important) to 5 (everything)

DVL!5<CR>

DVL:5

LVL!0<CR>

LVL:0

### Checking/Setting the System Time.

The realtime clock can be set or checked using either the TIM keyword which is human readable or NOW which is the number of seconds since Jan1,1970

TIM?<CR>

TIM:03/01/2012 00:01:43

TIM!03/01/2012 05:36:00<CR>

TIM:03/01/2012 05:36:00

NOW?<CR>

NOW:1330580188

#### Rebooting or Shutting Down

You can send the system to standby or reboot it from the console

SHD!<CR>

STC:01 02/29/2012 21:39:00 POWER\_ON\_IDLE

ACK:shutdown

RST!0<CR>

DBG:Monitor Init

HWV:2

SWV:2.0s-022912

DBG:Found our DS2482

...

Thermostat

*(overriding the thermostat and manual temperature control examples will go here)*

Logger Commands

The logger uses its own keywords in addition to the keywords sent by the logged device, and the console user. Most keywords which are not specific to the logger are passed to the device and the responses are in tern passed to the console. Some device information is stored by the logger (SSN, SWV, HWV) and will be returned from the local file.

LSV?<CR>

LSV:BOM5K-GEN-201207282430

## List of current keywords.

### basic communication

SYN sync (hello)

ACK acknowledge (yes)

NAK negative acknowledge (no)

### Information

SWV software version

HWV hardware version

MEM free memory

SSN Serial number from ambient sensor

HLP help for keyword

### Filter words

FTL fatal error

ALT alert

WRN warning

INF info

DBG debugging info

LOG information to send to logger to be logged

STC State Change

DVL Monitor Verbosity Level

LVL Logger Verbosity Level

DLG Logger is Dumb. (only log alerts and log)

### System control words

RST reset the system

SHD shutdown

### Console Test/Control

ALM sound alarm

CPT console print (send to console)

CND console indicate

BTN button press

WBP wait for button press

ERF Console Has Error Flag

### Clock control

NOW epoch time (integer)

TIM timestamp (readable)

### Temperature controller keywords (specific to a chiller )

THR Run Thermostat (0,1)

THM Thermostat Mode

DFR defrost

TS[1-n] temperature sensors

FAN fan output

CHL chiller output

TMP temperature

PWR power

PCT percent