Field Site Power Data Acquisition and System Reporting

Kenneth Shipley - ITS Engineer

Caltrans, District 2

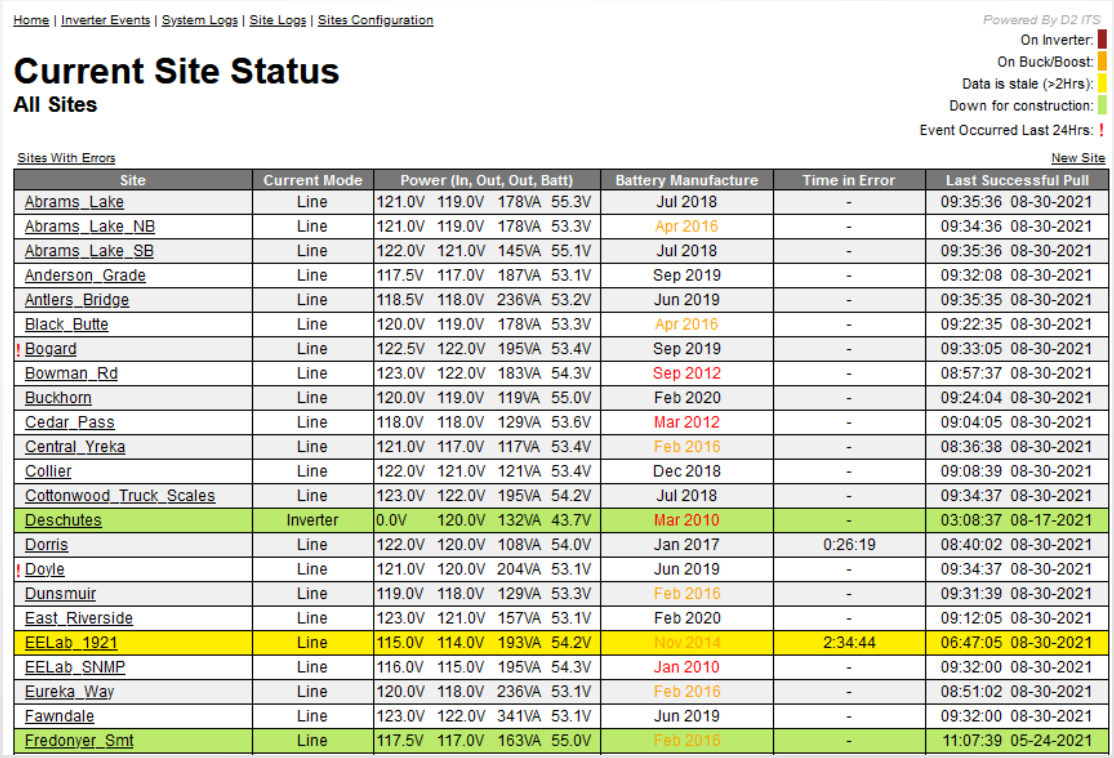
2021

Overview

- Background
- Relay Project Initiated
- Design Decisions and Architecture
- Implementation
- Examples

Overview

- Complications
- Integration
- Lessons Learned
- Questions



Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Powered By D2 ITS

On Inverter:
On Buck/Boost:
Data is stale (>2Hrs):
Down for construction:
Event Occurred Last 24Hrs: !

Current Site Status

All Sites

Sites With Errors

New Site

Site	Current Mode	Power (In, Out, Out, Batt)	Battery Manufacture	Time in Error	Last Successful Pull
Abrams_Lake	Line	121.0V 119.0V 178VA 55.3V	Jul 2018	-	09:35:36 08-30-2021
Abrams_Lake_NB	Line	121.0V 119.0V 178VA 53.3V	Apr 2016	-	09:34:36 08-30-2021
Abrams_Lake_SB	Line	122.0V 121.0V 145VA 55.1V	Jul 2018	-	09:35:36 08-30-2021
Anderson_Grade	Line	117.5V 117.0V 187VA 53.1V	Sep 2019	-	09:32:08 08-30-2021
Antlers_Bridge	Line	118.5V 118.0V 236VA 53.2V	Jun 2019	-	09:35:35 08-30-2021
Black_Butte	Line	120.0V 119.0V 178VA 53.3V	Apr 2016	-	09:22:35 08-30-2021
! Bogard	Line	122.5V 122.0V 195VA 53.4V	Sep 2019	-	09:33:05 08-30-2021
Bowman_Rd	Line	123.0V 122.0V 183VA 54.3V	Sep 2012	-	08:57:37 08-30-2021
Buckhorn	Line	120.0V 119.0V 119VA 55.0V	Feb 2020	-	09:24:04 08-30-2021
Cedar_Pass	Line	118.0V 118.0V 129VA 53.6V	Mar 2012	-	09:04:05 08-30-2021
Central_Yreka	Line	121.0V 117.0V 117VA 53.4V	Feb 2016	-	08:36:38 08-30-2021
Collier	Line	122.0V 121.0V 121VA 53.4V	Dec 2018	-	09:08:39 08-30-2021
Cottonwood_Truck_Scales	Line	123.0V 122.0V 195VA 54.2V	Jul 2018	-	09:34:37 08-30-2021
Deschutes	Inverter	0.0V 120.0V 132VA 43.7V	Mar 2010	-	03:08:37 08-17-2021
Dorris	Line	122.0V 120.0V 108VA 54.0V	Jan 2017	0:26:19	08:40:02 08-30-2021
! Doyle	Line	121.0V 120.0V 204VA 53.1V	Jun 2019	-	09:34:37 08-30-2021
Dunsmuir	Line	119.0V 118.0V 129VA 53.3V	Feb 2016	-	09:31:39 08-30-2021
East_Riverside	Line	123.0V 121.0V 157VA 53.1V	Feb 2020	-	09:12:05 08-30-2021
EELab_1921	Line	115.0V 114.0V 193VA 54.2V	Nov 2014	2:34:44	06:47:05 08-30-2021
EELab_SNMP	Line	116.0V 115.0V 195VA 54.3V	Jan 2010	-	09:32:00 08-30-2021
Eureka_Way	Line	120.0V 118.0V 236VA 53.1V	Feb 2016	-	08:51:02 08-30-2021
Fawndale	Line	123.0V 122.0V 341VA 53.1V	Jun 2019	-	09:32:00 08-30-2021
Fredonyer_Smt	Line	117.5V 117.0V 163VA 55.0V	Feb 2016	-	11:07:39 05-24-2021

Background

- Unreliable power in rural areas during inclement weather
- Install Battery Backup System (BBS) at Closed Circuit Television (CCTV) camera
- Increased perceived reliability

Background – Unreliable Power

- Unreliable power in rural areas during inclement weather
- Equipment at a field site would reset
- Cameras looking in unusable locations
- Large amounts of time spent re-aiming cameras
- Routers losing configurations/flash because of the hard power shutoffs

Background – Solution

- Install BBS at all CCTV Locations
- Possible Inverter Options
- Battery Chosen

Background – Inverter Requirements

- Must meet ITI (CBEMA) Curve
- Must fit in ITS Cabinet and/or Pony Cabinet
- Must be able to provide sufficient power to field site

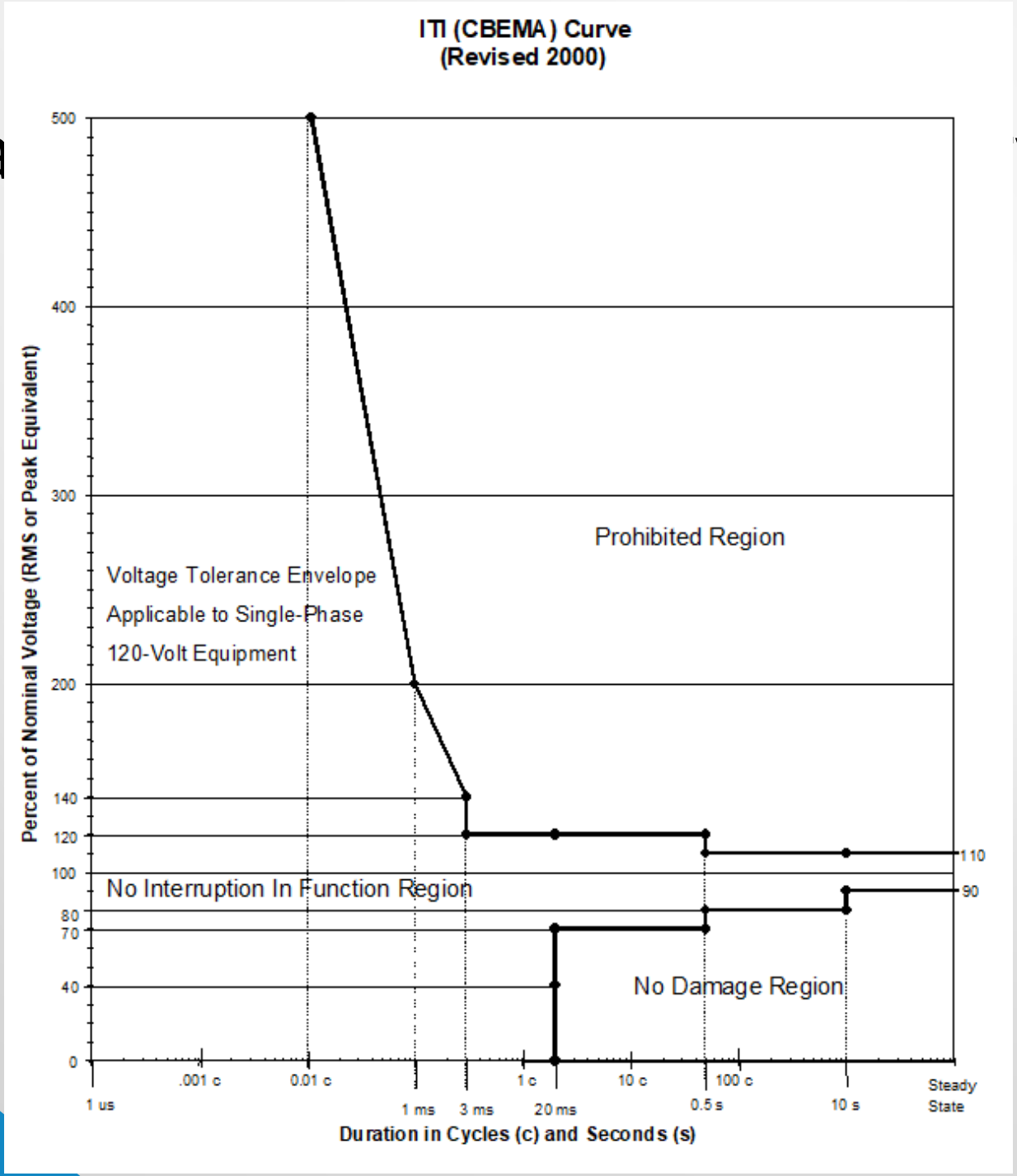
Background – ITI (CBEMA) Curve

- ITI: Information Technology Industry Council
- CBEMA: Computer Business Equipment Manufacturers Association

Background – ITI (CBEMA) Curve

- A power acceptability curve for sensitive electronics.
- Experimental and historical data from mainframe computers was used to create the CBEMA curve
- ITI Uses a modified version of the CBEMA Curve

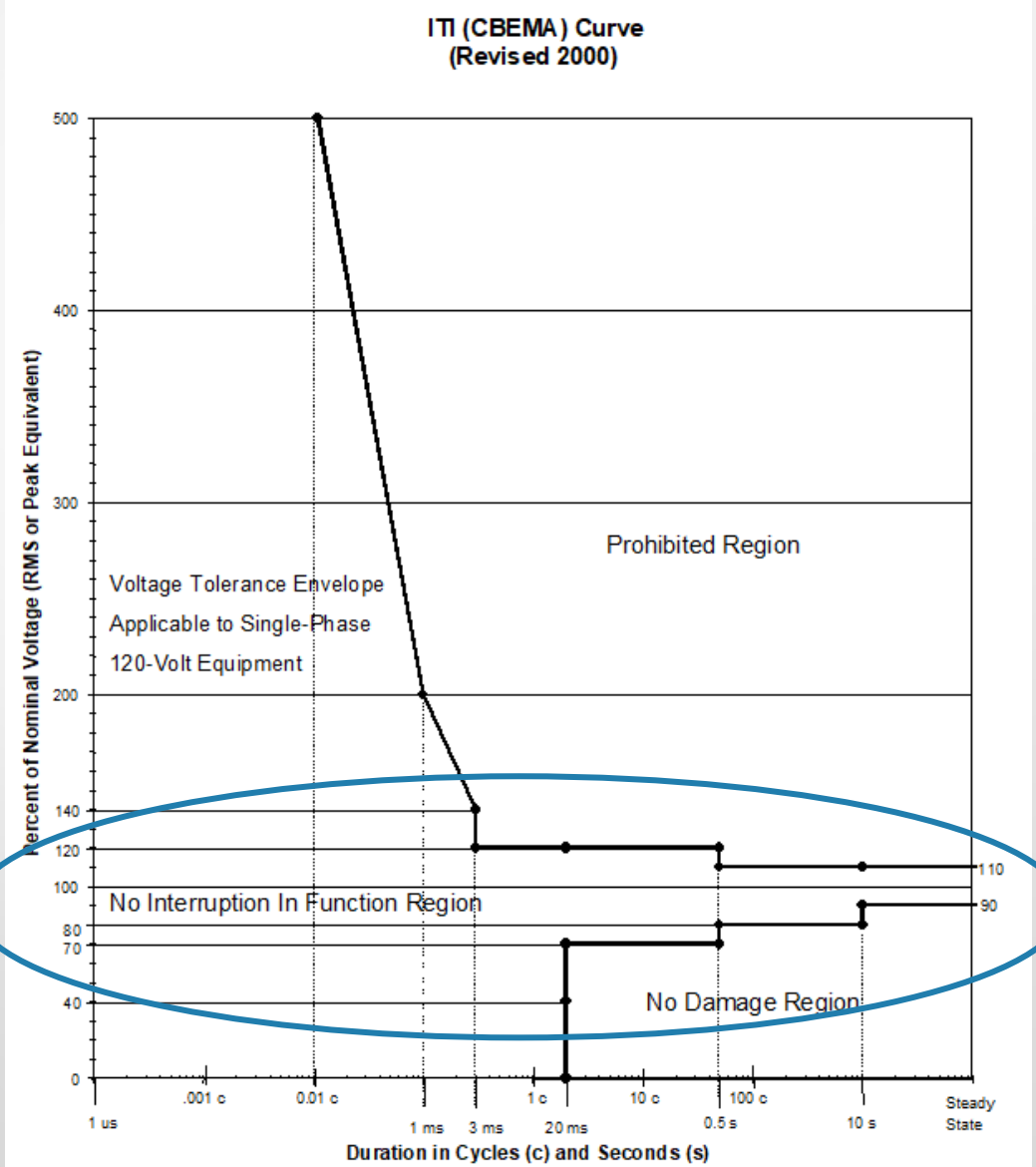
Ba ve



Source: ITI

Background – ITI (CBEMA) Curve

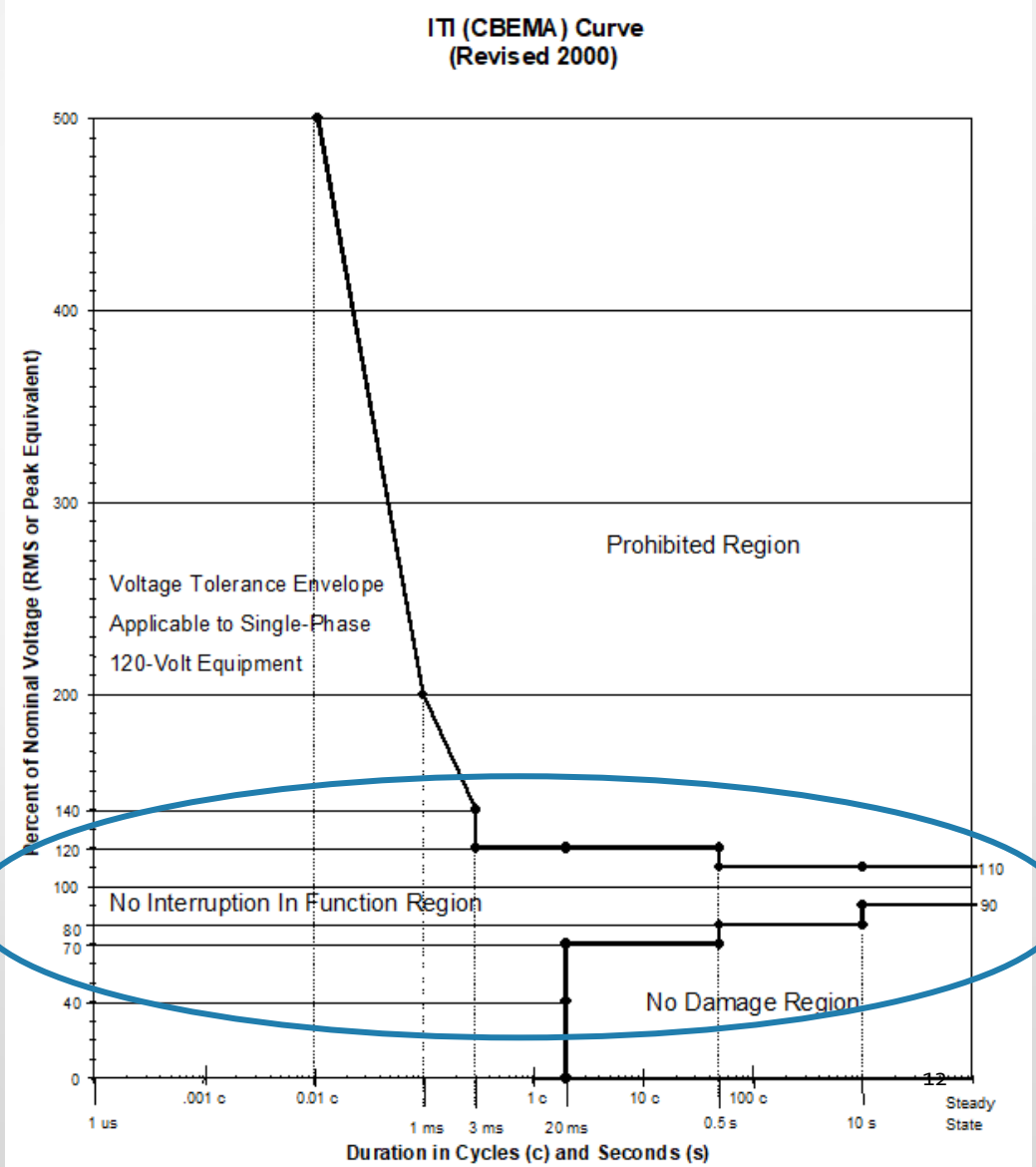
- The curve is broken up into three parts
- The Acceptable Region



Source: ITI

Background – ITI (CBEMA) Curve

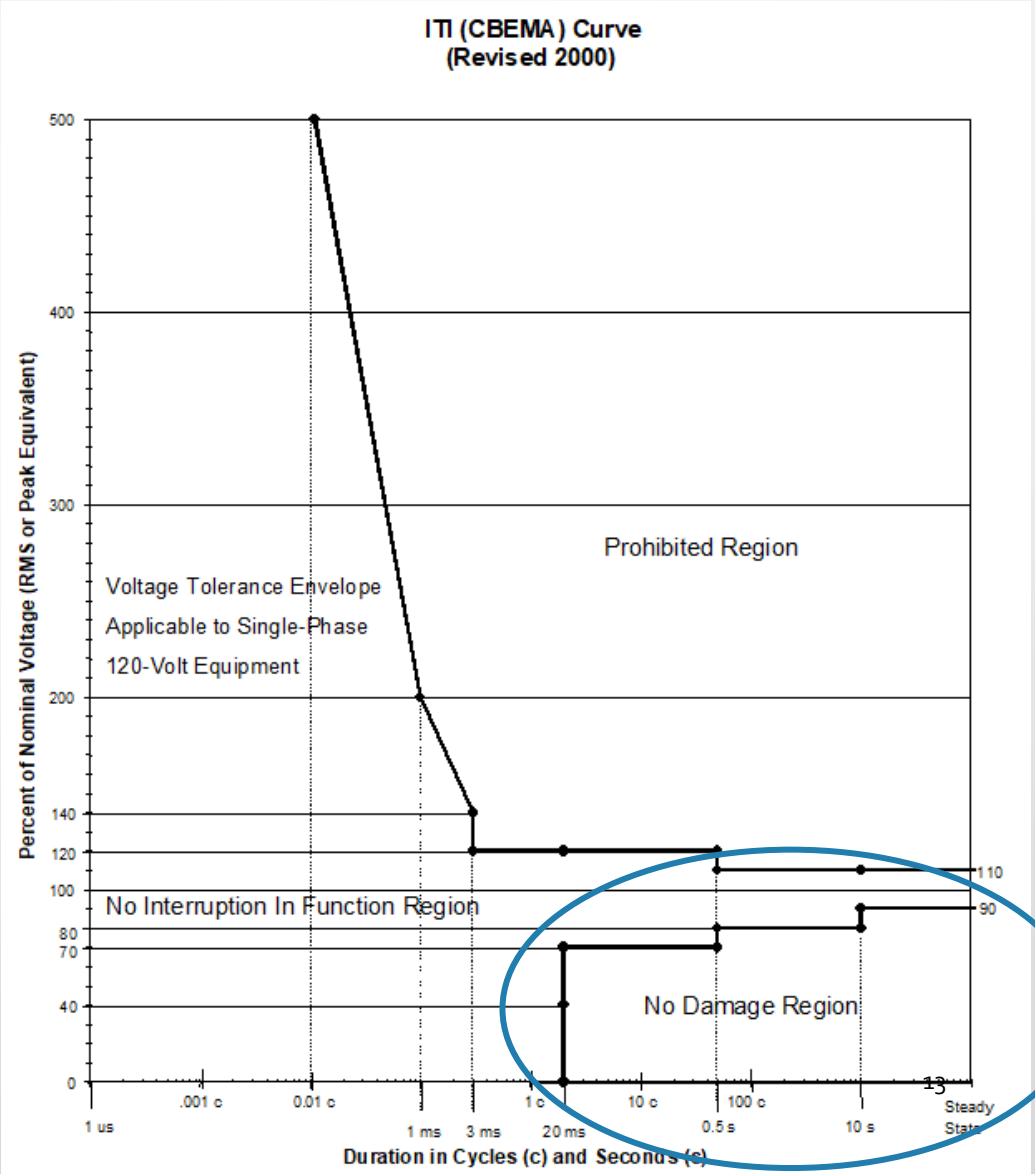
- The acceptable region
  - The region in which the equipment will continue to run without interruption
  - This determines the transfer time for the inverter
  - This will stop the cameras and routers power cycling for short bursts of power interruptions



Source: ITI

Background – ITI (CBEMA) Curve

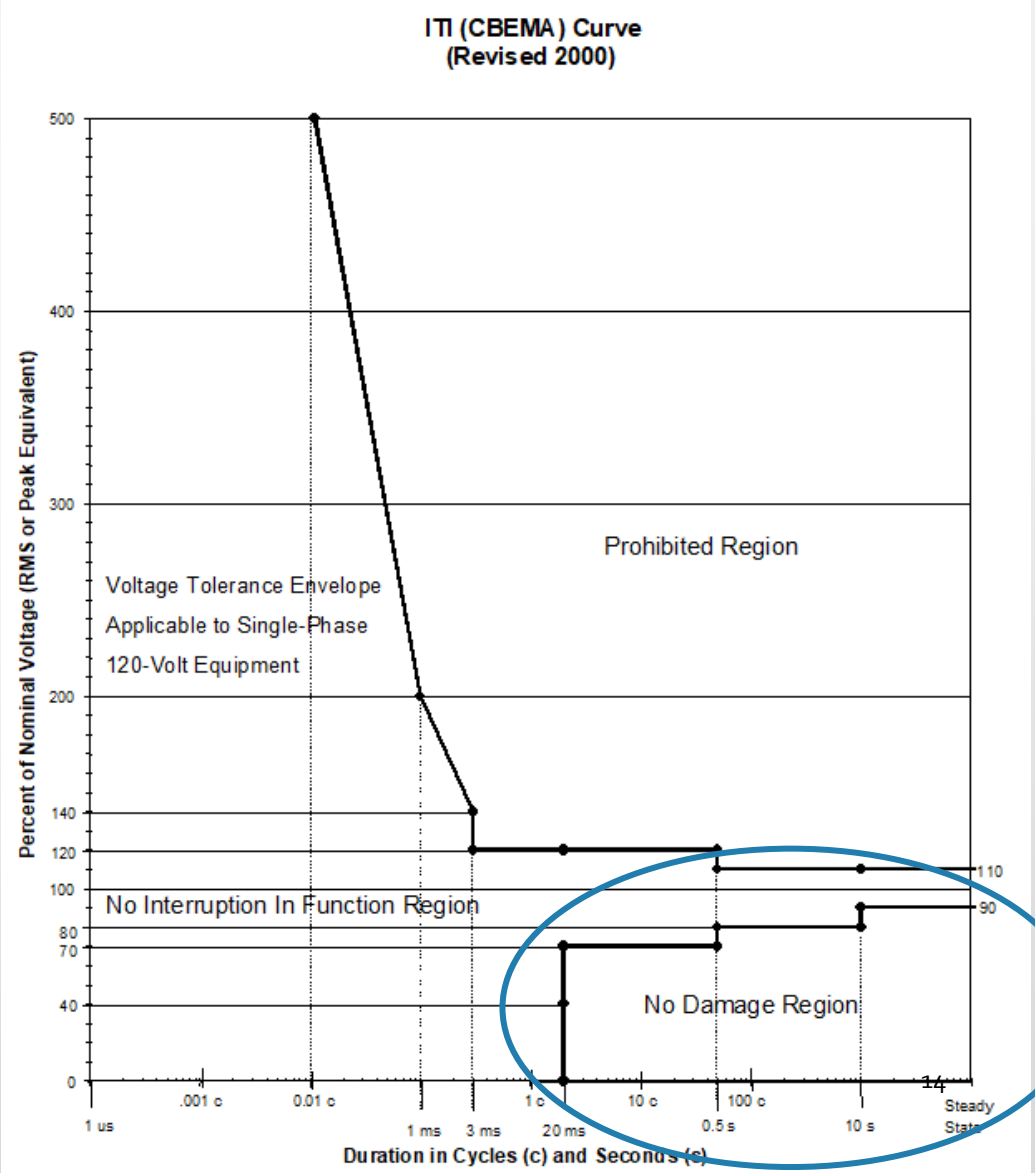
- The curve is broken up into three parts
- The Acceptable Region
- The No Damage Region



Source: ITI

Background – ITI (CBEMA) Curve

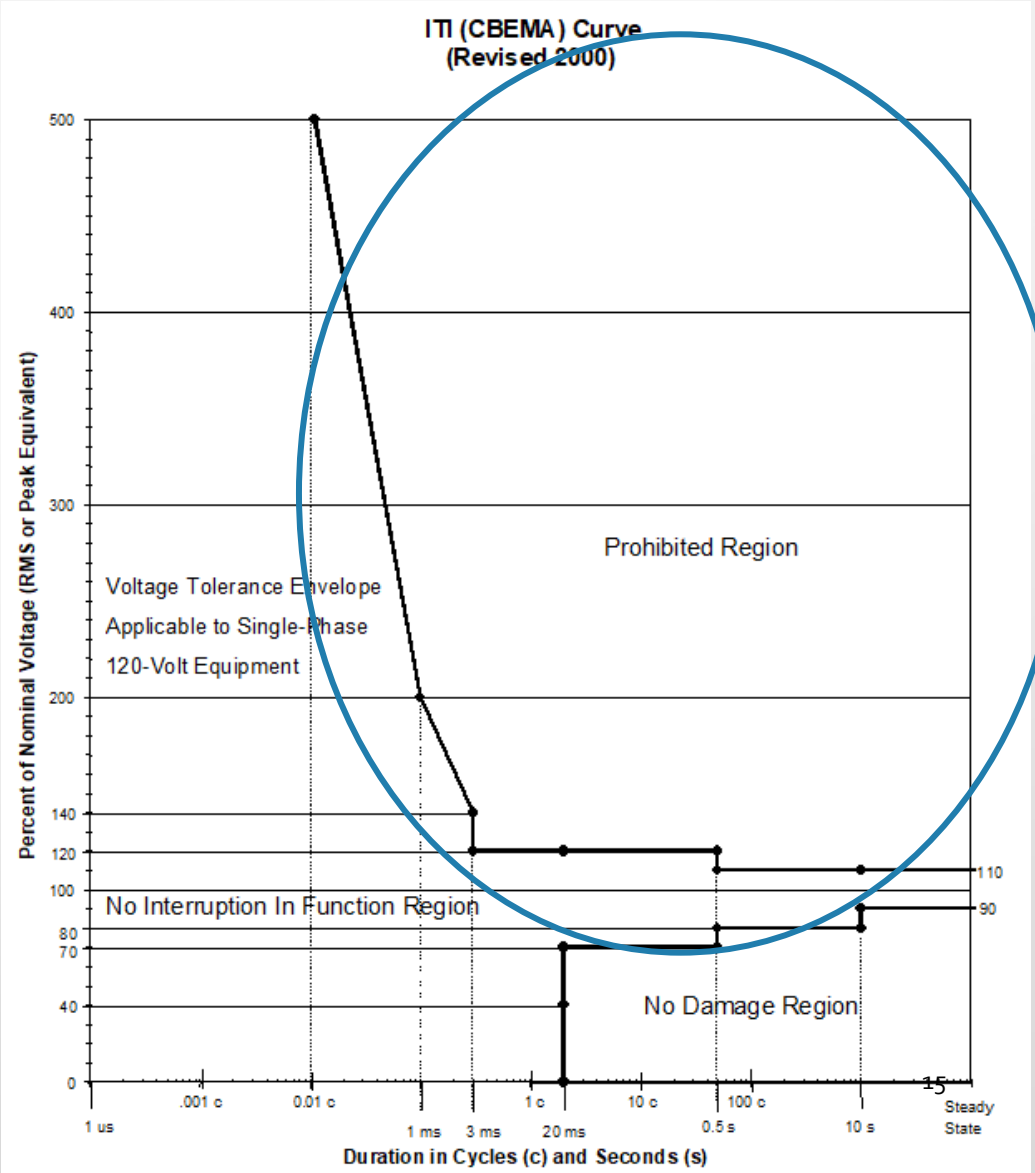
- The "No Damage" region
  - This region is where there will be no damage to the equipment
  - There will still be loss of power to equipment



Source: ITI

Background – ITI (CBEMA) Curve

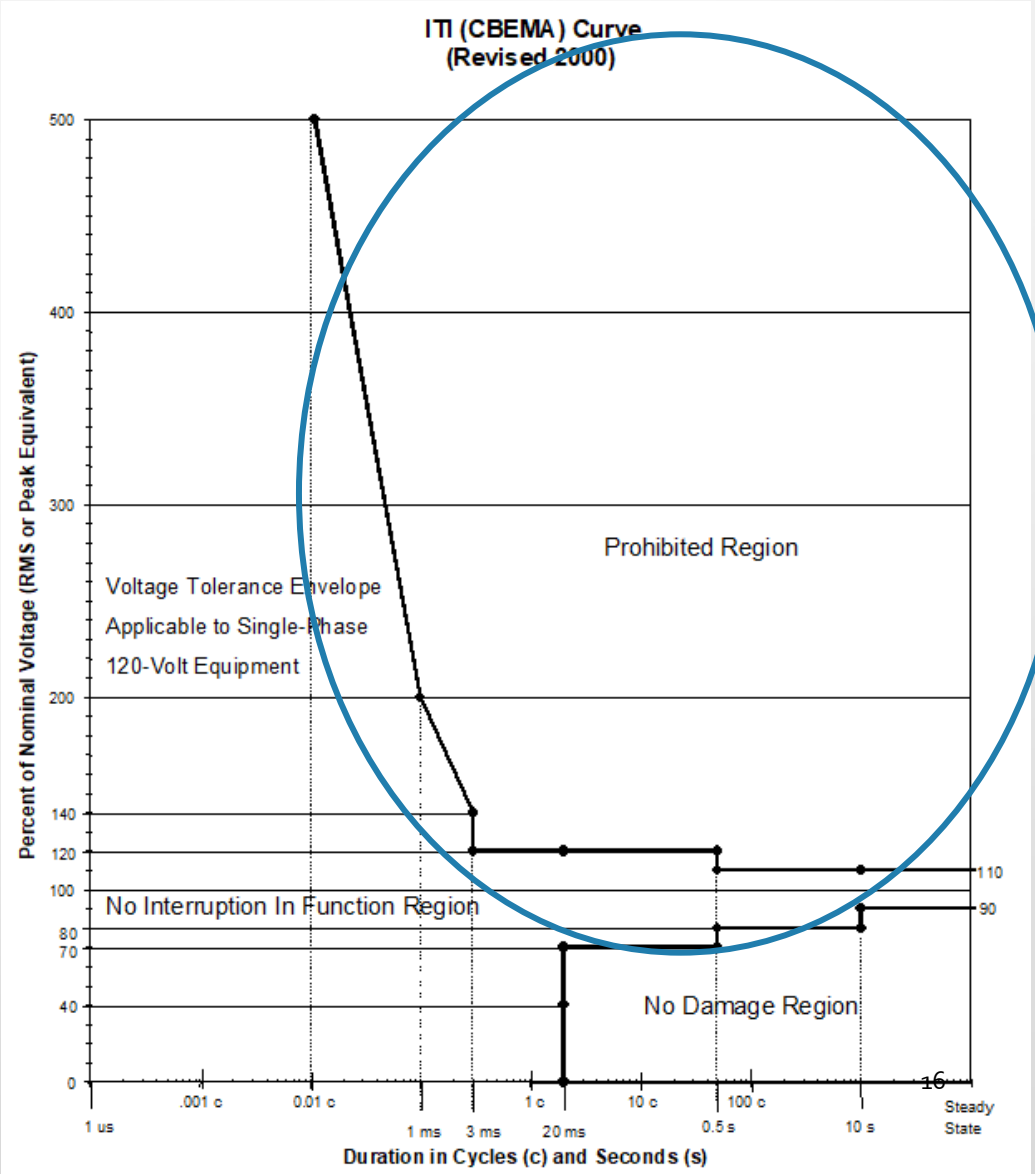
- The curve is broken up into three parts
- The Acceptable Region
- The No Damage Region
- The Prohibited Region



Source: ITI

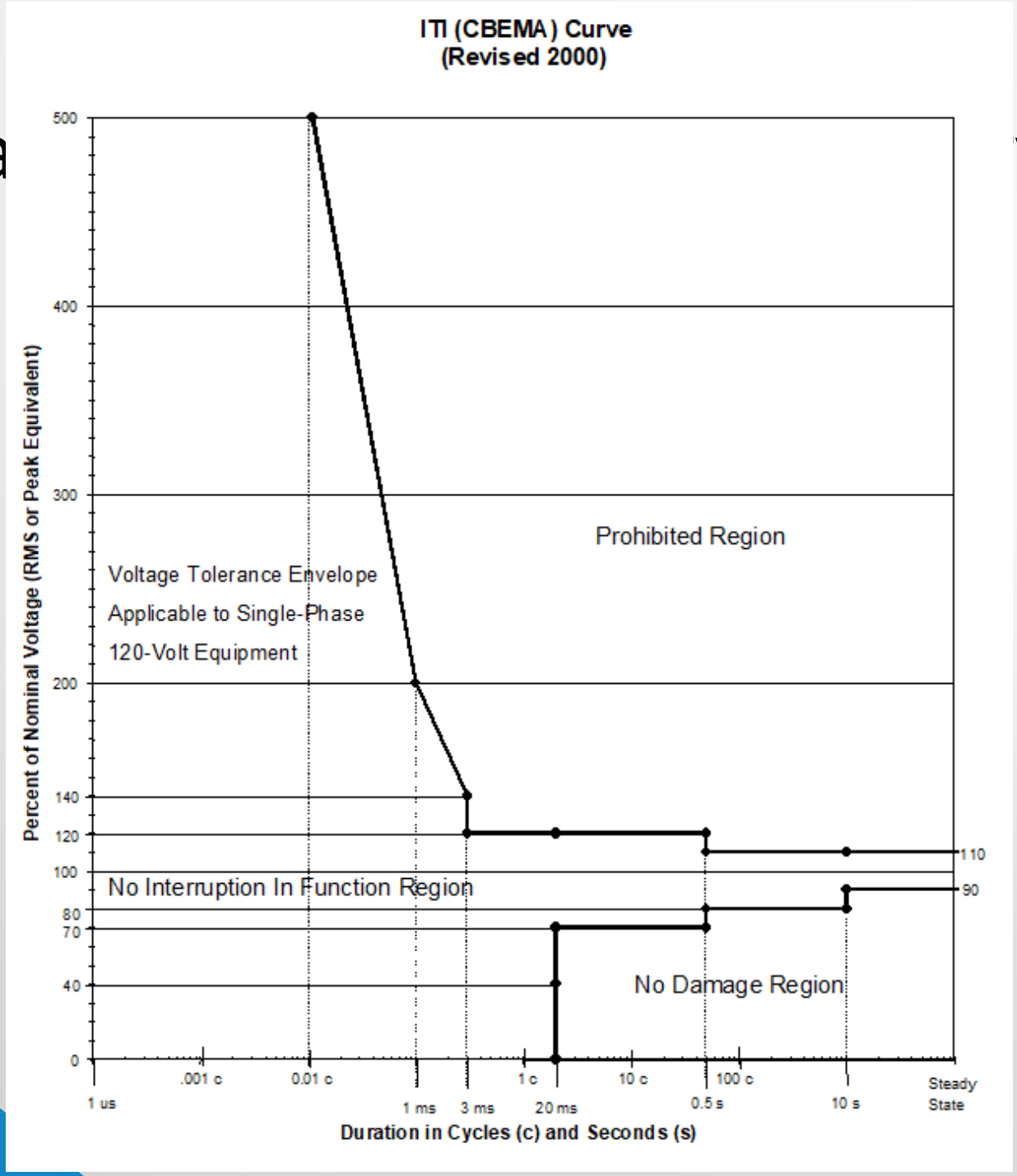
Background – ITI (CBEMA) Curve

- The "Prohibited" region
  - This region is where we would start to see equipment being damaged
  - Want to avoid this region in the curve



Source: ITI

Ba ve



Source: ITI

Background – Other Requirements

- Needs to be rack mountable
- Range of power output for field site 150-500 Watts

Background – Inverter Option 1

- Alpha FXM 1100

Background – Inverter Option 1 Specifications

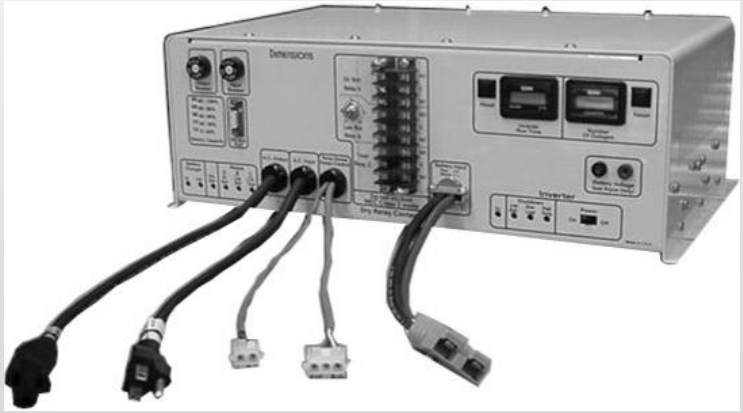
- 1100 Watts
- 20 Amp Input Current
- 15.5 Max Charge Current
- 5 ms Transfer time

Background – Inverter Option 1 Specifications

- W x D x H : 15.5" x 8.75" x 5.22"
- Will default float charge batteries at 54V
- Temperature compensated battery charger -5 mV/°C/Cell
  - User can Adjust between 0 to -6 mV

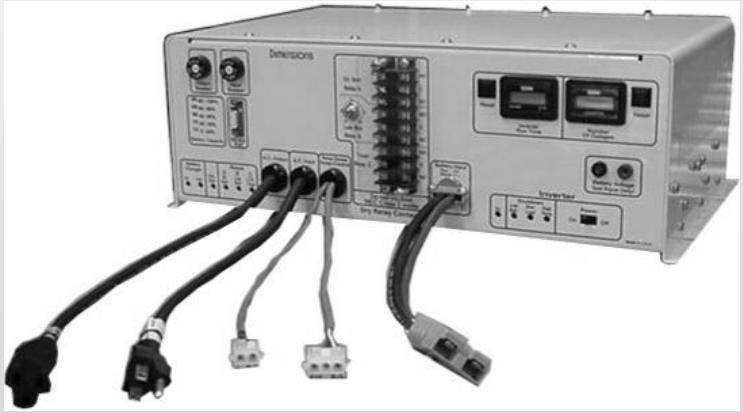
Background – Inverter Option 2

- Made by Dimensions
- What was stocked in the state warehouse



Background – Inverter Option 2 Specifications

- 1100-1700 Watts temperature dependent
- 60 ms Transfer Time
- W x D x H : 16.5" x 12" x 6"
- Temperature compensated battery charger 2.5-4.0 mV/°C



Background – Inverter Option 3

- Myers by Power Products, Inc.
- Previous inverter located at a few sites

Background – Inverter Option 3 Specifications

- 1500 Watts
- Max input current 20 A
- 10 A Max Charge Current
- 7ms Transfer Time
- W x D x H : 17" x 11" x 5.25"

Background – Inverter Chosen

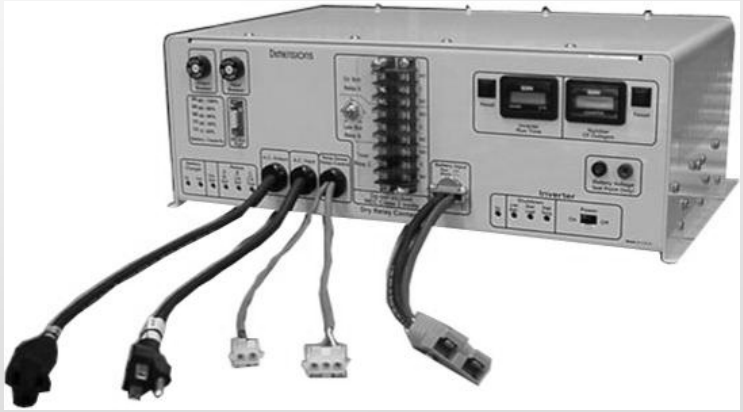
Alpha FXM 1100

- Met ITI(CBEMA) Curve requirements
- Required amount power outputted
- Unit operating temperature within acceptable range

Background – Inverter Chosen

Dimensions ADI-48M17

- Did not met the CBEMA Curve for electronic switching time
- Did not consider due to this



Background – Inverter Chosen

Myers UPS MP2000

- Met the ITI (CBEMA) Curve for electronic switching time
  - By 1.33ms
- Every time a field site would lose power the inverter would go into a fault state that would not power the site after power was restored
- Quality Assurance QA from company seemed to be hit or miss

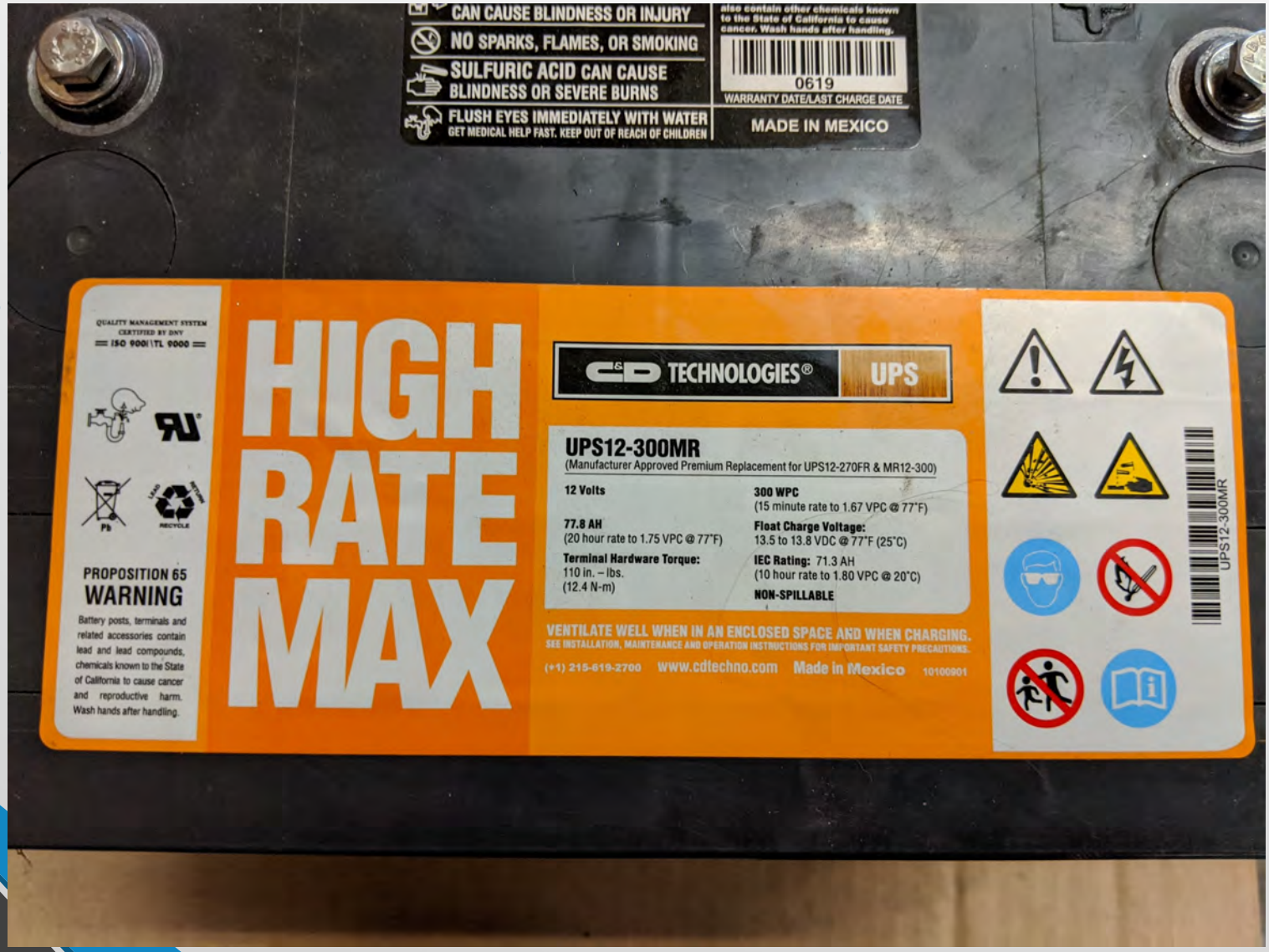
Background – Battery

- UPS Battery chosen
  - Consistent discharge
  - Supports float charge
- Deep Cycle battery not considered
  - Should not be float charged
- Car/mobility battery not considered
  - Short burst of amperage to start engines

Background – Battery

- C&D Technologies UPS12-300MR
- These batteries have an Absorbent Glass Mat to minimize off gassing
  - This avoids pressure building up inside the battery

Background – Battery



Background – Battery

- C&D Technologies UPS12-300MR
- These batteries have an Absorbent Glass Mat to minimize off gassing
  - This avoids pressure building up inside the battery

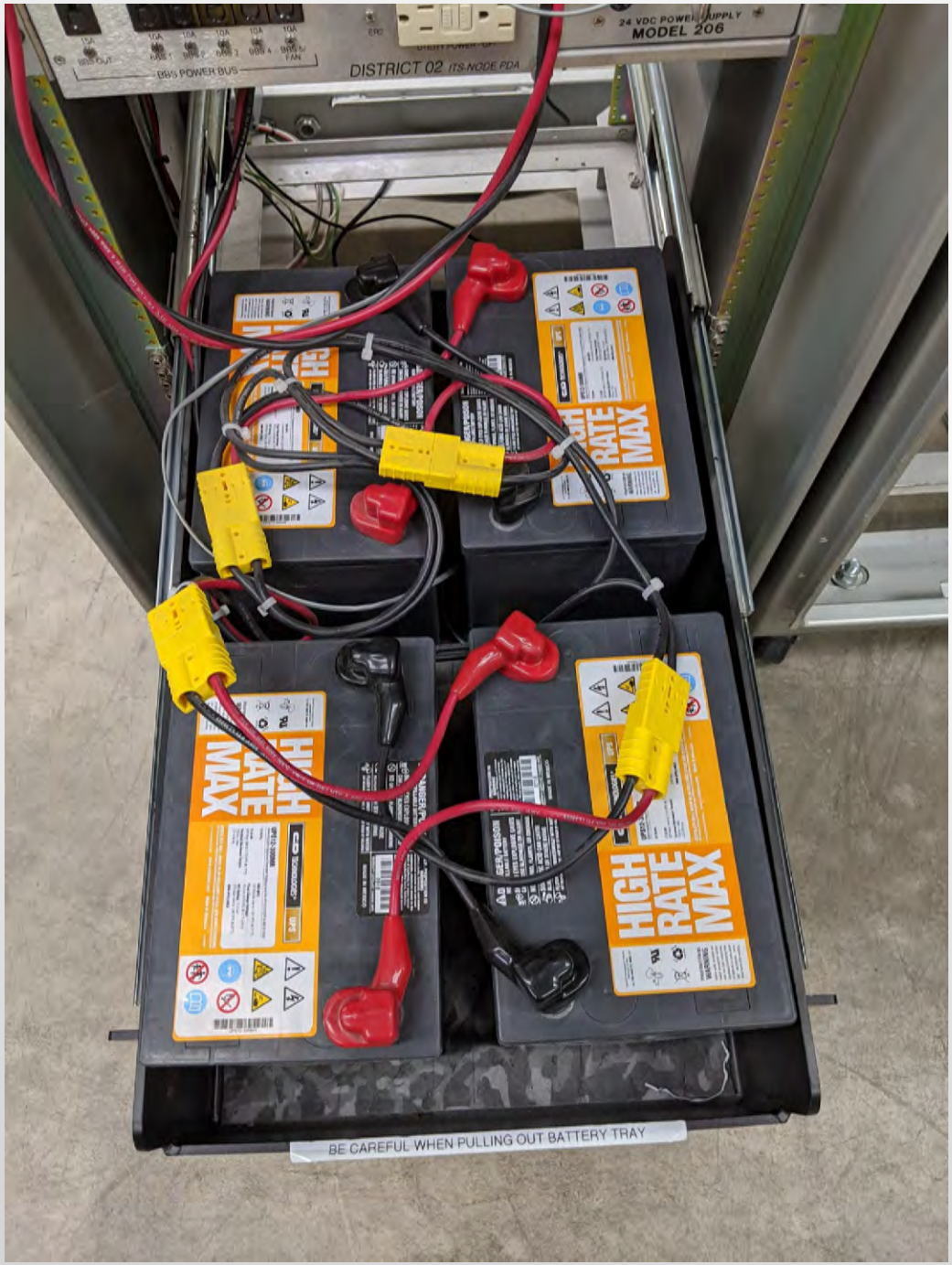
Background – Battery

C&D Technologies UPS12-300MR

- Absorbent Glass Mat (AGM)
  - A thin fiberglass mat inside the battery around the cells
  - Allows the battery to be completely sealed and spill proof
  - Captures the gas inside the battery to minimize off gassing


DANGER/POISON
NON SPILLABLE BATTERY
SHIELD EYES EXPLOSIVE GASES CAN CAUSE BLINDNESS OR INJURY
NO SPARKS, FLAMES, OR SMOKING
SULFURIC ACID CAN CAUSE BLINDNESS OR SEVERE BURNS
FLUSH EYES IMMEDIATELY WITH WATER
GET MEDICAL HELP FAST. KEEP OUT OF REACH OF CHILDREN
CALIF. PROPOSITION WARNING
0619
WARRANTY DATE/LAST CHARGE DATE
MADE IN MEXICO
HIGH RATE MAX
PROPOSITION 65 WARNING
Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.
C&D TECHNOLOGIES®
UPS
UPS12-300MR
(Manufacturer Approved Premium Replacement for UPS12-270FR & MR12-300)
12 Volts
77.8 AH
(20 hour rate to 1.75 VPC @ 77°F)
Terminal Hardware Torque:
110 in. – lbs.
(12.4 N-m)
300 WPC
(15 minute rate to 1.67 VPC @ 77°F)
Float Charge Voltage:
13.5 to 13.8 VDC @ 77°F (25°C)
IEC Rating: 71.3 AH
(10 hour rate to 1.80 VPC @ 20°C)
NON-SPILLABLE
VENTILATE WELL WHEN IN AN ENCLOSED SPACE AND WHEN CHARGING.
SEE INSTALLATION, MAINTENANCE AND OPERATION INSTRUCTIONS FOR IMPORTANT SAFETY PRECAUTIONS.
(+1) 215-619-2700 www.cdtechno.com Made in Mexico 10100091
UPS12-300MR

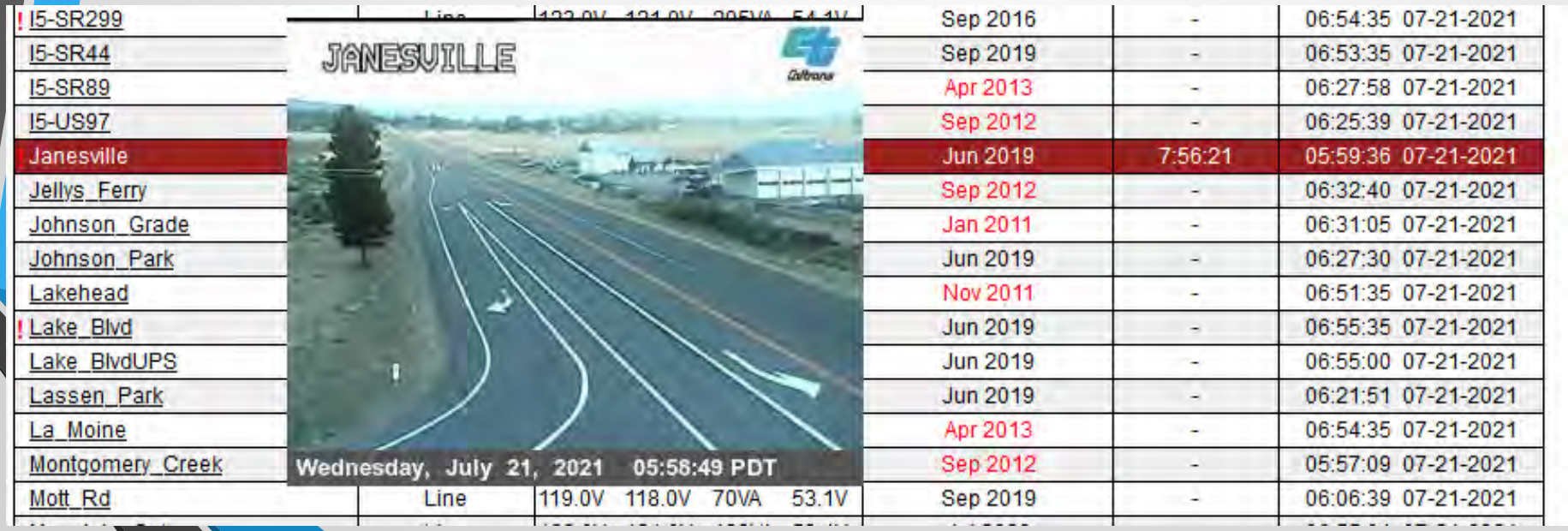

M35173 - 5 AMP
FLASHING BEACON CONTROL ASSEMBLY
FBC1
FBC2
FBC3
FBC4
McCain
alpha
MODEL 206L
DISTRICT 02


DISTRICT 02 ITS-NODE PDA
MODEL 206
HIGH RATE MAX
BE CAREFUL WHEN PULLING OUT BATTERY TRAY


HIGH RATE SERIES
HIGH RATE SERIES
HIGH RATE SERIES
HIGH RATE SERIES

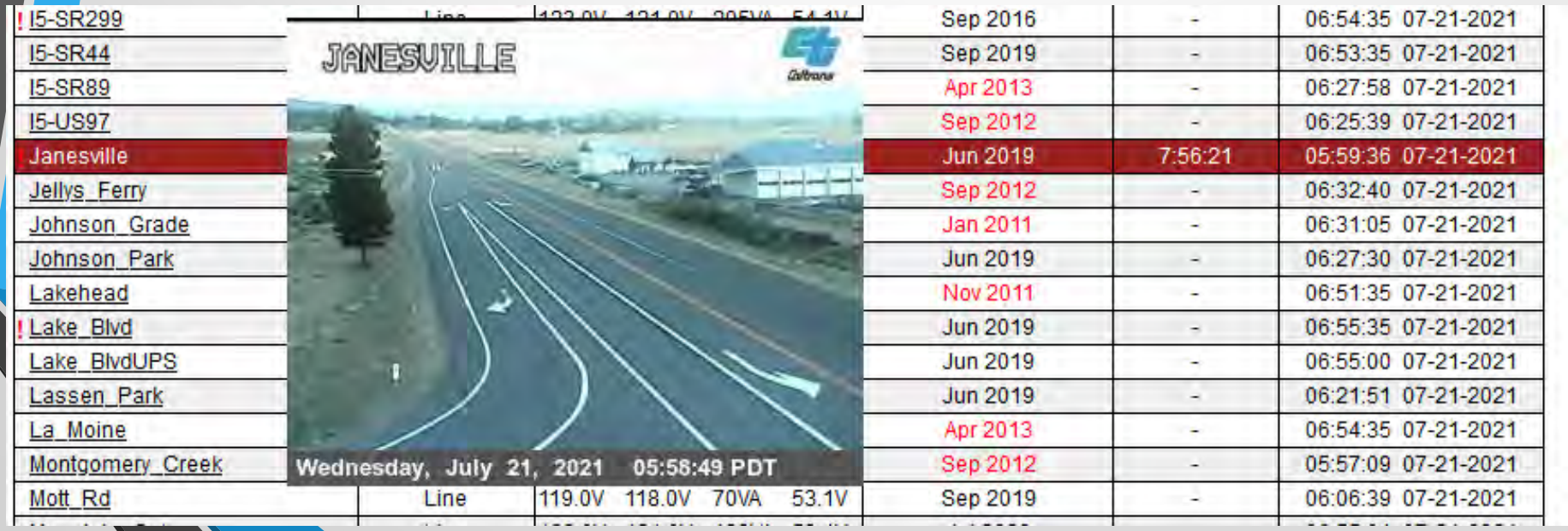
Background – Results

- Hardware at field sites maintain power when short bursts of power loss
- Cameras not going through start up procedure and oriented in useable home direction



Background – Results

- Less time re-aiming cameras
- Routers not losing flash and not power cycling

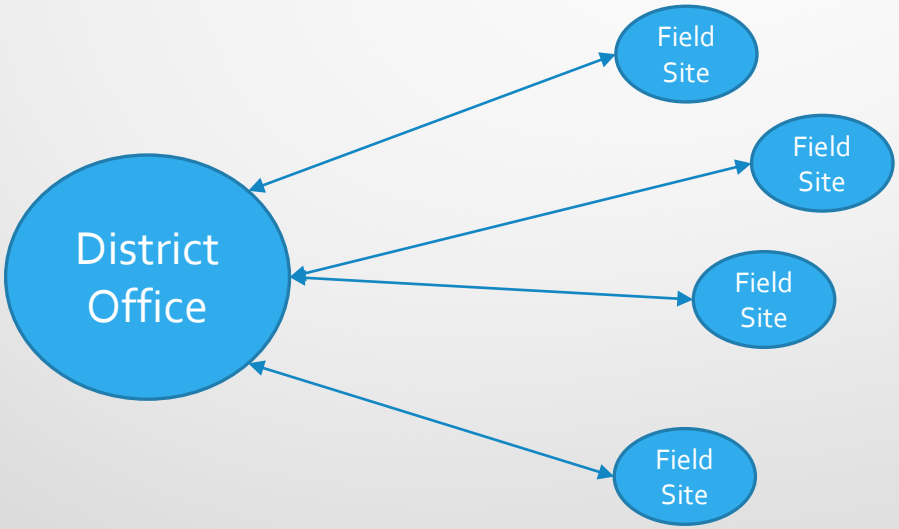


Relay Project Initiated

- Retrieve Current Power Status
- Maintain power history for each field site for trends
- Display on web based Graphical User Interface (GUI)

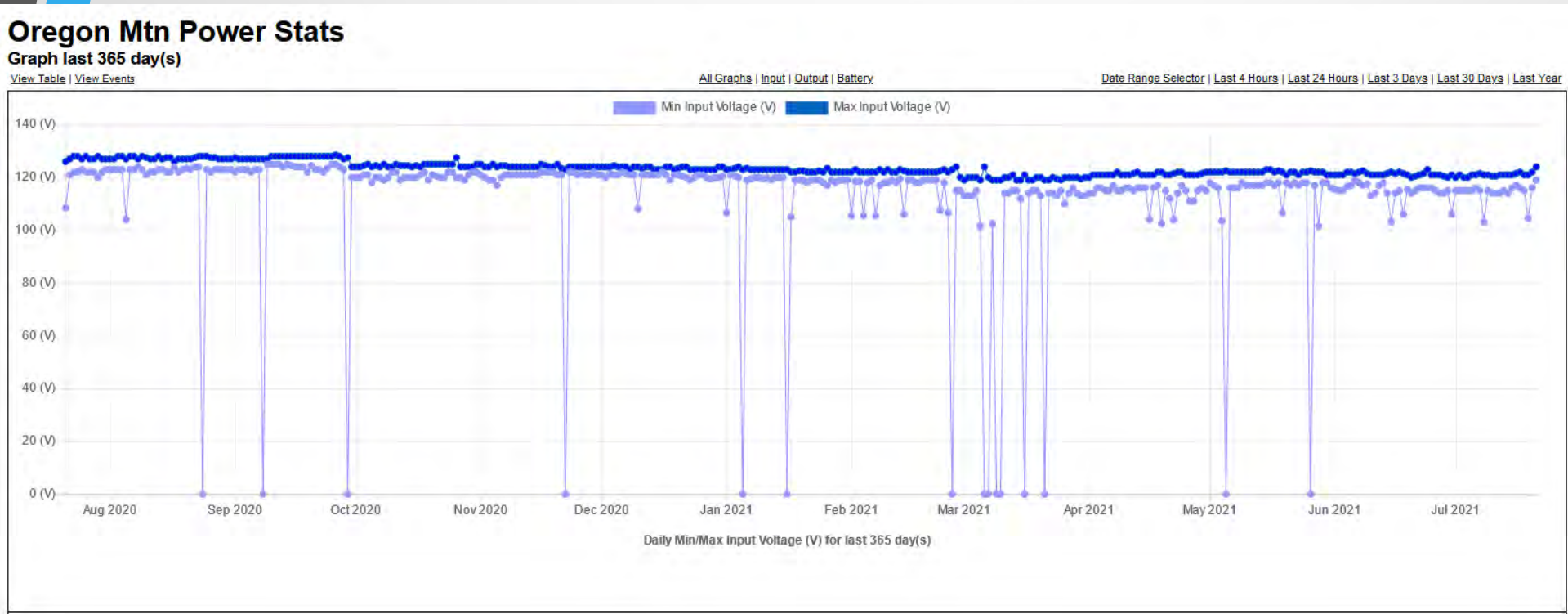
Relay Project – Power Status

- From the District office retrieve the current power status of a field site



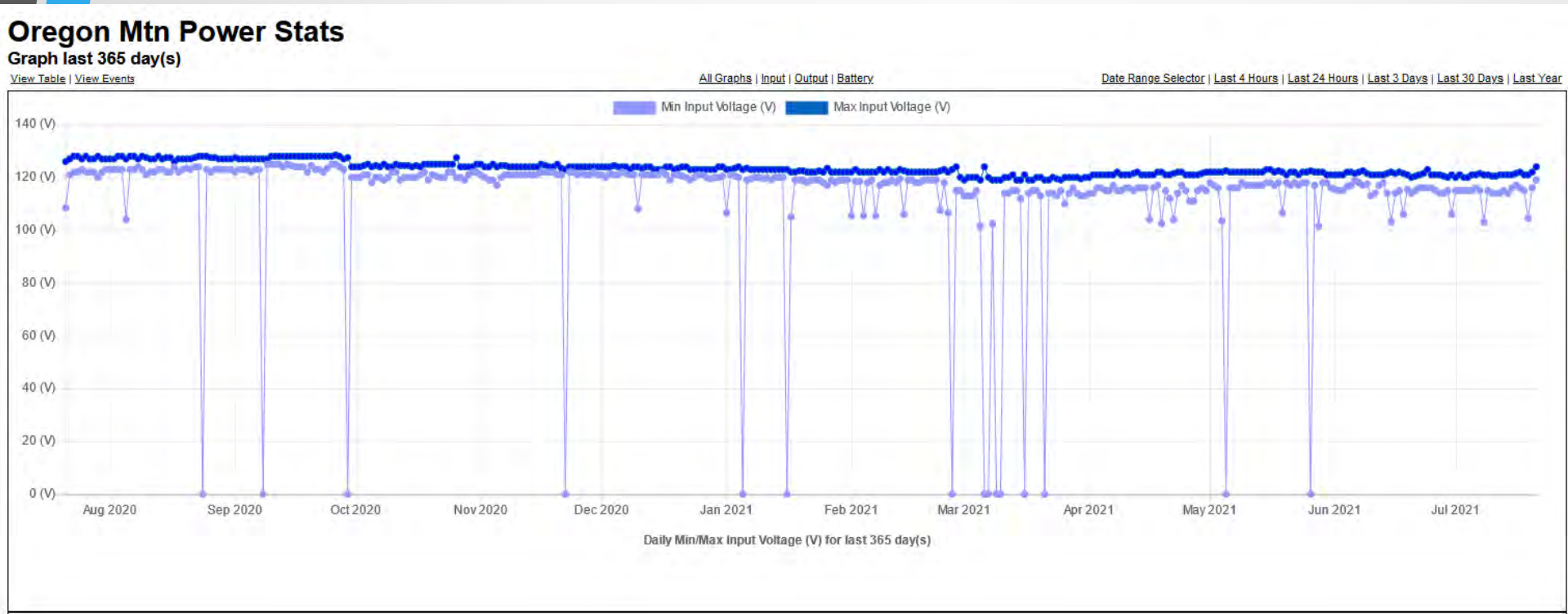
Relay Project – Power History

- Store the power status retrieved to see trends on a site-by-site basis



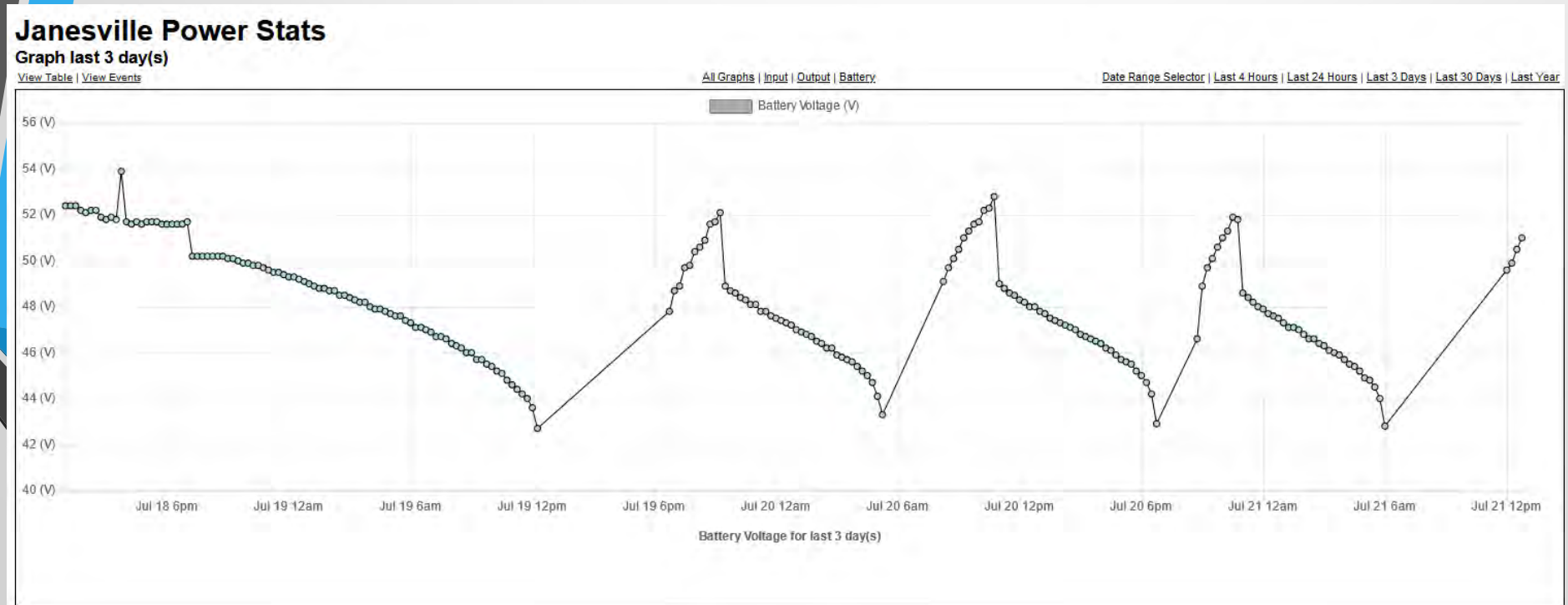
Relay Project – Web GUI

- Power failure at field site and running on Battery Backup
- Power trend history graphs



Relay Project – Web GUI

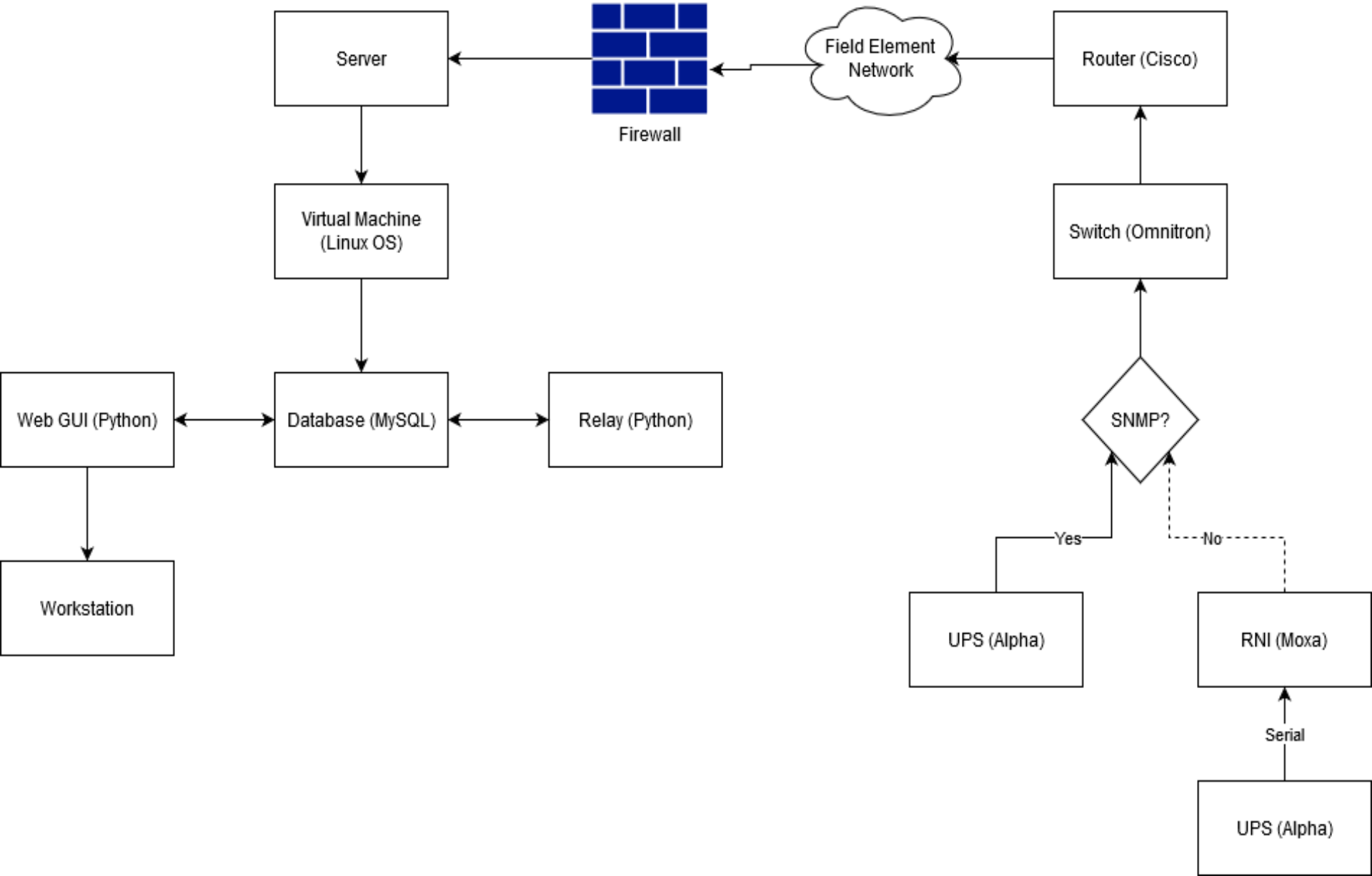
- Battery Status
  - Estimated time before total power loss
  - Age of Batteries, Replacement history



Design

- Hardware used
- Communications to the Alpha FXM 1100
- Software used for development

Design

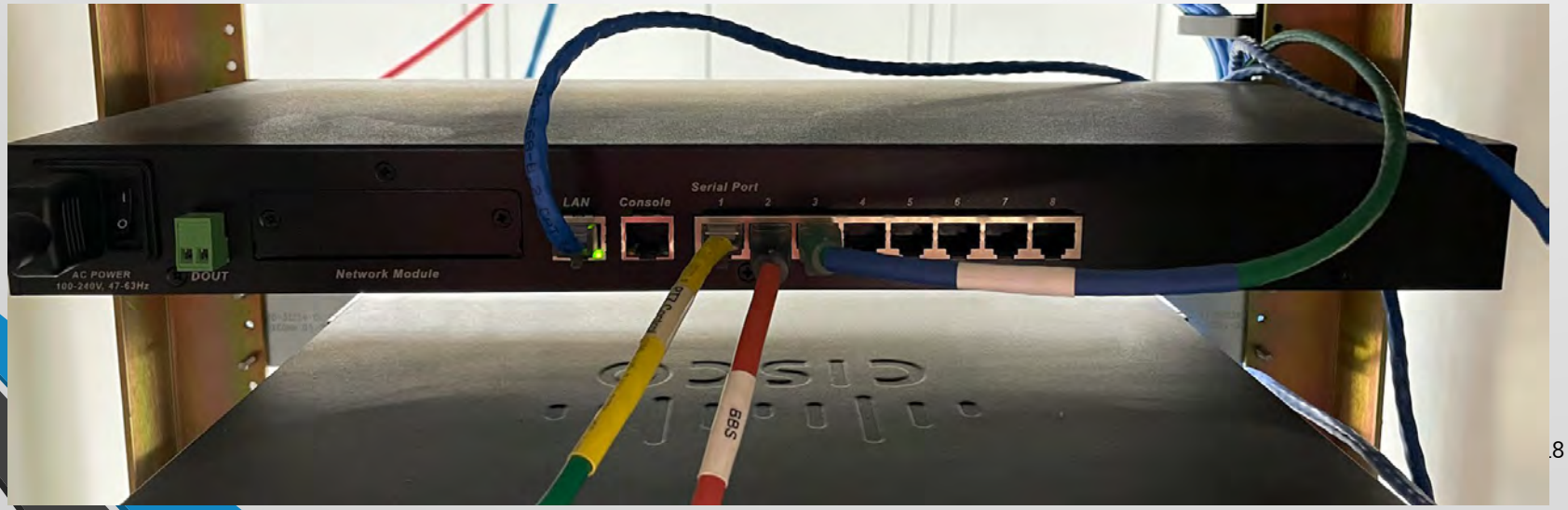

Server
Firewall
Field Element Network
Router (Cisco)
Virtual Machine (Linux OS)
Switch (Omnitron)
Web GUI (Python)
Database (MySQL)
Relay (Python)
SNMP?
Workstation
Yes
No
UPS (Alpha)
RNI (Moxa)
Serial
UPS (Alpha)

Design – Hardware

- Webserver hosted on a Virtual Machine (VM)
- Alpha FXM 1100
- Moxa at field site
  - Needed for communications to the Alpha

Design – Hardware

- Moxa at field site
  - Existing device at field sites used for PTZ of our cameras
  - It has multiple ports
  - Utilize port 2 of Moxa for communication to Alpha



Design – Communications

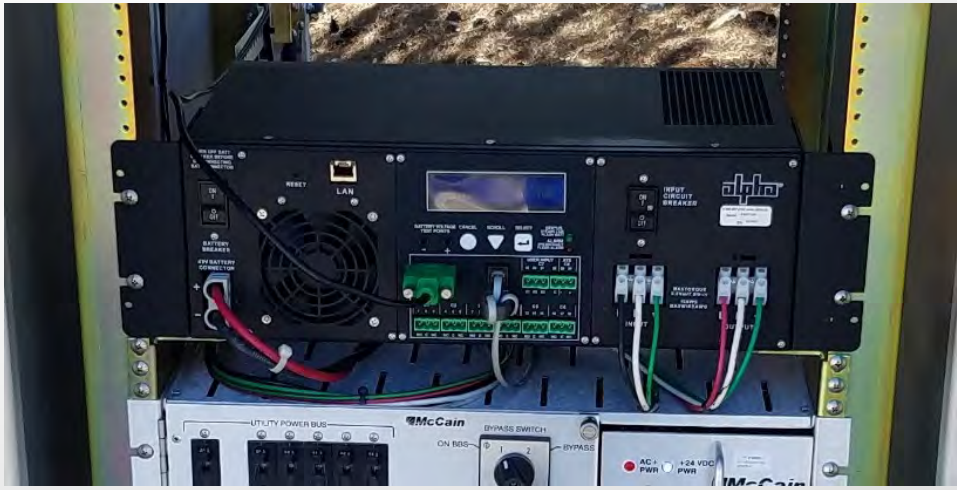
- Serial Communication

Desi ions

- Serial Comm

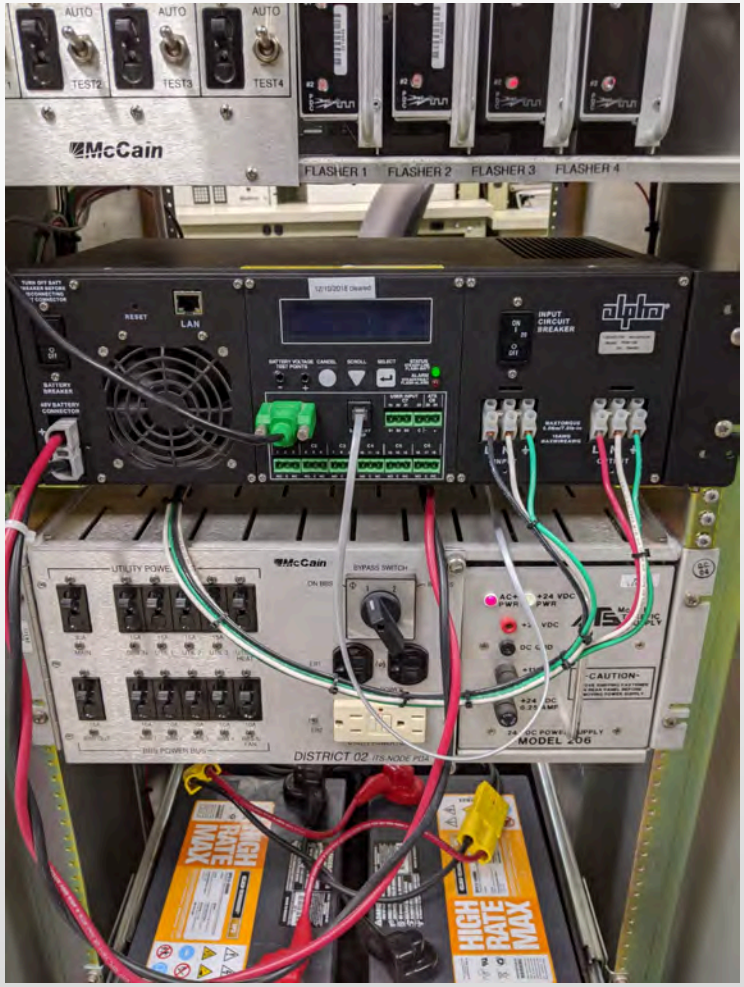
Design – Communications

- Serial Communication
  - Cable from ITS Node to BBS Cabinet
  - Moxa port configured for communications to Alpha
  - This is only way to communicate to older units as they do not have ethernet port



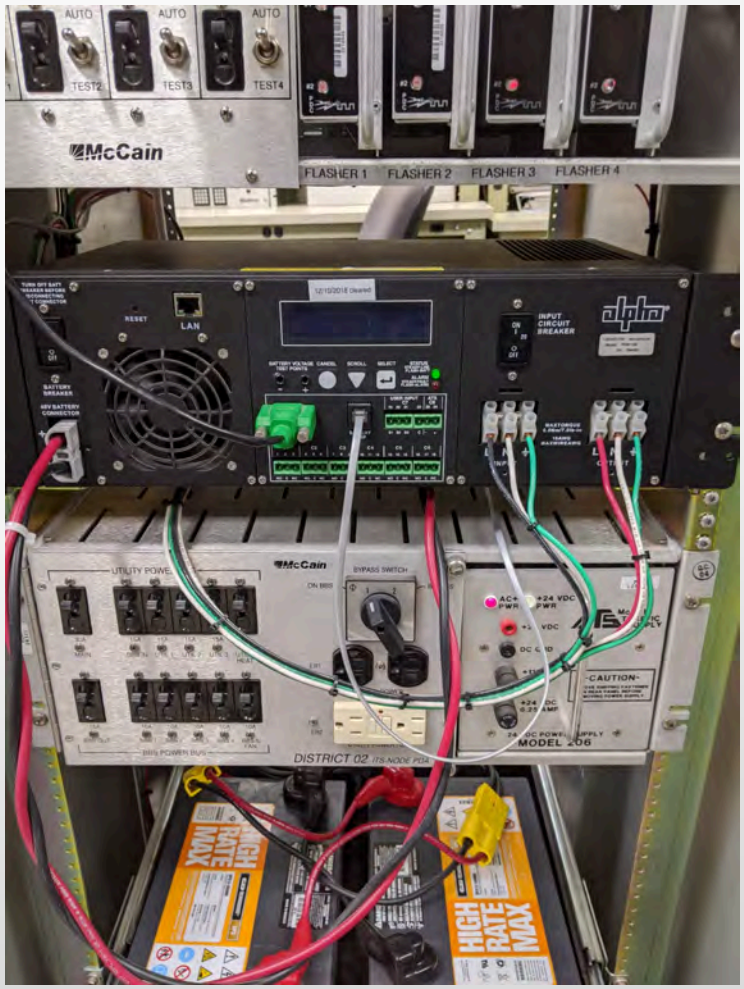
Design – Communications

- Serial Communication (PROS)
  - Allows for event history.
  - Limited information.
  - Provides Power States, Alarm, and Faults.
  - No Alpha configuration needed.



Design – Communications

- Serial Communication (CONS)
  - Power States, Alarms and Faults are in Binary and need to be parsed and converted to text.
  - POTS sites can timeout and not receive entire file resulting in missing information.

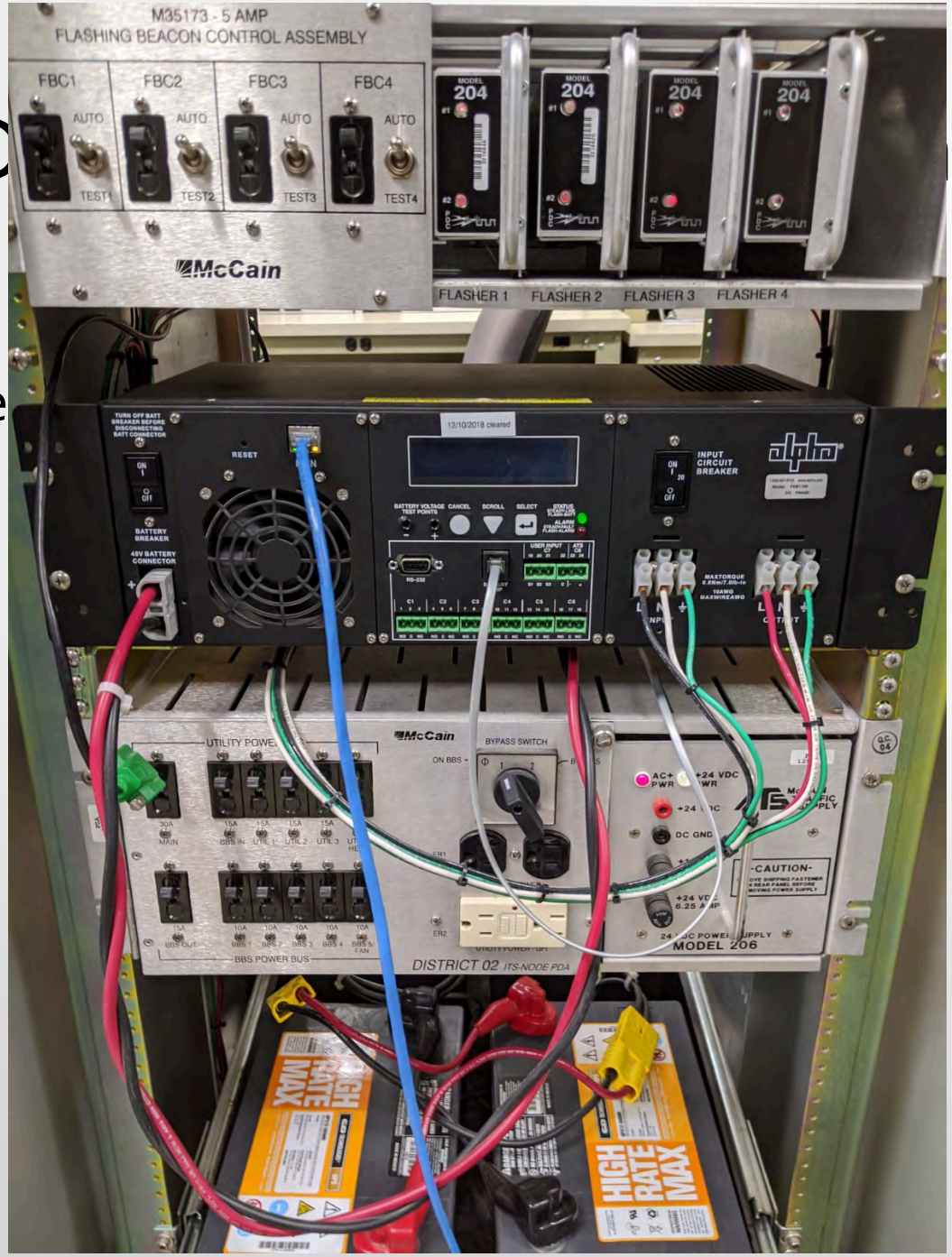


Design – Communications

- Ethernet

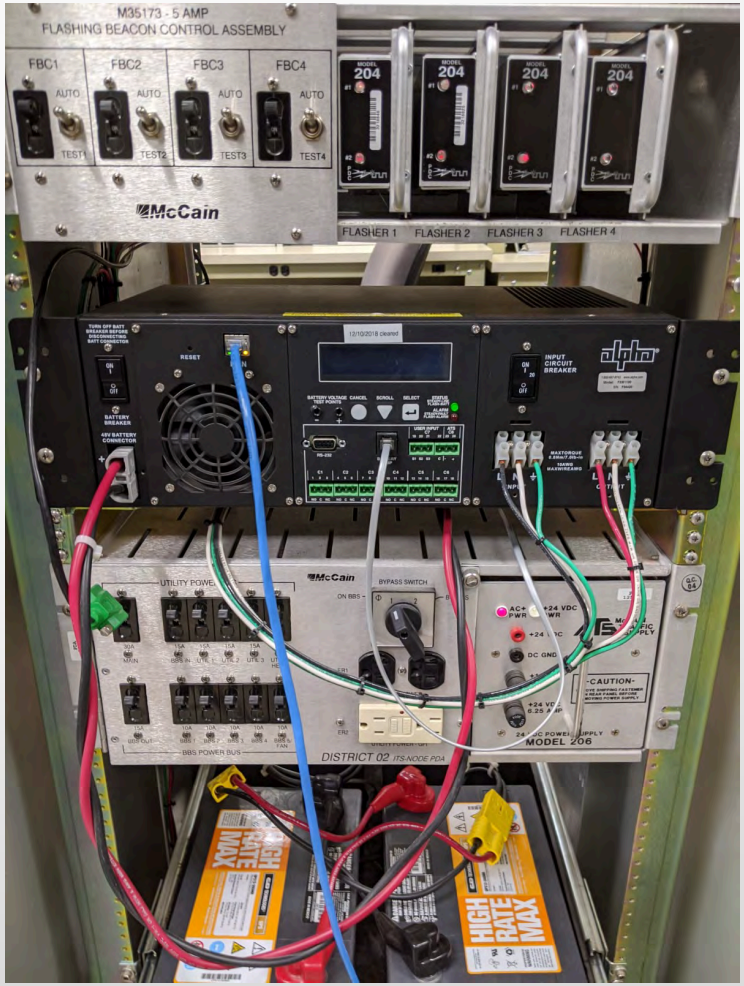
D s

- Etherne


M35173 - 5 AMP
FLASHING BEACON CONTROL ASSEMBLY
FBC1
FBC2
FBC3
FBC4
AUTO
TEST1
TEST2
TEST3
TEST4
McCain
MODEL 204
FLASHER 1
FLASHER 2
FLASHER 3
FLASHER 4
alpha
INPUT CIRCUIT BREAKER
BATTERY BREAKER
48V BATTERY CONNECTOR
RESET
12/10/2018 cleared
BYPASS SWITCH
UTILITY POWER
BBS POWER BUS
-CAUTION-
MODEL 206
DISTRICT 02 ITS-NODE PDA
HIGH RATE MAX

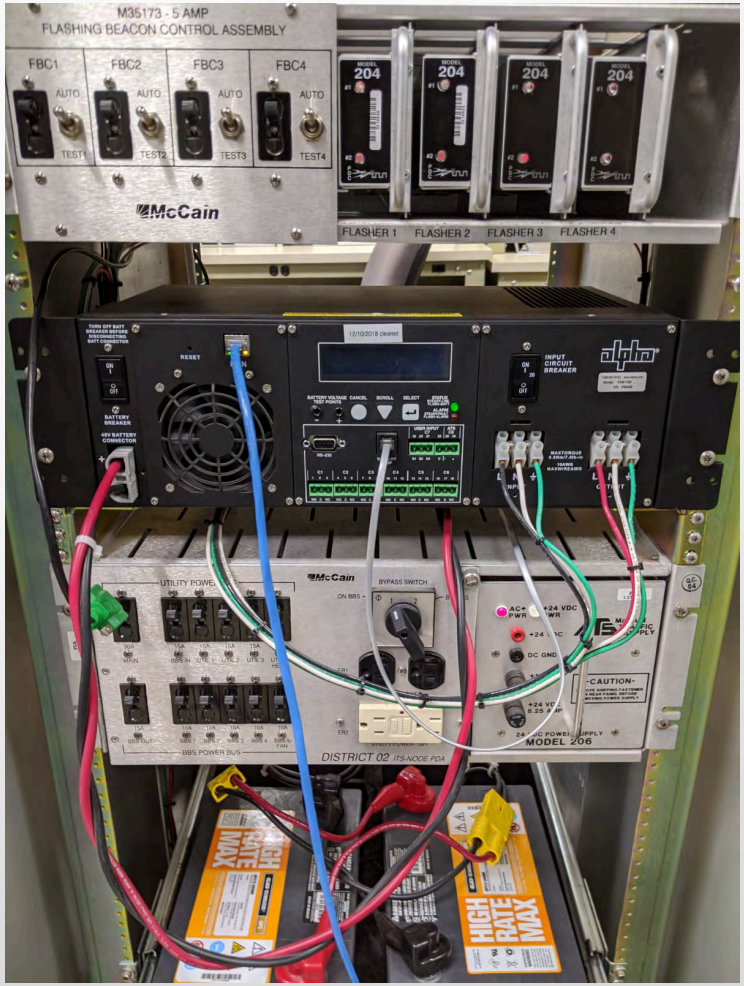
Design – Communications

- Ethernet
  - Newer Alpha comes with ethernet port
  - Allows for SNMP
  - Does not need the Moxa
  - Still supports serial communications



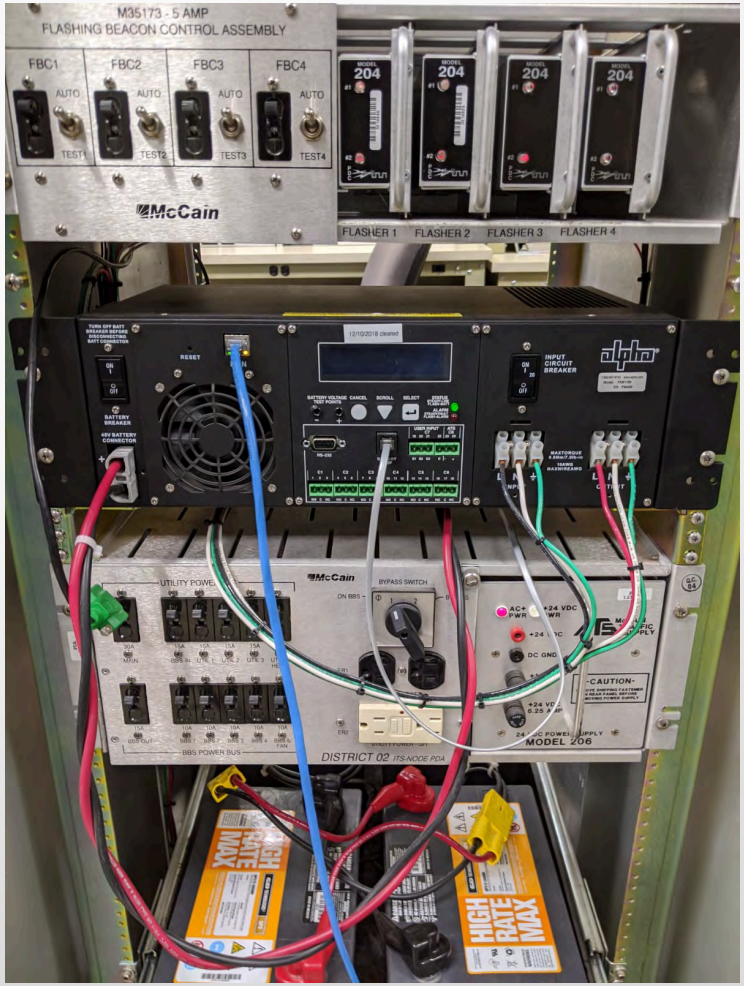
Design – Communications

- Ethernet (PROS)
  - Can provide more information*
  - Power states, Alarms and Faults can be read in either binary or string format
  - Faster resulting in less timeouts and missing data
  - Can access web interface



Design – Communications

- Ethernet (CONS)
  - Unable to retrieve an event history with SNMP
  - Unit must be configured before it is usable

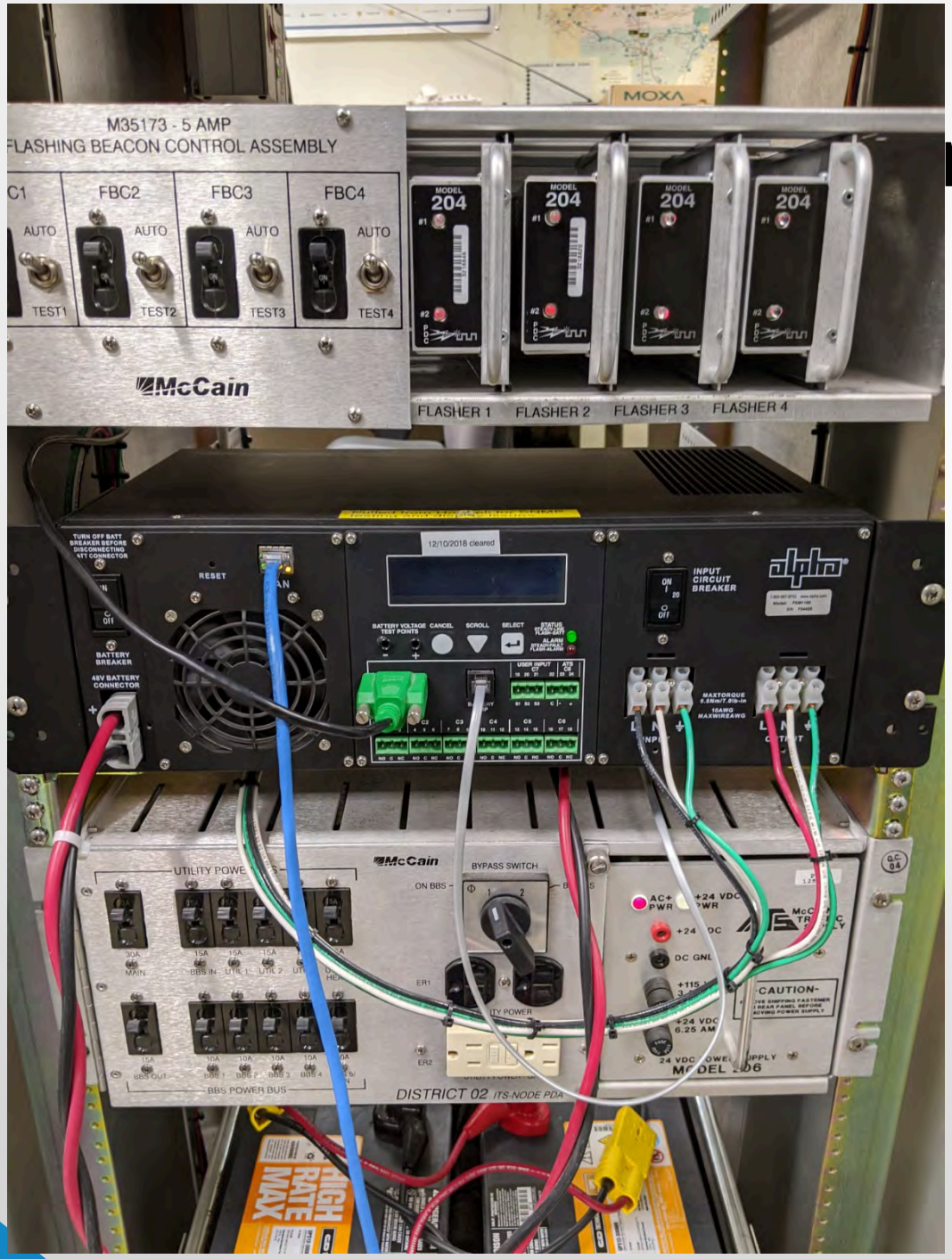


Design – Communications

- Both

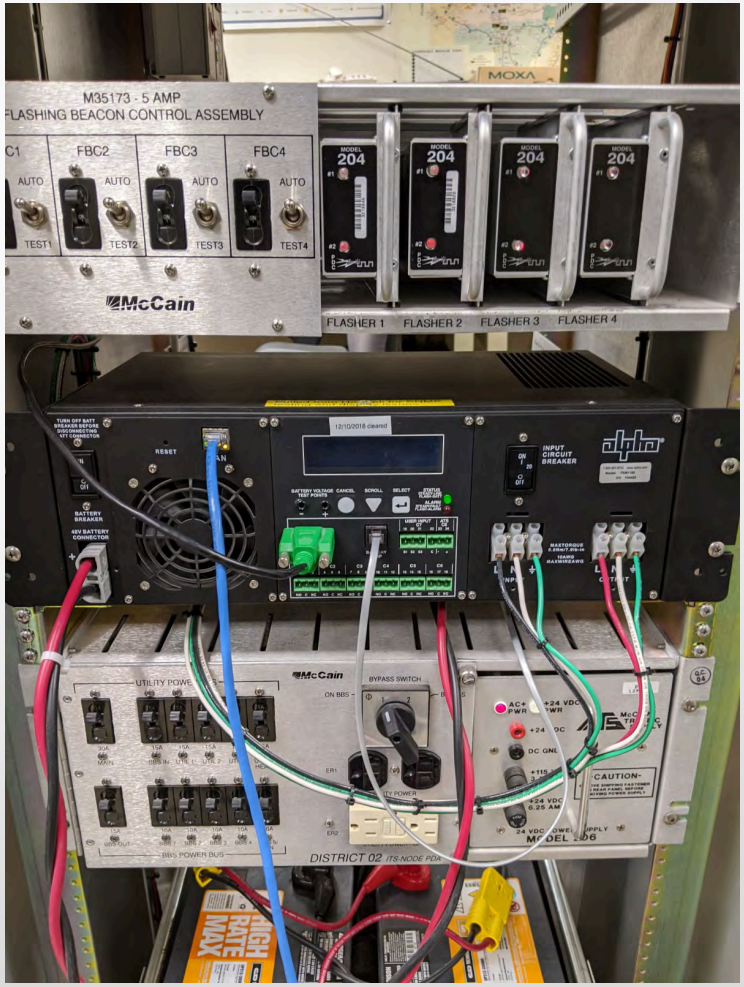
ns

- Both


M35173 - 5 AMP
FLASHING BEACON CONTROL ASSEMBLY
FBC1
FBC2
FBC3
FBC4
AUTO
TEST1
TEST2
TEST3
TEST4
McCain
MOXA
MODEL 204
FLASHER 1
FLASHER 2
FLASHER 3
FLASHER 4
12/10/2018 cleared
INPUT CIRCUIT BREAKER
alpha
BATTERY BREAKER
48V BATTERY CONNECTOR
BYPASS SWITCH
ON BBS
UTILITY POWER
BBS POWER BUS
DISTRICT 02 ITS NODE PDA
CAUTION
HIGH RATE MAX

Design – Communications

- Both
  - Fast polling due to SNMP
  - Still have terminal access via serial connection



Design – Software

- Linux Ubuntu 18.04LTS
- Apache2
- MySQL
- Interpreted Scripting Language

Design – Software

- Ubuntu 18.04LTS
  - Less resources needed to run Linux Operating System (OS)
  - Easy to configure and develop on
  - Newest stable version
  - Easy to install

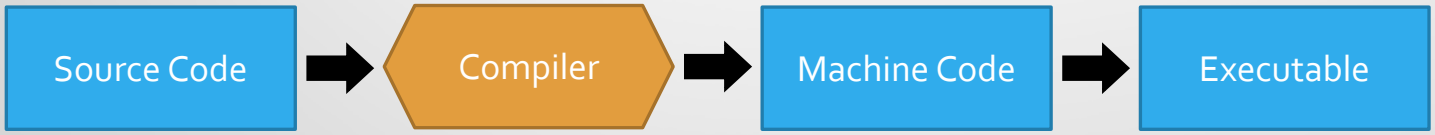
Source: Wikipedia

Design – Software

- Apache2
  - Reliable
  - Most successful web server
  - Runs on multiple operating systems
- MySQL
  - Scalable
  - High Performance

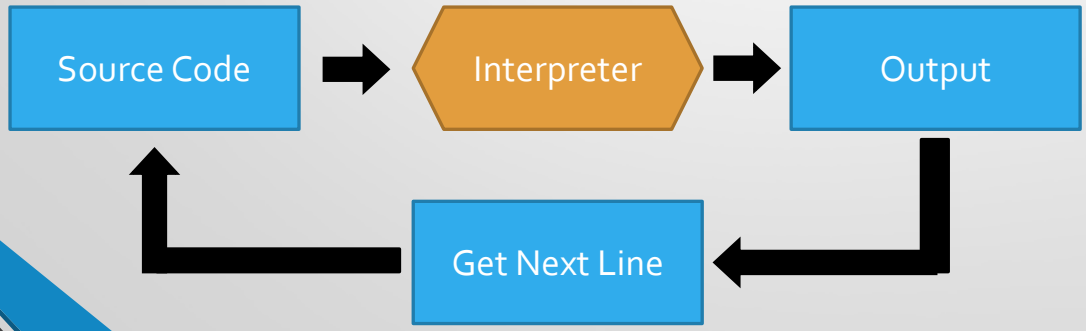
Design – Software

- Compiled language
  - C or C++
  - Fast
  - Source code protected



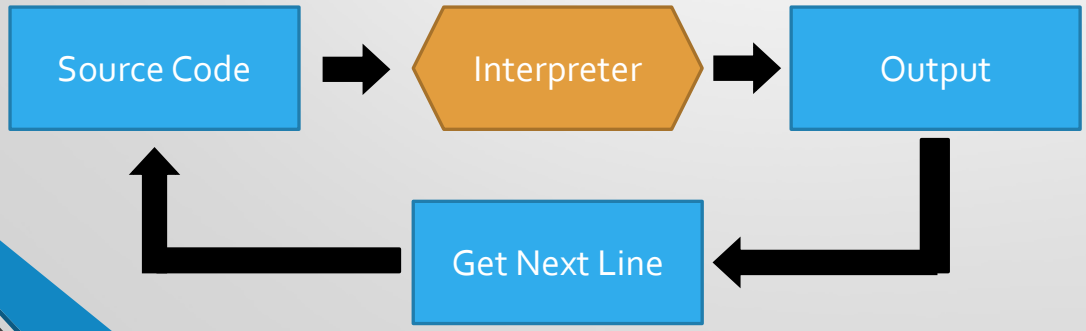
Design – Software

- Interpreted Scripting Language
  - Python and Perl
  - Good for development
  - Source code can be modified during runtime
    - Increasing effectiveness of debugging



Design – Software

- Interpreted Scripting Language
- Considerations
  - Python2
  - Perl



Design – Software

Python2

- Advantages
  - Familiarity
  - Good Support

Design – Software

Python2

- Advantages
  - Multiple modules to choose from
    - SNMP retrieval
    - Database integration
  - Good Thread Support

Design – Software

Python2

- Disadvantages
  - Slower then compiled language
  - Uses more memory

Design – Software

Perl

- Advantages
  - Good Support
  - Multiple modules to choose from
  - Good String manipulation

Source: Wikipedia

Design – Software

Perl

- Disadvantages
  - Unfamiliar
  - Slower then compiled language
  - Uses more memory

Source: Wikipedia

Design – Software

- Python2 chosen
  - Use of User Defined Functions
  - Familiarity
  - Better Thread Handling


Mt. Hebron, Lava Fire, June 2021

Implementation

- Deploy and establish communications to Alpha
- Database architecture and management
- Third party applications needed
- Process management options
- Programming languages used

Implementation – Deployment

Implementation – Deployment

- Older Alpha unit
- Most field sites have this unit
- Serial communication from Moxa only
- Firmware cannot be upgraded past 1.08.72 without issues

Implementation – Deployment

Implementation – Deployment

- Newer Alpha units
- Few field sites have this unit
- Comes with ethernet port allowing Simple Network Management Protocol (SNMP)
- Supports Serial communication from Moxa
- Firmware support to current firmware of 2.01.00

Implementation – Database

- MySQL used for local database
- Multiple tables were needed
  - Field Site configuration table
  - Current Power and Status tables
  - Running Power and Status tables

Database – Field Site Config

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	**Key**	int(4)			No	*None*		
2	**Site**	text	utf8_general_ci		No	*None*		
3	**IP**	varchar(13)	utf8_general_ci		No	*None*		
4	**Port**	int(4)			Yes	*NULL*		
5	**CommType**	varchar(10)	utf8_general_ci		No	*None*		
6	**Timeout**	int(3)			Yes	*NULL*		
7	**AlphaCommType**	varchar(6)	utf8_general_ci		No	*None*		
8	**ExStartMin**	int(2)			No	*None*		
9	**ExOffset**	int(2)			No	*None*		
10	**DateFrmt**	varchar(8)	utf8_general_ci		Yes	*NULL*		
11	**Down**	tinyint(1)			No	*None*		
12	**PingTO**	smallint(3)			Yes	*NULL*		
13	**Firmware**	tinytext	utf8_general_ci		No	*None*		
14	**CertUpdate**	tinyint(1)			No	0		
15	**RunningFlag**	tinyint(1)			No	0		
16	**Timestamp**	timestamp		on update CURRENT_TIMESTAMP	No	CURRENT_TIMESTAMP		ON UPDATE CURRENT_TIMESTAMP
17	**BattInstall**	date			Yes	*NULL*		
18	**CCTV**	tinyint(1)			No	*None*		

Database – Current Event

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	**sitekey**	int(4)			Yes	*NULL*		
2	**sitename**	varchar(25)	utf8_general_ci		Yes	*NULL*		
3	**date**	date			Yes	*NULL*		
4	**time**	varchar(8)	utf8_general_ci		Yes	*NULL*		
5	**alarms**	varchar(16)	utf8_general_ci		Yes	*NULL*		
6	**faults**	varchar(16)	utf8_general_ci		Yes	*NULL*		
7	**modecode**	int(3)		UNSIGNED ZEROFILL	Yes	*NULL*		
8	**mode**	varchar(10)	utf8_general_ci		Yes	*NULL*		
9	**evdate**	date			Yes	*NULL*		
10	**evtime**	time			Yes	*NULL*		
11	**ivdate**	date			Yes	*NULL*		
12	**ivtime**	time			Yes	*NULL*		
13	**epochtime**	decimal(12,2)			Yes	*NULL*		
14	**errorState**	tinyint(1)			No	0		
15	**errorTime**	datetime			Yes	*NULL*		
16	**updateTime**	timestamp		on update CURRENT_TIMESTAMP	No	CURRENT_TIMESTAMP		ON UPDATE CURRENT_TIMESTAMP

Database – Running Events

	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
☐	1	**sitekey** 🔑	int(4)			Yes	*NULL*		
☐	2	**date**	date			Yes	*NULL*		
☐	3	**time**	varchar(8)	utf8_general_ci		Yes	*NULL*		
☐	4	**alarms**	varchar(16)	utf8_general_ci		Yes	*NULL*		
☐	5	**faults**	varchar(16)	utf8_general_ci		Yes	*NULL*		
☐	6	**modecode**	int(3)		UNSIGNED ZEROFILL	Yes	*NULL*		
☐	7	**mode**	varchar(10)	utf8_general_ci		Yes	*NULL*		
☐	8	**evdate**	date			Yes	*NULL*		
☐	9	**evtime**	varchar(8)	utf8_general_ci		Yes	*NULL*		
☐	10	**ivdate**	date			Yes	*NULL*		
☐	11	**ivtime**	varchar(8)	utf8_general_ci		Yes	*NULL*		
☐	12	**epochtime**	decimal(12,2)			Yes	*NULL*		

Database – Current Power Stats

	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
☐	1	**sitekey**	int(4)			No	*None*		
☐	2	**inputVolt**	text	latin1_swedish_ci		No	*None*		
☐	3	**inputHz**	text	latin1_swedish_ci		No	*None*		
☐	4	**outputVolt**	text	latin1_swedish_ci		No	*None*		
☐	5	**outputAmp**	text	latin1_swedish_ci		No	*None*		
☐	6	**outputVA**	text	latin1_swedish_ci		No	*None*		
☐	7	**battVolt**	text	latin1_swedish_ci		No	*None*		
☐	8	**battTemp**	text	latin1_swedish_ci		No	*None*		
☐	9	**mode**	text	latin1_swedish_ci		No	*None*		
☐	10	**timestamp**	timestamp			No	CURRENT_TIMESTAMP		

Database – Running Power Stats

	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
☐	1	**sitekey**	int(4)			No	*None*		
☐	2	**inputVolt**	text	latin1_swedish_ci		No	*None*		
☐	3	**inputHz**	text	latin1_swedish_ci		No	*None*		
☐	4	**outputVolt**	text	latin1_swedish_ci		No	*None*		
☐	5	**outputAmp**	text	latin1_swedish_ci		No	*None*		
☐	6	**outputVA**	text	latin1_swedish_ci		No	*None*		
☐	7	**battVolt**	text	latin1_swedish_ci		No	*None*		
☐	8	**battTemp**	text	latin1_swedish_ci		No	*None*		
☐	9	**mode**	text	latin1_swedish_ci		No	*None*		
☐	10	**timestamp**	timestamp			No	CURRENT_TIMESTAMP		

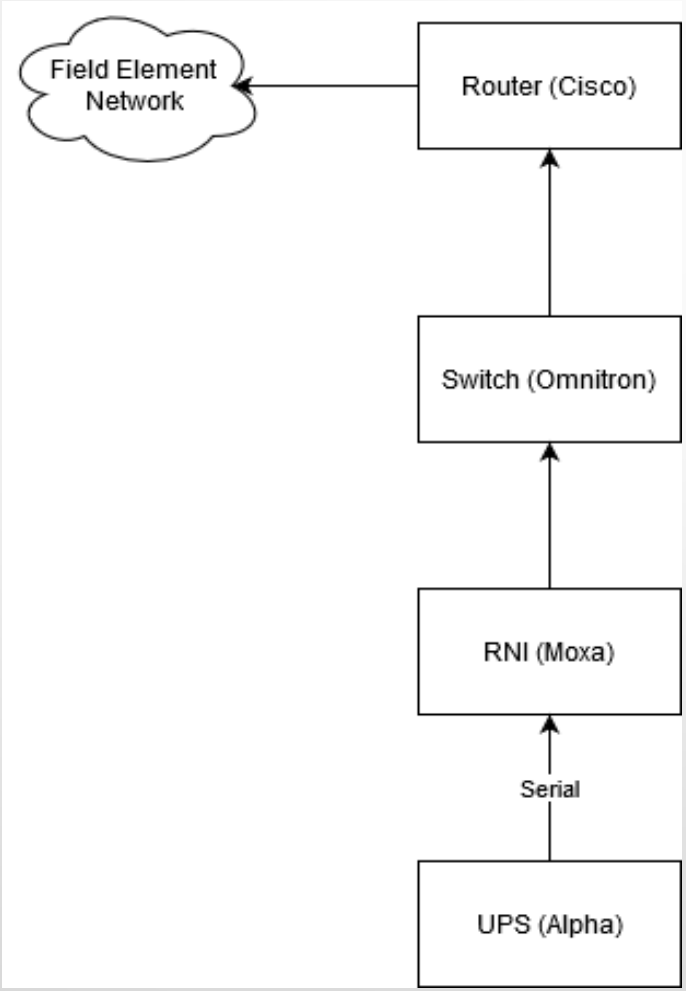
Implementation – Database

- Php My Admin
  - Installed and hosted on local server
  - Used for database management
  - Allows for manual exporting, importing and backing up

Implementation – Third Party

- Plink – Chosen over pySerial
  - Is a tool from Putty that is used for sending commands to a remote device
  - Needed for the older Alpha units' lack of ethernet port
  - Opens a Secure Shell (SSH) connection
  - Allows for commands only to be sent to a serial device
  - Command line interface

Implementation – Third Party



Implementation – Third Party

- pySerial – Not used
  - This is used for serial connection on local machine
  - Moxa has an IP address with a configured port for the serial connection to the Alpha

Implementation – Process Management

- Requirements
  - Needs to run in background
  - Needs to log any issues
  - Needs to monitor process in background
  - Needs to start application at startup
  - Considerations:
    - Supervisor or daemon

Implementation – Process Management

- Supervisor
  - Monitors the background process
  - Allows logging of standard output, errors and process complications
  - Launches backend process at startup
  - Monitors and ensure process is continuously running

Implementation – Process Management

- Supervisor
  - Reads in program configuration file for fine tuning process automation
  - Written in Python
  - If main thread of program unable to start and stay running for more then 1sec, 3 times, manual intervention is required

Implementation – Process Management

- Daemon
  - Process must be started with init
  - Logging must be done within process
  - Does not monitor process to ensure startup

Implementation – Process Management

- Supervisor Chosen
- Process Configuration Options
- Process Monitoring
- Process Logging

```
[program:bbs]
command=/var/bbs/bbs/main.py
autostart=true
directory=/var/bbs/bbs
user=username
stderr_logfile=/var/bbs/supervisor_logs/bbs_err.log
stdout_logfile=/var/bbs/supervisor_logs/bbs_out.log
stderr_logfile_maxbytes=5MB
stderr_logfile_backups=5
stdout_logfile_maxbytes=5MB
stdout_logfile_backups=5
```

Implementation – Programming Languages

- Python2
- Bash
- HTML
- JavaScript
- CSS

Source: World Wide Web Consortium

Implementation – Programming Languages

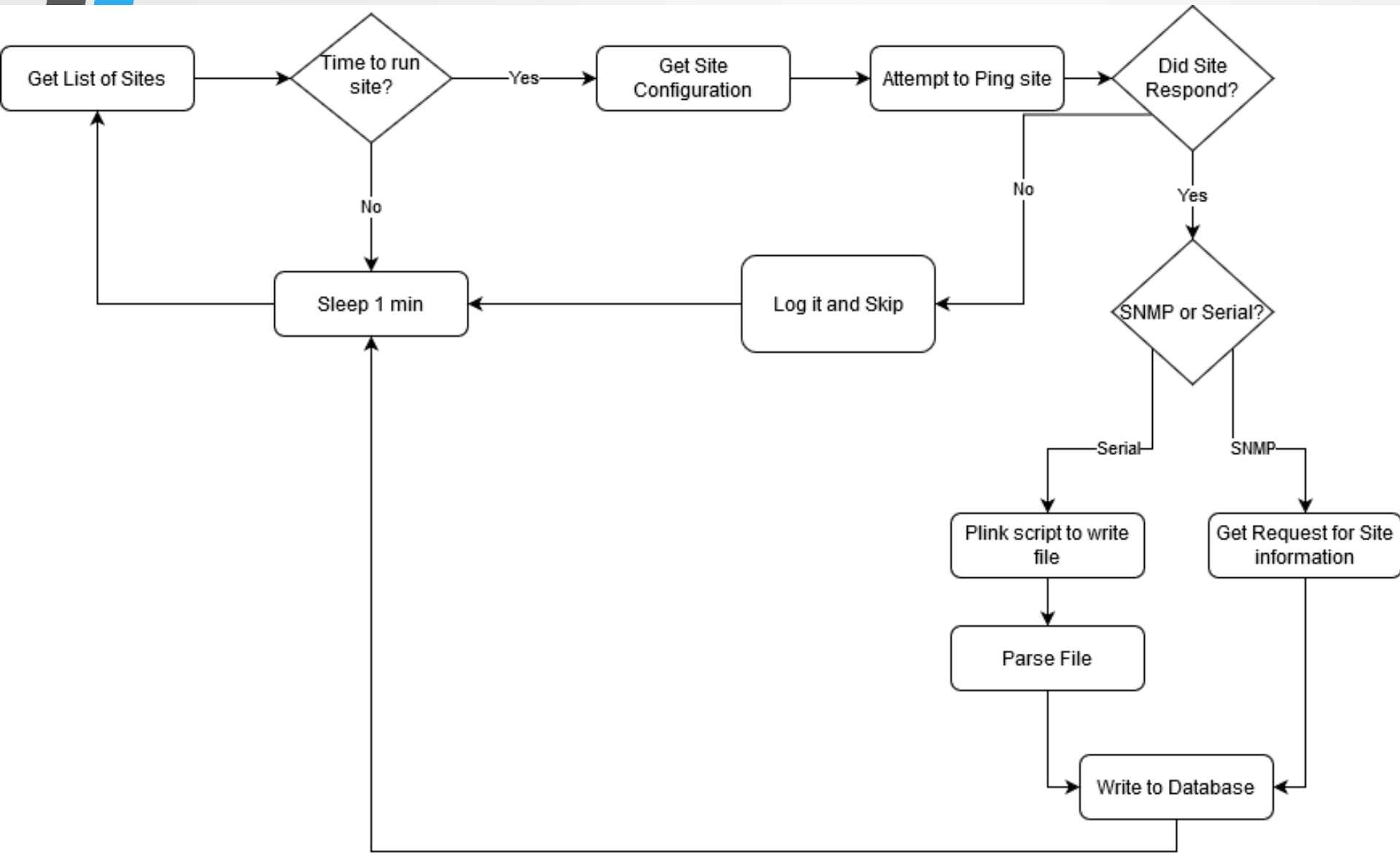
- Python2
  - Already installed on server
  - Backend written primarily in Python
  - Frontend written in HTML utilizing Python CGI
- Bash
  - In conjunction with plink writes a text file to server
- HTML, JavaScript, and CSS
  - Website design

Implementation – Programming Languages

- Python – Backend
  - Database integration
  - Checks field site time to run
  - Launches field site using threads
  - Uses bash to run OS subroutines
  - Text Parsing from serial communication

```
-- bbs
   |-- Comm.py
   |-- eventmonth.py
   |-- Event.py
   |-- log.py
   |-- main.py (x)
   |-- paths.py (Generic)
   |-- power.py
   |-- siteread.py
   |-- SNMP.py
   |-- SNMP_SQL.py
   |-- startup.py
   `-- validate.py
```

Implementation – Programming Languages



Implementation – Programming Languages

- Python – Frontend
  - Common Gateway Interface (CGI) for seemly dynamic Graphical User Interface (GUI)
  - Database integration
  - Allows for configuration of field site, and system

```
|-- ui
|   |-- js
|   |   |-- Chart.js
|   |   |-- FileSaver.js
|   |   |-- jquery.tablesorter.js
|   |   |-- jquery-3.3.1.js
|   |   |-- moment.js
|   |   `-- valid.js
|   |-- __init__.py
|   |-- allsites.py (x)
|   |-- graphs.py (x)
|   |-- helper.py (x)
|   |-- logs.py (x)
|   |-- modify.py (x)
|   |-- power.py (x)
|   |-- siteconfig.py (x)
|   |-- siteinfo.py (x)
|   `-- style.css
```

Implementation – Programming Languages

- HTML
  - Base code for the GUI
- JavaScript
  - Graph display
  - Data Validation
- CSS
  - Styling of webpage items

Implementation – Programming Languages

```
import sys
import cgi, cgitb, httplib
from datetime import datetime, timedelta

import pymysql

sys.path.insert(0, '/var/bbs/bbs/')
import paths
from helper import decode_al_fa, htmlheader, banner, htmlheader_refresh, legend, updateFirmware, maintenance, footer


cgitb.enable()
```

- CSS
  - Styling of webpage items

Implementation – Programming Languages

```
import sys
import cgi, cgitb, httplib
from datetime import datetime, timedelta

import pymysql

sys.path.insert(0, '/var/bbs/bbs/')
import paths
from helper import decode_al_fa, htmlheader, banner, htmlheader_refresh, legend, updateFirmware, maintenance, footer


cgitb.enable()
```

- CSS
  - Styling of webp

```
# Banner at top of page
banner()

# Header
print('''
<title>District 2 Battery Backup Status</title>
<div style="width:850px;">
    <div style="width:500px; float:left;">
        <h1 align = left>Current Site Status</h1>
        <h2 align = left>All Sites</h2>
    </div>
    ''')
# Legend
legend()
```

Implementation – Programming Languages

- Python – Third party modules that needed to be installed
  - Pymysql – MySQL Python integration
  - Easysnmp – SNMP Python integration

Implementation – Programming Languages

```
# Function: saveStats
# Args: stats -> list of power stats
#       siteName -> the name of the site
# Saves the power statitics to the running log of stats into the DB
def saveStats(stats, siteName):

    conn = pymysql.connect(
        db=paths.database,
        user=paths.user,
        passwd=paths.passwd,
        host=paths.host)
    c = conn.cursor()
    try:
        c.execute('''INSERT INTO `power`(`sitekey`, `inputVolt`, `inputHz`, `outputVolt`, `outputAmp`,
                `outputVA`, `battVolt`, `battTemp`, `mode`) VALUES(
        {}, '{}', '{}', '{}', '{}', '{}', '{}', '{}', '{}' )'''.format(stats[sitekey], stats[inputVolt],
            stats[inputHz], stats[outputVolt], stats[outputAmp], stats[outputVA], stats[battVolt], stats[battTemp], stats[mode]))
        conn.commit()
    except pymysql.MySQLError as e:
        miscSiteLog(siteName,"There was a SQL error {} saving power stats".format(e))
    finally:
        c.close()
        conn.close()
```

Implementation – Programming Languages

```
# Function: saveStats
# Args: stats -> list of power stats
#       siteName -> the name of the site
# Saves the power statitics to the running log of stats into the DB
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        user=paths.user,
        passwd=paths.passwd,
        host=paths.host)
    c = conn.cursor()
    try:
        c.execute('''INSERT INTO `power`(`sitekey`, `inputVolt`, `inputHz`, `outputVolt`, `outputAmp`,
                `outputVA`, `battVolt`, `battTemp`, `mode`) VALUES(
        {}, '{}', '{}', '{}', '{}', '{}', '{}', '{}', '{}' )'''.format(stats[sitekey], stats[inputVolt],
            stats[inputHz], stats[outputVolt], stats[outputAmp], stats[outputVA], stats[battVolt], stats[battTemp], stats[mode]))
        conn.commit()
    except pymysql.MySQLError as e:
        miscSiteLog(siteName,"There was a SQL error {} saving power stats".format(e))
    finally:
        c.close()
        conn.close()
```

```
# Function: setUpSesh
# Will take the sites IP address and open a session to that site.
def setUpSesh(ip, community = 'public'):
    session = Session(hostname = ip, community = community, version=2, use_sprint_value=True, timeout=10)
    return session
```

Implementation – Programming Languages

- Bash
  - Called by the backend Python script
  - Was needed to use the third-party applications plink to communicate via serial communication
  - Once plink has established SSH connection allows the writing of text file
  - Calling bash commands from Python can be tricky
  - Used to call system level commands
  - Will ping site to confirm communications

on – Programming
nguages

```
[0 - Main Menu]
[2 - Input / Output Values]
Input: 119.0V 60.0Hz
Output: 117.0V 1.6A 187VA
Battery: 52.8V 28Deg C

*clock=21-07-21 10:36:36

[0 - Main Menu]
[1 - Unit Specification]
Model: FXM1100
Input: 120V 60Hz
Output: 120V 1100VA
Battery: 48V
Software: V2.01.00

*event001=21-07-11 22:06:05 0000000000000000, 0000000000000000, 001
*event002=21-07-11 22:05:58 0000000000000000, 0000000000000000, 006
*event003=21-07-04 22:56:13 0000000000000000, 0000000000000000, 001
*event004=21-07-04 22:55:12 0000000000000000, 0000000000000000, 003
*event005=21-07-04 22:55:07 0000000000000000, 0000000000000000, 001
*event006=21-07-04 22:55:01 1000000000000000, 0000000000000000, 001
*event007=21-07-04 20:23:53 1000000000000000, 0000000000000000, 006
*event008=21-07-04 20:22:50 0000000000000000, 0000000000000000, 006
*event009=21-06-30 13:54:40 0000000000000000, 0000000000000000, 001
*event010=21-06-30 13:54:35 1000000000000000, 0000000000000000, 001
*event011=21-06-30 13:54:30 1000000000000000, 0000000000000000, 006
*event012=21-06-30 13:50:39 1000000010000000, 0000000000000000, 006
*event013=21-06-30 13:49:37 0000000010000000, 0000000000000000, 006
*event014=21-06-30 13:49:36 0000000000000000, 0000000000000000, 006
*event015=21-06-30 10:47:02 0000000000000000, 0000000000000000, 001
*event016=21-06-30 10:46:56 0000000000000000, 0000000000000000, 006
*event017=21-06-24 14:00:45 0000000000000000, 0000000000000000, 001
*event018=21-06-24 14:00:38 0000000000000000, 0000000000000000, 006
*event019=21-06-22 18:37:29 0000000000000000, 0000000000000000, 001
*event020=21-06-22 18:37:28 0000000000000000, 0000000000000000, 003
*event021=21-06-14 18:02:09 0000000000000000, 0000000000000000, 001
*event022=21-06-14 18:02:03 1000000000000000, 0000000000000000, 001
*event023=21-06-14 17:53:33 1000000000000000, 0000000000000000, 006
*event024=21-06-14 17:52:30 0000000000000000, 0000000000000000, 006
*event025=21-06-09 00:49:06 0000000000000000, 0000000000000000, 001
```

- hon script
- rd-party applications plink to mmunication
- d SSH connection allows the writing of text
- om Python can be tricky
- ommands
- ommunications

on – Programming
nguages

hon script

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```
[0 - Main Menu]
[2 - Input / Output Values]
Input: 119.0V 60.0Hz
Output: 117.0V 1.6A 187VA
Battery: 52.8V 28Deg C

*clock=21-07-21 10:36:36

[0 - Main Menu]
[1 - Unit Specification]
Model: FXM1100
Input: 120V 60Hz
Output: 120V 1100VA
Battery: 48V
Software: V2.01.00

*event001=21-07-11 22:06:05 0000000000000000, 0000000000000000, 001
*event002=21-07-11 22:05:58 0000000000000000, 0000000000000000, 006
*event003=21-07-04 22:56:13 0000000000000000, 0000000000000000, 001
*event004=21-07-04 22:55:12 0000000000000000, 0000000000000000, 003
*event005=21-07-04 22:55:07 0000000000000000, 0000000000000000, 001
*event006=21-07-04 22:55:01 1000000000000000, 0000000000000000, 001
*event007=21-07-04 20:23:53 1000000000000000, 0000000000000000, 006
*event008=21-07-04 20:22:50 0000000000000000, 0000000000000000, 006
*event009=21-06-30 13:54:40 0000000000000000, 0000000000000000, 001
*event010=21-06-30 13:54:35 1000000000000000, 0000000000000000, 001
*event011=21-06-30 13:54:30 1000000000000000, 0000000000000000, 006
*event012=21-06-30 13:50:39 1000000010000000, 0000000000000000, 006
*event013=21-06-30 13:49:37 0000000010000000, 0000000000000000, 006
*event014=21-06-30 13:49:36 0000000000000000, 0000000000000000, 006
*event015=21-06-30 10:47:02 0000000000000000, 0000000000000000, 001
*event016=21-06-30 10:46:56 0000000000000000, 0000000000000000, 006
*event017=21-06-24 14:00:45 0000000000000000, 0000000000000000, 001
*event018=21-06-24 14:00:38 0000000000000000, 0000000000000000, 006
*event019=21-06-22 18:37:29 0000000000000000, 0000000000000000, 001
*event020=21-06-22 18:37:28 0000000000000000, 0000000000000000, 003
*event021=21-06-14 18:02:09 0000000000000000, 0000000000000000, 001
*event022=21-06-14 18:02:03 1000000000000000, 0000000000000000, 001
*event023=21-06-14 17:53:33 1000000000000000, 0000000000000000, 006
*event024=21-06-14 17:52:30 0000000000000000, 0000000000000000, 006
*event025=21-06-09 00:49:06 0000000000000000, 0000000000000000, 001
```

```
[0 - Main Menu]
[2 - Input / Output Values]
Input: 122.0V 60.0Hz
Output: 122.0V 1.6A 195VA
Battery: 52.7V 20Deg C

*clock=07-21-21 10:32:22

[0 - Main Menu]
[1 - Unit Specification]
Model: FXM1100
Input: 120V 60Hz
Output: 120V 1100VA
Battery: 48V
Software: V1.08.72

*event001=07-19-21 12:06:08 0000000000000000, 0000000000000000, 001
*event002=07-19-21 12:06:01 0000000000000000, 0000000000000000, 006
*event003=07-19-21 12:05:57 0000000000000000, 0000000000000000, 001
*event004=07-19-21 12:05:50 0000000000000000, 0000000000000000, 006
*event005=07-19-21 11:49:28 0000000000000000, 0000000000000000, 001
*event006=07-19-21 11:49:21 0000000000000000, 0000000000000000, 006
*event007=07-19-21 11:40:10 0000000000000000, 000000000000000
```

Implementation – Programming Languages

- JavaScript – Third party modules used
  - Jquery-3.3.1.js – wide variety of uses
  - Jquery.tablesorter.js – Used to sort power table by name
  - Chart.js - Graph display
  - Moment.js – used by Chart.js for date integration

Examples

- Live demo of website
  - If successful skip next slide (slide 128)

Examples - Homepage

- First Example is of the system functioning normally

Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Powered By D2 ITS

On Inverter:
On Buck/Boost:
Data is stale (>2Hrs):
Down for construction:
Event Occurred Last 24Hrs: !

Current Site Status

All Sites

Sites With Errors | New Site

Site	Current Mode	Power (In, Out, Out, Batt)	Battery Manufacture	Time in Error	Last Successful Pull
Abrams_Lake	Line	120.0V 119.0V 202VA 54.8V	Jul 2018	-	07:35:35 07-27-2021
Abrams_Lake_NB	Line	120.0V 118.0V 177VA 53.2V	Apr 2016	-	07:34:36 07-27-2021
Abrams_Lake_SB	Line	122.0V 120.0V 144VA 54.6V	Jul 2018	-	07:35:35 07-27-2021
Anderson_Grade	Line	117.0V 116.0V 185VA 52.6V	Sep 2019	-	07:32:08 07-27-2021
! Antlers_Bridge	Line	119.0V 118.0V 236VA 52.9V	Jul 2009	-	07:35:35 07-27-2021
Black_Butte	Line	120.5V 120.0V 204VA 52.9V	Apr 2016	-	07:22:35 07-27-2021
Bogard	Line	122.5V 124.0V 198VA 53.4V	Sep 2019	-	07:33:04 07-27-2021
! Bowman_Rd	Line	124.0V 123.0V 184VA 54.2V	Sep 2012	-	06:57:37 07-27-2021
Buckhorn	Line	120.0V 119.0V 107VA 54.4V	Dec 2006	-	07:24:39 07-27-2021
Cedar_Pass	Line	119.0V 118.0V 129VA 53.4V	Mar 2012	-	07:04:09 07-27-2021
Central_Yreka	Line	119.0V 115.0V 126VA 52.9V	Feb 2016	-	06:36:38 07-27-2021
Collier	Line	122.0V 120.0V 216VA 36.2V	Dec 2018	-	07:08:43 07-27-2021
! Cottonwood_Truck_Scales	Line	124.0V 122.0V 195VA 54.2V	Jul 2018	-	07:34:37 07-27-2021
Deschutes	Line	120.0V 118.0V 129VA 52.9V	Mar 2010	-	07:08:37 07-27-2021
Dorris	Line	122.0V 121.0V 133VA 53.5V	Jan 2017	-	07:10:05 07-27-2021
Doyle	Line	121.0V 120.0V 192VA 53.0V	Jun 2019	-	07:34:37 07-27-2021
Dunsmuir	Line	119.0V 118.0V 129VA 53.6V	Feb 2016	-	07:31:39 07-27-2021
East_Riverside	Line	123.0V 121.0V 133VA 53.1V	Aug 2010	-	07:12:05 07-27-2021
EELab_1921	Line	116.0V 115.0V 195VA 54.4V	Nov 2014	-	07:31:35 07-27-2021
EELab_SNMP	Line	115.0V 114.0V 193VA 54.3V	Jan 2010	-	07:32:00 07-27-2021
Eureka_Way	Line	120.5V 120.0V 240VA 52.8V	Feb 2016	-	06:52:07 07-27-2021
Fawndale	Line	123.0V 121.0V 338VA 52.9V	Jun 2019	-	07:32:00 07-27-2021
Fredonyer_Smt	Line	117.5V 117.0V 163VA 55.0V	Feb 2016	-	11:07:39 05-24-2021
! Gibson	Line	118.0V 117.0V 198VA 54.2V	Apr 2011	-	07:34:37 07-27-2021
Grass_Lake	Line	124.5V 124.0V 161VA 53.5V	Jul 2011	-	07:34:36 07-27-2021
Hartnell	Line	121.0V 120.0V 204VA 54.0V	Jan 2011	-	07:31:35 07-27-2021
Hatchet_Mtn	Line	122.5V 120.0V 180VA 53.4V	Jun 2019	-	07:35:36 07-27-2021
Hilltop	Line	121.0V 120.0V 168VA 52.9V	Oct 2017	-	07:31:35 07-27-2021
HilltopUPS	Line	121.0V 120.0V 168VA 52.9V	Oct 2017	-	07:36:00 07-27-2021
Hilt_Sandhouse	Line	122.0V 120.0V 192VA 52.7V	Jun 2019	-	07:17:09 07-27-2021
I5-SR273	Line	123.0V 121.0V 217VA 53.1V	Apr 2016	-	07:31:35 07-27-2021
I5-SR299	Line	122.0V 121.0V 205VA 53.9V	Sep 2016	-	07:34:35 07-27-2021
I5-SR44	Line	122.0V 120.0V 156VA 53.6V	Sep 2019	-	07:33:35 07-27-2021
I5-SR89	Line	121.0V 120.0V 144VA 53.8V	Apr 2013	-	07:27:58 07-27-2021
I5-US97	Line	121.0V 121.0V 157VA 54.1V	Sep 2012	-	07:25:38 07-27-2021
Janesville	Line	119.0V 117.0V 187VA 53.3V	Jun 2019	-	07:29:37 07-27-2021
Jellys_Ferry	Line	120.5V 119.0V 178VA 53.2V	Sep 2012	-	07:32:40 07-27-2021
Johnson_Grade	Line	121.0V 119.0V 130VA 53.4V	Jan 2011	-	07:31:08 07-27-2021
Johnson_Park	Line	120.0V 118.0V 141VA 53.1V	Jun 2019	-	07:27:32 07-27-2021
Lakehead	Line	122.0V 120.0V 252VA 54.4V	Nov 2011	-	07:31:35 07-27-2021
Lake_Blvd	Line	121.0V 119.0V 261VA 53.2V	Jun 2019	-	07:35:35 07-27-2021

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normally

Current Site Status

All Sites

Sites With Errors

Site	Current Mode	Power (
Abrams_Lake	Line	120.0V 119
Abrams_Lake_NB	Line	120.0V 118
Abrams_Lake_SB	Line	122.0V 120
Anderson_Grade	Line	117.0V 116
! Antlers_Bridge	Line	119.0V 118
Black_Butte	Line	120.5V 120
Bogard	Line	122.5V 124
! Bowman_Rd	Line	124.0V 123
Buckhorn	Line	120.0V 119
Cedar_Pass	Line	119.0V 118
Central_Yreka	Line	119.0V 115
Collier	Line	122.0V 120
! Cottonwood_Truck_Scales	Line	124.0V 122
Deschutes	Line	120.0V 118
Dorris	Line	122.0V 123
Doyle	Line	121.0V 120
Dunsmuir	Line	119.0V 118
East_Riverside	Line	123.0V 123
EELab_1921	Line	116.0V 115
EELab_SNMP	Line	115.0V 114
Eureka_Way	Line	120.5V 120
Fawndale	Line	123.0V 123
Fredonyer_Smt	Line	117.5V 117
! Gibson	Line	118.0V 117
Grass_Lake	Line	124.5V 124
Hartnell	Line	121.0V 120
Hatchet_Mtn	Line	122.5V 120
Hilltop	Line	121.0V 120
HilltopUPS	Line	121.0V 120
Hilt_Sandhouse	Line	122.0V 120
I5-SR273	Line	123.0V 123
I5-SR299	Line	122.0V 123
I5-SR44	Line	122.0V 120
I5-SR89	Line	121.0V 120
I5-US97	Line	121.0V 123
Janesville	Line	119.0V 117
Jellys_Ferry	Line	120.5V 119
Johnson_Grade	Line	121.0V 119
Johnson_Park	Line	120.0V 118
Lakehead	Line	122.0V 120
Lake_Blvd	Line	121.0V 119

Lake_Blvd	Line	121.0V	119.0V	261VA	53.2V	Jun 2019	-	07:35:35 07-27-2021
Lake_BlvdUPS	Line	121.0V	119.0V	261VA	53.3V	Jun 2019	-	07:35:00 07-27-2021
Lassen_Park	Line	123.5V	124.0V	210VA	55.4V	Jun 2019	-	07:21:48 07-27-2021
La_Moine	Line	117.0V	116.0V	243VA	52.9V	Apr 2013	-	07:34:35 07-27-2021
Montgomery_Creek	Line	123.5V	122.0V	170VA	53.6V	Sep 2012	-	06:57:05 07-27-2021
! Mott_Rd	Line	119.0V	117.0V	81VA	53.1V	Sep 2019	-	07:06:39 07-27-2021
Mountain_Gate	Line	122.0V	121.0V	193VA	53.1V	Jul 2020	-	07:35:02 07-27-2021
! Mt_Hebron	Line	120.0V	119.0V	130VA	53.7V	Apr 2011	-	07:26:32 07-27-2021
North_Hilt	Line	124.0V	123.0V	159VA	53.5V	Sep 2012	-	07:33:35 07-27-2021
North_Mountain_Gate	Line	123.0V	122.0V	183VA	53.1V	Jul 2020	-	07:32:00 07-27-2021
North_Red_Bluff	Line	122.0V	121.0V	169VA	52.6V	Sep 2012	-	07:29:39 07-27-2021
North_Weed	Line	121.5V	121.0V	133VA	52.6V	Apr 2013	-	07:33:39 07-27-2021
OBrien	Line	121.0V	119.0V	142VA	53.2V	Mar 2012	-	09:22:35 04-29-2020
! Oregon_Mtn	Line	120.0V	118.0V	200VA	53.1V	Jan 2017	-	07:35:13 07-27-2021
Perez	Line	119.0V	117.0V	163VA	53.2V	Sep 2012	-	07:31:35 07-27-2021
Pine_Grove	Line	120.0V	119.0V	226VA	36.2V	Jul 2018	-	07:33:36 07-27-2021
Pit_River_Bridge	Line	124.0V	123.0V	270VA	51.8V	Jun 2019	-	07:31:35 07-27-2021
! Pollard_Flat	Line	119.0V	117.0V	175VA	54.1V	Apr 2011	-	07:32:37 07-27-2021
Red_Bluff	Line	121.0V	119.0V	107VA	52.4V	Jul 2009	-	07:32:40 07-27-2021
Riverside_Ave	Line	118.5V	118.0V	153VA	52.4V	Apr 2016	-	07:34:35 07-27-2021
! Sacramento_Hill	Line	119.0V	111.0V	222VA	52.9V	Jun 2014	-	07:35:35 07-27-2021
Salt_Creek	Line	121.0V	119.0V	130VA	52.9V	Sep 2019	-	07:27:37 07-27-2021
Shasta_River_Bridge	Line	122.0V	121.0V	181VA	53.0V	Jul 2009	-	07:32:36 07-27-2021
Shingletown	Line	120.0V	120.0V	192VA	54.8V	Sep 2019	-	07:31:35 07-27-2021
Sidehill	Line	121.0V	120.0V	168VA	52.6V	Sep 2019	-	07:34:37 07-27-2021
Sims_Road	Line	119.0V	119.0V	154VA	54.9V	Sep 2012	-	07:35:39 07-27-2021
Smith_Rd	Line	122.0V	120.0V	168VA	54.2V	Jul 2017	-	07:31:35 07-27-2021
! Snowman	Line	121.0V	119.0V	154VA	53.5V	Apr 2013	-	07:33:36 07-27-2021
! South_Bonnyview	Line	119.0V	118.0V	177VA	53.5V	Nov 2008	-	07:35:36 07-27-2021
South_Weed	Line	125.0V	124.0V	99VA	52.9V	Jun 2019	-	06:53:39 07-27-2021
South_Yreka	Line	120.0V	118.0V	129VA	53.3V	Aug 2011	-	07:04:39 07-27-2021
Spring_Garden	Line	121.0V	119.0V	214VA	53.5V	Oct 2017	-	07:24:04 07-27-2021
SR299-SR89	Line	120.0V	119.0V	202VA	53.8V	Jun 2015	-	06:49:34 07-27-2021
! SR36-SR44	Line	124.5V	123.0V	221VA	53.8V	Apr 2011	-	06:52:34 07-27-2021
SR36-SR89	Line	121.0V	120.0V	192VA	54.3V	Apr 2011	-	07:34:35 07-27-2021
SR36-US395	Line	125.0V	124.0V	111VA	52.9V	Aug 2010	-	07:34:36 07-27-2021
SR70-SR89	Inverter	0.0V	120.0V	132VA	49.1V	Jun 2019	4 days, 14:39:06	23:57:08 07-22-2021
SR70-US395	Line	122.0V	122.0V	146VA	52.6V	Jan 2011	-	07:31:05 07-27-2021
Summit_Dr	Line	123.0V	122.0V	158VA	52.6V	Mar 2014	-	06:55:38 07-27-2021
Sundial_Bridge	Line	122.0V	121.0V	169VA	52.6V	Jan 2011	-	07:31:35 07-27-2021
! Townhill	Line	124.0V	123.0V	159VA	52.9V	Aug 2013	-	06:59:39 07-27-2021
Vina	Line	121.5V	122.0V	97VA	53.0V	Jun 2014	-	07:02:41 07-27-2021
Vollmers	Line	120.0V	119.0V	214VA	53.0V	Nov 2008	-	07:28:37 07-27-2021
Weed_Airport	Line	122.0V	120.0V	120VA	53.4V	Nov 2011	-	07:31:05 07-27-2021
Wilcox_Rd_NB	Line	121.0V	119.0V	178VA	52.5V	Jul 2016	-	07:14:39 07-27-2021
Wilcox_Rd_SB	Line	120.5V	119.0V	166VA	52.4V	Apr 2013	-	06:40:40 07-27-2021
Wonderland	Line	123.0V	121.0V	229VA	53.0V	Jul 2020	-	07:36:00 07-27-2021

87 Total Site(s) 2 Down Site(s) 1 Error Site(s) 13 Flagged Site(s) 0 Stale Site(s) 0 Site(s) Need Cert

Examples - Homepage

- First Example is of the system functioning normally

Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Powered By D2 ITS

On Inverter:
On Buck/Boost:
Data is stale (>2Hrs):
Down for construction:
Event Occurred Last 24Hrs: !

Current Site Status

All Sites

Sites With Errors

New Site

Site						ery Manufacture	Time in Error	Last Successful Pull
Abrams_Lake						Jul 2018	-	07:35:35 07-27-2021
Abrams_Lake_NB						Apr 2016	-	07:34:36 07-27-2021
Abrams_Lake_SB						Jul 2018	-	07:35:35 07-27-2021
Anderson_Grade						Sep 2019	-	07:32:08 07-27-2021
! Antlers_Bridge						Jul 2009	-	07:35:35 07-27-2021
Black_Butte						Apr 2016	-	07:22:35 07-27-2021
Bogard						Sep 2019	-	07:33:04 07-27-2021
! Bowman_Rd						Sep 2012	-	06:57:37 07-27-2021
Buckhorn						Dec 2006	-	07:24:39 07-27-2021
Cedar_Pass	Line	119.0V	118.0V	129VA	53.4V	Mar 2012	-	07:04:09 07-27-2021
Central_Yreka	Line	121.0V	117.0V	128VA	52.6V	Feb 2016	-	07:36:38 07-27-2021
Collier	Line	122.0V	120.0V	216VA	36.2V	Dec 2018	-	07:08:43 07-27-2021
! Cottonwood_Truck_Scales	Line	124.0V	122.0V	195VA	54.2V	Jul 2019		07:24:27 07-27-2021

No Image For This Site

ıally

Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Current Site Status

All Sites

Powered By D2 ITS

On Inverter:
On Buck/Boost:
Data is stale (>2Hrs):
Down for construction:
Event Occurred Last 24Hrs: !

Sites With Errors

New Site

Site						Battery Manufacture	Time in Error	Last Successful Pull
Abrams_Lake						Jul 2018	-	07:35:35 07-27-2021
Abrams_Lake_NB						Apr 2016	-	07:34:36 07-27-2021
Abrams_Lake_SB	Line	122.0V	120.0V	144VA	54.6V	Jul 2018	-	07:35:35 07-27-2021
Anderson_Grade						Sep 2019	-	07:32:08 07-27-2021
! Antlers_Bridge						Jul 2009	-	07:35:35 07-27-2021
Black_Butte						Apr 2016	-	07:22:35 07-27-2021
Bogard						Sep 2019	-	07:33:04 07-27-2021
! Bowman_Rd						Sep 2012	-	06:57:37 07-27-2021
Buckhorn						Dec 2006	-	07:24:39 07-27-2021
Cedar_Pass						Mar 2012	-	07:04:09 07-27-2021
Central_Yreka						Feb 2016	-	07:36:38 07-27-2021
Collier						Dec 2018	-	07:08:43 07-27-2021
! Cottonwood_Truck_Scales						Jul 2018	-	07:34:37 07-27-2021
Deschutes						Mar 2010	-	07:08:37 07-27-2021
Dorris						Jan 2017	-	07:10:05 07-27-2021
Doyle						Jun 2019	-	07:34:37 07-27-2021
Dunsmuir						Feb 2016	-	07:37:05 07-27-2021
East_Riverside	Line	123.0V	121.0V	133VA	53.1V	Aug 2010	-	07:12:05 07-27-2021
EELab_1921	Line	116.0V	115.0V	195VA	54.4V	Nov 2014	-	07:31:35 07-27-2021
EELab_SNMP	Line	115.0V	114.0V	193VA	54.3V	Jan 2010	-	07:32:00 07-27-2021

No Image

Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Powered By D2 ITS

On Inverter:
On Buck/Boost:
Data is stale (>2Hrs):
Down for construction:
Event Occurred Last 24Hrs: !

Current Site Status

All Sites

Sites With Errors

New Site

Site						Battery Manufacture	Time in Error	Last Successful Pull
Abrams_Lake						Jul 2018	-	07:35:35 07-27-2021
Abrams_Lake_NB						Apr 2016	-	07:34:36 07-27-2021
Abrams_Lake_SB	Line	122.0V	120.0V	144VA	54.6V	Jul 2018	-	07:35:35 07-27-2021
Anderson_Grade						Sep 2019	-	07:32:08 07-27-2021
! Antlers_Bridge						Jul 2009	-	07:35:35 07-27-2021
Black_Butte						Apr 2016	-	07:22:35 07-27-2021
Bogard						Sep 2019	-	07:33:04 07-27-2021
! Bowman_Rd						Sep 2012	-	06:57:37 07-27-2021
Buckhorn						Dec 2006	-	07:24:39 07-27-2021
East_Riverside	Line	123.0V	121.0V	133VA	53.1V	Aug 2010	-	07:12:05 07-27-2021
EELab_1921						Nov 2014	-	07:31:35 07-27-2021
EELab_SNMP						Jan 2010	-	07:32:00 07-27-2021
Eureka_Way						Feb 2016	-	06:52:07 07-27-2021
Fawndale						Jun 2019	-	07:37:00 07-27-2021
Fredonyer_Smt						Feb 2016	-	11:07:39 05-24-2021
! Gibson						Apr 2011	-	07:34:37 07-27-2021
Grass_Lake						Jul 2011	-	07:34:36 07-27-2021
Hartnell						Jan 2011	-	07:36:35 07-27-2021
Hatchet_Mtn						Jun 2019	-	07:35:36 07-27-2021
Hilltop						Oct 2017	-	07:37:05 07-27-2021
HilltopUPS						Oct 2017	-	07:36:00 07-27-2021
Hilt_Sandhouse						Jun 2019	-	07:17:09 07-27-2021
I5-SR273						Apr 2016	-	07:36:35 07-27-2021
I5-SR299						Sep 2016	-	07:34:35 07-27-2021
I5-SR44	Line	122.0V	120.0V	156VA	53.6V	Sep 2019	-	07:33:35 07-27-2021
I5-SR89	Line	121.0V	120.0V	144VA	53.8V	Apr 2013	-	07:27:58 07-27-2021

No Image

Down for Construction

Tuesday, July 27, 2021 07:37:01 PDT

Powered By D2 ITS

On Inverter:
On Buck/Boost:
Data is stale (>2Hrs):
Down for construction:
Event Occurred Last 24Hrs: !

Current Site Status

All Sites

Sites With Errors

New Site

Site	Battery Manufacture	Time in Error	Last Successful Pull
Abrams_Lake	Jul 2018	-	07:35:35 07-27-2021
Abrams_Lake_NB	Apr 2016	-	07:34:36 07-27-2021
Abrams_Lake_SB	Jul 2018	-	07:35:35 07-27-2021
Anderson_Grade	Sep 2019	-	07:32:08 07-27-2021
! Antlers_Bridge	Jul 2009	-	07:35:35 07-27-2021
Black_Butte	Apr 2016	-	07:22:35 07-27-2021
Bogard	Sep 2019	-	07:33:04 07-27-2021
! Bowman_Rd	Sep 2012	-	06:57:37 07-27-2021
Buckhorn	Dec 2006	-	07:24:39 07-27-2021
East_Riverside	Aug 2010	-	07:12:05 07-27-2021
EELab_1921	Nov 2014	-	07:31:35 07-27-2021
EELab_SNMP	Jan 2010	-	07:32:00 07-27-2021
Eureka_Way	Feb 2016	-	06:52:07 07-27-2021
Fawndale	Jun 2019	-	07:37:00 07-27-2021
Fredonyer_Smt	Feb 2015	-	11:07:39 05-24-2021
Spring_Garden	Oct 2017	-	07:24:04 07-27-2021
SR299-SR89	Jun 2015	-	06:49:34 07-27-2021
! SR36-SR44	Apr 2011	-	06:52:34 07-27-2021
SR36-SR89	Apr 2011	-	07:34:35 07-27-2021
SR36-US395	Aug 2010	-	07:34:36 07-27-2021
SR70-SR89	Jun 2019	4 days, 14:40:08	23:57:08 07-22-2021
SR70-US395	Jan 2011	-	07:31:05 07-27-2021
Summit_Dr	Mar 2014	-	06:55:38 07-27-2021
Sundial_Bridge	Jan 2011	-	07:36:35 07-27-2021
! Townhill	Aug 2013	-	06:59:39 07-27-2021
Vina	Jun 2014	-	07:02:41 07-27-2021
Vollmers	Nov 2008	-	07:28:37 07-27-2021
Weed_Airport	Nov 2011	-	07:31:05 07-27-2021
Wilcox_Rd_NB	Jul 2016	-	07:14:39 07-27-2021
Wilcox_Rd_SB	Apr 2013	-	06:40:40 07-27-2021
Wonderland	Jul 2020	-	07:36:00 07-27-2021

Abrams_Lake_NB	Line	120.0V	118.0V	177VA	53.2V	
Abrams_Lake_SB	Line	122.0V	120.0V	144VA	54.6V	
East_Riverside	Line	123.0V	121.0V	133VA	53.1V	
Spring_Garden	Line	121.0V	119.0V	214VA	53.5V	
Wonderland	Line	123.0V	121.0V	229VA	53.0V	

No Image

Temporarily Unavailable

Tuesday, July 27, 2021 06:59:02 PDT

87 Total Site(s) 2 Down Site(s) 1 Error Site(s) 13 Flagged Site(s) 0 Stale Site(s) 0 Site(s) Need Cert

10.20.2.213/sites?mode=events&site_key=77&site_name=SR70-SR89&interval=30&sort=0

Examples

- Next example is of the 2019 PG&E Power Safety Public Shutoff (PSPS)

Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Powered By D2 ITS

Data is stale:
Not in line state:
Down for construction:
Awaiting SSH certificate:
Event Occurred Last 24Hrs: !

Current Site Status

All Sites

Sites With Errors | New Site

Site	Firmware	Communication Type	Current Mode	Power (In, Out, Out, Batt)	Battery Install Date	Last Successful Pull
Abrams_Lake_NB	1.08.72	Cell	Line	121.0V 119.0V 154VA 55.0V	-	07:24:35 10-28-2019
Abrams_Lake_SB	2.00.01	Cell	Line	122.0V 121.0V 121VA 57.3V	-	07:20:35 10-28-2019
Anderson_Grade	1.08.72	ISDN	Line	118.0V 117.0V 152VA 54.6V	-	04:02:08 10-28-2019
Antlers_Bridge	1.08.72	MW	Inverter	0.0V 120.0V 228VA 42.6V	-	03:15:35 10-27-2019
Black_Butte	1.08.72	Cell	Line	120.0V 118.0V 177VA 54.9V	-	07:22:35 10-28-2019
Bogard	1.08.72	POTS	Line	120.0V 120.0V 180VA 54.8V	-	07:18:03 10-28-2019
Bowman_Rd	2.00.04	ISDN	Inverter	0.0V 120.0V 156VA 44.0V	-	10:58:05 10-27-2019
Buckhorn	2.00.04	ISDN	Line	116.0V 115.0V 103VA 56.7V	-	07:24:39 10-28-2019
Cedar_Pass	1.08.72	POTS	Line	120.0V 120.0V 120VA 54.7V	-	07:04:10 10-28-2019
Central_Yreka	1.08.72	ISDN	Line	118.5V 114.0V 114VA 54.8V	-	06:36:38 10-28-2019
Collier	1.08.72	ISDN	Line	121.0V 119.0V 202VA 55.5V	-	07:08:35 10-28-2019
Cottonwood_Truck_Scales	2.00.04	ISDN	Inverter	0.0V 120.0V 156VA 43.2V	-	13:34:37 10-27-2019
Deschutes	1.08.72	ISDN	Inverter	0.0V 120.0V 132VA 43.1V	-	08:08:37 10-27-2019
Dorris	1.08.72	POTS	Line	126.0V 125.0V 137VA 55.1V	-	07:10:05 10-28-2019
! Doyle	2.00.01	Cell	Line	124.0V 124.0V 173VA 36.1V	-	07:24:36 10-28-2019
Dunsmuir	1.08.72	Cell	Line	119.5V 118.0V 118VA 54.9V	-	07:21:35 10-28-2019
East_Riverside	1.08.72	POTS	Inverter	0.0V 120.0V 96VA 47.4V	-	07:12:03 10-28-2019
EELab_1921	2.01.00	POTS	Line	117.0V 116.0V 185VA 54.9V	May 2014	07:17:04 10-28-2019
EELab_SNMP	2.01.00	POTS	Line	118.0V 117.0V 187VA 54.9V	Jan 2010	07:17:00 10-28-2019
Eureka_Way	1.08.72	ISDN	Line	121.0V 120.0V 252VA 55.3V	-	06:51:50 10-28-2019
Fawndale	1.08.72	MW	Line	121.0V 119.0V 178VA 53.4V	-	13:12:30 05-29-2019
Fredonyer_Smt	1.08.72	Cell	Inverter	0.0V 120.0V 192VA 42.0V	-	06:12:36 10-28-2019
Gibson	2.00.04	ISDN	Line	117.0V 116.0V 197VA 56.5V	-	07:19:37 10-28-2019
! Grass_Lake	1.08.72	Cell	Line	122.5V 122.0V 134VA 54.8V	-	07:24:35 10-28-2019
Hartnell	1.08.72	FIBER	Line	121.0V 120.0V 168VA 54.5V	-	07:21:35 10-28-2019
Hatchet_Mtn	1.08.72	Cell	Line	122.0V 120.0V 180VA 55.8V	-	07:20:36 10-28-2019
Hilltop	2.01.00	FIBER	Line	121.0V 120.0V 120VA 54.4V	-	07:21:35 10-28-2019
HilltopUPS	2.01.00	FIBER	Line	121.0V 120.0V 120VA 54.5V	-	07:21:00 10-28-2019
Hilt_Sandhouse	2.00.04	ISDN	Line	122.0V 120.0V 132VA 55.5V	-	07:17:05 10-28-2019
I5-SR273	2.00.04	FIBER	Inverter	0.0V 120.0V 192VA 42.6V	-	05:51:35 10-27-2019
I5-SR299	2.00.04	FIBER	Line	121.0V 120.0V 180VA 55.5V	-	07:24:35 10-28-2019
I5-SR44	2.00.04	FIBER	Line	120.5V 119.0V 142VA 54.4V	-	07:23:35 10-28-2019
I5-SR89	1.08.72	ISDN	Line	120.0V 119.0V 142VA 54.7V	-	06:28:25 10-28-2019
I5-US97	2.00.04	ISDN	Line	119.0V 119.0V 154VA 56.8V	-	06:25:39 10-28-2019
! Janesville	1.08.72	POTS	Line	121.5V 120.0V 180VA 38.1V	-	22:44:36 10-27-2019
! Jellys_Ferry	2.00.04	ISDN	Line	121.0V 119.0V 154VA 56.7V	-	06:32:40 10-28-2019
Johnson_Grade	1.08.72	POTS	Inverter	0.0V 120.0V 132VA 48.1V	-	06:31:07 10-28-2019
Lakehead	1.08.72	MW	Inverter	0.0V 120.0V 240VA 42.5V	-	02:41:35 10-27-2019
! Lake_Blvd	2.01.00	MW	Line	122.0V 120.0V 228VA 54.6V	-	07:20:35 10-28-2019
Lake_BlvdUPS	2.01.00	MW	Line	122.0V 120.0V 228VA 54.6V	-	07:20:01 10-28-2019
Lassen_Park	1.08.72	POTS	Line	124.0V 124.0V 223VA 49.2V	-	17:21:33 10-26-2019
La_Moine	1.08.72	MW	Line	116.0V 115.0V 230VA 54.6V	-	07:24:35 10-28-2019
Montgomery_Creek	1.08.72	POTS	Inverter	0.0V 120.0V 156VA 43.0V	-	11:57:06 10-27-2019
Mott_Rd	1.08.72	ISDN	Inverter	0.0V 120.0V 72VA 48.7V	-	09:06:55 05-28-2019
Mt_Hebron	1.08.72	POTS	Line	117.5V 116.0V 116VA 54.6V	-	06:26:33 10-28-2019
North_Hilt	1.08.72	Cell	Line	126.0V 124.0V 136VA 54.7V	-	07:23:35 10-28-2019
! North_Red_Bluff	1.08.72	ISDN	Line	120.5V 120.0V 0VA 54.4V	-	06:29:40 10-28-2019
North_Weed	1.08.72	ISDN	Line	119.0V 117.0V 128VA 54.7V	-	07:18:39 10-28-2019
OBrien	1.08.72	MW	Inverter	0.0V 120.0V 192VA 42.2V	-	03:37:35 10-27-2019

: Power Safety Public

Powered By D2 ITS
Data is stale:
Not in line state:
Down for construction:
Awaiting SSH certificate:

Current Site Status

All Sites

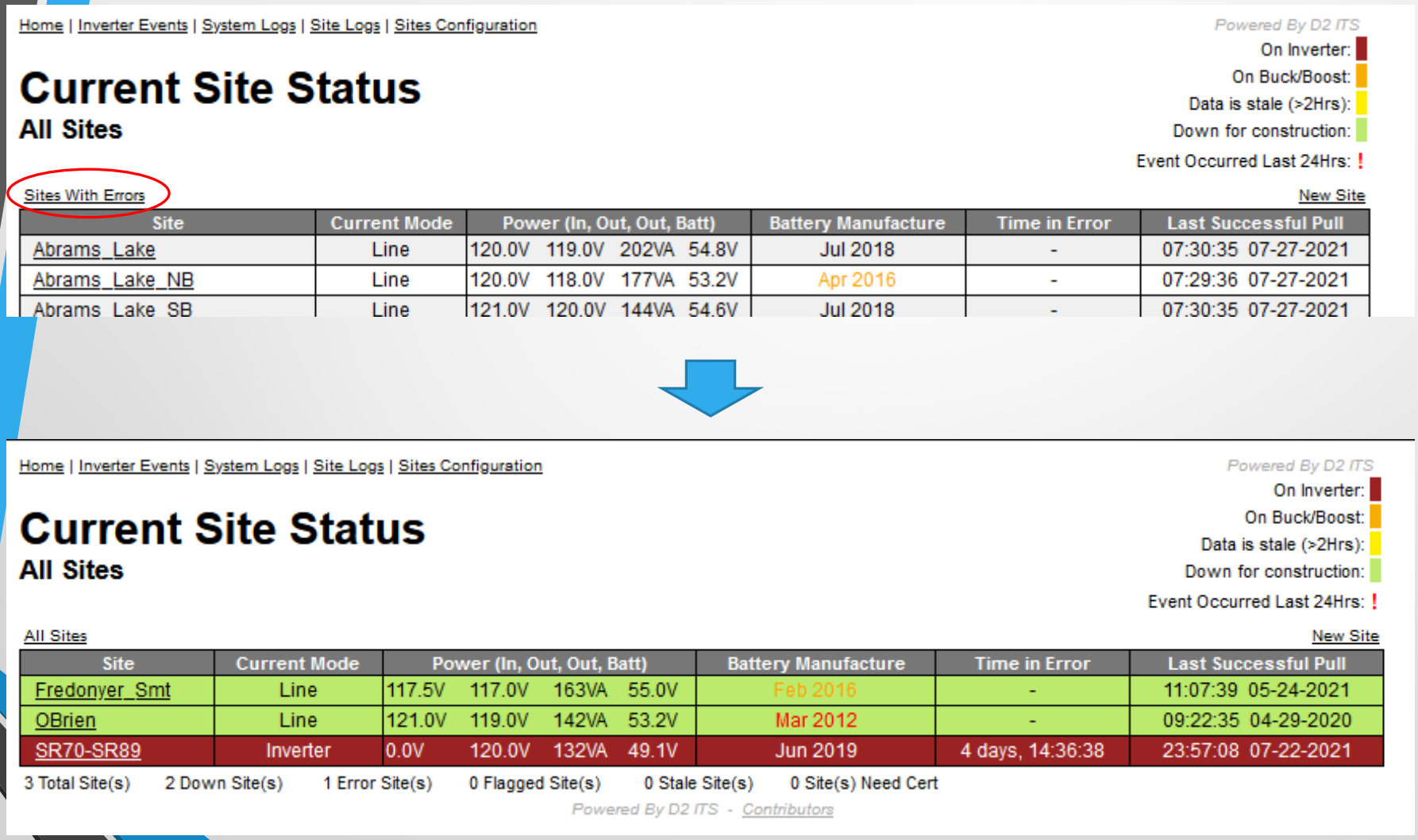
Sites With Errors

Site	Firmware
Abrams_Lake_NB	1.08.72
Abrams_Lake_SB	2.00.01
Anderson_Grade	1.08.72
Antlers_Bridge	1.08.72
Black_Butte	1.08.72
Bogard	1.08.72
Bowman_Rd	2.00.04
Buckhorn	2.00.04
Cedar_Pass	1.08.72
Central_Yreka	1.08.72
Collier	1.08.72
Cottonwood_Truck_Scales	2.00.04
Deschutes	1.08.72
Dorris	1.08.72
Doyle	2.00.01
Dunsmuir	1.08.72
East_Riverside	1.08.72
EELab_1921	2.01.00
EELab_SNMP	2.01.00
Eureka_Way	1.08.72
Fawndale	1.08.72
Fredonyer_Smt	1.08.72
Gibson	2.00.04
Grass_Lake	1.08.72
Hartnell	1.08.72
Hatchet_Mtn	1.08.72
Hilltop	2.01.00
HilltopUPS	2.01.00
Hilt_Sandhouse	2.00.04
I5-SR273	2.00.04
I5-SR299	2.00.04
I5-SR44	2.00.04
I5-SR89	1.08.72
I5-US97	2.00.04
Janesville	1.08.72
Jellys_Ferry	2.00.04
Johnson_Grade	1.08.72
Lakehead	1.08.72
Lake_Blvd	2.01.00
Lake_BlvdUPS	2.01.00
Lassen_Park	1.08.72
La_Moine	1.08.72
Montgomery_Creek	1.08.72
Mott_Rd	1.08.72
Mt_Hebron	1.08.72
North_Hilt	1.08.72
North_Red_Bluff	1.08.72
North_Weed	1.08.72
OBrien	1.08.72

OBrien	1.08.72	MW	Inverter	0.0V 120.0V 192VA 42.2V	-	03:37:35 10-27-2019
Oregon_Mtn	2.00.04	POTS	Line	125.5V 123.0V 184VA 55.4V	-	07:19:16 10-28-2019
Perez	1.08.72	MW	Line	117.5V 116.0V 162VA 55.1V	-	07:21:35 10-28-2019
Pine_Grove	1.08.72	MW	Line	120.5V 120.0V 216VA 54.2V	-	07:23:36 10-28-2019
Pit_River_Bridge	1.08.72	MW	Inverter	0.0V 120.0V 252VA 42.0V	Jun 2019	05:01:35 10-27-2019
Pollard_Flat	2.00.04	ISDN	Line	119.0V 118.0V 177VA 56.0V	-	07:17:37 10-28-2019
Red_Bluff	1.08.72	ISDN	Line	121.0V 119.0V 119VA 53.3V	-	07:17:35 10-28-2019
Riverside_Ave	1.08.72	FIBER	Line	119.0V 118.0V 153VA 54.5V	-	07:24:35 10-28-2019
Sacramento_Hill	1.08.72	MW	Inverter	0.0V 120.0V 216VA 42.3V	-	04:55:35 10-27-2019
Salt_Creek	1.08.72	ISDN	Inverter	0.0V 120.0V 132VA 45.3V	-	19:27:37 10-26-2019
Shasta_River_Bridge	1.08.72	Cell	Line	119.0V 118.0V 165VA 54.7V	-	07:17:36 10-28-2019
Shingletown	1.08.72	POTS	Line	121.0V 121.0V 205VA 51.8V	-	18:01:37 10-26-2019
Sidehill	1.08.72	ISDN	Inverter	0.0V 120.0V 132VA 42.2V	-	19:49:32 06-25-2019
Sims_Road	1.08.72	ISDN	Line	118.0V 118.0V 129VA 55.1V	-	07:20:38 10-28-2019
Smith_Rd	2.00.04	FIBER	Line	121.0V 119.0V 119VA 55.5V	-	07:21:35 10-28-2019
Snowman	1.08.72	Cell	Line	119.0V 117.0V 117VA 54.8V	-	07:23:35 10-28-2019
South_Bonnyview	2.00.04	FIBER	Line	119.0V 117.0V 152VA 55.5V	-	07:20:35 10-28-2019
South_Weed	1.08.72	ISDN	Line	124.0V 123.0V 123VA 49.3V	-	06:53:39 10-28-2019
South_Yreka	1.08.72	ISDN	Line	121.5V 120.0V 108VA 56.0V	-	07:04:38 10-28-2019
Spring_Garden	1.08.72	POTS	Line	124.5V 125.0V 200VA 56.2V	-	07:24:04 10-28-2019
SR299-SR89	1.08.72	POTS	Line	117.0V 116.0V 150VA 54.9V	-	06:49:38 10-28-2019
SR36-SR44	1.08.72	POTS	Line	125.0V 124.0V 136VA 55.1V	-	21:52:03 10-27-2019
SR36-SR89	1.08.72	MW	Inverter	0.0V 120.0V 168VA 47.1V	-	07:24:37 10-28-2019
SR36-US395	1.08.72	POTS	Inverter	0.0V 120.0V 108VA 47.8V	-	07:24:36 10-28-2019
SR70-SR89	1.08.72	POTS	Inverter	0.0V 120.0V 120VA 44.8V	-	02:56:06 10-28-2019
SR70-US395	1.08.72	POTS	Line	118.5V 118.0V 177VA 55.1V	-	07:01:06 10-28-2019
Summit_Dr	1.08.72	ISDN	Line	120.0V 119.0V 130VA 54.9V	-	06:56:20 10-28-2019
Sundial_Bridge	1.08.72	FIBER	Line	123.0V 121.0V 157VA 54.1V	-	07:21:35 10-28-2019
Townhill	1.08.72	POTS	Inverter	0.0V 120.0V 132VA 44.3V	-	04:59:35 10-28-2019
Vina	1.08.72	ISDN	Inverter	0.0V 120.0V 108VA 43.9V	-	18:02:40 10-27-2019
Vollmers	1.08.72	ISDN	Line	119.0V 117.0V 198VA 54.3V	-	07:13:37 10-28-2019
Weed_Airport	1.08.72	ISDN	Line	121.0V 119.0V 130VA 54.7V	-	07:15:35 10-28-2019
Wilcox_Rd_NB	1.08.72	ISDN	Line	123.0V 122.0V 170VA 55.3V	-	07:14:40 10-28-2019
Wilcox_Rd_SB	1.08.72	ISDN	Line	123.0V 121.0V 157VA 54.7V	-	06:40:39 10-28-2019

82 Total Site(s) 3 Down Site(s) 19 Error Site(s) 23 Flagged Site(s) 5 Stale Site(s) 0 Site(s) Need Cert

Examples – Error Sites



Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Powered By D2 ITS

On Inverter:
On Buck/Boost:
Data is stale (>2Hrs):
Down for construction:
Event Occurred Last 24Hrs: !

Current Site Status

All Sites

Sites With Errors

New Site

Site	Current Mode	Power (In, Out, Out, Batt)	Battery Manufacture	Time in Error	Last Successful Pull
Abrams_Lake	Line	120.0V 119.0V 202VA 54.8V	Jul 2018	-	07:30:35 07-27-2021
Abrams_Lake_NB	Line	120.0V 118.0V 177VA 53.2V	Apr 2016	-	07:29:36 07-27-2021
Abrams_Lake_SB	Line	121.0V 120.0V 144VA 54.6V	Jul 2018	-	07:30:35 07-27-2021

Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Powered By D2 ITS

On Inverter:
On Buck/Boost:
Data is stale (>2Hrs):
Down for construction:
Event Occurred Last 24Hrs: !

Current Site Status

All Sites

All Sites

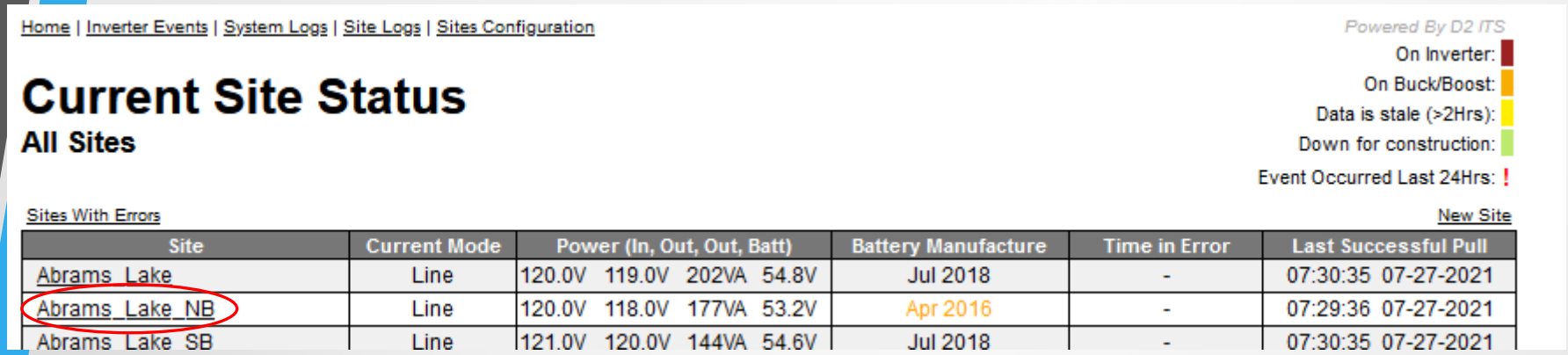
New Site

Site	Current Mode	Power (In, Out, Out, Batt)	Battery Manufacture	Time in Error	Last Successful Pull
Fredonyer_Smt	Line	117.5V 117.0V 163VA 55.0V	Feb 2016	-	11:07:39 05-24-2021
OBrien	Line	121.0V 119.0V 142VA 53.2V	Mar 2012	-	09:22:35 04-29-2020
SR70-SR89	Inverter	0.0V 120.0V 132VA 49.1V	Jun 2019	4 days, 14:36:38	23:57:08 07-22-2021

3 Total Site(s) 2 Down Site(s) 1 Error Site(s) 0 Flagged Site(s) 0 Stale Site(s) 0 Site(s) Need Cert

Powered By D2 ITS - Contributors

Examples – Event Data (No Recent)



Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Powered By D2 ITS

On Inverter:
On Buck/Boost:
Data is stale (>2Hrs):
Down for construction:
Event Occurred Last 24Hrs: !

Current Site Status

All Sites

Sites With Errors

New Site

Site	Current Mode	Power (In, Out, Out, Batt)	Battery Manufacture	Time in Error	Last Successful Pull
Abrams_Lake	Line	120.0V 119.0V 202VA 54.8V	Jul 2018	-	07:30:35 07-27-2021
Abrams_Lake_NB	Line	120.0V 118.0V 177VA 53.2V	Apr 2016	-	07:29:36 07-27-2021
Abrams_Lake_SB	Line	121.0V 120.0V 144VA 54.6V	Jul 2018	-	07:30:35 07-27-2021

Examples – Event Data (No Recent)

Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Powered By D2 ITS

Total Events: 16
Not on Line: 9
Number of alarms: 6
Number of faults: 0

Abrams Lake NB

Last 30 Days

Edit Site | Archive | Inverter Events | Logs | Power

Last 24 Hours | Last 48 Hours | Last 30 Days | Last Year

Date Time	Mode	Alarms	Faults	Data Retrieved Time
07-11-2021 22:06:05	Line	0000000000000000	0000000000000000	07-11-2021 22:05:06
07-11-2021 22:05:58	Inverter	0000000000000000	0000000000000000	07-11-2021 22:05:06
07-04-2021 22:56:13	Line	0000000000000000	0000000000000000	07-04-2021 22:54:36
07-04-2021 22:55:12	Boost1	0000000000000000	0000000000000000	07-04-2021 22:54:36
07-04-2021 22:55:07	Line	0000000000000000	0000000000000000	07-04-2021 22:54:36
07-04-2021 22:55:01	Line	1000000000000000	0000000000000000	07-04-2021 22:54:36
07-04-2021 20:23:53	Inverter	1000000000000000	0000000000000000	07-04-2021 20:24:36
07-04-2021 20:22:50	Inverter	0000000000000000	0000000000000000	07-04-2021 20:24:36
06-30-2021 13:54:40	Line	0000000000000000	0000000000000000	06-30-2021 13:54:35
06-30-2021 13:54:35	Line	1000000000000000	0000000000000000	06-30-2021 13:54:35
06-30-2021 13:54:30	Inverter	1000000000000000	0000000000000000	06-30-2021 13:54:35
06-30-2021 13:50:39	Inverter	1000000010000000	0000000000000000	06-30-2021 13:49:36
06-30-2021 13:49:37	Inverter	0000000010000000	0000000000000000	06-30-2021 13:49:36
06-30-2021 13:49:36	Inverter	0000000000000000	0000000000000000	06-30-2021 13:49:36
06-30-2021 10:47:02	Line	0000000000000000	0000000000000000	06-30-2021 10:49:36
06-30-2021 10:46:56	Inverter	0000000000000000	0000000000000000	06-30-2021 10:49:36

Powered By D2 ITS - Contributors

Last 30 Days

Examples – Event Data (Alarms)

Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Powered By D2 ITS

Total Events: 16
Not on Line: 9
Number of alarms: 6
Number of faults: 0

Abrams Lake NB

Last 30 Days

Edit Site | Archive | Inverter Events | Logs | Power

Last 24 Hours | Last 48 Hours | Last 30 Days | Last Year

Date Time	Mode	Alarms	Faults	Data Retrieved Time
07-11-2021 22:06:05	Line	0000000000000000	0000000000000000	07-11-2021 22:05:06
07-11-2021 22:05:58	Inverter	0000000000000000	0000000000000000	07-11-2021 22:05:06
07-04-2021 22:56:13	Line	0000000000000000	0000000000000000	07-04-2021 22:54:36
07-04-2021 22:55:12	Boost1	0000000000000000	0000000000000000	07-04-2021 22:54:36
07-04-2021 22:55:07	Line	0000000000000000	0000000000000000	07-04-2021 22:54:36
07-04-2021 22:55:01	Line	1000000000000000	0000000000000000	07-04-2021 22:54:36
07-04-2021 20:23:53	Inverter	1000000000000000	0000000000000000	07-04-2021 20:24:36
07-04-2021 20:22:50	Inverter	0000000000000000	0000000000000000	07-04-2021 20:24:36
06-30-2021 13:54:40	Line	0000000000000000	0000000000000000	06-30-2021 13:54:35
06-30-2021 13:54:35	Line	1000000000000000	0000000000000000	06-30-2021 13:54:35
06-30-2021 13:54:30	Inverter	1000000000000000	0000000000000000	06-30-2021 13:54:35
06-30-2021 13:50:39	Inverter	1000000010000000	0000000000000000	06-30-2021 13:49:36
06-30-2021 13:49:37	Inverter	0000000010000000	0000000000000000	06-30-2021 13:49:36
06-30-2021 13:49:36	Inverter	0000000	['Power Outage', 'Input Frequency Out of Range']	06-30-2021 13:49:36
06-30-2021 10:47:02	Line	0000000000000000	0000000000000000	06-30-2021 10:49:36
06-30-2021 10:46:56	Inverter	0000000000000000	0000000000000000	06-30-2021 10:49:36

Powered By D2 ITS - Contributors

Examples – Event Data (Recent)

North_Hill	Line	123.0V	121.0V	157VA	54.2V	Sep 2012	-	10:48:36 07-27-2021
North_Mountain_Gate	Line	124.0V	122.0V	183VA	53.1V	Jul 2020	-	10:47:00 07-27-2021
North_Red_Bluff	Line	123.0V	121.0V	181VA	52.4V	Sep 2012	-	10:29:39 07-27-2021
North_Weed	Line	123.0V	122.0V	134VA	54.1V	Apr 2013	-	10:48:38 07-27-2021
OBrien	Line	121.0V	119.0V	142VA	53.2V	Mar 2012	-	09:22:35 04-29-2020
Oregon_Mtn	Line	119.0V	117.0V	198VA	53.0V	Jan 2017	-	10:49:16 07-27-2021
Perez	Line	119.0V	117.0V	163VA	52.9V	Sep 2012	-	10:46:35 07-27-2021
Pine_Grove	Line	121.0V	119.0V	226VA	36.2V	Jul 2018	-	10:49:06 07-27-2021

Total Events: 64
Not on Line: 42
Number of alarms: 11
Number of faults: 0

Oregon Mtn

Last 24 Hours

Last 24 Hrs.

Date Time	Mode	Alarms	Faults	Data Retrieved Time
07-27-2021 10:27:05	Line	0000000000000000	0000000000000000	07-27-2021 10:34:03
07-27-2021 10:26:53	Inverter	0000000000000000	0000000000000000	07-27-2021 10:34:03
07-27-2021 10:26:53	Inverter	0000000010000000	0000000000000000	07-27-2021 10:34:03
07-27-2021 08:40:07	Line	0000000000000000	0000000000000000	07-27-2021 08:49:08
07-27-2021 08:39:54	Inverter	0000000000000000	0000000000000000	07-27-2021 08:49:08
07-27-2021 08:39:54	Inverter	0000000010000000	0000000000000000	07-27-2021 08:49:08
07-27-2021 08:22:11	Line	0000000000000000	0000000000000000	07-27-2021 08:34:09
07-27-2021 08:21:59	Inverter	0000000[	00000000	07-27-2021 08:34:09
07-27-2021 08:21:58	Inverter	0000000000000000	0000000000000000	07-27-2021 08:34:09
07-27-2021 06:43:14	Line	0000000000000000	0000000000000000	07-27-2021 06:49:13
07-27-2021 06:43:08	Line	0000000000000000	0000000000000000	07-27-2021 06:49:13
07-27-2021 06:43:08	Inverter	0000000000000000	0000000000000000	07-27-2021 06:49:13
07-27-2021 06:43:01	Inverter	0000000000000000	0000000000000000	07-27-2021 06:49:13
07-27-2021 06:25:25	Line	0000000000000000	0000000000000000	07-27-2021 06:34:09
07-27-2021 06:25:18	Line	0000000000000000	0000000000000000	07-27-2021 06:34:09
07-27-2021 06:25:18	Inverter	0000000000000000	0000000000000000	07-27-2021 06:34:09
07-27-2021 06:25:12	Inverter	0000000000000000	0000000000000000	07-27-2021 06:34:09
07-27-2021 04:26:12	Line	0000000000000000	0000000000000000	07-27-2021 04:35:15
07-27-2021 04:26:05	Line	0000000000000000	0000000000000000	07-27-2021 04:35:15
07-27-2021 04:26:05	Inverter	0000000000000000	0000000000000000	07-27-2021 04:35:15
07-27-2021 04:25:59	Inverter	0000000000000000	0000000000000000	07-27-2021 04:35:15
07-27-2021 02:42:48	Line	0000000000000000	0000000000000000	07-27-2021 02:49:08
07-27-2021 02:42:42	Line	0000000000000000	0000000000000000	07-27-2021 02:49:08
07-27-2021 02:42:42	Inverter	0000000000000000	0000000000000000	07-27-2021 02:49:08
07-27-2021 02:42:35	Inverter	0000000000000000	0000000000000000	07-27-2021 02:49:08
07-27-2021 01:17:48	Line	0000000000000000	0000000000000000	07-27-2021 01:19:13
07-27-2021 01:17:41	Inverter	0000000000000000	0000000000000000	07-27-2021 01:19:13
07-27-2021 00:24:02	Line	0000000000000000	0000000000000000	07-27-2021 00:34:10
07-27-2021 00:23:55	Inverter	0000000000000000	0000000000000000	07-27-2021 00:34:10
07-27-2021 00:23:55	Boost1	0000000000000000	0000000000000000	07-27-2021 00:34:10
07-27-2021 00:23:55	Line	0000000000000000	0000000000000000	07-27-2021 00:34:10
07-27-2021 00:23:48	Inverter	0000000000000000	0000000000000000	07-27-2021 00:34:10
07-26-2021 22:22:53	Line	0000000000000000	0000000000000000	07-26-2021 22:34:15

['Input Frequency Out of Range']

Examples – Event Data (No Power 4+ Days)

! SR36-SR44	Line	125.0V 124.0V 223VA 52.9V	Apr 2011	-	09:52:45 07-27-2021
SR36-SR89	Line	121.0V 120.0V 192VA 53.2V	Apr 2011	-	10:49:36 07-27-2021
SR36-US395	Line	125.0V 125.0V 112VA 52.9V	Aug 2010	-	10:49:36 07-27-2021
SR70-SR89	Inverter	0.0V 120.0V 132VA 49.1V	Jun 2019	4 days, 17:54:16	23:57:08 07-22-2021
SR70-US395	Line	122.5V 122.0V 146VA 52.7V	Jan 2011	-	10:46:05 07-27-2021
Summit_Dr	Line	123.0V 122.0V 158VA 52.6V	Mar 2014	-	09:55:38 07-27-2021

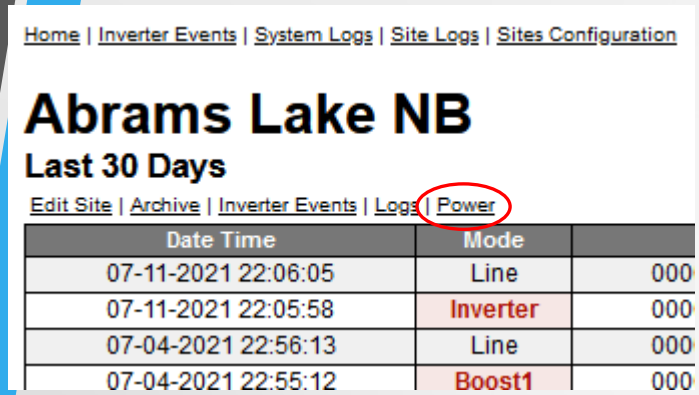
Total Events: 38
Not on Line: 21
Number of alarms: 1
Number of faults: 0

SR70-SR89

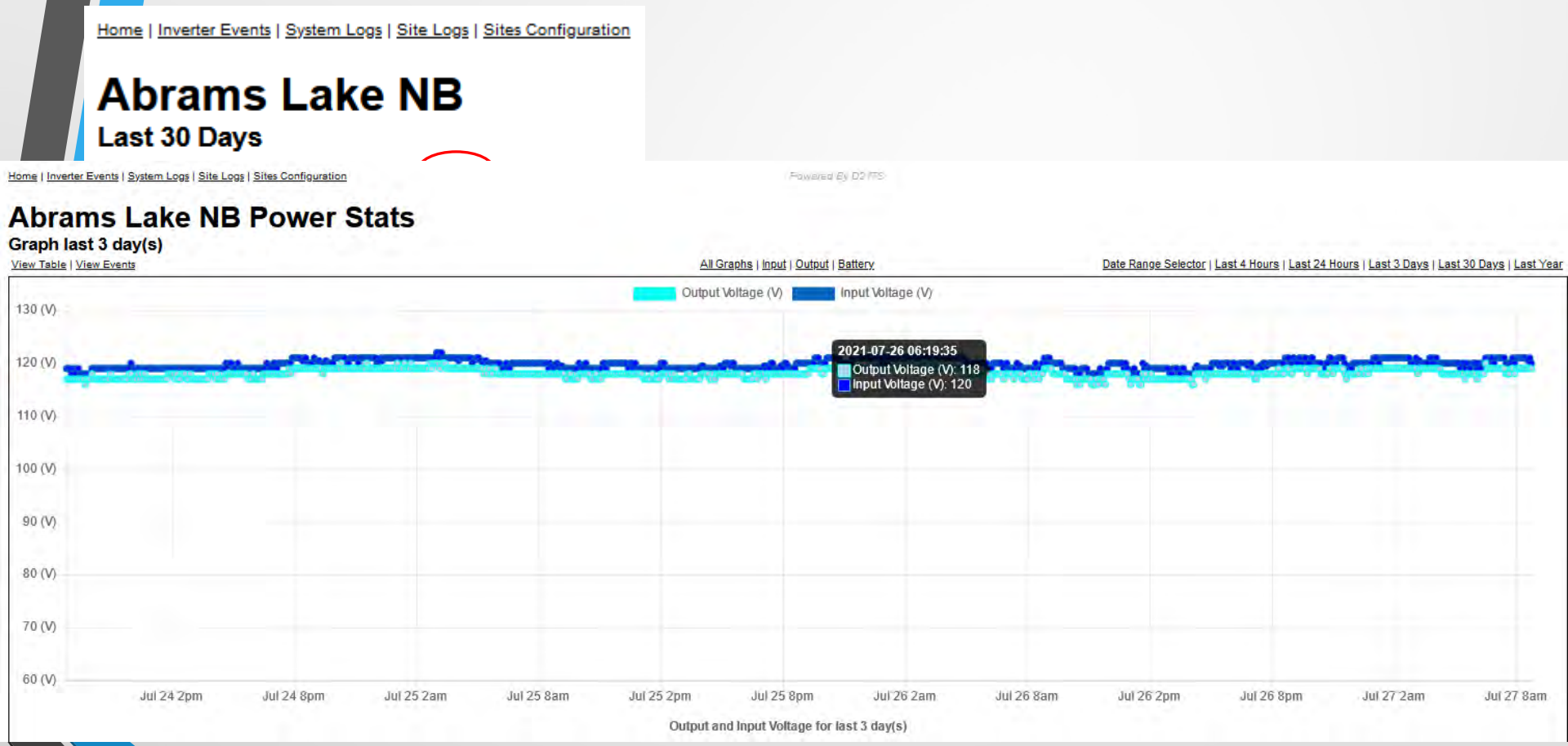
Last 30 Days

Date Time	Mode	Alarms	Faults	Data Retrieved Time
07-22-2021 18:05:13	Inverter	0000000000000000	0000000000000000	07-22-2021 18:56:15
07-22-2021 17:56:13	Line	0000000000000000	0000000000000000	07-22-2021 18:56:15
07-22-2021 17:56:07	Boost1	0000000000000000	0000000000000000	07-22-2021 20:56:05
07-22-2021 17:56:07	Inverter	0000000000000000	0000000000000000	07-22-2021 18:56:15
07-22-2021 16:54:50	Line	0000000000000000	0000000000000000	07-22-2021 20:56:05
07-22-2021 16:54:43	Inverter	0000000000000000	0000000000000000	07-22-2021 20:56:05
07-22-2021 16:53:22	Line	0000000000000000	0000000000000000	07-22-2021 20:56:05
07-22-2021 16:53:15	Inverter	0000000000000000	0000000000000000	07-22-2021 20:56:05
07-22-2021 12:30:46	Line	0000000000000000	0000000000000000	07-22-2021 12:56:05
07-22-2021 12:30:39	Inverter	0000000000000000	0000000000000000	07-22-2021 12:56:05
07-21-2021 16:41:45	Line	0000000000000000	0000000000000000	07-21-2021 16:56:05
07-21-2021 16:41:38	Inverter	0000000000000000	0000000000000000	07-21-2021 16:56:05
07-21-2021 16:39:10	Line	0000000000000000	0000000000000000	07-21-2021 16:56:05
07-21-2021 16:10:09	Inverter	0000000000000000	0000000000000000	07-21-2021 16:56:05
07-21-2021 15:34:11	Line	0000000000000000	0000000000000000	07-21-2021 15:56:04
07-21-2021 15:34:04	Inverter	0000000000000000	0000000000000000	07-21-2021 15:56:04
07-19-2021 18:11:44	Line	0000000000000000	0000000000000000	07-19-2021 18:57:10
07-19-2021 18:11:44	Boost1	0000000000000000	0000000000000000	07-19-2021 18:57:10
07-19-2021 18:04:03	Line	0000000000000000	0000000000000000	07-19-2021 18:57:10
07-19-2021 14:38:31	Inverter	0000000000000000	0000000000000000	07-19-2021 14:56:36
07-17-2021 12:20:20	Line	0000000000000000	0000000000000000	07-17-2021 12:57:05
07-17-2021 12:20:13	Inverter	0000000000000000	0000000000000000	07-17-2021 12:57:05
07-16-2021 14:14:09	Line	0000000000000000	0000000000000000	07-16-2021 14:56:11
07-16-2021 14:14:03	Inverter	0000000000000000	0000000000000000	07-16-2021 14:56:11
07-14-2021 14:03:17	Line	0000000000000000	0000000000000000	07-14-2021 14:56:05
07-14-2021 14:03:10	Inverter	0000000000000000	0000000000000000	07-14-2021 14:56:05
07-14-2021 13:19:52	Line	0000000000000000	0000000000000000	07-14-2021 13:56:05
07-14-2021 13:19:47	Inverter	0000000010000000	0000000000000000	07-14-2021 13:56:05
07-14-2021 13:19:47	Inverter	0000000000000000	0000000000000000	07-14-2021 13:56:05
07-14-2021 11:01:43	Inverter	0000000000000000	0000000000000000	07-14-2021 11:56:03
07-13-2021 12:15:34	Line	0000000000000000	0000000000000000	07-13-2021 12:57:11
07-13-2021 12:15:27	Inverter	0000000000000000	0000000000000000	07-13-2021 12:57:11
07-09-2021 12:15:33	Line	0000000000000000	0000000000000000	07-09-2021 12:57:01
07-09-2021 12:15:27	Inverter	0000000000000000	0000000000000000	07-09-2021 12:57:01
07-03-2021 12:15:26	Line	0000000000000000	0000000000000000	07-03-2021 12:56:04
07-03-2021 12:15:19	Inverter	0000000000000000	0000000000000000	07-03-2021 12:56:04
06-30-2021 12:15:26	Line	0000000000000000	0000000000000000	06-30-2021 12:56:04
06-30-2021 12:15:19	Inverter	0000000000000000	0000000000000000	06-30-2021 12:56:04

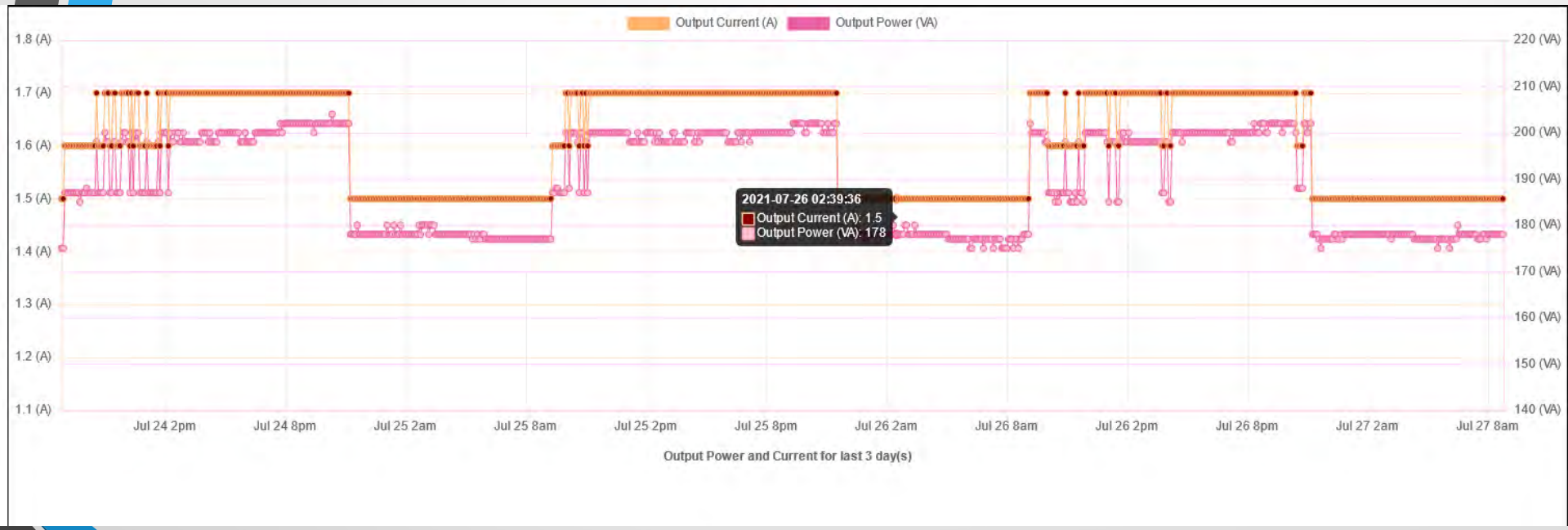
Examples - Power



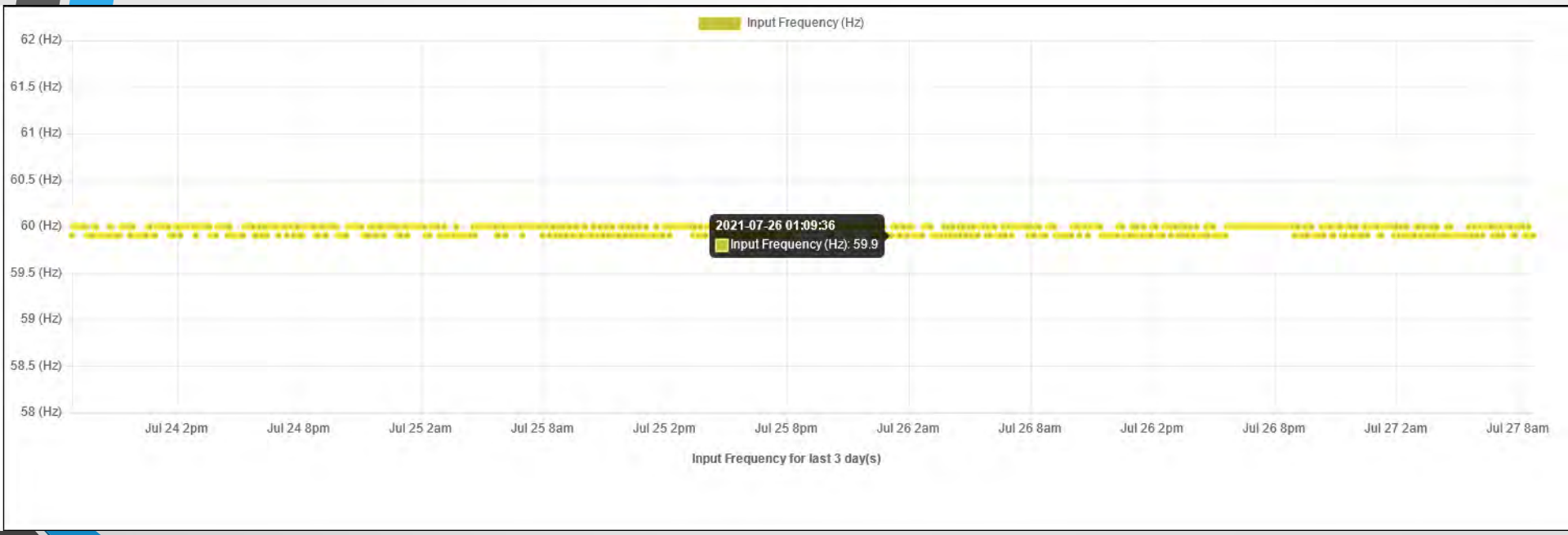
Examples - Power



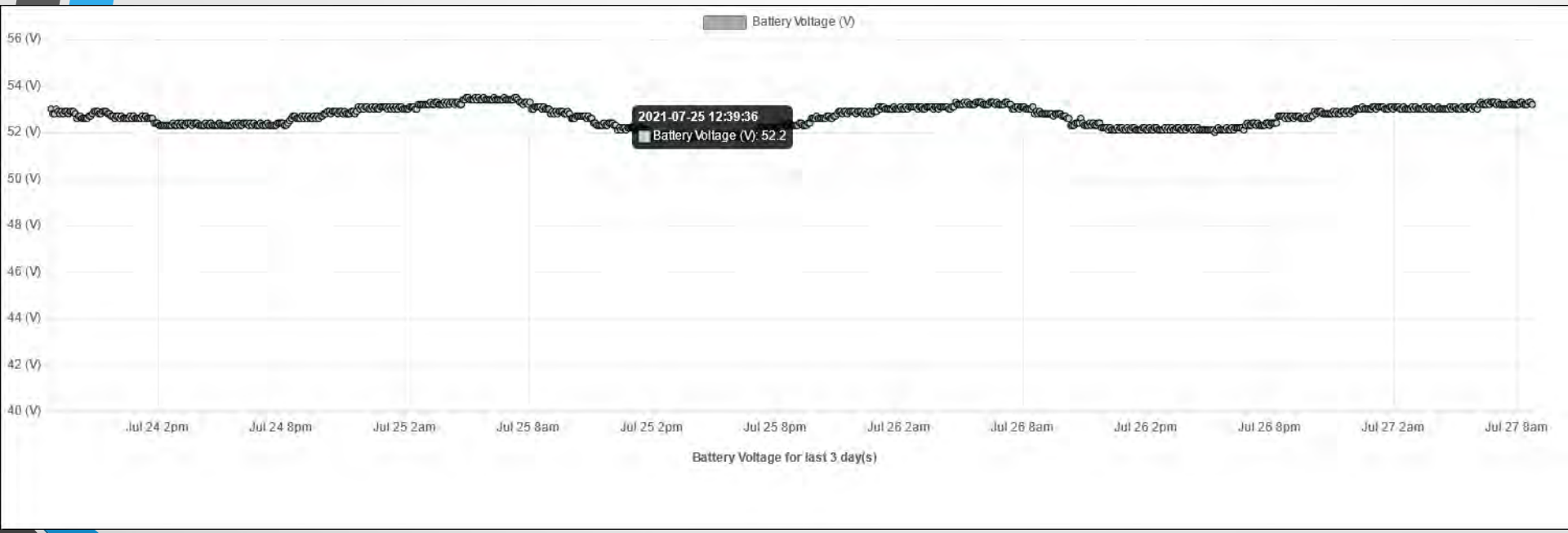
Examples - Power



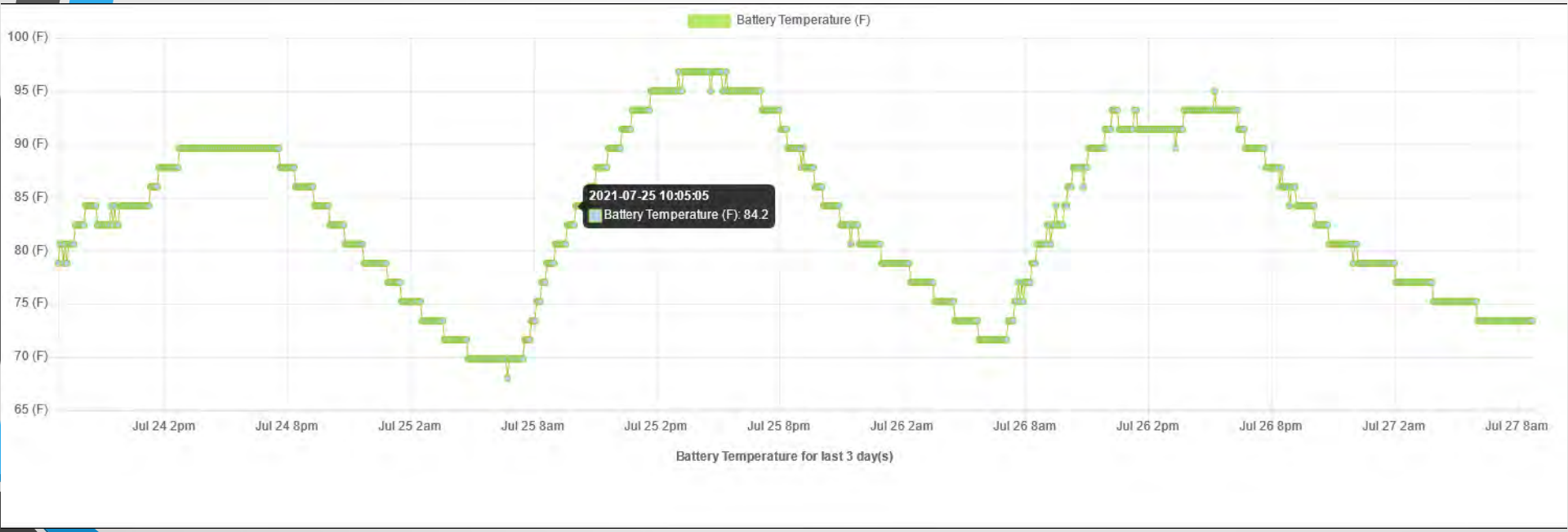
Examples - Power



Examples - Power

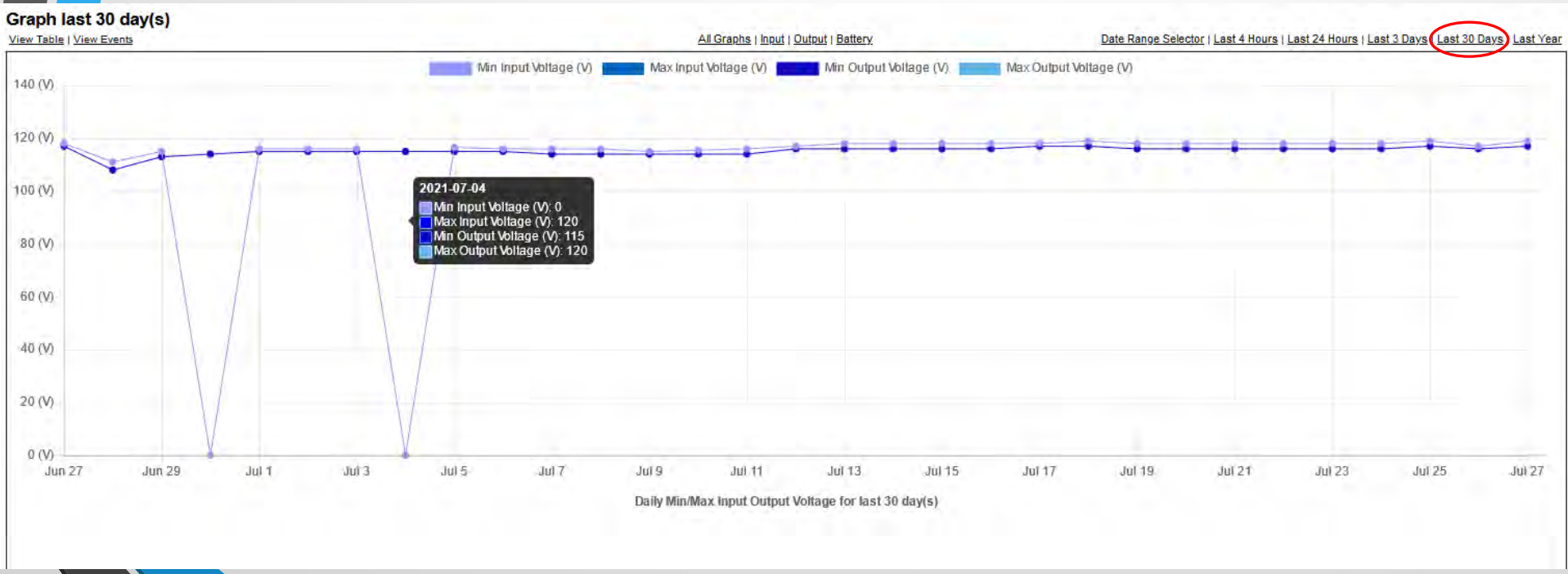


Examples - Power

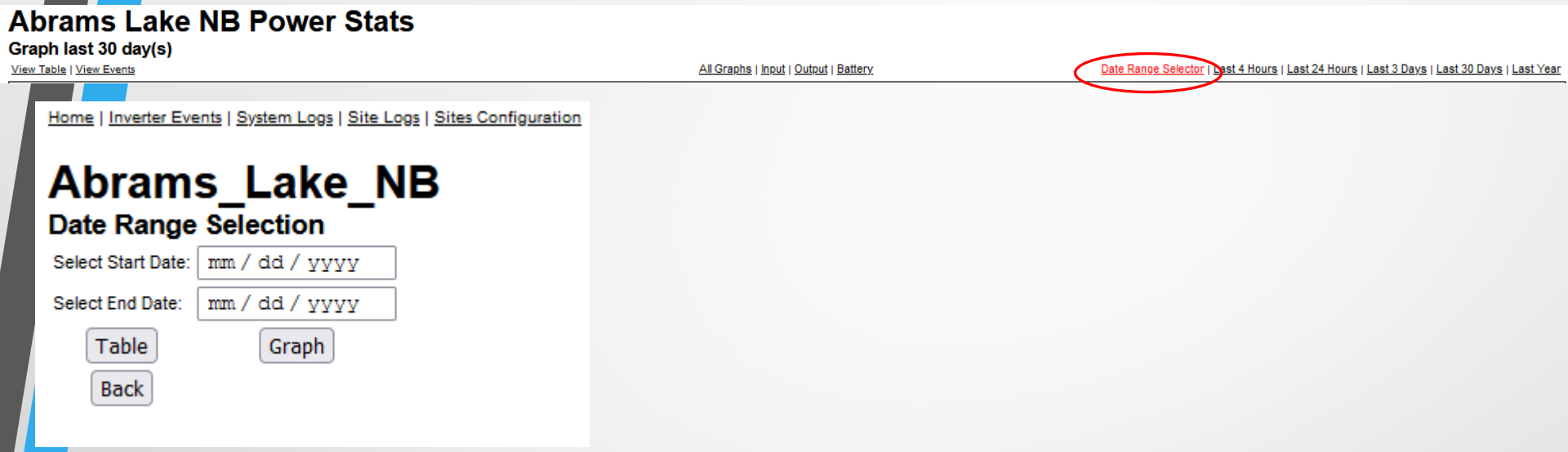


Examples - Power

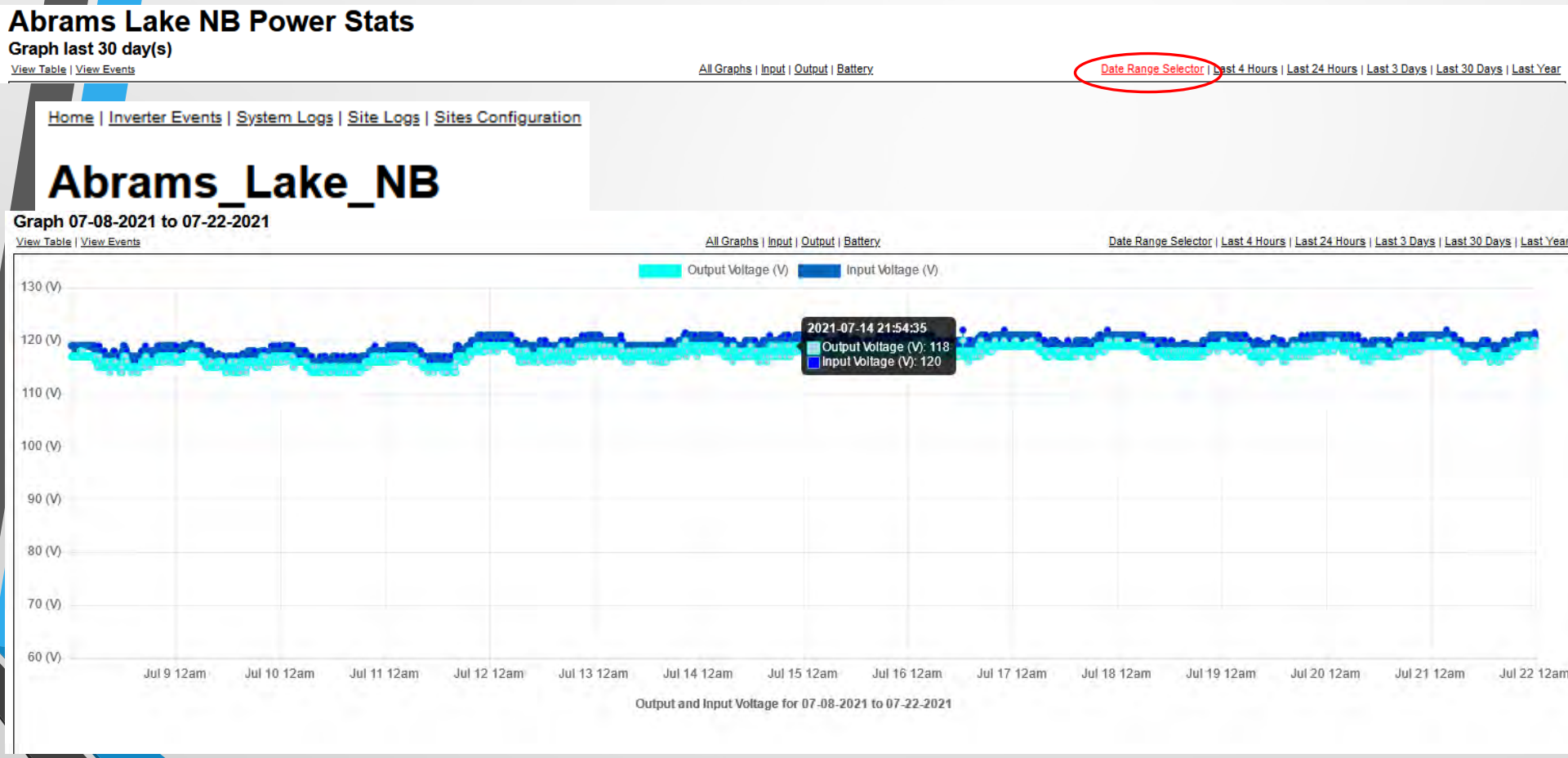
Greater then 3 days only shows Min/Max per day



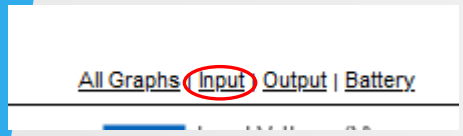
Examples - Power



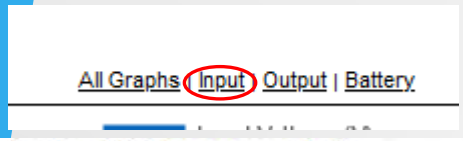
Examples - Power

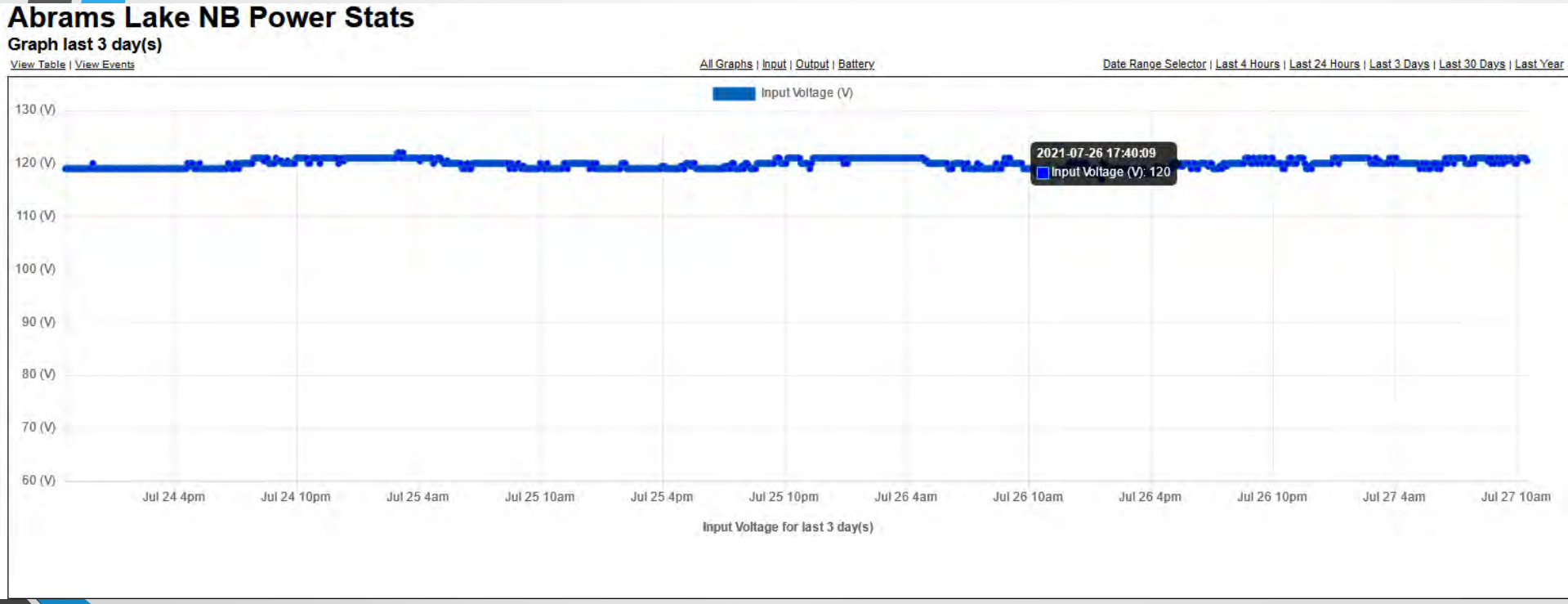


Examples - Power

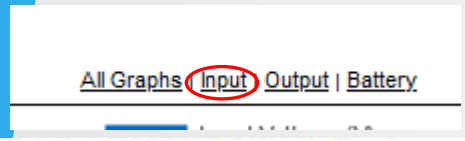


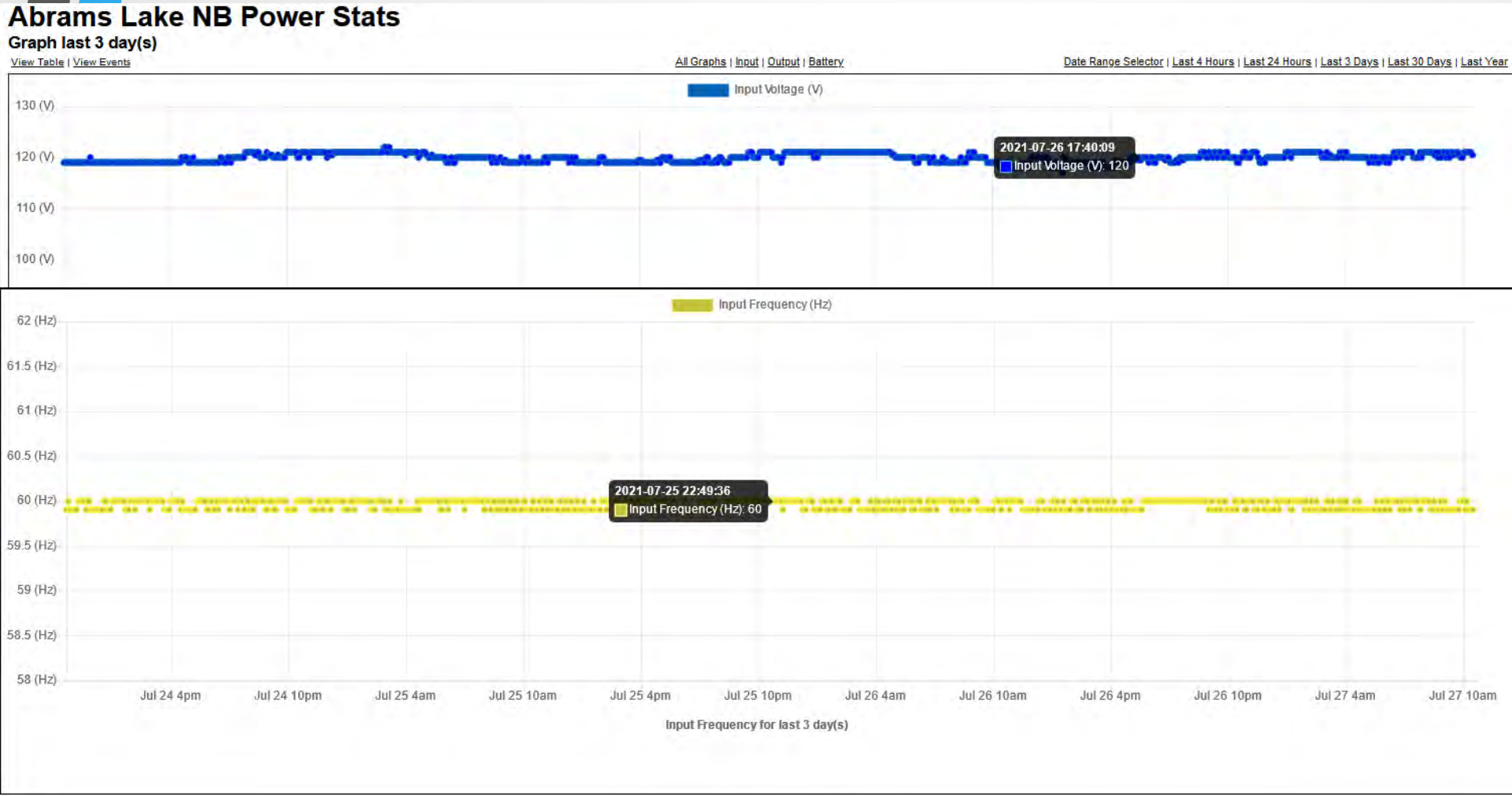
Examples - Power



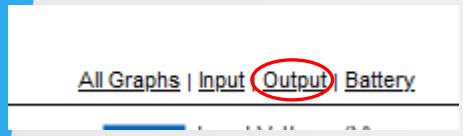


Examples - Power

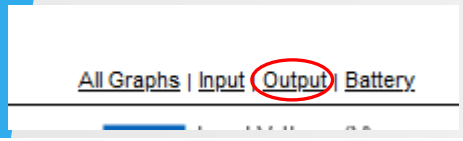


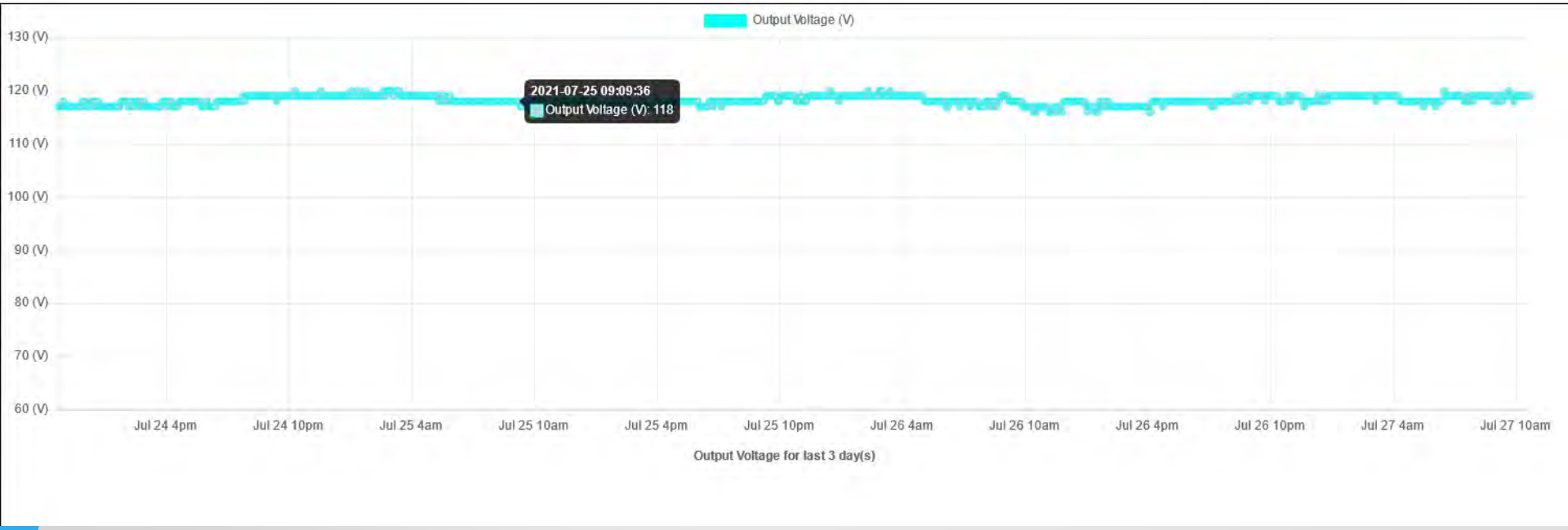


Examples - Power



Examples - Power





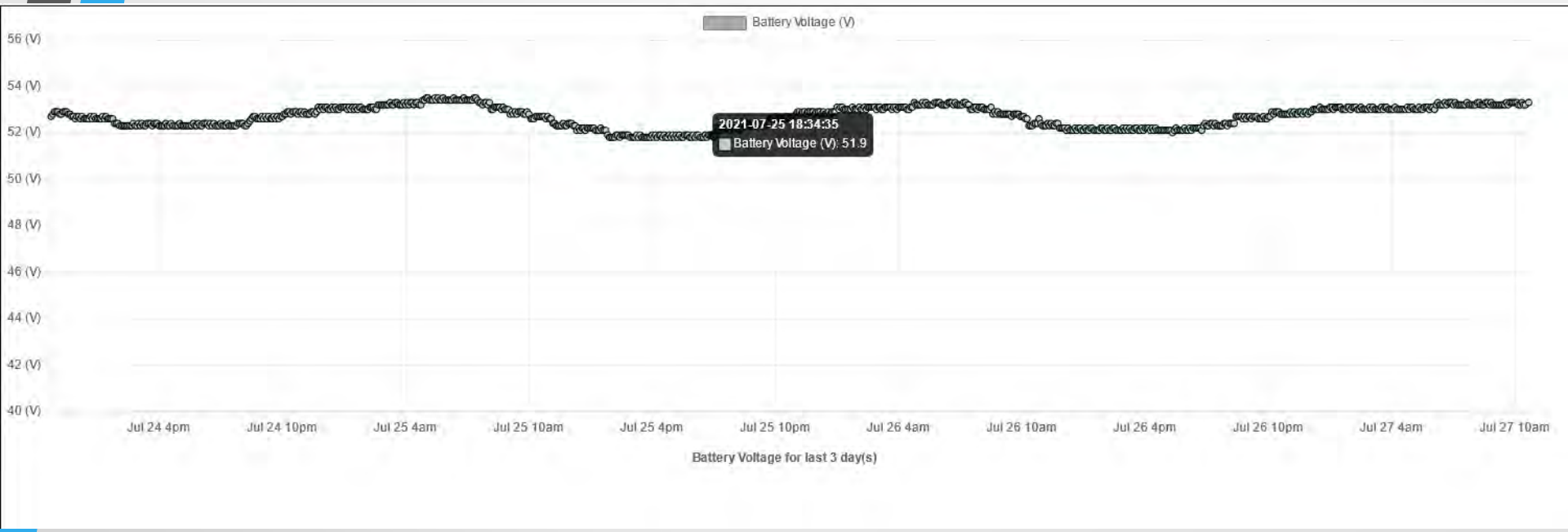
Examples - Power

Examples - Power

All Graphs | Input | Output | Battery

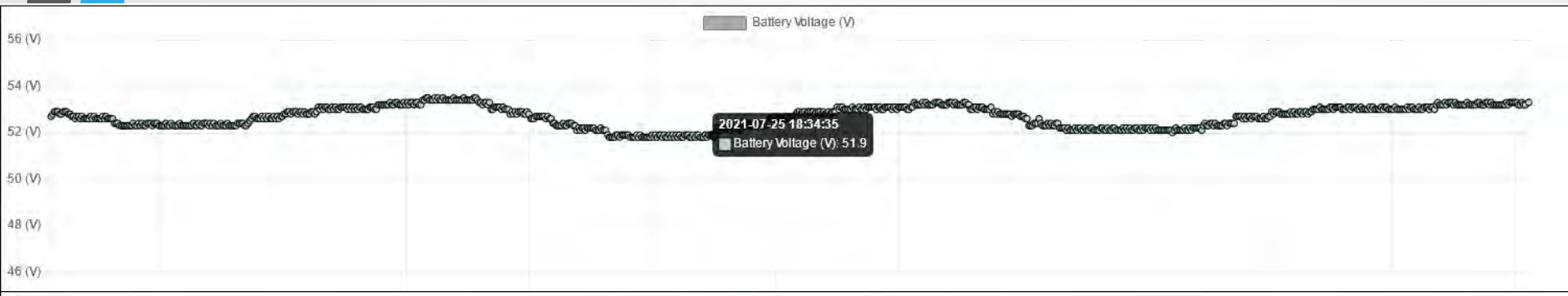
Examples - Power

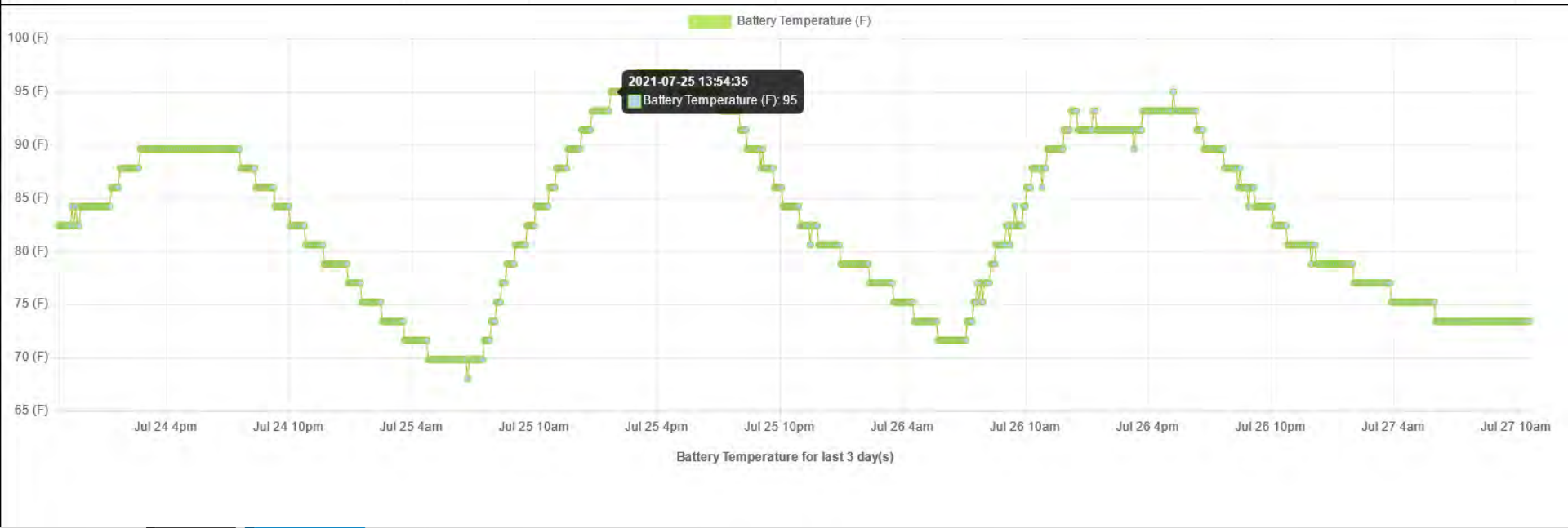
Examples - Power



Examples - Power

All Graphs | Input | Output | Battery





Examples - Power

Abrams Lake NB Power Stats

Table last 3 day(s)

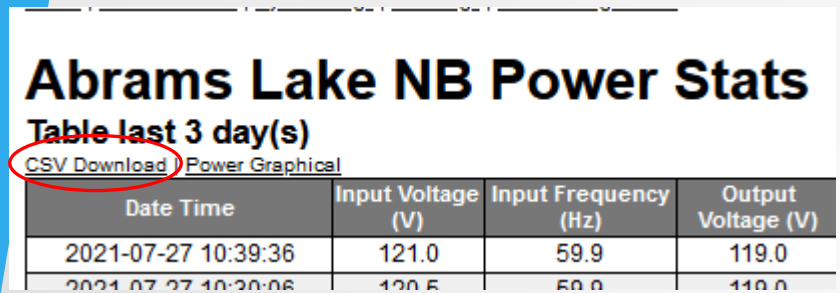
CSV Download | Power Graphical

Date Range Selector | Last 4 Hours | Last 24 Hours | Last 3 Days | Last 30 Days | Last Year

Date Time	Input Voltage (V)	Input Frequency (Hz)	Output Voltage (V)	Output Current (A)	Output Power (VA)	Battery Voltage (V)	Battery Temperature (°C)	Mode
2021-07-27 10:39:36	121.0	59.9	119.0	1.5	178	53.3	23	Line
2021-07-27 10:30:06	120.5	59.9	119.0	1.5	178	53.2	23	Line
2021-07-27 10:24:36	121.0	59.9	119.0	1.5	178	53.2	23	Line
2021-07-27 10:19:35	121.0	59.9	119.0	1.5	178	53.3	23	Line
2021-07-27 10:14:36	121.0	59.9	119.0	1.5	178	53.2	23	Line
2021-07-27 10:09:36	121.0	60.0	119.0	1.5	178	53.2	23	Line
2021-07-27 10:04:35	121.0	59.9	119.0	1.5	178	53.3	23	Line
2021-07-27 09:59:36	120.0	60.0	119.0	1.5	178	53.3	23	Line
2021-07-27 09:54:35	120.0	60.0	118.0	1.5	177	53.3	23	Line
2021-07-27 09:49:36	120.5	60.0	119.0	1.5	178	53.3	23	Line
2021-07-27 09:45:06	121.0	59.9	119.0	1.5	178	53.3	23	Line
2021-07-27 09:39:35	121.0	59.9	120.0	1.5	180	53.2	23	Line
2021-07-27 09:34:37	120.5	59.9	119.0	1.5	178	53.3	23	Line
2021-07-27 09:29:36	121.0	59.9	119.0	1.5	178	53.2	23	Line
2021-07-27 09:24:35	121.0	59.9	119.0	1.5	178	53.2	23	Line
2021-07-27 09:19:36	120.0	59.9	118.0	1.5	177	53.2	23	Line
2021-07-27 09:14:35	121.0	59.9	119.0	1.5	178	53.2	23	Line
2021-07-27 09:09:36	120.0	59.9	118.0	1.5	177	53.2	23	Line
2021-07-27 09:04:36	121.0	60.0	119.0	1.5	178	53.2	23	Line
2021-07-27 08:59:35	121.0	59.9	119.0	1.5	178	53.2	23	Line
2021-07-27 08:54:36	120.0	59.9	118.0	1.5	177	53.2	23	Line

Examples - Power

Examples - Power

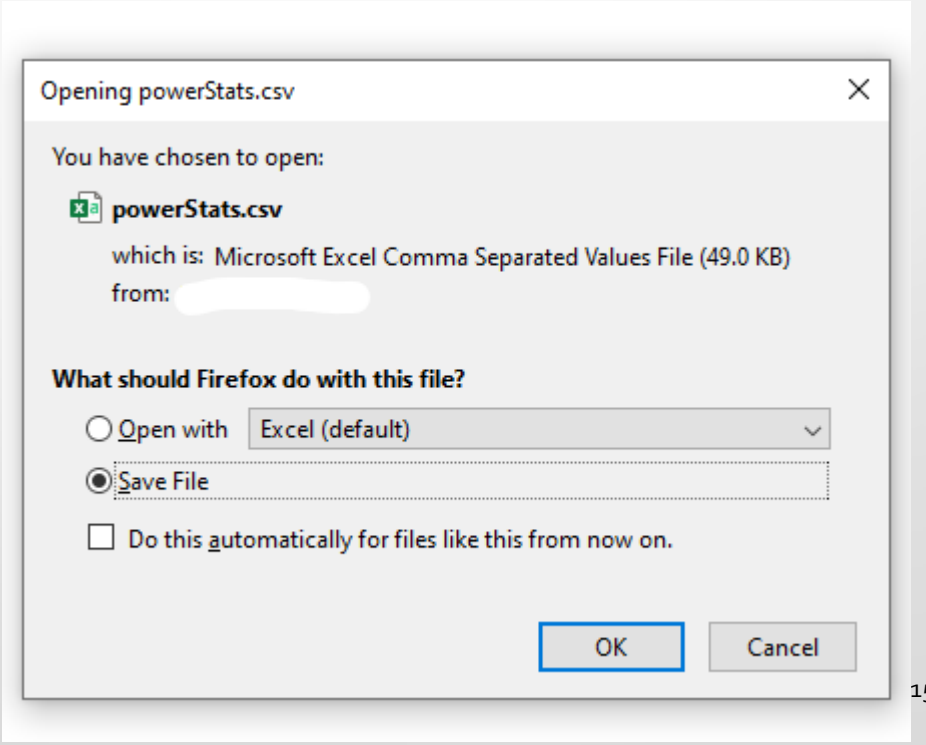


Abrams Lake NB Power Stats

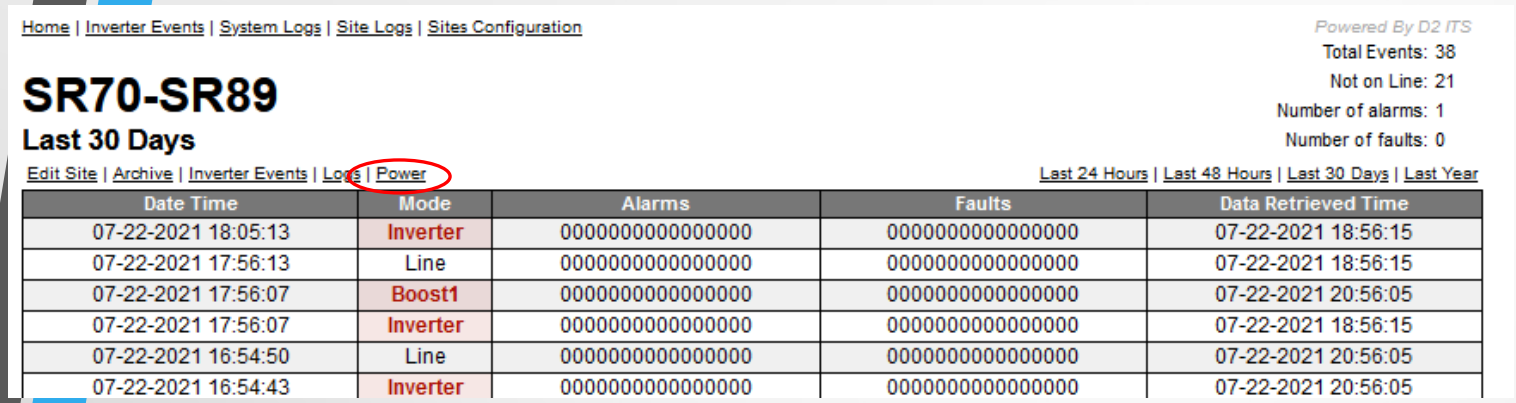
Table last 3 day(s)

CSV Download | Power Graphical

Date Time	Input Voltage (V)	Input Frequency (Hz)	Output Voltage (V)
2021-07-27 10:39:36	121.0	59.9	119.0
2021-07-27 10:30:06	120.5	59.9	119.0



Examples – Power (Outage)



Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Powered By D2 ITS

Total Events: 38
Not on Line: 21
Number of alarms: 1
Number of faults: 0

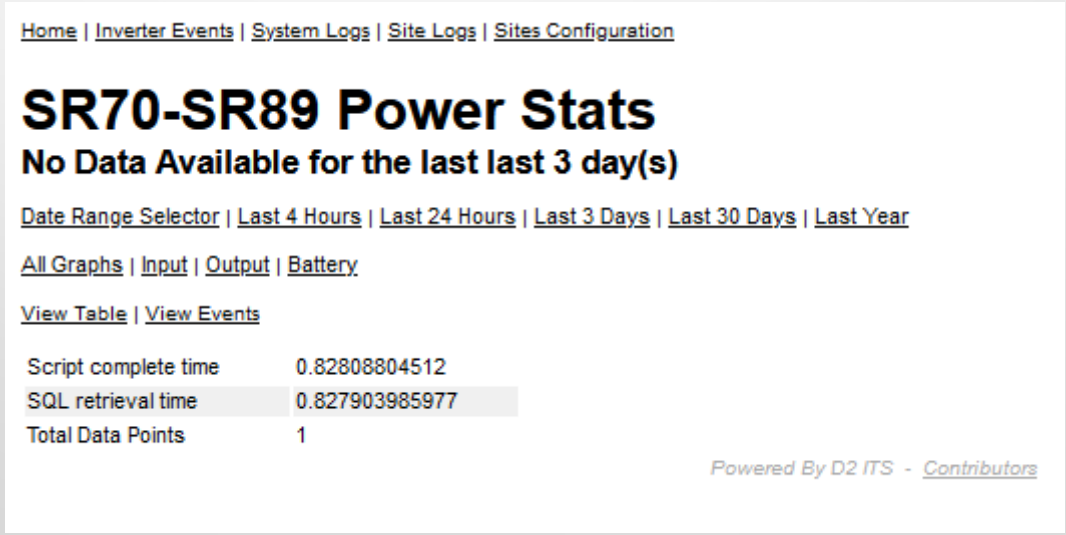
SR70-SR89

Last 30 Days

Edit Site | Archive | Inverter Events | Logs | Power

Last 24 Hours | Last 48 Hours | Last 30 Days | Last Year

Date Time	Mode	Alarms	Faults	Data Retrieved Time
07-22-2021 18:05:13	Inverter	0000000000000000	0000000000000000	07-22-2021 18:56:15
07-22-2021 17:56:13	Line	0000000000000000	0000000000000000	07-22-2021 18:56:15
07-22-2021 17:56:07	Boost1	0000000000000000	0000000000000000	07-22-2021 20:56:05
07-22-2021 17:56:07	Inverter	0000000000000000	0000000000000000	07-22-2021 18:56:15
07-22-2021 16:54:50	Line	0000000000000000	0000000000000000	07-22-2021 20:56:05
07-22-2021 16:54:43	Inverter	0000000000000000	0000000000000000	07-22-2021 20:56:05



Home | Inverter Events | System Logs | Site Logs | Sites Configuration

SR70-SR89 Power Stats

No Data Available for the last last 3 day(s)

Date Range Selector | Last 4 Hours | Last 24 Hours | Last 3 Days | Last 30 Days | Last Year

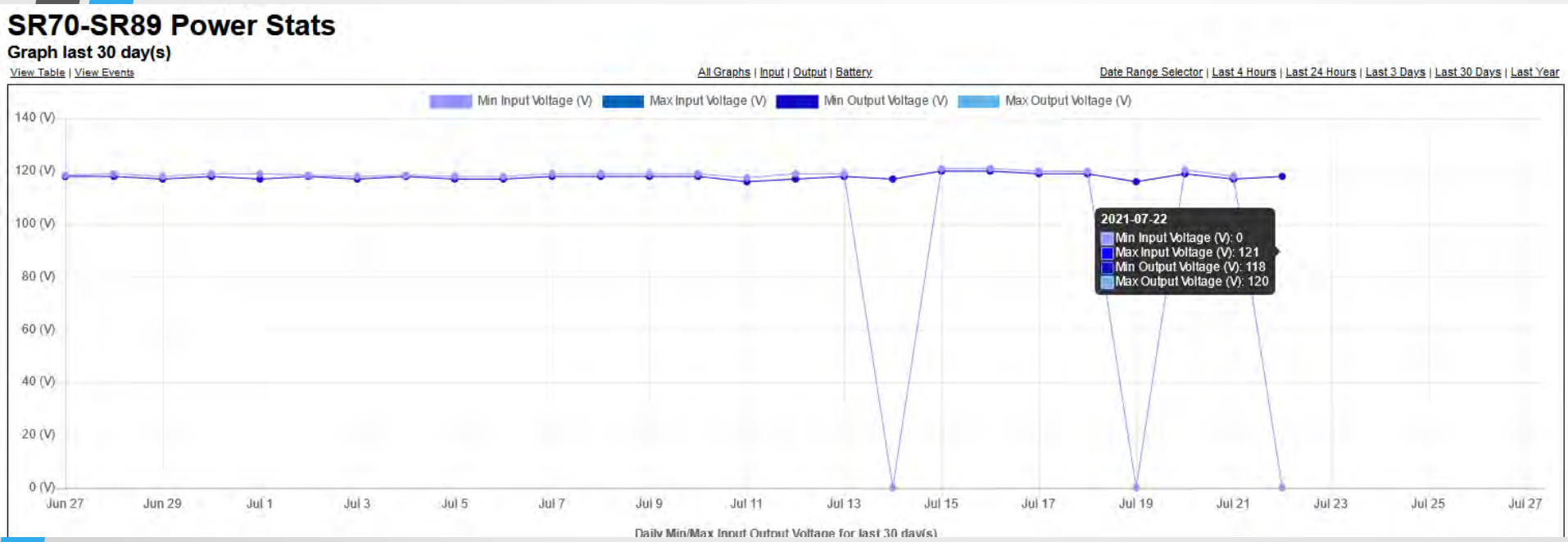
All Graphs | Input | Output | Battery

View Table | View Events

Script complete time	0.82808804512
SQL retrieval time	0.827903985977
Total Data Points	1

Powered By D2 ITS - Contributors

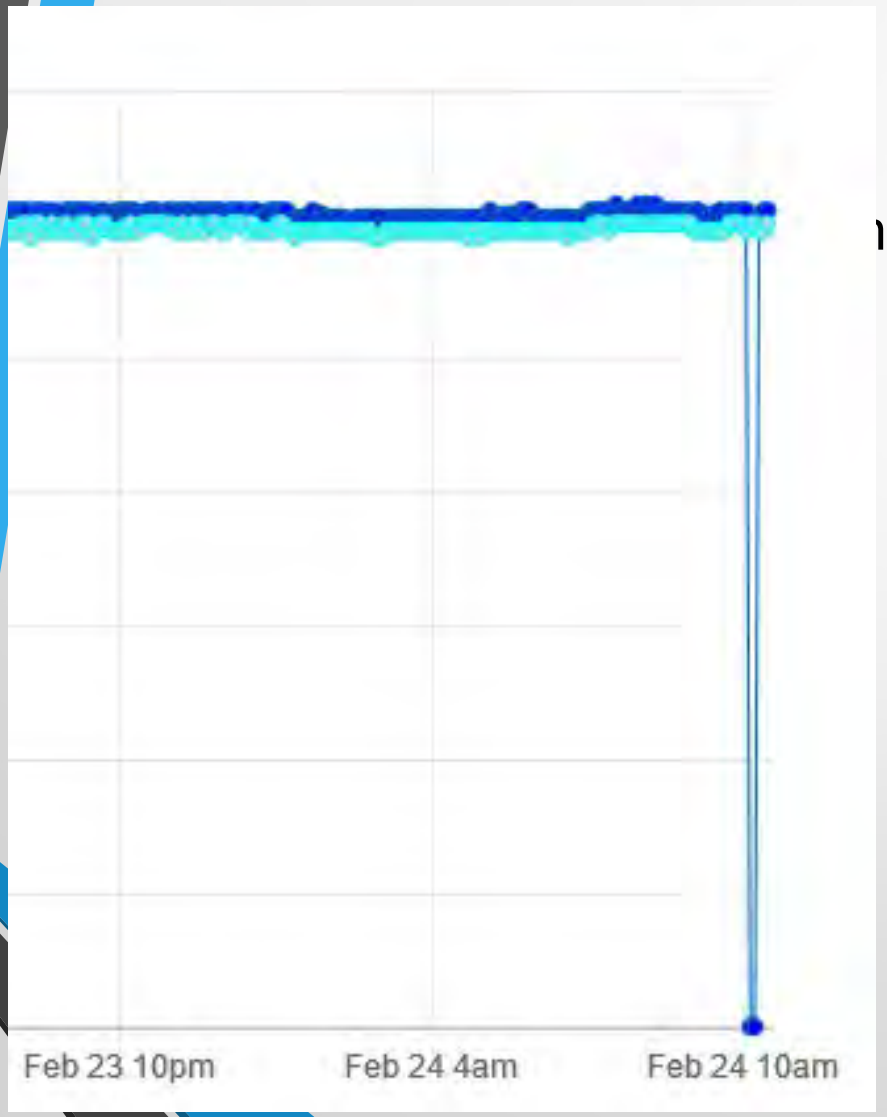
Examples – Power (Outage)



Examples – Power (Outage)

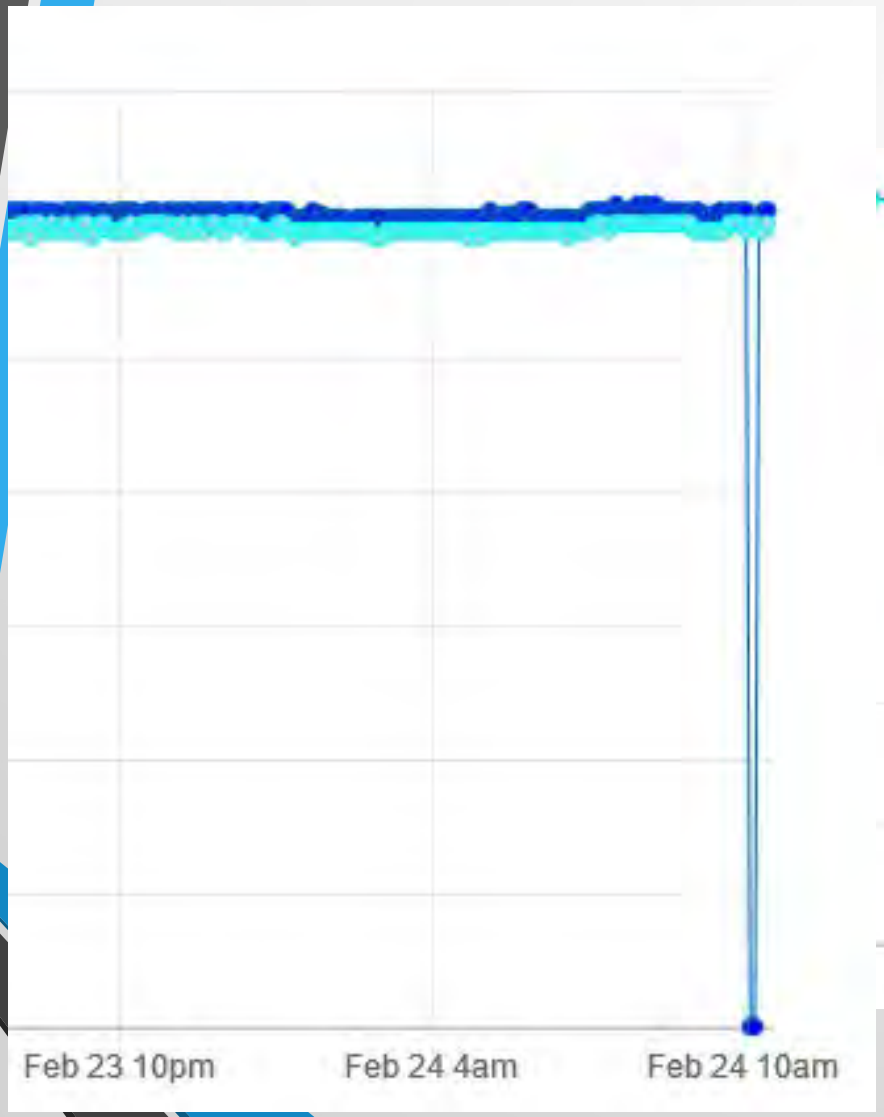
- Graph page of a site running off battery backup with no input power

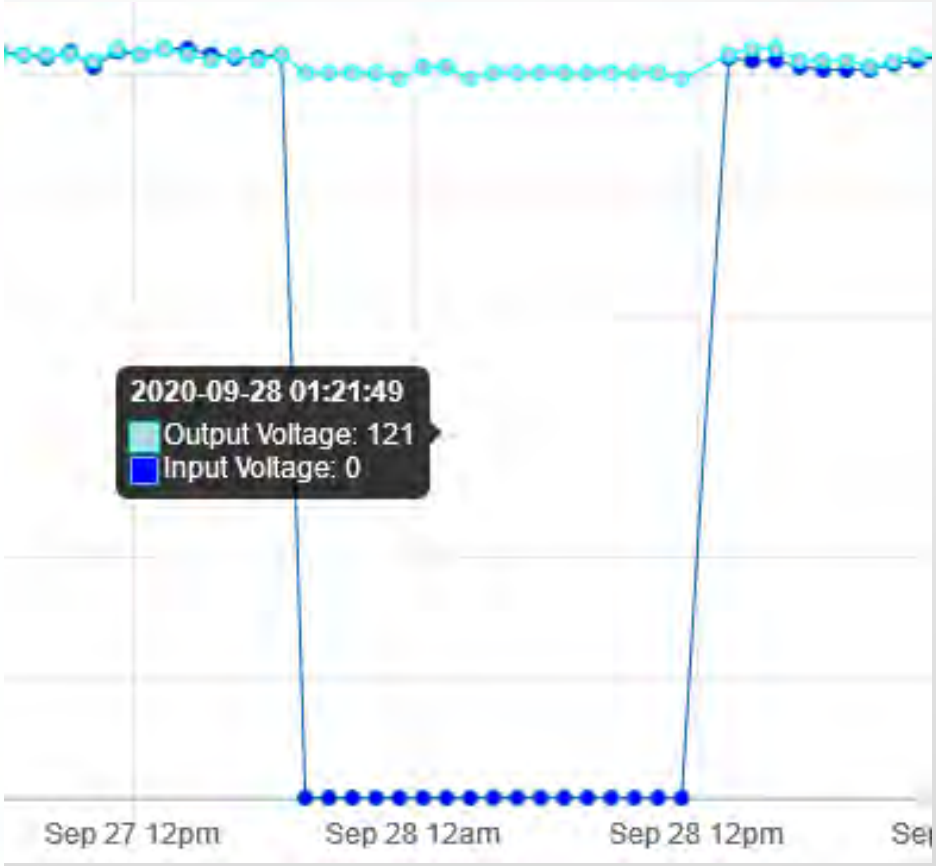
Examples – Power (Outage)



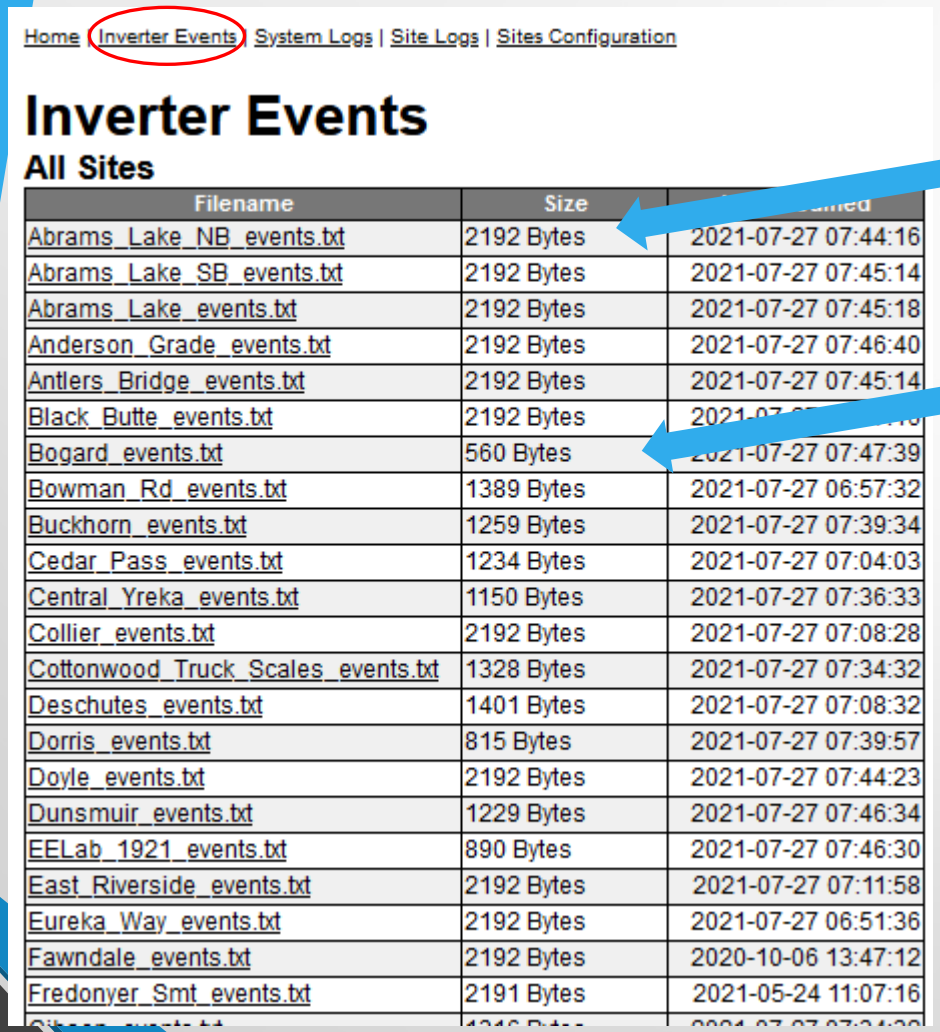
ıg off battery backup with no

Examples – Power (Outage)





Examples – Inverter Events



Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Inverter Events

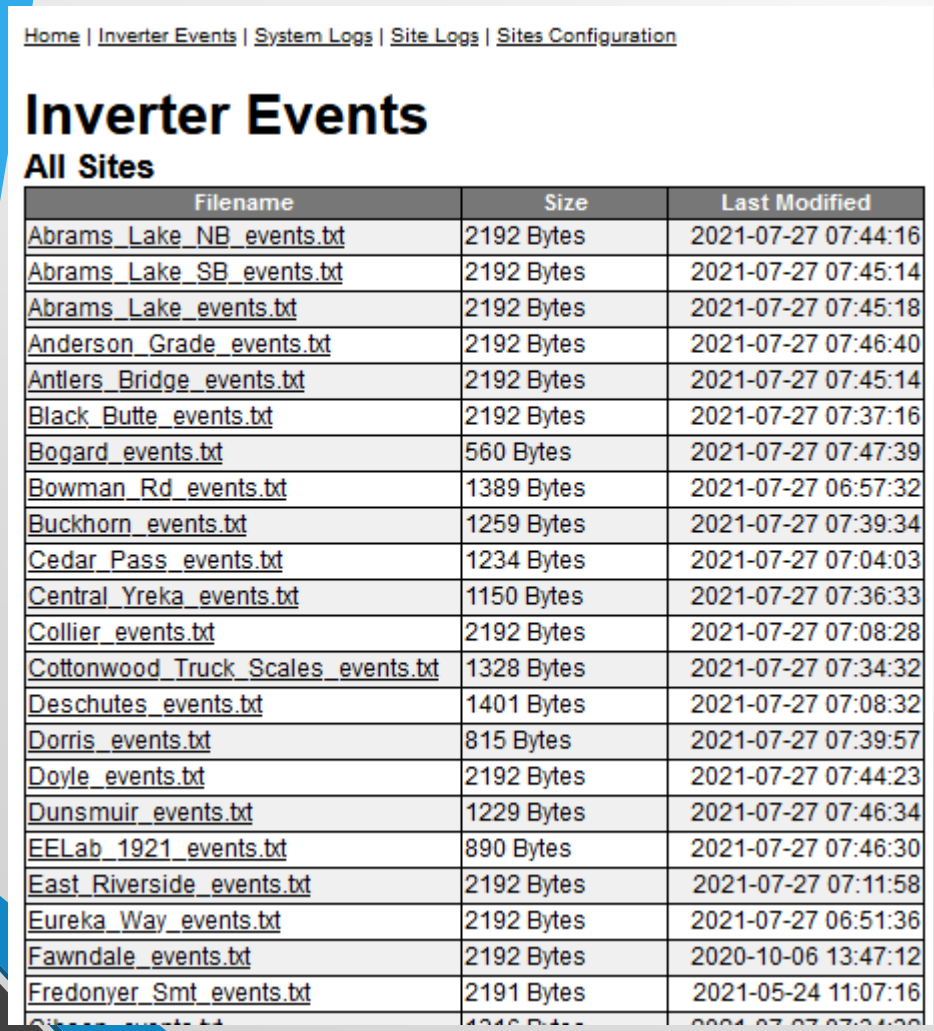
All Sites

Filename	Size	Last Modified
Abrams_Lake_NB_events.txt	2192 Bytes	2021-07-27 07:44:16
Abrams_Lake_SB_events.txt	2192 Bytes	2021-07-27 07:45:14
Abrams_Lake_events.txt	2192 Bytes	2021-07-27 07:45:18
Anderson_Grade_events.txt	2192 Bytes	2021-07-27 07:46:40
Antlers_Bridge_events.txt	2192 Bytes	2021-07-27 07:45:14
Black_Butte_events.txt	2192 Bytes	2021-07-27 07:[illegible]
Bogard_events.txt	560 Bytes	2021-07-27 07:47:39
Bowman_Rd_events.txt	1389 Bytes	2021-07-27 06:57:32
Buckhorn_events.txt	1259 Bytes	2021-07-27 07:39:34
Cedar_Pass_events.txt	1234 Bytes	2021-07-27 07:04:03
Central_Yreka_events.txt	1150 Bytes	2021-07-27 07:36:33
Collier_events.txt	2192 Bytes	2021-07-27 07:08:28
Cottonwood_Truck_Scales_events.txt	1328 Bytes	2021-07-27 07:34:32
Deschutes_events.txt	1401 Bytes	2021-07-27 07:08:32
Dorris_events.txt	815 Bytes	2021-07-27 07:39:57
Doyle_events.txt	2192 Bytes	2021-07-27 07:44:23
Dunsmuir_events.txt	1229 Bytes	2021-07-27 07:46:34
EELab_1921_events.txt	890 Bytes	2021-07-27 07:46:30
East_Riverside_events.txt	2192 Bytes	2021-07-27 07:11:58
Eureka_Way_events.txt	2192 Bytes	2021-07-27 06:51:36
Fawndale_events.txt	2192 Bytes	2020-10-06 13:47:12
Fredonyer_Smt_events.txt	2191 Bytes	2021-05-24 11:07:16

Complete Download of site events

Partial Download of site events

Examples – Inverter Events



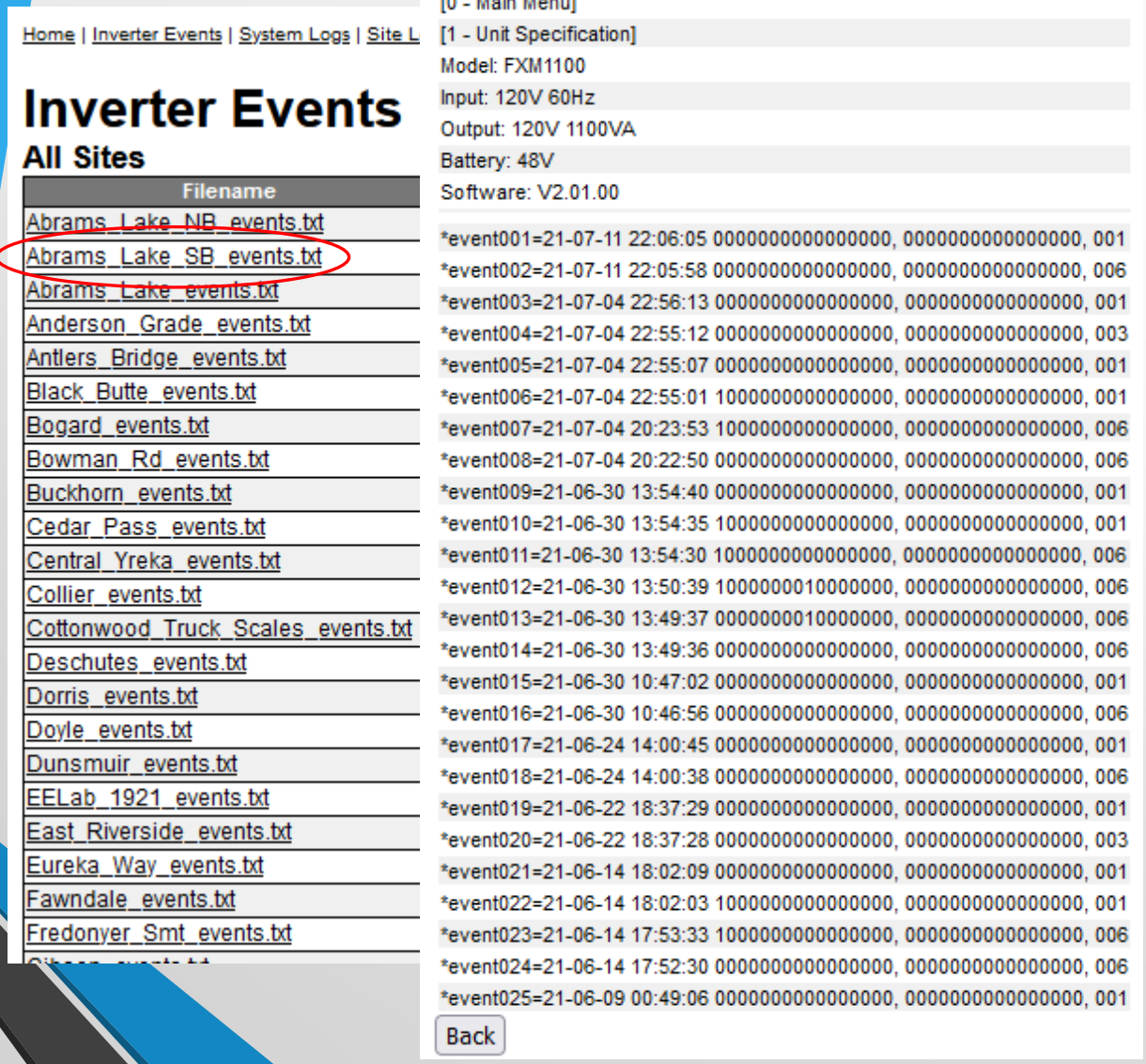
Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Inverter Events

All Sites

Filename	Size	Last Modified
Abrams_Lake_NB_events.txt	2192 Bytes	2021-07-27 07:44:16
Abrams_Lake_SB_events.txt	2192 Bytes	2021-07-27 07:45:14
Abrams_Lake_events.txt	2192 Bytes	2021-07-27 07:45:18
Anderson_Grade_events.txt	2192 Bytes	2021-07-27 07:46:40
Antlers_Bridge_events.txt	2192 Bytes	2021-07-27 07:45:14
Black_Butte_events.txt	2192 Bytes	2021-07-27 07:37:16
Bogard_events.txt	560 Bytes	2021-07-27 07:47:39
Bowman_Rd_events.txt	1389 Bytes	2021-07-27 06:57:32
Buckhorn_events.txt	1259 Bytes	2021-07-27 07:39:34
Cedar_Pass_events.txt	1234 Bytes	2021-07-27 07:04:03
Central_Yreka_events.txt	1150 Bytes	2021-07-27 07:36:33
Collier_events.txt	2192 Bytes	2021-07-27 07:08:28
Cottonwood_Truck_Scales_events.txt	1328 Bytes	2021-07-27 07:34:32
Deschutes_events.txt	1401 Bytes	2021-07-27 07:08:32
Dorris_events.txt	815 Bytes	2021-07-27 07:39:57
Doyle_events.txt	2192 Bytes	2021-07-27 07:44:23
Dunsmuir_events.txt	1229 Bytes	2021-07-27 07:46:34
EELab_1921_events.txt	890 Bytes	2021-07-27 07:46:30
East_Riverside_events.txt	2192 Bytes	2021-07-27 07:11:58
Eureka_Way_events.txt	2192 Bytes	2021-07-27 06:51:36
Fawndale_events.txt	2192 Bytes	2020-10-06 13:47:12
Fredonyer_Smt_events.txt	2191 Bytes	2021-05-24 11:07:16

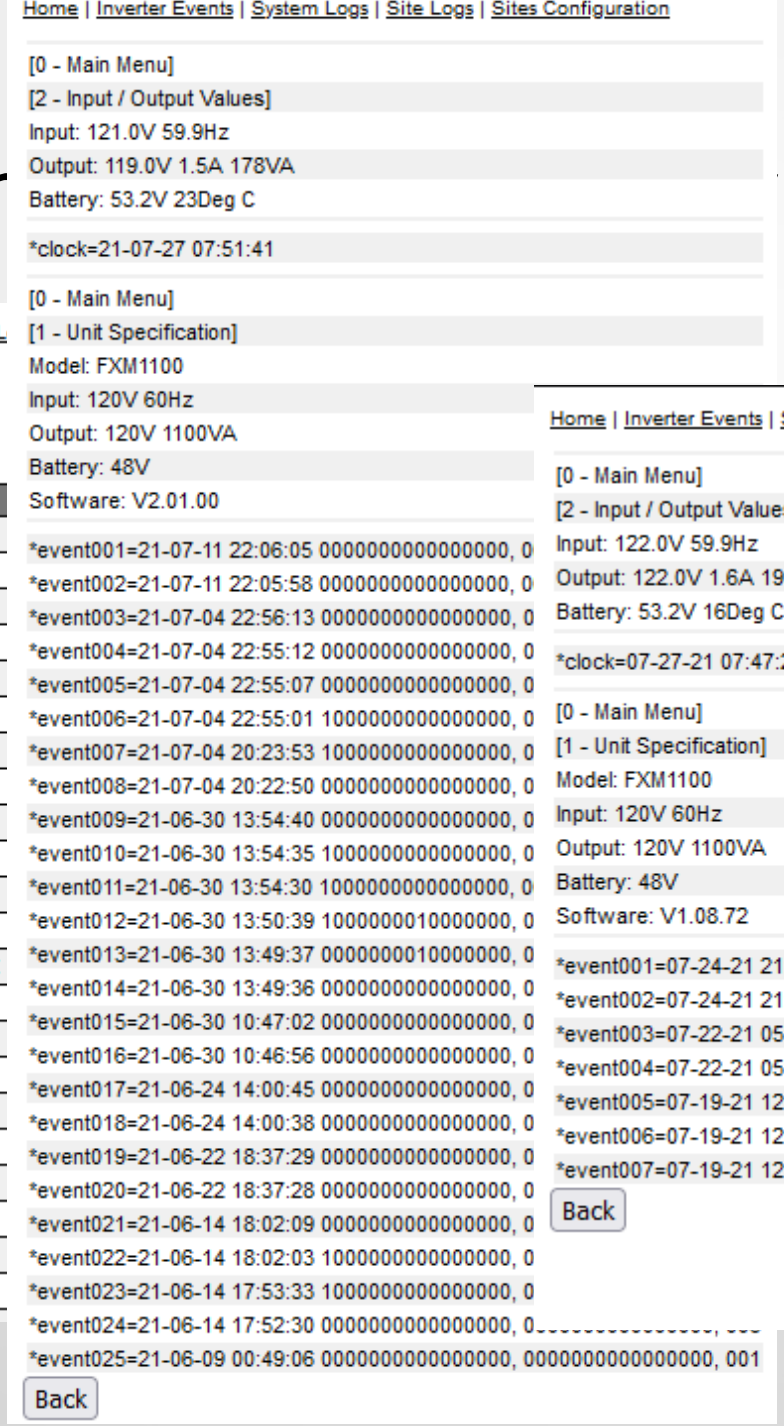
Exam ents

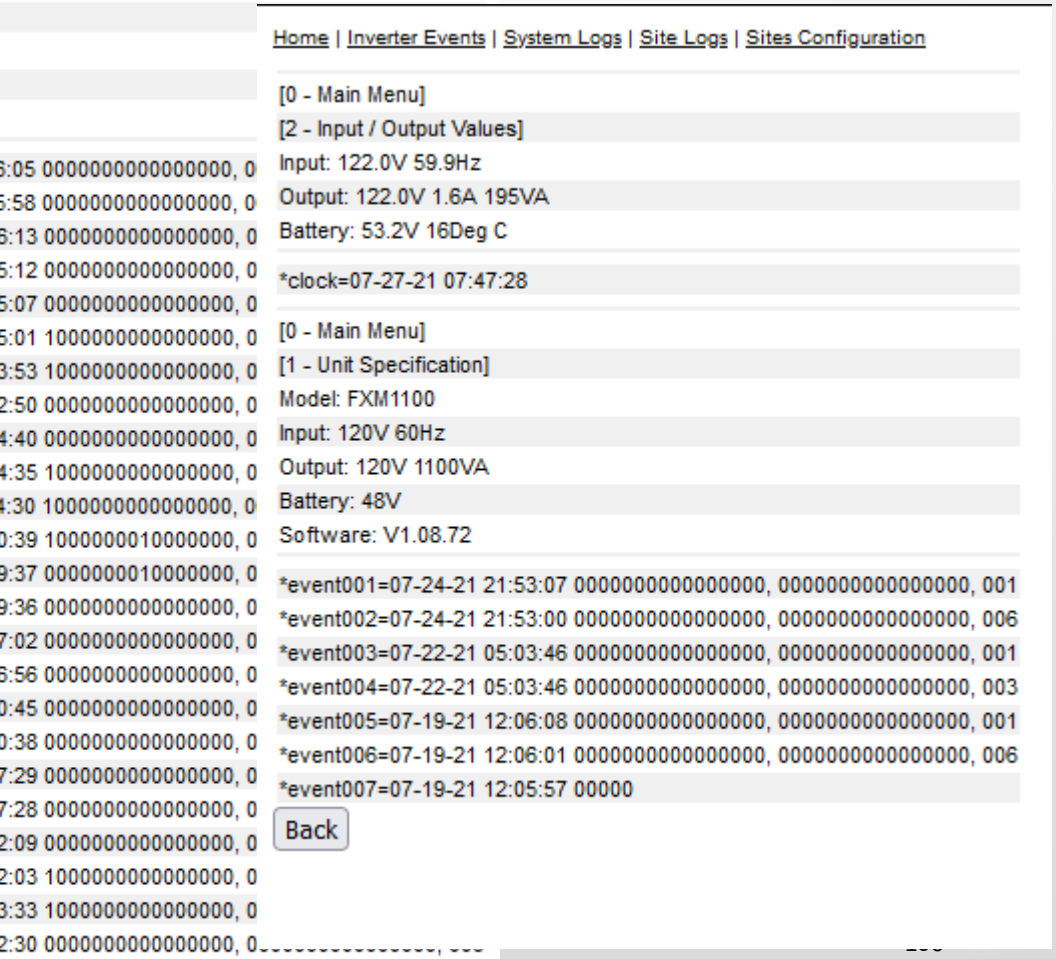

Home | Inverter Events | System Logs | Site L
Inverter Events
All Sites
Filename
Abrams_Lake_NB_events.txt
Abrams_Lake_SB_events.txt
Abrams_Lake_events.txt
Anderson_Grade_events.txt
Antlers_Bridge_events.txt
Black_Butte_events.txt
Bogard_events.txt
Bowman_Rd_events.txt
Buckhorn_events.txt
Cedar_Pass_events.txt
Central_Yreka_events.txt
Collier_events.txt
Cottonwood_Truck_Scales_events.txt
Deschutes_events.txt
Dorris_events.txt
Doyle_events.txt
Dunsmuir_events.txt
EELab_1921_events.txt
East_Riverside_events.txt
Eureka_Way_events.txt
Fawndale_events.txt
Fredonyer_Smt_events.txt

Home | Inverter Events | System Logs | Site Logs | Sites Configuration
[0 - Main Menu]
[2 - Input / Output Values]
Input: 121.0V 59.9Hz
Output: 119.0V 1.5A 178VA
Battery: 53.2V 23Deg C
*clock=21-07-27 07:51:41
[0 - Main Menu]
[1 - Unit Specification]
Model: FXM1100
Input: 120V 60Hz
Output: 120V 1100VA
Battery: 48V
Software: V2.01.00
*event001=21-07-11 22:06:05 0000000000000000, 0000000000000000, 001
*event002=21-07-11 22:05:58 0000000000000000, 0000000000000000, 006
*event003=21-07-04 22:56:13 0000000000000000, 0000000000000000, 001
*event004=21-07-04 22:55:12 0000000000000000, 0000000000000000, 003
*event005=21-07-04 22:55:07 0000000000000000, 0000000000000000, 001
*event006=21-07-04 22:55:01 1000000000000000, 0000000000000000, 001
*event007=21-07-04 20:23:53 1000000000000000, 0000000000000000, 006
*event008=21-07-04 20:22:50 0000000000000000, 0000000000000000, 006
*event009=21-06-30 13:54:40 0000000000000000, 0000000000000000, 001
*event010=21-06-30 13:54:35 1000000000000000, 0000000000000000, 001
*event011=21-06-30 13:54:30 1000000000000000, 0000000000000000, 006
*event012=21-06-30 13:50:39 1000000010000000, 0000000000000000, 006
*event013=21-06-30 13:49:37 0000000010000000, 0000000000000000, 006
*event014=21-06-30 13:49:36 0000000000000000, 0000000000000000, 006
*event015=21-06-30 10:47:02 0000000000000000, 0000000000000000, 001
*event016=21-06-30 10:46:56 0000000000000000, 0000000000000000, 006
*event017=21-06-24 14:00:45 0000000000000000, 0000000000000000, 001
*event018=21-06-24 14:00:38 0000000000000000, 0000000000000000, 006
*event019=21-06-22 18:37:29 0000000000000000, 0000000000000000, 001
*event020=21-06-22 18:37:28 0000000000000000, 0000000000000000, 003
*event021=21-06-14 18:02:09 0000000000000000, 0000000000000000, 001
*event022=21-06-14 18:02:03 1000000000000000, 0000000000000000, 001
*event023=21-06-14 17:53:33 1000000000000000, 0000000000000000, 006
*event024=21-06-14 17:52:30 0000000000000000, 0000000000000000, 006
*event025=21-06-09 00:49:06 0000000000000000, 0000000000000000, 001
Back

Exam ents

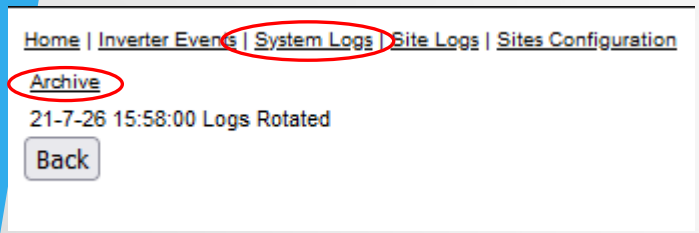

Home | Inverter Events | System Logs | Site L
Inverter Events
All Sites
Filename
Abrams_Lake_NB_events.txt
Abrams_Lake_SB_events.txt
Abrams_Lake_events.txt
Anderson_Grade_events.txt
Antlers_Bridge_events.txt
Black_Butte_events.txt
Bogard_events.txt
Bowman_Rd_events.txt
Buckhorn_events.txt
Cedar_Pass_events.txt
Central_Yreka_events.txt
Collier_events.txt
Cottonwood_Truck_Scales_events.txt
Deschutes_events.txt
Dorris_events.txt
Doyle_events.txt
Dunsmuir_events.txt
EELab_1921_events.txt
East_Riverside_events.txt
Eureka_Way_events.txt
Fawndale_events.txt
Fredonyer_Smt_events.txt


Home | Inverter Events | System Logs | Site Logs | Sites Configuration
[0 - Main Menu]
[2 - Input / Output Values]
Input: 121.0V 59.9Hz
Output: 119.0V 1.5A 178VA
Battery: 53.2V 23Deg C
*clock=21-07-27 07:51:41
[0 - Main Menu]
[1 - Unit Specification]
Model: FXM1100
Input: 120V 60Hz
Output: 120V 1100VA
Battery: 48V
Software: V2.01.00
*event001=21-07-11 22:06:05 0000000000000000, 0
*event002=21-07-11 22:05:58 0000000000000000, 0
*event003=21-07-04 22:56:13 0000000000000000, 0
*event004=21-07-04 22:55:12 0000000000000000, 0
*event005=21-07-04 22:55:07 0000000000000000, 0
*event006=21-07-04 22:55:01 1000000000000000, 0
*event007=21-07-04 20:23:53 1000000000000000, 0
*event008=21-07-04 20:22:50 0000000000000000, 0
*event009=21-06-30 13:54:40 0000000000000000, 0
*event010=21-06-30 13:54:35 1000000000000000, 0
*event011=21-06-30 13:54:30 1000000000000000, 0
*event012=21-06-30 13:50:39 1000000010000000, 0
*event013=21-06-30 13:49:37 0000000010000000, 0
*event014=21-06-30 13:49:36 0000000000000000, 0
*event015=21-06-30 10:47:02 0000000000000000, 0
*event016=21-06-30 10:46:56 0000000000000000, 0
*event017=21-06-24 14:00:45 0000000000000000, 0
*event018=21-06-24 14:00:38 0000000000000000, 0
*event019=21-06-22 18:37:29 0000000000000000, 0
*event020=21-06-22 18:37:28 0000000000000000, 0
*event021=21-06-14 18:02:09 0000000000000000, 0
*event022=21-06-14 18:02:03 1000000000000000, 0
*event023=21-06-14 17:53:33 1000000000000000, 0
*event024=21-06-14 17:52:30 0000000000000000, 0
*event025=21-06-09 00:49:06 0000000000000000, 0000000000000000, 001
Back


Home | Inverter Events | System Logs | Site Logs | Sites Configuration
[0 - Main Menu]
[2 - Input / Output Values]
Input: 122.0V 59.9Hz
Output: 122.0V 1.6A 195VA
Battery: 53.2V 16Deg C
*clock=07-27-21 07:47:28
[0 - Main Menu]
[1 - Unit Specification]
Model: FXM1100
Input: 120V 60Hz
Output: 120V 1100VA
Battery: 48V
Software: V1.08.72
*event001=07-24-21 21:53:07 0000000000000000, 0000000000000000, 001
*event002=07-24-21 21:53:00 0000000000000000, 0000000000000000, 006
*event003=07-22-21 05:03:46 0000000000000000, 0000000000000000, 001
*event004=07-22-21 05:03:46 0000000000000000, 0000000000000000, 003
*event005=07-19-21 12:06:08 0000000000000000, 0000000000000000, 001
*event006=07-19-21 12:06:01 0000000000000000, 0000000000000000, 006
*event007=07-19-21 12:05:57 00000
Back

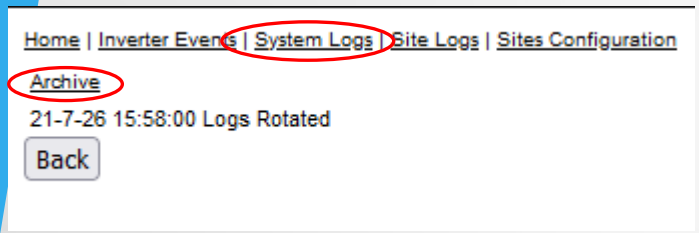
Examples – System Logs

Current System Log



Examples – S

Current System Log



Archive System Logs

Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Site Logs

system

Current

Filename	Size	Last Modified
system01.log	30 Bytes	2021-07-01 15:58:00
system02.log	30 Bytes	2021-07-02 15:58:00
system03.log	30 Bytes	2021-07-03 15:58:00
system04.log	30 Bytes	2021-07-04 15:58:00
system05.log	30 Bytes	2021-07-05 15:58:00
system06.log	30 Bytes	2021-07-06 15:58:00
system07.log	30 Bytes	2021-07-07 15:58:00
system08.log	30 Bytes	2021-07-08 15:58:00
system09.log	30 Bytes	2021-07-09 15:58:00
system10.log	30 Bytes	2021-07-10 15:58:00
system11.log	30 Bytes	2021-07-11 15:58:00
system12.log	30 Bytes	2021-07-12 15:58:00
system13.log	30 Bytes	2021-07-13 15:58:00
system14.log	30 Bytes	2021-07-14 15:58:00
system15.log	30 Bytes	2021-07-15 15:58:00
system16.log	30 Bytes	2021-07-16 15:58:00
system17.log	30 Bytes	2021-07-17 15:58:00
system18.log	30 Bytes	2021-07-18 15:58:00
system19.log	30 Bytes	2021-07-19 15:58:00
system20.log	30 Bytes	2021-07-20 15:58:00
system21.log	30 Bytes	2021-07-21 15:58:00
system22.log	30 Bytes	2021-07-22 15:58:00
system23.log	30 Bytes	2021-07-23 15:58:00
system24.log	30 Bytes	2021-07-24 15:58:00
system25.log	30 Bytes	2021-07-25 15:58:00
system26.log	30 Bytes	2021-07-26 15:58:00
system27.log	30 Bytes	2021-06-27 15:58:00
system28.log	30 Bytes	2021-06-28 15:58:00
system29.log	30 Bytes	2021-06-29 15:58:00
system30.log	30 Bytes	2021-06-30 15:58:00
system31.log	30 Bytes	2021-05-31 15:58:00

31 Total Files

Back

– Site Logs

Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Site Logs

All Sites

Archive

Site Logs	Total Size	Number of Files
Abrams_Lake	511 Bytes	3
Abrams_Lake_NB	85 Bytes	3
Abrams_Lake_SB	369 Bytes	3
Anderson_Grade	85 Bytes	3
Antlers_Bridge	85 Bytes	3
Black_Butte	85 Bytes	3
Bogard	85 Bytes	3
Bowman_Rd	85 Bytes	3
Buckhorn	85 Bytes	3
Cedar_Pass	114 Bytes	3
Central_Yreka	85 Bytes	3
Collier	85 Bytes	3
Cottonwood_Truck_Scales	85 Bytes	3
Deschutes	85 Bytes	3
Dorris	85 Bytes	3
Doyle	85 Bytes	3
Dunsmuir	85 Bytes	3
EELab_1921	298 Bytes	3
EELab_SNMP	85 Bytes	3
East_Riverside	85 Bytes	3
Eureka_Way	85 Bytes	3
Fawndale	85 Bytes	3
Fredonyer_Smt	143 Bytes	3
Gibson	85 Bytes	3
Grass_Lake	1789 Bytes	3
Hartnell	4028 Bytes	3
Hatchet_Mtn	1079 Bytes	3
Hilltop	4053 Bytes	3

Current Site Logs

– Site Logs

Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Site Logs

All Sites

Archive

Site Logs	Total Size	Number of Files
Abrams_Lake	511 Bytes	3
Abrams_Lake_NB	85 Bytes	3
Abrams_Lake_SB	369 Bytes	3
Anderson_Grade	85 Bytes	3
Antlers_Bridge	85 Bytes	3
Black_Butte	85 Bytes	3
Bogard	85 Bytes	3
Bowman_Rd	85 Bytes	3
Buckhorn	85 Bytes	3
Cedar_Pass	114 Bytes	3
Central_Yreka	85 Bytes	3
Collier	85 Bytes	3
Cottonwood_Truck_Scales	85 Bytes	3
Deschutes	85 Bytes	3
Dorris	85 Bytes	3
Doyle	85 Bytes	3
Dunsmuir	85 Bytes	3
EELab_1921	298 Bytes	3
EELab_SNMP	85 Bytes	3
East_Riverside	85 Bytes	3
Eureka_Way	85 Bytes	3
Fawndale	85 Bytes	3
Fredonyer_Smt	143 Bytes	3
Gibson	85 Bytes	3
Grass_Lake	1789 Bytes	3
Hartnell	4028 Bytes	3
Hatchet_Mtn	1079 Bytes	3
Hilltop	4053 Bytes	3

Current Site Logs

Site Log

Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Site Logs

Abrams_Lake

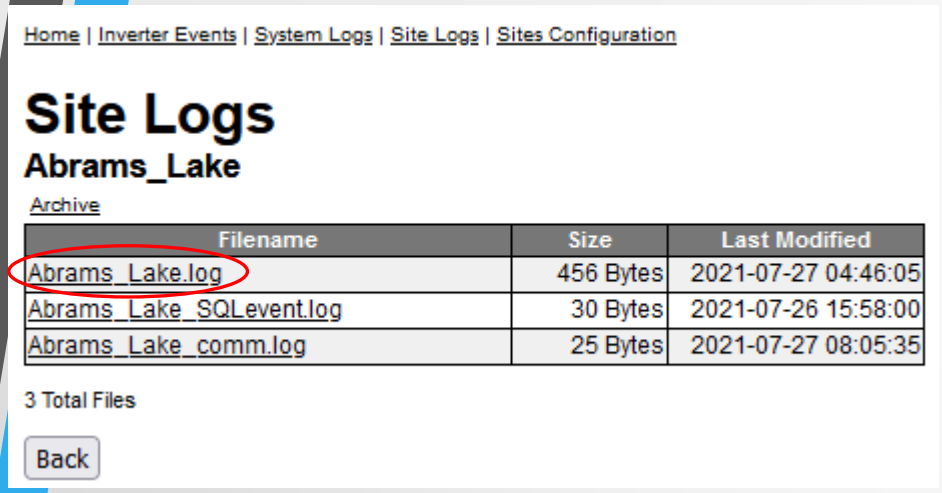
Archive

Filename	Size	Last Modified
Abrams_Lake.log	456 Bytes	2021-07-27 04:46:05
Abrams_Lake_SQLevent.log	30 Bytes	2021-07-26 15:58:00
Abrams_Lake_comm.log	25 Bytes	2021-07-27 08:05:35

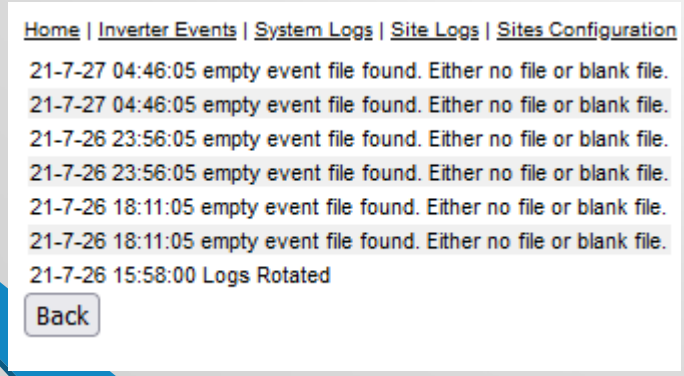
3 Total Files

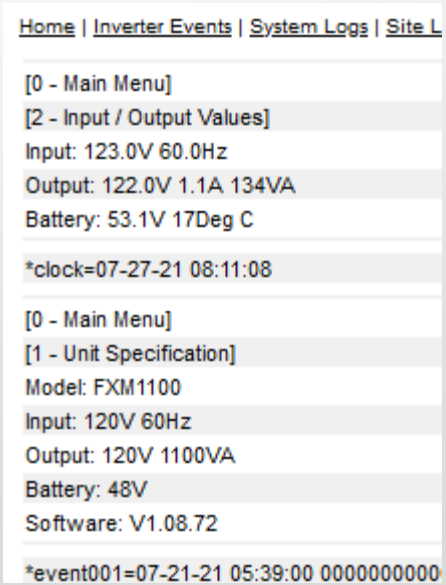
Back

Examples – Site Logs

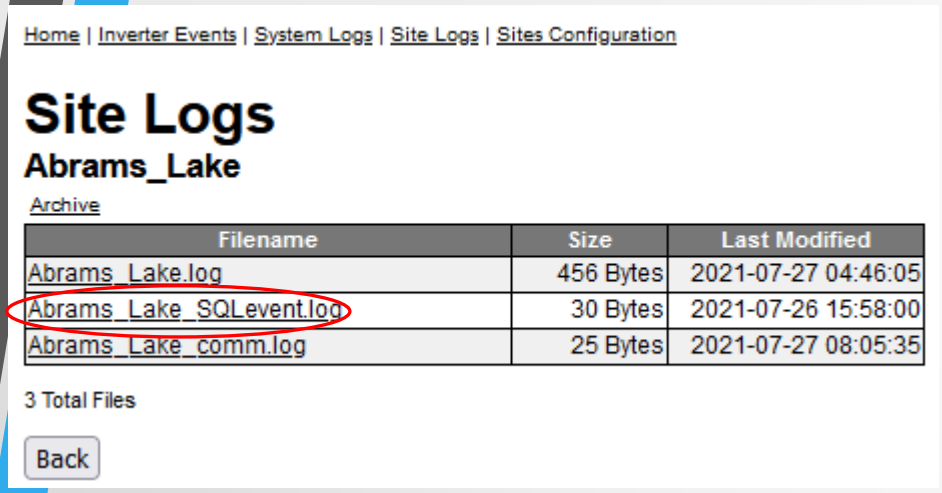


At least one complete event needed.

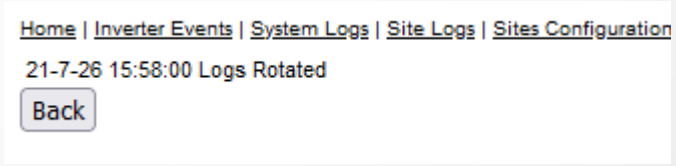




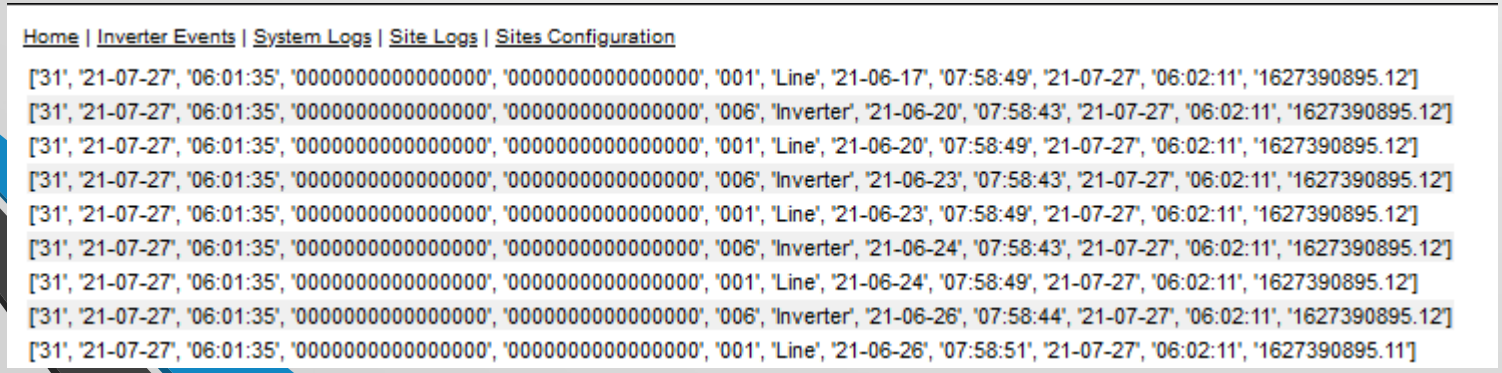
Examples – Site Logs



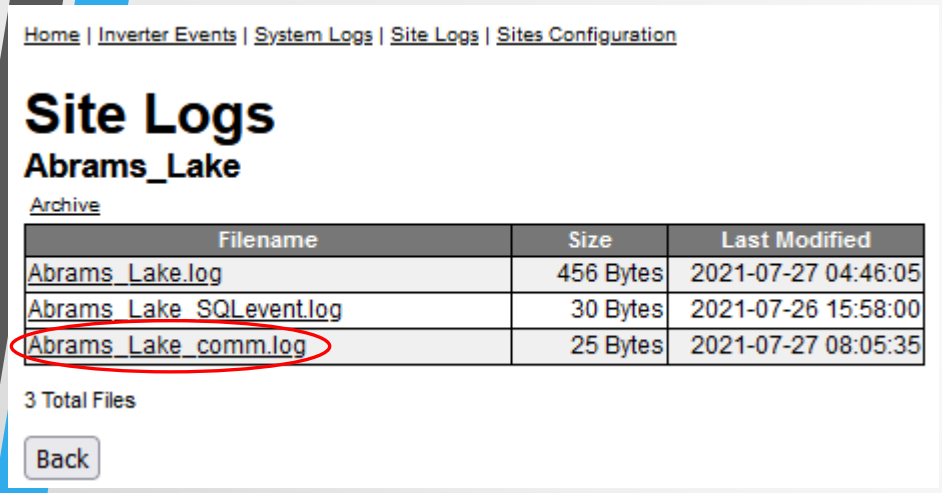
No SQL Errors



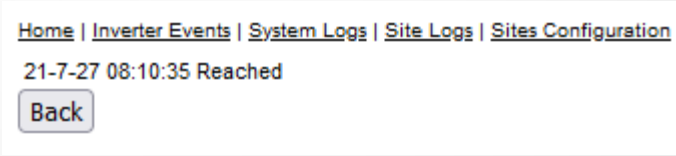
Some debug information

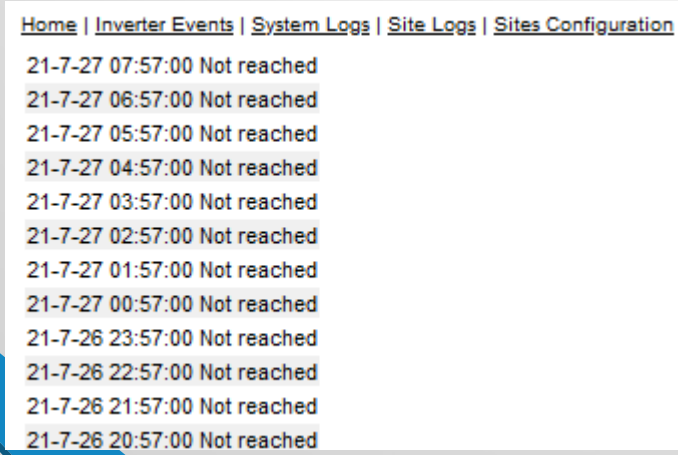


Examples – Site Logs



Site was reached by ping





No communications to site

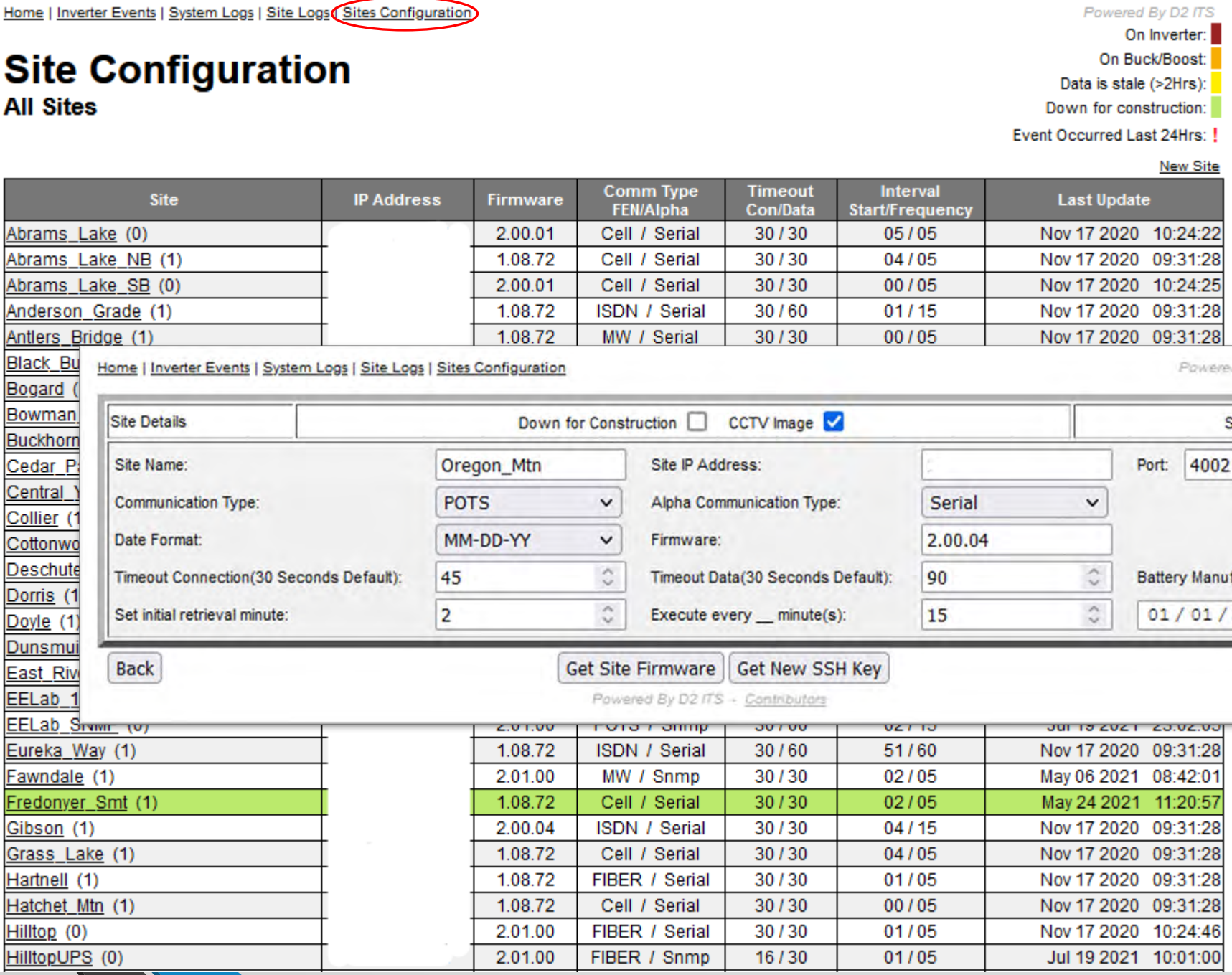
On Inverter:
On Buck/Boost:
Data is stale (>2Hrs):
Down for construction:
Event Occurred Last 24Hrs: !

Site Configuration

All Sites

New Site

Site	IP Address	Firmware	Comm Type FEN/Alpha	Timeout Con/Data	Interval Start/Frequency	Last Update
Abrams_Lake (0)		2.00.01	Cell / Serial	30 / 30	05 / 05	Nov 17 2020 10:24:22
Abrams_Lake_NB (1)		1.08.72	Cell / Serial	30 / 30	04 / 05	Nov 17 2020 09:31:28
Abrams_Lake_SB (0)		2.00.01	Cell / Serial	30 / 30	00 / 05	Nov 17 2020 10:24:25
Anderson_Grade (1)		1.08.72	ISDN / Serial	30 / 60	01 / 15	Nov 17 2020 09:31:28
Antlers_Bridge (1)		1.08.72	MW / Serial	30 / 30	00 / 05	Nov 17 2020 09:31:28
Black_Butte (1)		1.08.72	Cell / Serial	30 / 30	07 / 15	Nov 17 2020 09:31:28
Bogard (1)		1.08.72	POTS / Serial	45 / 90	01 / 15	Nov 17 2020 09:31:28
Bowman_Rd (1)		2.00.04	ISDN / Serial	30 / 30	57 / 60	Nov 17 2020 09:31:28
Buckhorn (1)		2.00.04	ISDN / Serial	30 / 30	09 / 15	Nov 17 2020 09:31:28
Cedar_Pass (1)		1.08.72	POTS / Serial	40 / 90	02 / 60	Nov 17 2020 09:31:28
Central_Yreka (1)		1.08.72	ISDN / Serial	30 / 30	36 / 60	Nov 17 2020 09:31:28
Collier (1)		1.08.72	ISDN / Serial	30 / 30	08 / 60	Nov 17 2020 09:31:28
Cottonwood_Truck_Scales (1)		2.00.04	ISDN / Serial	30 / 30	34 / 60	Nov 17 2020 09:31:28
Deschutes (1)		2.01.00	ISDN / Serial	30 / 30	08 / 60	Nov 17 2020 09:31:28
Dorris (1)		1.08.72	POTS / Serial	30 / 90	08 / 30	Nov 17 2020 09:31:28
Doyle (1)		2.01.00	Cell / Serial	30 / 30	04 / 05	Nov 17 2020 09:31:28
Dunsmuir (1)		1.08.72	Cell / Serial	30 / 30	01 / 05	Nov 17 2020 09:31:28
East_Riverside (1)		1.08.72	POTS / Serial	45 / 90	10 / 60	Nov 17 2020 09:31:28
EELab_1921 (0)		2.01.00	POTS / Serial	30 / 30	01 / 15	Nov 17 2020 10:24:35
EELab_SNMP (0)		2.01.00	POTS / Snmp	30 / 00	02 / 15	Jul 19 2021 23:02:05
Eureka_Way (1)		1.08.72	ISDN / Serial	30 / 60	51 / 60	Nov 17 2020 09:31:28
Fawndale (1)		2.01.00	MW / Snmp	30 / 30	02 / 05	May 06 2021 08:42:01
Fredonyer_Smt (1)		1.08.72	Cell / Serial	30 / 30	02 / 05	May 24 2021 11:20:57
Gibson (1)		2.00.04	ISDN / Serial	30 / 30	04 / 15	Nov 17 2020 09:31:28
Grass_Lake (1)		1.08.72	Cell / Serial	30 / 30	04 / 05	Nov 17 2020 09:31:28
Hartnell (1)		1.08.72	FIBER / Serial	30 / 30	01 / 05	Nov 17 2020 09:31:28
Hatchet_Mtn (1)		1.08.72	Cell / Serial	30 / 30	00 / 05	Nov 17 2020 09:31:28
Hilltop (0)		2.01.00	FIBER / Serial	30 / 30	01 / 05	Nov 17 2020 10:24:46
HilltopUPS (0)		2.01.00	FIBER / Snmp	16 / 30	01 / 05	Jul 19 2021 10:01:00


Home | Inverter Events | System Logs | Site Logs | Sites Configuration
Powered By D2 ITS
On Inverter:
On Buck/Boost:
Data is stale (>2Hrs):
Down for construction:
Event Occurred Last 24Hrs: !
Site Configuration
All Sites
New Site
Site
IP Address
Firmware
Comm Type FEN/Alpha
Timeout Con/Data
Interval Start/Frequency
Last Update
Abrams_Lake (0) 2.00.01 Cell / Serial 30 / 30 05 / 05 Nov 17 2020 10:24:22
Abrams_Lake_NB (1) 1.08.72 Cell / Serial 30 / 30 04 / 05 Nov 17 2020 09:31:28
Abrams_Lake_SB (0) 2.00.01 Cell / Serial 30 / 30 00 / 05 Nov 17 2020 10:24:25
Anderson_Grade (1) 1.08.72 ISDN / Serial 30 / 60 01 / 15 Nov 17 2020 09:31:28
Antlers_Bridge (1) 1.08.72 MW / Serial 30 / 30 00 / 05 Nov 17 2020 09:31:28
Home | Inverter Events | System Logs | Site Logs | Sites Configuration
Powered By D2 ITS
Delete Site
Site Details
Down for Construction
CCTV Image
Site Key: 1
Site Name: Oregon_Mtn
Site IP Address:
Port: 4002
Communication Type: POTS
Alpha Communication Type: Serial
Date Format: MM-DD-YY
Firmware: 2.00.04
Timeout Connection(30 Seconds Default): 45
Timeout Data(30 Seconds Default): 90
Battery Manufacture
Set initial retrieval minute: 2
Execute every __ minute(s): 15
01 / 01 / 2017
Back
Get Site Firmware
Get New SSH Key
Save
Powered By D2 ITS - Contributors
Eureka_Way (1) 1.08.72 ISDN / Serial 30 / 60 51 / 60 Nov 17 2020 09:31:28
Fawndale (1) 2.01.00 MW / Snmp 30 / 30 02 / 05 May 06 2021 08:42:01
Fredonyer_Smt (1) 1.08.72 Cell / Serial 30 / 30 02 / 05 May 24 2021 11:20:57
Gibson (1) 2.00.04 ISDN / Serial 30 / 30 04 / 15 Nov 17 2020 09:31:28
Grass_Lake (1) 1.08.72 Cell / Serial 30 / 30 04 / 05 Nov 17 2020 09:31:28
Hartnell (1) 1.08.72 FIBER / Serial 30 / 30 01 / 05 Nov 17 2020 09:31:28
Hatchet_Mtn (1) 1.08.72 Cell / Serial 30 / 30 00 / 05 Nov 17 2020 09:31:28
Hilltop (0) 2.01.00 FIBER / Serial 30 / 30 01 / 05 Nov 17 2020 10:24:46
HilltopUPS (0) 2.01.00 FIBER / Snmp 16 / 30 01 / 05 Jul 19 2021 10:01:00

Difficulties

- Bash
- Plink
- Moxa
- Alpha

Difficulties – Bash

- Initially was called by Python script using os.system()
  - Caused issue when switching from Ubuntu 16.04 to 18.04
  - Function call does not have multiple arguments
  - Keeps connection open after sleep occurs

```
2
clock
event1-25
1
```

```
[0 - Main Menu]
 [2 - Input / Output Values]
  Input:  120.5V 60.0Hz
  Output: 119.0V 1.6A 190VA
  Battery:  53.4V 15Deg C


*clock=09-04-19    10:15:58


[0 - Main Menu]
 [1 - Unit Specification]
  Model:  FXM1100
  Input:  120V 60Hz
  Output: 120V 1100VA
  Battery:  48V
  Software: V1.08.72


*event001=09-04-19    06:14:35    0000000000000000, 0000000000000000, 001
*event002=09-04-19    06:14:28    0000000000000000, 0000000000000000, 006
*event003=09-02-19    10:11:50    0000000000000000, 0000000000000000, 001
```

Difficulties – Bash

- Switched to Python subprocess()
  - Supports multiple operating systems
  - Allows the spawning of new processes and connects the input, output and errors

```
commands = '/var/bbs/bbs/bash/commands'
with open(commands,'r') as f, open(path, 'w') as out:
    test = subprocess.Popen(['timeout', str(Timeout), 'plink', '-ssh', 'user@'+IP, '-P', Port, '-pw', paths.moxpw], stdin=f, stdout=out)
    sleep(int(Timeout) + 5)
    rCode = test.poll()
    if rCode == 0 or rCode == 124:
        return ((rCode == 0) or (rCode == 124))

    test.kill()
    rCode = test.poll()
    return rCode == -9
```

Difficulties – Bash

- Found an issue where <sleep> was called in the bash script to close the connection to field site after set time
- On slow sites where the data would take longer to pass. The connection would stay open until all data was passed or the modem closed the connection
- Changed the script to use <timeout> with a kill command if time elapsed

Difficulties – Bash

$1 – IP Address of Field Site
$2 – File location of Event log
$4 – Port number of Moxa to BBS Cable
$5 – Password to Moxa

$3 – Sleep time

```
#!/bin/bash
ping -w 30 -c 1 $1 > /dev/null
{ cat ./bash/commands; sleep $3; } | ./plink -ssh user@$1 -P $4 -
pw $5 >$2
```

$TO – Timeout time

```
#!/bin/bash
ping -w 30 -c 1 $1 > /dev/null
TO=$(($3 * 2))
{ cat ./bash/commands; } | timeout $TO plink -ssh user@$1 -P $4 -
pw $5 >$2
```

Difficulties – Plink

- Difference in Plink version 0.67 and 0.70 when accepting certificate
- Original Development was done with Putty version 0.67
- Upon switching to 0.70 Putty security was updated and cyphers were changed

Difficulties – Plink

- The change was caused because development was on Ubuntu 16.04LTS and then transitioned to 18.04LTS the current Ubuntu Linux
- This caused an issue where the key returned from Moxa did not match the required key
- Had to manually compile an older version of Plink so that it functioned correctly

Difficulties – Moxa

- Difference in Moxa version 1.16 and 1.17 when accepting certificate
- Moxa version 1.16 returned wrong key to server
- Resulted in no connection to field site from District Office
- Upon upgrading Moxa to firmware 1.17 key was then accepted

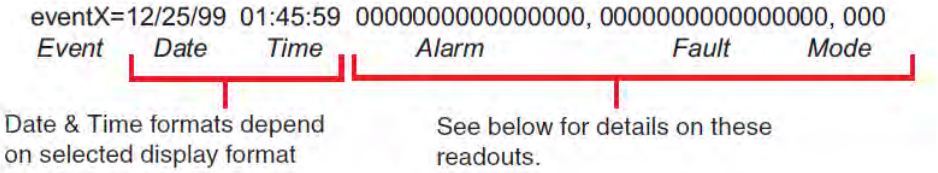
Difficulties – Moxa/Plink

- Once both Moxa and Plink were updated to proper versions certificate and key issues were resolved
- Never found out if one or the other was the main culprit

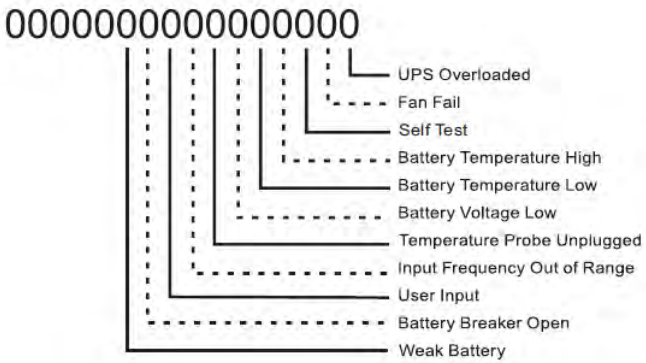
Difficulties – Alpha FXM 1100

- Command *eventclr does not work
- Date time issue with specific firmware
  - current year is 2019. Tens' place is 1, ones' place is 9, 1*9=9, 2019+9=2028, display year is 2028
- Lack of serial commands documentation

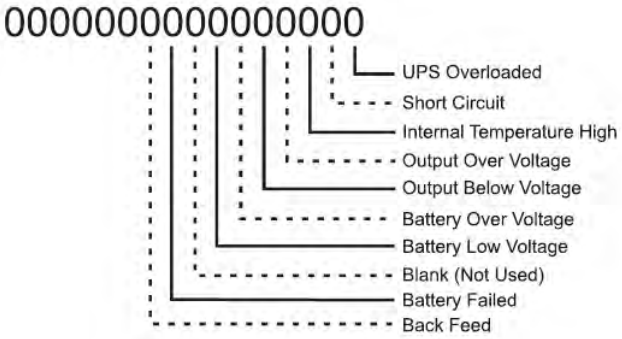
Difficulties – Alpha FXM 1100



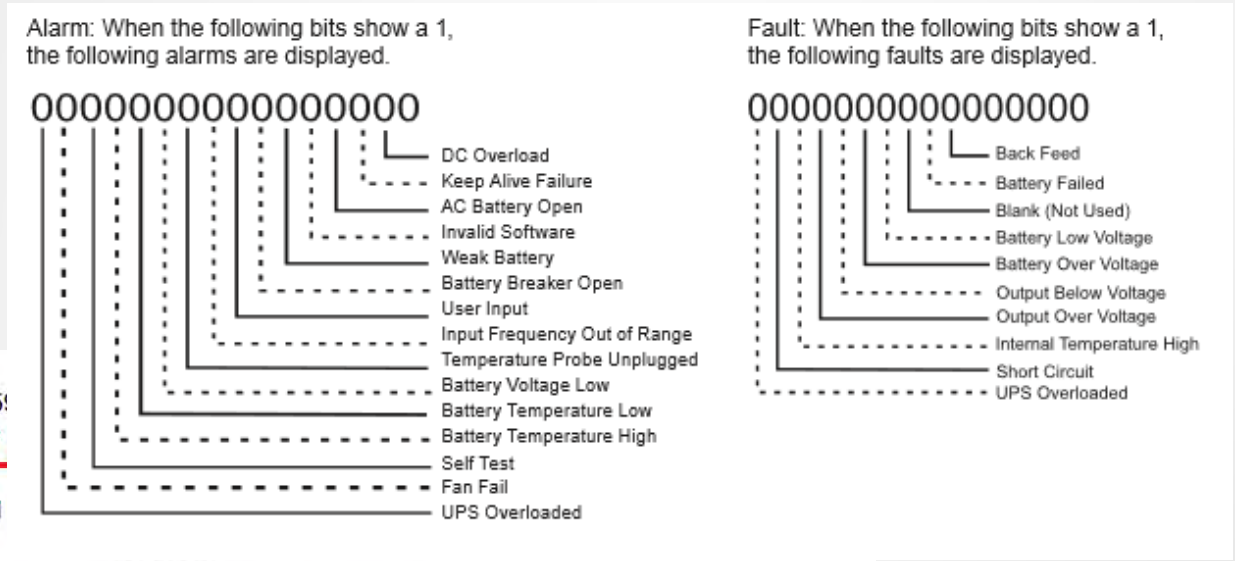
Alarm: When the following bits show a 1, the following alarms are displayed.

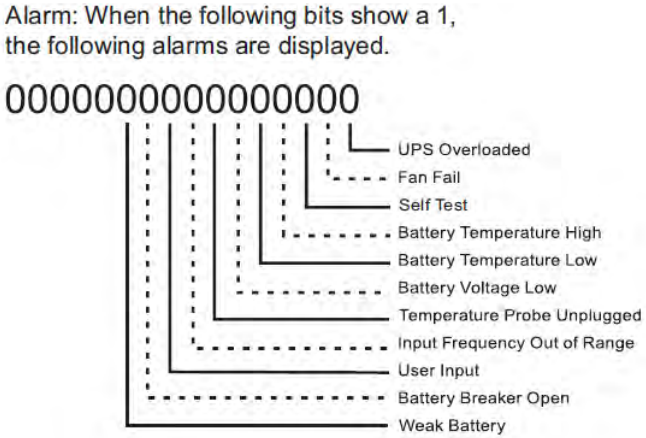


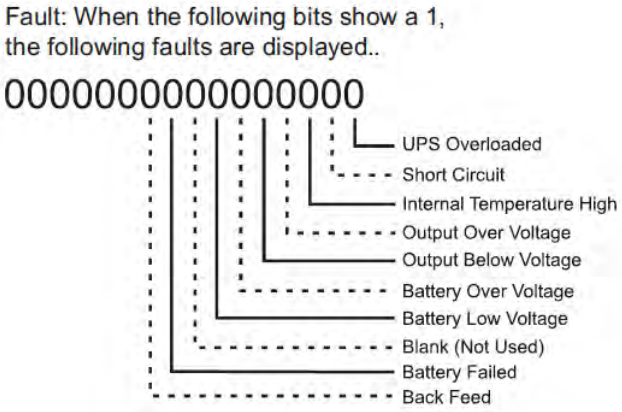
Fault: When the following bits show a 1, the following faults are displayed..



Difficulties – Alpha FXM 1100







Difficulties – Alpha FXM 1100

- Event and Fault codes inconsistent between manual
- Additional Event codes not documented
- Software automatically turning off event logging upon firmware upgrade
  - Defeats the purpose of downloading events

Difficulties – Alpha FXM 1100

- Total number events incorrectly documented
  - States 100 but some Alpha contained 200 events
- Serial application UPS Monitor Software unreliable
- Inability to get all events from application
  - Alpha provided application for serial will crash when attempting to download event list.

Difficulties – Alpha FXM 1100

- Unresponsive technical support
- Ability to perform a firmware upgrade via serial unreliable past firmware 1.08.72

Difficulties – Alpha FXM 1100

- Multiple firmware needed on Alpha's with communication module
- Communication module does not properly work if Alpha firmware does not match

Difficulties – Alpha FXM 1100

- If upgrading Alpha remotely must upgrade com port first
- If upgrading Alpha locally must upgrade Alpha Firmware first

Difficulties – Alpha FXM 1100

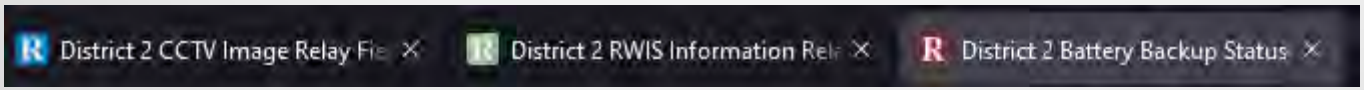
- When switching to SNMP only will lose the event history being grabbed from the serial side
- SNMP only gives the current status

Integration

- ITS Engineering and Support
- Transportation Management Center (TMC)

Integration

- ITS Engineering and Support
  - Incorporated into daily checks of system health
  - Shows if a field site is running on battery backup
  - Gives time that this occurred



Integration - PSPS

Powered By D2 ITS

Data is stale:
Not in line state:
Down for construction:
Awaiting SSH certificate:
Event Occurred Last 24Hrs: !

Current Site Status

All Sites

Sites With Errors | New Site

Site	Firmware	Communication Type	Current Mode	Power (In, Out, Out, Batt)	Battery Install Date	Last Successful Pull
Abrams_Lake_NB	1.08.72	Cell	Line	121.0V 119.0V 154VA 55.0V	-	07:24:35 10-28-2019
Abrams_Lake_SB	2.00.01	Cell	Line	122.0V 121.0V 121VA 57.3V	-	07:20:35 10-28-2019
Anderson_Grade	1.08.72	ISDN	Line	118.0V 117.0V 152VA 54.6V	-	04:02:08 10-28-2019
Antlers_Bridge	1.08.72	MW	Inverter	0.0V 120.0V 228VA 42.6V	-	03:15:35 10-27-2019
Black_Butte	1.08.72	Cell	Line	120.0V 118.0V 177VA 54.9V	-	07:22:35 10-28-2019
Bogard	1.08.72	POTS	Line	120.0V 120.0V 180VA 54.8V	-	07:18:03 10-28-2019
Bowman_Rd	2.00.04	ISDN	Inverter	0.0V 120.0V 156VA 44.0V	-	10:58:05 10-27-2019
Buckhorn	2.00.04	ISDN	Line	116.0V 115.0V 103VA 56.7V	-	07:24:39 10-28-2019
Cedar_Pass	1.08.72	POTS	Line	120.0V 120.0V 120VA 54.7V	-	07:04:10 10-28-2019
Central_Yreka	1.08.72	ISDN	Line	118.5V 114.0V 114VA 54.8V	-	06:36:38 10-28-2019
Collier	1.08.72	ISDN	Line	121.0V 119.0V 202VA 55.5V	-	07:08:35 10-28-2019
Cottonwood_Truck_Scales	2.00.04	ISDN	Inverter	0.0V 120.0V 156VA 43.2V	-	13:34:37 10-27-2019
Deschutes	1.08.72	ISDN	Inverter	0.0V 120.0V 132VA 43.1V	-	08:08:37 10-27-2019
Dorris	1.08.72	POTS	Line	126.0V 125.0V 137VA 55.1V	-	07:10:05 10-28-2019
! Doyle	2.00.01	Cell	Line	124.0V 124.0V 173VA 36.1V	-	07:24:36 10-28-2019
Dunsmuir	1.08.72	Cell	Line	119.5V 118.0V 118VA 54.9V	-	07:21:35 10-28-2019
East_Riverside	1.08.72	POTS	Inverter	0.0V 120.0V 96VA 47.4V	-	07:12:03 10-28-2019
EELab_1921	2.01.00	POTS	Line	117.0V 116.0V 185VA 54.9V	May 2014	07:17:04 10-28-2019
EELab_SNMP	2.01.00	POTS	Line	118.0V 117.0V 187VA 54.9V	Jan 2010	07:17:00 10-28-2019
Eureka_Way	1.08.72	ISDN	Line	121.0V 120.0V 252VA 55.3V	-	06:51:50 10-28-2019
Fawndale	1.08.72	MW	Line	121.0V 119.0V 178VA 53.4V	-	13:12:30 05-29-2019
Fredonyer_Smt	1.08.72	Cell	Inverter	0.0V 120.0V 192VA 42.0V	-	06:12:36 10-28-2019
Gibson	2.00.04	ISDN	Line	117.0V 116.0V 197VA 56.5V	-	07:19:37 10-28-2019
! Grass_Lake	1.08.72	Cell	Line	122.5V 122.0V 134VA 54.8V	-	07:24:35 10-28-2019
Hartnell	1.08.72	FIBER	Line	121.0V 120.0V 168VA 54.5V	-	07:21:35 10-28-2019
Hatchet_Mtn	1.08.72	Cell	Line	122.0V 120.0V 180VA 55.8V	-	07:20:36 10-28-2019
Hilltop	2.01.00	FIBER	Line	121.0V 120.0V 120VA 54.4V	-	07:21:35 10-28-2019
HilltopUPS	2.01.00	FIBER	Line	121.0V 120.0V 120VA 54.5V	-	07:21:00 10-28-2019
Hilt_Sandhouse	2.00.04	ISDN	Line	122.0V 120.0V 132VA 55.5V	-	07:17:05 10-28-2019
I5-SR273	2.00.04	FIBER	Inverter	0.0V 120.0V 192VA 42.6V	-	05:51:35 10-27-2019
I5-SR299	2.00.04	FIBER	Line	121.0V 120.0V 180VA 55.5V	-	07:24:35 10-28-2019
I5-SR44	2.00.04	FIBER	Line	120.5V 119.0V 142VA 54.4V	-	07:23:35 10-28-2019
I5-SR89	1.08.72	ISDN	Line	120.0V 119.0V 142VA 54.7V	-	06:28:25 10-28-2019
I5-US97	2.00.04	ISDN	Line	119.0V 119.0V 154VA 56.8V	-	06:25:39 10-28-2019
! Janesville	1.08.72	POTS	Line	121.5V 120.0V 180VA 38.1V	-	22:44:36 10-27-2019
! Jellys_Ferry	2.00.04	ISDN	Line	121.0V 119.0V 154VA 56.7V	-	06:32:40 10-28-2019
Johnson_Grade	1.08.72	POTS	Inverter	0.0V 120.0V 132VA 48.1V	-	06:31:07 10-28-2019
Lakehead	1.08.72	MW	Inverter	0.0V 120.0V 240VA 42.5V	-	02:41:35 10-27-2019
! Lake_Blvd	2.01.00	MW	Line	122.0V 120.0V 228VA 54.6V	-	07:20:35 10-28-2019
Lake_BlvdUPS	2.01.00	MW	Line	122.0V 120.0V 228VA 54.6V	-	07:20:01 10-28-2019
Lassen_Park	1.08.72	POTS	Line	124.0V 124.0V 223VA 49.2V	-	17:21:33 10-26-2019
La_Moine	1.08.72	MW	Line	116.0V 115.0V 230VA 54.6V	-	07:24:35 10-28-2019
Montgomery_Creek	1.08.72	POTS	Inverter	0.0V 120.0V 156VA 43.0V	-	11:57:06 10-27-2019
Mott_Rd	1.08.72	ISDN	Inverter	0.0V 120.0V 72VA 48.7V	-	09:06:55 05-28-2019
Mt_Hebron	1.08.72	POTS	Line	117.5V 116.0V 116VA 54.6V	-	06:26:33 10-28-2019
North_Hilt	1.08.72	Cell	Line	126.0V 124.0V 136VA 54.7V	-	07:23:35 10-28-2019
! North_Red_Bluff	1.08.72	ISDN	Line	120.5V 120.0V 0VA 54.4V	-	06:29:40 10-28-2019
North_Weed	1.08.72	ISDN	Line	119.0V 117.0V 128VA 54.7V	-	07:18:39 10-28-2019
OBrien	1.08.72	MW	Inverter	0.0V 120.0V 192VA 42.2V	-	03:37:35 10-27-2019

PSPS

Powered By D2 ITS
Data is stale:
Not in line state:
Down for construction:

Current Site Status

All Sites

Sites With Errors

Site	Firmware
Abrams_Lake_NB	1.08.72
Abrams_Lake_SB	2.00.01
Anderson_Grade	1.08.72
Antlers_Bridge	1.08.72
Black_Butte	1.08.72
Bogard	1.08.72
Bowman_Rd	2.00.04
Buckhorn	2.00.04
Cedar_Pass	1.08.72
Central_Yreka	1.08.72
Collier	1.08.72
Cottonwood_Truck_Scales	2.00.04
Deschutes	1.08.72
Dorris	1.08.72
Doyle	2.00.01
Dunsmuir	1.08.72
East_Riverside	1.08.72
EELab_1921	2.01.00
EELab_SNMP	2.01.00
Eureka_Way	1.08.72
Fawndale	1.08.72
Fredonyer_Smt	1.08.72
Gibson	2.00.04
Grass_Lake	1.08.72
Hartnell	1.08.72
Hatchet_Mtn	1.08.72
Hilltop	2.01.00
HilltopUPS	2.01.00
Hilt_Sandhouse	2.00.04
I5-SR273	2.00.04
I5-SR299	2.00.04
I5-SR44	2.00.04
I5-SR89	1.08.72
I5-US97	2.00.04
Janesville	1.08.72
Jellys_Ferry	2.00.04
Johnson_Grade	1.08.72
Lakehead	1.08.72
Lake_Blvd	2.01.00
Lake_BlvdUPS	2.01.00
Lassen_Park	1.08.72
La_Moine	1.08.72
Montgomery_Creek	1.08.72
Mott_Rd	1.08.72
Mt_Hebron	1.08.72
North_Hilt	1.08.72
North_Red_Bluff	1.08.72
North_Weed	1.08.72
OBrien	1.08.72

OBrien	1.08.72	MW	Inverter	0.0V 120.0V 192VA 42.2V	-	03:37:35 10-27-2019
Oregon_Mtn	2.00.04	POTS	Line	125.5V 123.0V 184VA 55.4V	-	07:19:16 10-28-2019
Perez	1.08.72	MW	Line	117.5V 116.0V 162VA 55.1V	-	07:21:35 10-28-2019
Pine_Grove	1.08.72	MW	Line	120.5V 120.0V 216VA 54.2V	-	07:23:36 10-28-2019
Pit_River_Bridge	1.08.72	MW	Inverter	0.0V 120.0V 252VA 42.0V	Jun 2019	05:01:35 10-27-2019
Pollard_Flat	2.00.04	ISDN	Line	119.0V 118.0V 177VA 56.0V	-	07:17:37 10-28-2019
Red_Bluff	1.08.72	ISDN	Line	121.0V 119.0V 119VA 53.3V	-	07:17:35 10-28-2019
Riverside_Ave	1.08.72	FIBER	Line	119.0V 118.0V 153VA 54.5V	-	07:24:35 10-28-2019
Sacramento_Hill	1.08.72	MW	Inverter	0.0V 120.0V 216VA 42.3V	-	04:55:35 10-27-2019
Salt_Creek	1.08.72	ISDN	Inverter	0.0V 120.0V 132VA 45.3V	-	19:27:37 10-26-2019
Shasta_River_Bridge	1.08.72	Cell	Line	119.0V 118.0V 165VA 54.7V	-	07:17:36 10-28-2019
Shingletown	1.08.72	POTS	Line	121.0V 121.0V 205VA 51.8V	-	18:01:37 10-26-2019
Sidehill	1.08.72	ISDN	Inverter	0.0V 120.0V 132VA 42.2V	-	19:49:32 06-25-2019
Sims_Road	1.08.72	ISDN	Line	118.0V 118.0V 129VA 55.1V	-	07:20:38 10-28-2019
Smith_Rd	2.00.04	FIBER	Line	121.0V 119.0V 119VA 55.5V	-	07:21:35 10-28-2019
Snowman	1.08.72	Cell	Line	119.0V 117.0V 117VA 54.8V	-	07:23:35 10-28-2019
South_Bonnyview	2.00.04	FIBER	Line	119.0V 117.0V 152VA 55.5V	-	07:20:35 10-28-2019
South_Weed	1.08.72	ISDN	Line	124.0V 123.0V 123VA 49.3V	-	06:53:39 10-28-2019
South_Yreka	1.08.72	ISDN	Line	121.5V 120.0V 108VA 56.0V	-	07:04:38 10-28-2019
Spring_Garden	1.08.72	POTS	Line	124.5V 125.0V 200VA 56.2V	-	07:24:04 10-28-2019
SR299-SR89	1.08.72	POTS	Line	117.0V 116.0V 150VA 54.9V	-	06:49:38 10-28-2019
SR36-SR44	1.08.72	POTS	Line	125.0V 124.0V 136VA 55.1V	-	21:52:03 10-27-2019
SR36-SR89	1.08.72	MW	Inverter	0.0V 120.0V 168VA 47.1V	-	07:24:37 10-28-2019
SR36-US395	1.08.72	POTS	Inverter	0.0V 120.0V 108VA 47.8V	-	07:24:36 10-28-2019
SR70-SR89	1.08.72	POTS	Inverter	0.0V 120.0V 120VA 44.8V	-	02:56:06 10-28-2019
SR70-US395	1.08.72	POTS	Line	118.5V 118.0V 177VA 55.1V	-	07:01:06 10-28-2019
Summit_Dr	1.08.72	ISDN	Line	120.0V 119.0V 130VA 54.9V	-	06:56:20 10-28-2019
Sundial_Bridge	1.08.72	FIBER	Line	123.0V 121.0V 157VA 54.1V	-	07:21:35 10-28-2019
Townhill	1.08.72	POTS	Inverter	0.0V 120.0V 132VA 44.3V	-	04:59:35 10-28-2019
Vina	1.08.72	ISDN	Inverter	0.0V 120.0V 108VA 43.9V	-	18:02:40 10-27-2019
Vollmers	1.08.72	ISDN	Line	119.0V 117.0V 198VA 54.3V	-	07:13:37 10-28-2019
Weed_Airport	1.08.72	ISDN	Line	121.0V 119.0V 130VA 54.7V	-	07:15:35 10-28-2019
Wilcox_Rd_NB	1.08.72	ISDN	Line	123.0V 122.0V 170VA 55.3V	-	07:14:40 10-28-2019
Wilcox_Rd_SB	1.08.72	ISDN	Line	123.0V 121.0V 157VA 54.7V	-	06:40:39 10-28-2019

82 Total Site(s) 3 Down Site(s) 19 Error Site(s) 23 Flagged Site(s) 5 Stale Site(s) 0 Site(s) Need Cert

Integration

- ITS Engineering and Support
  - Allows ITS to have an early warning system before the field site shuts down due to power loss
  - When power loss occurs can check power company info to see if there is a planned power outage before making a field site visit

Pollard Flat CCTV After Delta Fire

Integration

- Transportation Management Center (TMC)
  - Due to advance notice from ITS allows TMC Staff to anticipate the loss of a field site and adjust accordingly

gration

- nent Center (TMC)

m ITS allows TMC Staff to anticipate
adjust accordingly

gration

- ment Center (TMC)
  - m ITS allows TMC Staff to anticipate
    adjust accordingly

Home | Inverter Events | System Logs | Site Logs | Sites Configuration

Powered By D2 ITS

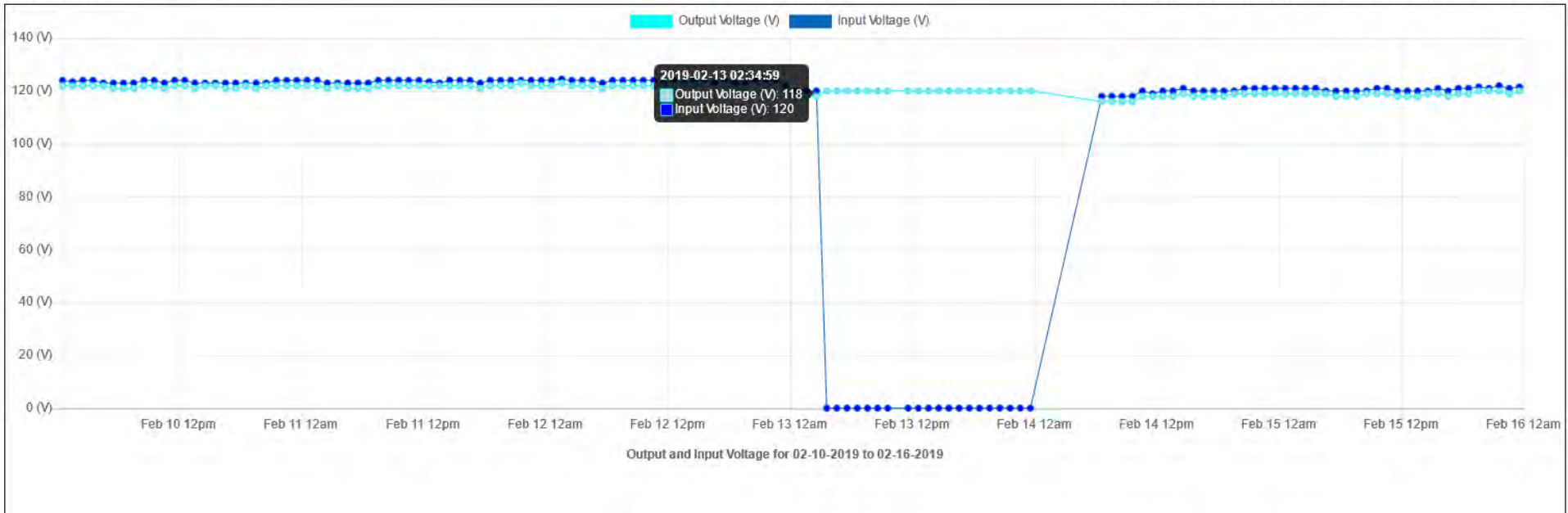
Cottonwood Truck Scales Power Stats

Graph 02-10-2019 to 02-16-2019

View Table | View Events

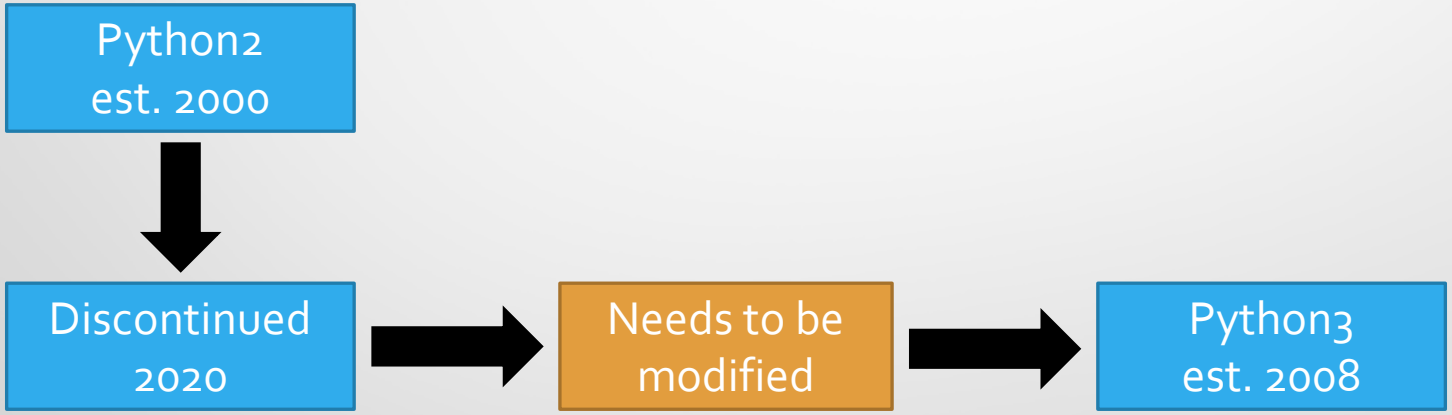
All Graphs | Input | Output | Battery

Date Range Selector | Last 4 Hours | Last 24 Hours | Last 3 Days | Last 30 Days | Last Year



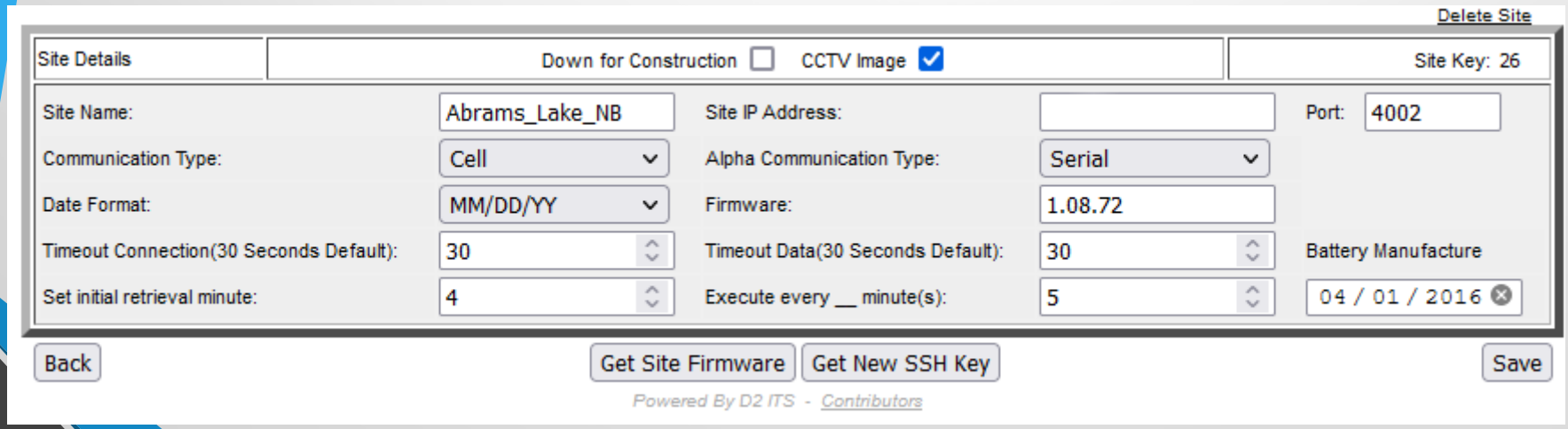
Lessons Learned

- Develop on same OS as that which will be deployed on
- Future proof source code



Lessons Learned

- Open some configuration options for the user
- Add data validation of user input
- Use proper input tag i.e. dropdown, number only, etc.

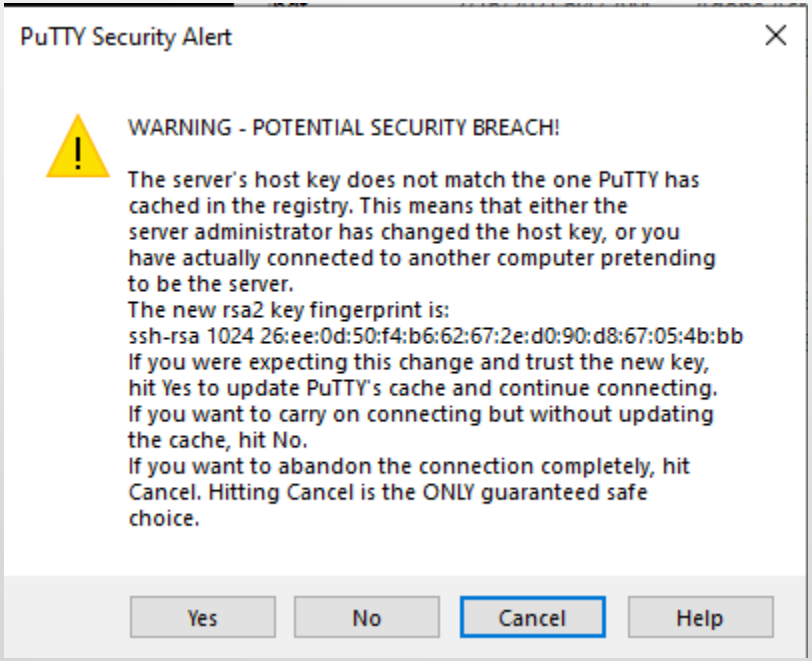


Lessons Learned

- Directory structure matters early on and will cause issue when trying to address later
- Slow connections will be encountered, and the background process needs to be able to handle incomplete data
- File permissions matter and will need to be addressed
- Database architecture
- Database sizing

Lessons Learned – Plink

- Since establishes a SSH connection need to accept a certificate when adding a new field site
- Needed a script to automate SSH certificate acceptance



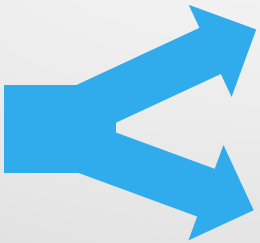
Future

- Switch OS to Red Hat or Red Hat based OS
- Convert code to python3
- Upgrade Alpha units

Future – OS

- Switch OS to Red Hat or Red Hat based OS
  - The way that Caltrans is moving want all servers based on Red Hat

Source: Wikipedia



Source: Wikipedia

Source: Red Hat

Future – Python 3

- Convert code to python3
  - When project was started there was no End of Life (EOL) for python2 announced
  - Upon "completion" of project EOL was announced for Python2 January 2020
  - Minimal Changes to code will be needed

```
print "There are no () needed around a print statement in Python2"
print("The () are required around a print statement in Python3")
```

Future – Alpha

- Upgrade Alpha units
  - Replace older units to allow SNMP
    - Shorter communication time
    - Not relying on Python calling a bash script
    - More support from Alpha
    - The way the industry is moving
    - Less data transferred would also improve reliability of slower sites

Future – Database

- Automate database management
  - Rotate tables
  - Archive tables

Questions?