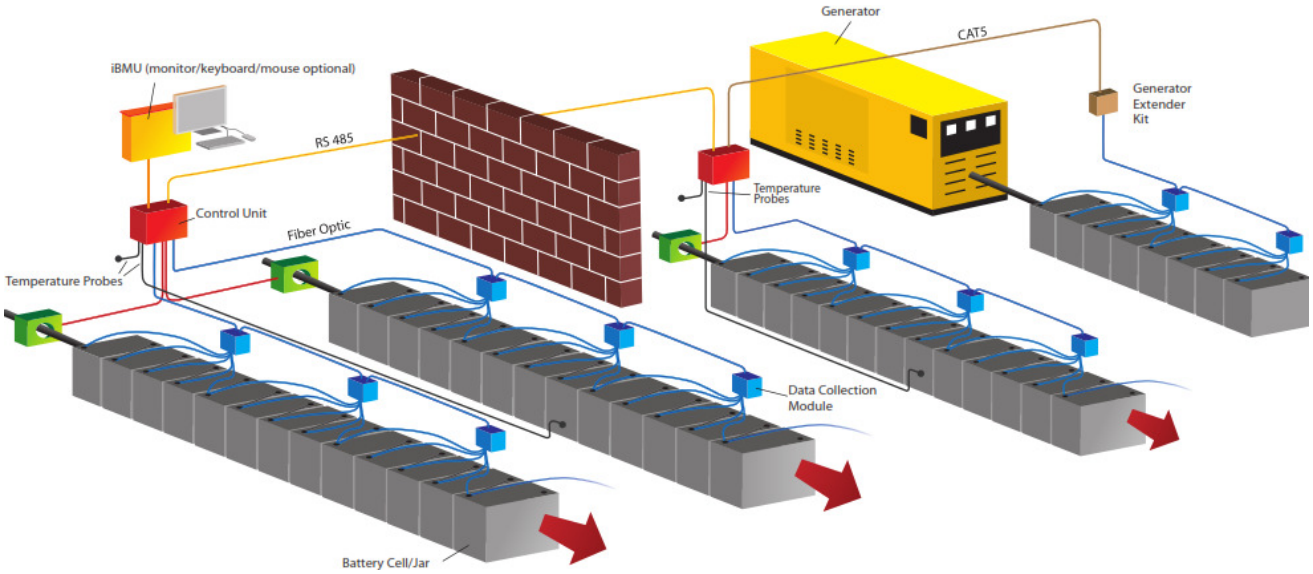
Cellwatch End User Training Primer

- *Material in this document is designed to complement the Cellwatch End User training.*
- *Material in this primer may be updated or removed without notice. Always verify that the latest primer is used.*

System Overview



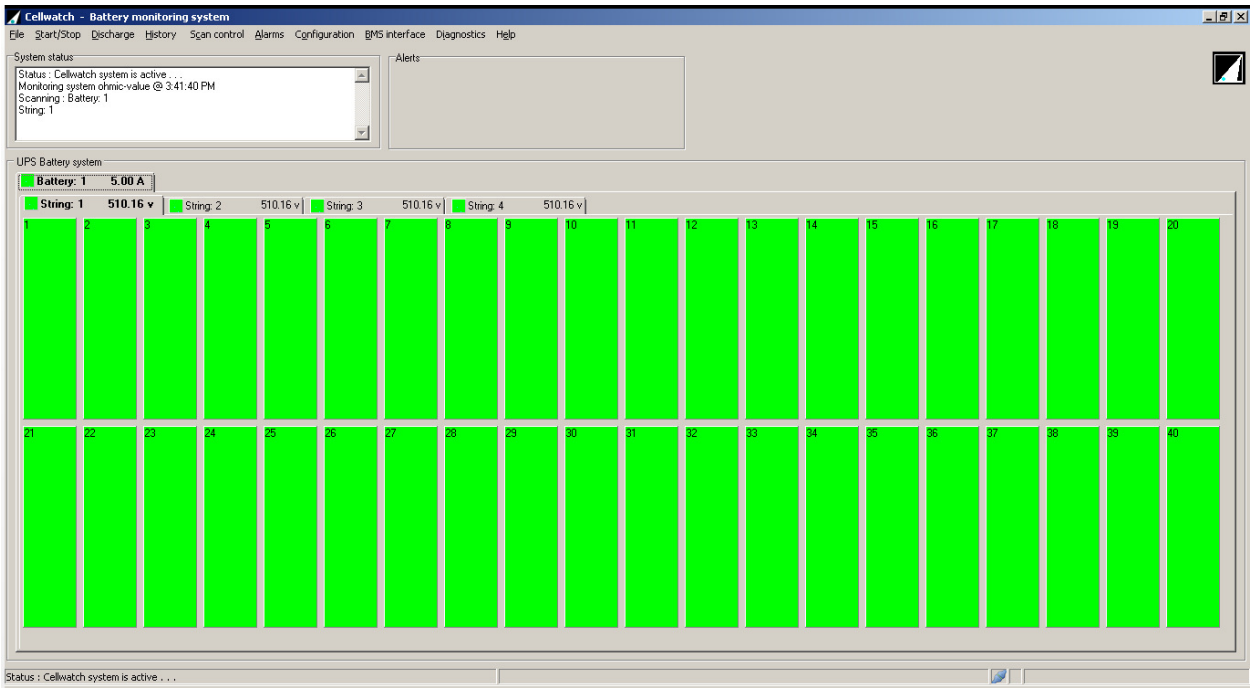
Major Components:

- **iBMU (I**ntegrated **B**attery **M**onitor **U**nit**)** – a standalone solid state server running Windows Embedded Standard (i.e. Win 7 Embedded) dedicated to running Cellwatch.
- **CU (C**ontrol **U**nit**)** – a data aggregator that sends commands issued by the iBMU over dedicated RS-485 to the optically connected DCM modules.
- **TRC** (**T**hermal **R**unaway **C**ontroller) – a CU with the expanded ability to send a signal to disconnect switches to isolate a battery if thermal runaway conditions have been continuously present for 12 hours (default).
- **DCM** (**D**ata **C**ollection **M**odule) – a device that reports back voltage, ohmic value, AC ripple (any DCM 5 version), and cell temperature (DCM 5T only).
- **Generator Extender Kit** – a dedicated Cat5 expansion between a CU/TRC and a Remote module that allows fiber optic communications to DCM modules connected to generator, substation, switchgear or transfer switch batteries.

Hierarchical Battery Structure

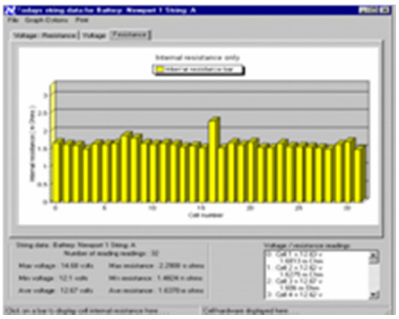
- **Battery** – a single/multi string configuration that is connected to a DC charger or UPS module
- **String** – a parallel feature of the battery comprised of multiple jars connected in series or a single jar
- **Jar** – the lowest changeable unit of the string. Often 2V, 4V, 6V, 8V, 12V, or 16V modules (can also be called a container or regarding 2V modules, cells)

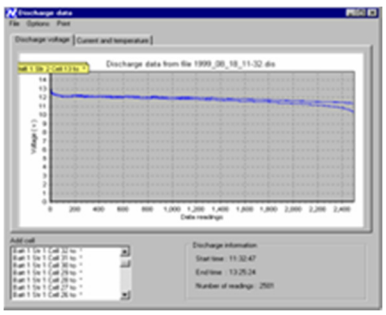
User Interface Basics

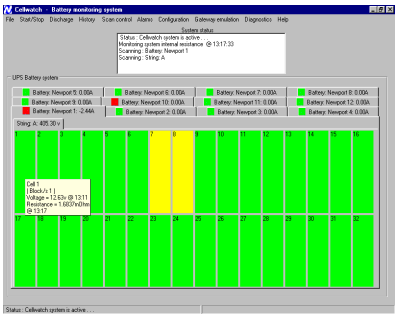


Three ways to Interact:

Left Click = Daily Graphs
Right Click = Options
Hover = Most Recent Data







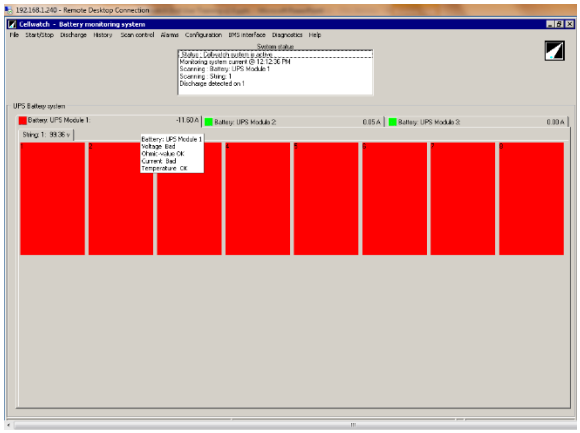
Cellwatch Software Suite

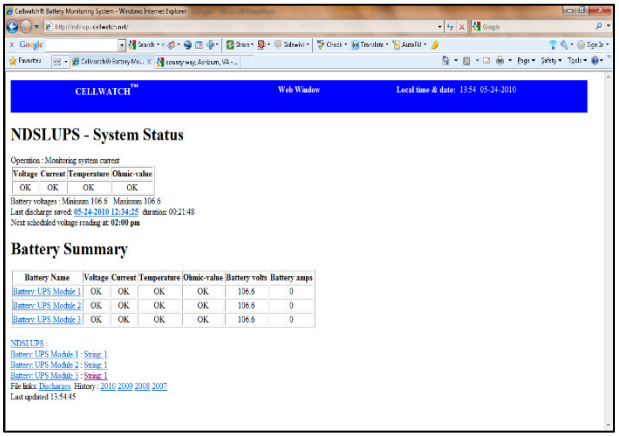
- Cellwatch – the standalone Cellwatch software that actively monitors and collects battery data
- Configuration Builder – a program that configures the on-screen display to properly display the data from the connected hardware
- Data Manager – a historical and live alarm database maintained on the iBMU
- Email Alert – a free email notification program that sends alarm notifications to users
- Battery Warranty Report Tool – a tool used to allow users to print PDF battery reports for warranty claims

Alarm Notifications

Cellwatch provides the following methods to collect data or alarms:

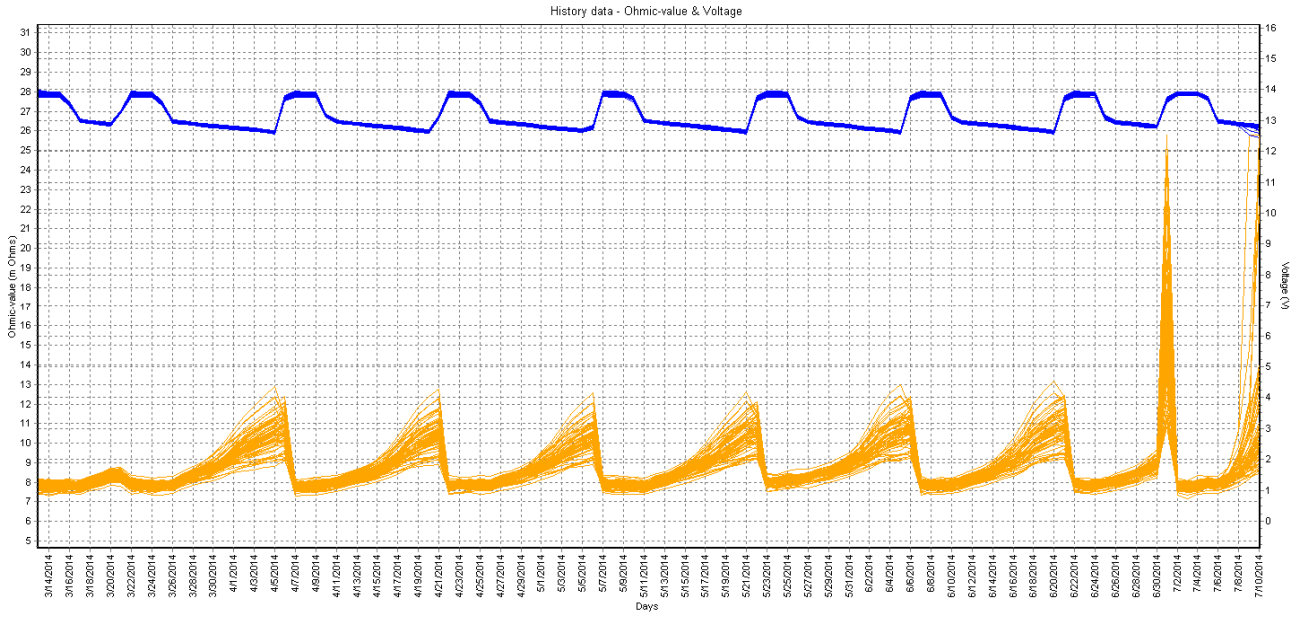
- On-Screen in Cellwatch via Alerts Window or Red battery, string, or jar
- On-Screen in Data Manager via Red lines
- Relay Notifications on CU or TRC
- Webpage interface (optionally disabled)
- Modbus TCP/IP (optionally disabled)
- SNMP (client must be installed)
- Email Notifications via Email Alert or Cellwatch.net (on-line service)



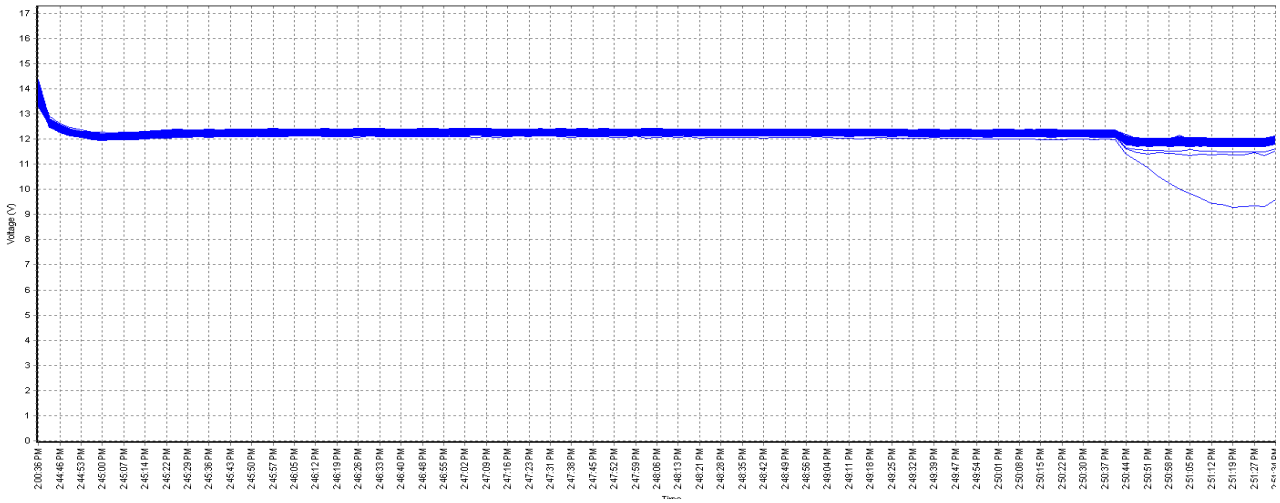


Data Collected

- History file – daily average data for voltage, ohmic, temperature, and current across the current year (ripple included with extended features of DCM5); can be plotted across multiple years to view trending values over life of jar
- Discharge file – voltage, current, and temperature every few seconds during an on-load event
- Recharge file - voltage, current, and temperature every few seconds following the end of a discharge/on-load event
- Logfile – an account of every software interaction and measurement taken in Cellwatch
- Cellwatch.fdb – database containing every logged alarm event



History data file (Graph view)



Discharge graph