



# MONITOR YOUR WIRELESS SITE CONDITIONS

## With Intelligent DC Power Solutions from ICT

### Overview

Information is key. Information about what is going on at your remote communications sites is everything. That is why ICT created the Intelligent Power initiative, utilizing TCP/IP based communication in a practical, cost effective way to provide site managers with more information and control of their DC power infrastructure and connected loads including radios, repeaters, RF amplifiers, routers and other devices.

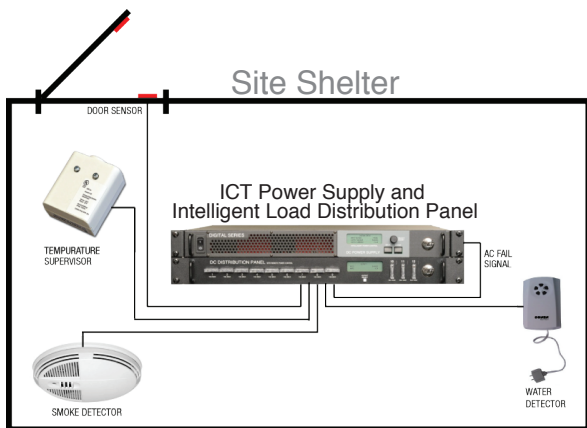
ICT Intelligent Distribution Series 2 and Series 3 Load Distribution Panels work in conjunction with ICT DC power supplies such as Modular Power Series, Digital Series or Pro Series 1RU power supplies and DC-AC inverters to create an effective solution for not only providing and distributing highly reliable DC and AC power, but also for providing continuous monitoring and multiple layers of alarms and early warnings that you need to ensure continuous up-time and quality of service at your sites.

### Environmental Site Monitoring

As a communications site manager you want to know things like when a door opens, a smoke detector trips, a pre-defined temperature level is reached, or water is detected in the shelter.

The goal of environmental monitoring is of course to reduce or eliminate downtime, stay informed of conditions at the site, and be notified so that you can invoke pre-planned or remedial actions based on the urgency of the situation. Up to now, the most common way to obtain environmental data from the site was to use a third party solution which can add cost and use up valuable rack space.

ICT Distribution Series provide five digital site monitoring inputs for environmental sensors to be connected so that door, water, smoke, temperature, AC faults and a host of other sensor readings can be monitored and reported. With built-in web servers, ICT Distribution Series can send email, text, or SNMP messages to keep you informed of conditions at your sites. Environmental and site power monitoring has never been this easy or cost effective (see fig.1).

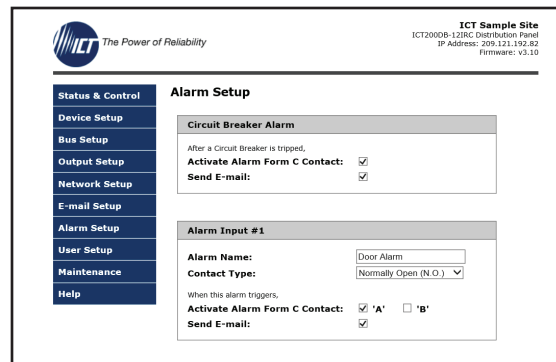


### A New Solution

Most sites need DC power, and many sites need DC power distribution. Now for the first time, ICT has utilized the power portion of your infrastructure and incorporated environmental site monitoring into a single, cost effective solution for tower sites.

Utilizing the TCP/IP Ethernet-enabled versions of the ICT Distribution Series 2 and Series 3 load panels, you can now add environmental monitoring to your sites without the expense or rack space required for a third party solution. All Ethernet-enabled versions of the Distribution Series 2 come with five digital dry alarm contact inputs that are configurable for normally open or normally closed operation.

Each contact can be custom labelled in the easy-to-use graphical user interface built into the Distribution Series panels, so when you receive an email or text alarm it will clearly state which alarm has been tripped. SNMP messages can also be sent to your Network Management System (NMS) interface, and every alarm event will be captured in the 30 day downloadable data log. After an alarm clears, the Distribution Series panels will even send you an email to report that the alarm condition has cleared.



### Power Monitoring

Communications site managers know that monitoring power remotely can reveal a lot about the health of critical equipment at a site. Whether it's a power supply, battery bank or connected DC loads such as radios and repeaters, real-time monitoring of DC current is a vital tool to observing performance. When it comes to quality of service and uptime, site managers want to know when AC power fails, when DC voltage starts to drop, and when DC voltage is approaching a level that necessitates some type of preventive measure to be taken.

Whether it's pre-planned or reactive remediation, early warning of problems is vital to ensuring that service is not interrupted. By utilizing the ICT Digital Series, Pro Series, or Modular Power Series power supply, combined with the ICT Distribution Series 2 or Series 3 fused or breakered load distribution panels with remote power control, you are able to monitor key power parameters including the current draw of every connected device, receive email alerts if a pre-defined alarm condition is encountered, and undertake remote actions including power cycling the loads or shedding non-critical loads to extend battery life, all from your office.

### Multiple Alarming Levels

Working in combination, the ICT Power Supplies with Ethernet and Battery Backup/LVD options installed, and Ethernet-enabled Distribution Series 2 or Series 3 with Remote Power Control will provide multiple layers of warnings and fail-safe actions based on parameters determined and set by the site manager.

**Level 1** - All ICT Intelligent power supplies and Distribution Series models are able to monitor and report on key power parameters constantly. At the first level, the Distribution Series can be used to detect and report an AC failure by running a jumper from the Form C contact on the back of the power supply to one of the five dry contact inputs on the Distribution Series 2 provided for site monitoring. This contact can be labeled AC FAULT in the Alarms setup page of the Distribution Series graphical user interface. Use the normally closed power supply Form C contact (NC) and set the input contact on the Distribution Series 2 to normally open (NO). When an AC fault occurs, the Form C contact on the power supply will activate and the Distribution Series will send an email alert to the site manager identifying the alarm as an AC fault. This provides the first warning that an event has occurred at the site.

By deselecting the Activate Form C Contact for all other alarm conditions on the power supply, only an AC fault or a serious internal power supply problem will activate the Form C contact. By selecting 'Send E-Mail' for all other alarms including DC Output Failure, Over-Temperature, and Parallel Unit Offline Alarm (if installed), the site manager will receive email alerts when one of these alarms is triggered.

**Level 2** - When AC fails, the loads connected to the Distribution Series are seamlessly transferred to the battery by the battery backup equipped ICT power supply. The Distribution Series continues to monitor the battery voltage, reporting in real time, and when the voltage drops to a level pre-defined by the site manager, an email alarm is sent.

The screenshot shows the 'Battery Backup' configuration page in the ICT Digital Series Demo web interface. The page title is 'Digital Series Demo' with sub-headers 'ICT2000-14', 'IP Address: 209.121.192.81', and 'Firmware: v1.09'. The left sidebar contains navigation links: System Status, Device Setup, Battery Backup (selected), Network Setup, Alarm Setup, User Setup, Maintenance, and Help. The main content area is titled 'Battery Backup' and includes the following settings:

- Battery Input Voltage: 13.8 VDC
- LVD Settings:
  - Disconnect Voltage: 10.5 VDC
  - Reconnect Voltage: 12.5 VDC
- When a battery fault occurs, Activate Alarm Form C Contact:
- Send E-mail:

A 'Save Settings' button is located at the bottom of the form.

The Distribution Series can also be set up to automatically shed loads so that non-critical loads will shut down automatically at levels pre-defined by the site manager, leaving only the critical loads still running. This will help prolong battery power at the site as long as possible.

**Level 3** - By this time two warnings have been sounded and email alerts sent. First that an AC fault has occurred, and second that DC voltage has dropped to a pre-defined alert level. The final fail-safe level occurs when the ICT power supply senses that the DC voltage is approaching dangerously low levels and opens the LVD contactor at a pre-defined level set by the site manager. The LVD is designed to protect the battery from damage due to over-discharging. When this happens DC power is disconnected so that the loads and communications with the power system are now inoperable.

Where critical communications are involved, sites are typically designed to ensure that service is never interrupted due to a power failure. Designers will generally ensure that there is enough battery backup in place to run the loads for the expected period of AC power outage. Backup systems such as generators may also be installed to ensure 100 percent uptime.

The first level AC Fault alarm is the initial warning of an event at the site that needs attention, and the second warning of low DC voltage is an escalation of urgency that needs to be attended to. The final level in which the LVD contactor opens to protect the batteries should never be reached if the site is designed to provide 100 percent uptime reliability. At a non-critical site this final level may be acceptable until a technician can visit the site to replace the battery or otherwise restore service.

### Conclusion

ICT Pro, Digital and Modular Power Series power supplies with Battery Backup/LVD, combined with Ethernet-enabled Distribution Series DC distribution panels with remote power control, create an effective solution for monitoring and reporting on critical environmental and power-related events at communications sites.

When timely information is essential, this Intelligent DC power solution will provide first and second level alerts to site managers, as well as taking fail-safe steps to protect the infrastructure when required.

