

DataCube[®]

Installation Manual

Version 1.3
April 2010



ethermetrics.com

Notices

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Disclaimer of Liability

The information contained in this manual is provided “as is” and is subject to change without notice. EtherMetrics disclaims all warranties, either expressed or implied, with regard to this document and any information contained herein.

The installation techniques, handling, and use of this product are beyond EtherMetrics’ control. Therefore, EtherMetrics shall not be liable for errors or for incidental or consequential damages in connection with loss, damage, or expense resulting from improper installation, handling, or use.

Product Warranty

The DataCube has a limited two year warranty from the date of shipment. EtherMetrics’ responsibility is limited to repair, replacement, or refund, and any of which may be selected by EtherMetrics at its sole discretion.

The DataCube warranty only covers defects occurring from normal use. The warranty does not include malfunctions or failures resulting from: misuse, neglect, improper applications, improper installation, acts of nature, or repairs by anyone other than EtherMetrics. Additionally, EtherMetrics shall not be liable for any indirect, special, incidental, or consequential damages.

Technical Assistance

For assistance with device troubleshooting, contact our Technical Support Department using our toll-free number 1-888-8-ETHER-M (1-888-838-4376).

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Contents

Notices.....	1
Disclaimer of Liability.....	1
Product Warranty.....	1
Technical Assistance.....	1
Contents.....	2
Overview.....	3
DataCube.....	3
Package Contents.....	3
What You Will Need.....	3
Device Specifications.....	4
Approvals and Compliance.....	4
System Requirements.....	5
Installation.....	6
Important Safety Instructions.....	6
Wiring Schematics.....	7
Terminal Pin Descriptions.....	7
Meter Connection.....	8
UPS/CTL Connection.....	8
Ethernet Connection.....	9
Mounting the DataCube.....	10
Mounting to a DIN Rail.....	10
Mounting to a Wall.....	10
Troubleshooting.....	11
Network Status.....	11
System Status.....	11
Software Configuration.....	12
Overview.....	12
Instructions.....	12
Configure the DataCube's network settings directly.....	12
Configure the DataCube's meter information.....	13
Configure the DataCube's username and password (optional).....	13
Certifications.....	14
FCC Part 15 Class B.....	14
Radio Frequency Interference (RFI)(FCC 15.105).....	14
Industry Canada.....	14
Declaration of Conformity (In accordance with FCC Dockets 96-208 and 95-19).....	15
Document Revisions.....	16

Overview

DataCube

Congratulations on your purchase of the EtherMetrics DataCube®. The DataCube is a powerful pulse data logger for recording, retrieving, and analyzing energy and water meter data. The DataCube data logger comes equipped with an efficient and intuitive analysis graphing program. The DataCube's web interface directly provides the advanced analytical capabilities, eliminating the need for servers or other infrastructure.

This manual provides safety, installation, and maintenance instructions for the DataCube. Please read the following instructions thoroughly prior to installation.

Package Contents

- ✓ This Manual
- ✓ DataCube
- ✓ DIN rail mounting clip and screw

NOTE

Check to see that all the package contents listed above have been included, and that there has been no damage to any of the components in shipping. Report any missing items to us. Shipping damages should be reported to the shipping agent.

What You Will Need

- ✓ Screw driver
- ✓ One screw and anchor (if hanging the DataCube from a wall)
 - EtherMetrics recommends #5 (M3) slotted Pan Head screws, 1/2" (12mm) long
 - Screw specifications:
 - 3/8" (10mm) length or longer
 - Shaft no wider than 1/8" (0.125" or 3.2 mm)
 - Head no wider than 5/16" (0.30" or 8.0 mm)
 - Head no taller than 5/64" (0.075" or 2.0 mm)
- ✓ Wire cutters/strippers
- ✓ 26—20 AWG stranded or solid (0.14 – 0.5mm) insulated wire
- ✓ One UTP CAT5 cable or better for 10BASE-T/ 100BASE-TX

NOTE

It is important that you locate and **write down your MAC address and product key** for future reference. You will need this number to register your DataCube on EtherMetrics.net, and will also need this number to give to our Technical and/or Customer Support Departments if you ever need to call for assistance. You can find your MAC address and Product Key on the bottom of the DataCube.




MAC ADDRESS: ___ : ___ : ___ : ___ : ___ : ___

PRODUCT KEY: _____

Device Specifications

Device Specifications	
Input Voltage	Class 2- 802.3af Power over Ethernet, 24 V ===
Input Power	4.65 W Max
Output Voltage	24 V === / 48 V ===
Output Current	100mA / 10mA
Pulse Channels	1
LED Indicators	Status; Ethernet link, Ethernet activity
Operating Temperature	-4°F (-20°C) to 131°F (+55°C)
Operating Humidity	5% to 90% (non condensing)
Operating Altitude	12,000 feet (3657.6 meters)
Dimensions	1.75" L x 1.75" W x 1.25" H
Weight	2 oz.
Mounting	Screw hanger, 35mm DIN rail
Communications	TCP/IP
Security	SSL, IPSEC
Protocols	SOAP, JSON, XML, HTTP, FTP, SFTP, SMTP, Modbus/TCP, BACNet/IP
Logging Method	Adjustable pulse interval or per-pulse event
Memory	> 3 years of data

Approvals and Compliance

Markings	Description
	TUV Rheinland N.A. certification for US and Canada per UL 61010-1 2 nd Ed. +A1 and CAN/CSA C22.2 No. 61010-1 2 nd Ed. +A1
	This product has been tested to the requirements of CAN/CSA C22.2 No. 61010-1 second edition, including Amendment 1.
	EN 61010-1:2001 FCC Part 15 Class B

System Requirements

Hardware Requirements	Specification
Ports	1 RJ-45 connector for 10BASE-T and 100BASE-TX, with IEEE 802.3af POE
Cables	UTP CAT5 or better for 10BASE-T/100BASE-TX
I/O	One pulse input, one 24V DC industrial power output, one power input/output
Meter	Analog or digital utility meter with an available pulse output/pulse initiator

Software Requirements	Specification
Web Browser	Microsoft Internet Explorer (version 5.5 and above), Firefox (version 2.0 and above), or Safari
Operating System	Windows 2000 and above, MAC OS 10.3.9 and above, or Linux
Management	Built-in Web user interface for easy-browser-based configuration (HTTP)

Installation



The instructions given in this manual are only intended for qualified persons who are thoroughly trained in the operations and maintenance of electronic control devices which are used in conjunction with power distribution equipment and understand the risks involved. These instructions are not to be used as a substitute for training and experience in safety procedures for this type of equipment.

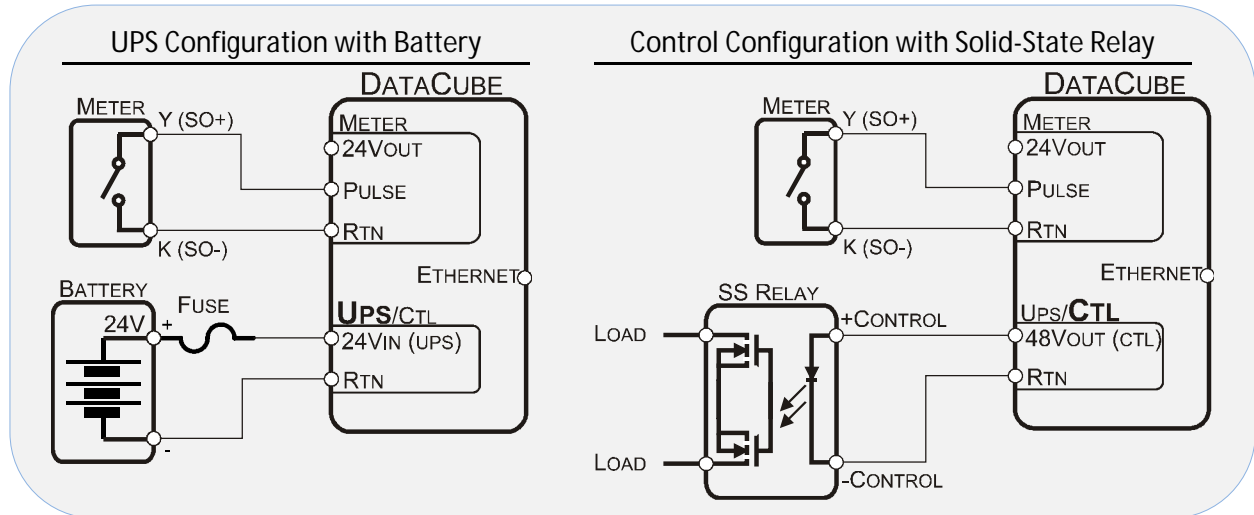
Important Safety Instructions

If the DataCube is NOT installed properly, safety precautions may be impaired. Therefore, only qualified personnel or licensed electricians should install the DataCube and always adhere to the following checklist:

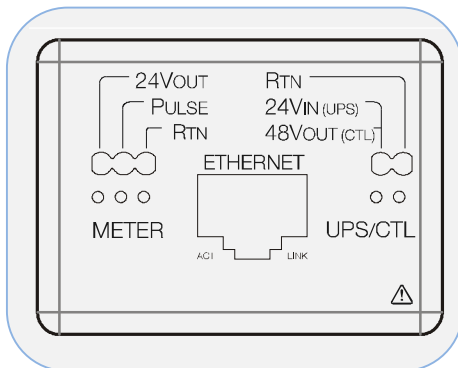
- ✓ Install in accordance with all relevant national, regional, and local electrical and building codes.
- ✓ The DataCube is NOT weatherproof. EtherMetrics recommends installing the device in either an electrical enclosure (panel or junction box) or in a limited access electrical room.
- ✓ The DataCube is intended for installation into DRY LOCATIONS only, such as indoors or within outdoor electrical enclosures which prevent ingress of water, for example, NEMA Type 4 enclosures. However, during installation into outdoor enclosures, take care not to contact the Power Over Ethernet (POE) pins if you are wet or your hands are moist. POE voltage may be hazardous to touch in wet conditions. It is recommended that the POE connection to the DataCube is made prior to connecting power to the POE inserter in conditions where your hands or body may be wet.
- ✓ Do NOT install the DataCube where it may be exposed to temperatures below -20°C or above 55°C , or where excessive moisture, dust, or other contamination is present.
- ✓ Verify that circuit voltages and currents are within the proper range of the `.
- ✓ The Pulse terminal of the DataCube meter connections is intended ONLY for connection to fully isolated potential-free Form-A or Form-C dry-contact or solid-state pulse initiator output circuits as defined by ANSI C12.1-2008 or IEC 62053-31.
- ✓ The Pulse terminal of the DataCube meter connections is not classified as a measurement circuit terminal per IEC 61010-1. It is not intended for direct connection to AC mains circuits. It is not suitable for Measurement Category I, II, III, or IV connections.
- ✓ The Pulse terminal of the DataCube meter connections is suitable only for connection to meter pulse initiator outputs which are properly safety isolated from mains by double or reinforced insulation.
- ✓ Do not place DataCube or Ethernet wiring in any conduit, outlet or junction box containing mains electrical wiring.
- ✓ Do not place DataCube or Ethernet wiring in close proximity to heat sources which could damage insulation.
- ✓ Before powering on the DataCube, ensure that all wires connected to the DataCube are securely installed by tugging on each wire.
- ✓ Do NOT create additional mounting holes in the DataCube as they may damage the device and reduce the reliability and functionality of the device.
- ✓ Do NOT open or alter the DataCube's enclosure.
- ✓ Clean only with a dry cloth.
- ✓ When EMC is an issue, EtherMetrics recommends the following:
 - Only use shielded cables
 - Twisted-pair cables should be used for signal connections
 - Always run signal and power cables in separate conduits
 - If EMC issues persist, use ferrite bead(s) on signal wires

Wiring Schematics

The most common configuration utilizes the DataCube with only a meter and POE Ethernet interface. Other configurations include a DataCube configured for uninterruptible power and a DataCube configured to control an external solid-state relay.



Terminal Pin Descriptions



Block	Terminal	Description
METER	24VOUT	24V DC output rated at 100mA maximum
METER	PULSE	This terminal is intended for connection ONLY to fully isolated potential-free Form-A or Form-C dry-contact or solid-state pulse initiator output circuits type as defined by ANSI C12.1-2008 or IEC 62053-31. The DataCube uses a sensor voltage of 3.3V DC at 1mA to detect meter pulse contact closures.
METER	RTN	Return connection for pulse initiator return and also 24V DC output.
UPS/CTL	48VOUT (CTL)	When configured in optional Control mode, this terminal provides programmable switched 48V DC 10mA power to actuate a fully isolated solid state relay.
UPS/CTL	24VIN (UPS)	When configured in optional Uninterrupted Power Supply (UPS) mode, this terminal connects to the positive pole (anode) of a 24V Valve Regulated Lead Acid (VRLA) battery, also called a Sealed Lead Acid (SLA) battery.
UPS/CTL	RTN	In Control mode: return for 24V DC output; In UPS mode: connected to negative pole (cathode) of battery
ETHERNET	ETHERNET	IEEE 802.3af Power Over Ethernet (POE) compatible connection

Meter Connection

NOTE

Before connecting the DataCube to a meter, verify that the meter has a pulse initiator. The DataCube is compatible with fully isolated potential free dry-contact or solid-state pulse outputs only. Disconnect any voltage or connection to other equipment prior to connecting the DataCube to the meter's pulse output. Additionally, determine if the pulse initiator's output is Form A (KY) or Form C (KYZ). If you are unsure, please contact your utility or meter provider. For further assistance, contact EtherMetrics' Technical Support Department.

To prepare cable for connection to the DataCube, expose ½ inch (12mm) of bare wire at the end of the leads to be inserted into the DataCube. When inserting, there should be some initial resistance that yields when the wire slides into the opening with little additional effort. Once fully seated, tug gently on the wire to ensure it is solidly connected. Thin or stranded wire may deflect while being inserted. To aid the insertion of thin wires, depress the release button by inserting one end of a paper clip or pushpin into the hole below the wire's terminal. While the button is depressed, the wire should slide in freely.

Connect the DataCube **RTN** and **PULSE** input terminals to the meter's "K" and "Y" leads. For non-polarized meter pulse outputs, either lead can be connected to either terminal. For polarized meter outputs, connect the positive lead to the DataCube's **PULSE** terminal and the negative lead to the DataCube's **RTN** terminal. The DataCube may also be connected to the "K" and "Z" outputs of the pulse initiator.



Do not mistakenly connect the 24V_{OUT} terminal to the meter's pulse output. Doing so may damage the meter's pulse initiator. The 24V_{OUT} terminal is only to be connected to a meter's power input, if one is required.

NOTE

Form A vs. Form C pulses – The DataCube is designed to accept Form A pulses. If the meter presents Form C pulses, be sure to double the meter's scaling factor when configuring through the web interface.

To disconnect the DataCube's terminal block wires, insert a paper clip or pushpin into the hole directly below the wire you wish to disconnect to depress the orange lever while simultaneously pulling the wire out of its hole.

UPS/CTL Connection

NOTE

The DataCube can use the UPS/CTL terminal in one of two ways: as an input for a battery to provide uninterrupted operation in the event that power over Ethernet (POE) temporarily fails; or, as an output to operate a fully isolated solid-state relay for interfacing with external equipment, such as a Building Automation System (BAS).

To configure UPS/CTL as an uninterruptible power source, a 24V VRLA (Sealed Lead-Acid) battery is the recommended external power supply. To connect a battery to the DataCube, use 26-20 AWG stranded or solid (0.14 – 0.5mm) fused leads with at least ½ inch (12 mm) of exposed bare wire. First connect the leads to the UPS/CTL inputs on the DataCube, and then to the battery, being careful to observe polarity. The positive battery lead must be fused as closely as possible to the battery terminal with a 0.3A fuse rated for at least 48V $\overline{=}$. Ensure no bare wire or wire strands are visible once the wire has been inserted. Be sure to take note of the amp-hour rating of the battery for the configuration web interface.

To configure UPS/CTL to operate a fully isolated solid-state relay (SSR), connect the **48V_{OUT} (CTL)** terminal and **Rtn** terminals to the input side of the SSR with 26-20 AWG stranded or solid wire, being careful to observe the input polarity requirements of the SSR, if there are any. The DataCube can provide up to 48V $\overline{=}$ at up to 10 mA to operate the SSR.

Ethernet Connection

The DataCube is equipped to receive Power over Ethernet (POE). The DataCube is a Power Class 2 device, using IEEE802.3af, with a power draw of 4.65W maximum. To enable Power Over Ethernet and internet to the DataCube, plug a shielded Cat5 or better Ethernet cable into the RJ45 terminal of the DataCube.

Once the Ethernet cable has been plugged into the DataCube and POE has switched on, the "LINK" LED should illuminate solid amber and the "ACT" LED should illuminate solid green. Additionally, a system status LED on the top panel should light up solid green indicating the DataCube is connected properly. If the LEDs do not light up solid or are different colors than described, please refer to the troubleshooting section of this manual.

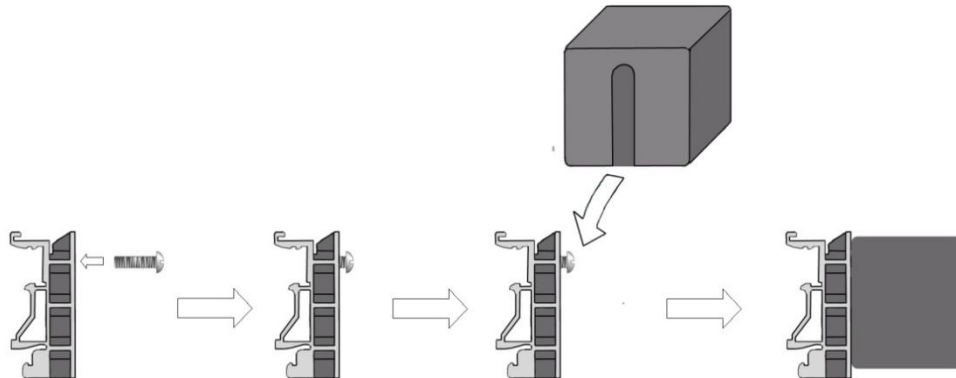
Mounting the DataCube

The DataCube can be mounted in two ways:

- DIN rail mounted (EN50022/IEC 60715 35mm "Top Hat" DIN rail)
- Wall mounted with a screw

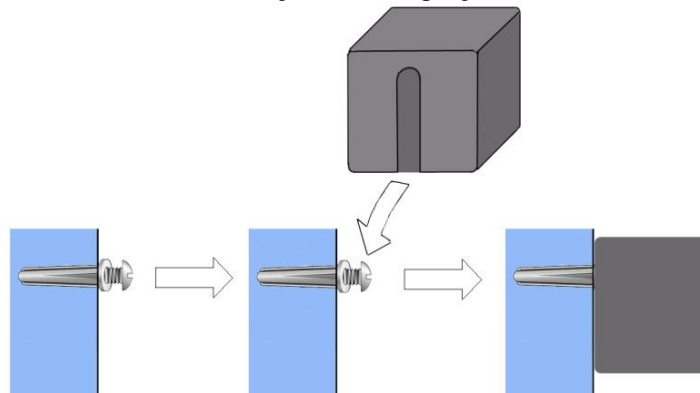
Mounting to a DIN Rail

- Step 1: Partially fasten the provided screw into the top screw hole of the DIN rail clip provided. Leave a clearance of about an eighth of an inch (1/8").
- Step 2: Attach the DataCube to the DIN rail clip by sliding the DataCube's slot over the exposed screw head. Slide the DataCube all the way down to tightly secure the DataCube to the DIN rail clip.
- Step 3: Snap the DIN rail clip with the secured DataCube onto the DIN rail.



Mounting to a Wall

- Step 1: Mount a screw and anchor set (if needed) to the wall, leaving the screw head sticking out from the wall about an eighth of an inch (1/8").
- Step 2: Mount the DataCube by sliding the DataCube's slot over the exposed screw head. Slide the DataCube all the way down to tightly secure the DataCube to the wall.



Troubleshooting

The DataCube contains three LEDs to help diagnose incorrect installation as well as verify correct operation. There are two LEDs located directly below the Ethernet port on the front panel. These LEDs indicate whether or not the DataCube is connected to the network properly. Additionally, there is an LED located on the top panel of the DataCube. This LED indicates the status of the system.

Use the following tables to troubleshoot network and system problems. For further assistance, contact EtherMetrics' Technical Support Department.

Network Status

Act (Green)	Link (Amber)	Description	Tips
Solid	Solid	DataCube is installed correctly	
Off	Off	Ethernet cable is not detected	<ul style="list-style-type: none">✓ Verify Ethernet cable is good✓ Verify POE injector is good✓ Verify switch and/or router is good
Off	Solid	DataCube cannot obtain a valid IP address	<ul style="list-style-type: none">✓ Use a laptop to change network settings so that the laptop can communicate with the default IP address as printed on the DataCube label✓ Manually configure the IP address
Blinking	Solid	DataCube cannot access the internet	<ul style="list-style-type: none">✓ This may be normal✓ Verify that the device is not intended to receive internet access from your network administrator

System Status

LEDs	Description	Tips
Solid Green	DataCube is installed correctly	
Flashing Orange	DataCube is waiting to receive a pulse	<ul style="list-style-type: none">✓ It can take up to 5 minutes for the DataCube to find a pulse
Solid Orange	DataCube is not able to receive pulses	<ul style="list-style-type: none">✓ Reverse polarity of pulse wires✓ Login to the device for specific alerts
Solid Red	System failure	<ul style="list-style-type: none">✓ Contact EtherMetrics for a replacement

Software Configuration

Overview

The DataCube's parameters are configured with a brief, web-based system, either directly or through EtherMetrics.net (preferred).

Instructions

Each DataCube ships with a default IP address, 12 character MAC address, and six digit Product Key. Locate and note this information on your DataCube's product label before proceeding.

MAC ADDRESS: ___ : ___ : ___ : ___ : ___ : ___

PRODUCT KEY: _____

DEFAULT IP ADDRESS: 192.168.1.225

NOTE

If the network that hosts the DataCube utilizes Dynamic Host Control Protocol (DHCP) to allocate IP addresses and also allows outbound port 80 (HTTP) connections, the DataCube may be configured through EtherMetrics.net. If unsure, please plug in the DataCube. A solid illuminated green Activity (ACT) LED to the left of the Ethernet port indicates EtherMetrics.net connectivity. Otherwise, you will have to configure the DataCube directly.

Configure the DataCube's IP address using EtherMetrics.net

- Step 1: Please login to <http://www.ethermetrics.net>. If you have not yet established an account, register using the MAC address and Product Key of one of your DataCubes.
- Step 2: If the DataCube to be configured does not appear in the "Devices" tab, then add the DataCube using the MAC address and Product Key.
- Step 3: Click on the DataCube to be configured in the "Devices" tab and complete the wizard.

Configure the DataCube's network settings directly

NOTE

If this default IP address conflicts with an existing device on your network you must continue with the configuration on an isolated network or by using a crossover cable. When working with the crossover cable, make sure you disable any wireless adapters on your system.

- Step 1: Browse to the DataCube's IP address (default: 192.168.1.225) with your web browser (you may need to change your network settings to connect to the device, see your IT administrator for instructions on how to do this in your corporate environment)
- Step 2: Enter the default username and password. ("admin", "datacube" -- no quotes)
- Step 3: Supply the necessary information. (If you are using a static IP, you must supply the IP address, NTP server address, and subnet mask. If you intend on using EtherMetrics.net, you will also need to supply the DNS servers, and the default gateway. If you are using DHCP select "DHCP")
- Step 4: Enter a descriptive name for this DataCube in the "DataCube name" field

Step 5: Press the "Save" button.

Step 6: Within 60 seconds the DataCube will make use of the new settings. The default IP is no longer used.

Configure the DataCube's meter information

Step 1: Browse to the DataCube's IP address with your web browser

Step 2: Enter the default username and password

Step 3: Click on "Meter information"

Step 4: Enter the meter information (units of measure, pulse multiplier value, etc.)

Step 5: Press the "Save" button

Configure the DataCube's username and password (optional)

Step 1: Browse to the DataCube's IP address with your web browser

Step 2: Enter the default username and password

Step 3: Click on "Security"

Step 4: Enter the new username and password

Step 5: Press the "Save" button.

Step 6: The DataCube will immediately make use of this new username and password combination. The default username and password are no longer used.

Certifications

This product complies with the following standards.

FCC Part 15 Class B

Radio Frequency Interference (RFI)(FCC 15.105)

The DataCube has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WARNING: Changes or modifications to this device not expressly approved by EtherMetrics LLC could void the user's authority to operate the equipment.

Industry Canada

This Class B digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Cet appareillage numérique de la classe B répond à toutes les exigences de l'interférence canadienne causant des règlements d'équipement. L'opération est sujette aux deux conditions suivantes: (1) ce dispositif peut ne pas causer l'interférence nocive, et (2) ce dispositif doit accepter n'importe quelle interférence reçue, y compris l'interférence qui peut causer l'opération peu désirée.

Declaration of Conformity (In accordance with FCC Dockets 96-208 and 95-19)

Manufacturer's Name: EtherMetrics LLC
Corporate Headquarters: 291 River Street – Suite 317
Troy NY 12180-3278
Manufacturing Headquarters: 291 River Street – Suite 317
Troy NY 12180-3278

EtherMetrics declares, that the product:

Product Name: DataCube
Model Number: v1.1

to which this declaration relates, meets the requirements specified by the Federal Communications Commission as detailed in the following specifications:

- Part 15, Subpart B, for Class B Equipment
- FCC Docket 96-208 as it applies to Class B personal Computers and Peripherals

The product listed above has been tested at an External Test Laboratory certified per FCC rules and has been found to meet the FCC, Part 15, Class B, Emission Limits. Documentation is on file and available from EtherMetrics LLC.

Document Revisions

Date	Author	Notes
April 08, 2010	KB	Version 1.3 Updated business contact information
January 20 2010	KB	Version 1.2 Updated information on screw attachment, screw dimensions
January 16 2010	KB	Version 1.1 Updated sections regarding safety Added new ethermetrics.net section Update graphics
June 21 2009	SD	Version 1.0 First release