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Which internet browsers can I use?



CubeIP Meters are designed to use standard internet PC web browsers.

They have been extensively tested with Mozilla 1.7, Firefox 1.5/2.0 and IE6. Javascript needs to be enabled for automatic, real time, updating of the displays which use AJAXi technology.

Firefox 2.0 includes an embedded svgi viewer and will display the full set of graphing, trending and animated graphics from the web server.

Internet Explorer 6 requires the free adobe SVG viewer plug-in freely downloadable from the Adobe web site.



[Download SVG viewer for Internet Explorer](#)

Data Logging



An area of internal Flash memory is dedicated to recording selected meter readings – up to 20 parameters with a time stamped record. To ensure correct time-stamping of records, the *CubeIP Meter* uses a software clock, which is synchronised across the Internet from an SNTP server. Each time stamped record contains up to 20 individual measurements read by the meter.

Records are regularly sent to an FTP server on the network. There they are saved, providing a backup of the readings, and can be accessed to provide comprehensive reports. If the FTP server is unreachable for any reason, then data is saved internally and included in the next successful transmission. This ensures that a complete record is maintained on the FTP server. Two intervals can be independently configured using a standard web browser.

- The time between records held in the internal flash memory is set-in the log interval.
- The interval between FTP transmissions is set as the FTP interval.

A log interval of 900 seconds with an ftp interval of 60 minutes would send one file every hour containing, on average, four data records.

Datalog.html is used to set the data logging parameters within the meter. <http://meterurl/Datalog.html> .

Network.html will have been used to configure the network parameters required for time stamping and for FTP transfers. If DNS server details are not known then the Open DNS servers at IP addresses 208.67.222.222 and 208.67.220.220 may be used. The gateway address will commonly be the address of the router which provides access to the internet. If a Windows XP IE browser is being used then these details can be displayed by typing *ipconfig /all* in a command prompt window.

The meter uses passive FTP to send data files so will not normally require any changes to the firewall or router settings. The meter does not use DHCP but instead has a static IP address.

If the meter web server pages are to be viewed from the internet side of the firewall then access will have to be provided to port 80 or port 8080.

If complete data log files are to be copied from the meter then access will also be required to port 69.

Data structures ↑

Each file name is made up of the meter MAC address, date and time separated by the underline character

ftp Transmitted data log structure
 Time Stamp (20070716_235837 + parameter 1 value(2435) + parameter 2 value(5000)+
 parameter 20 value(5)

Typical data file, with the first log at 07:30:00 on 17th July 2007 (7.30 am exactly)

```
001BE5101010_070717_074354
timestamp,7680,7681,7684,7685,7714,7715,7716,7726,7729,7727,7730,7705,7701,7713,7732,7733,7691,7694,7736,7737
070717_073000,2,919,81,2449,944,187,81,2452,100,3226,49,77,22,162,499,2,2,2,4,5
070717_073500,2,923,81,2447,944,188,80,2445,100,3226,49,77,21,146,499,2,2,2,4,5
070717_074000,2,927,81,2445,944,187,80,2443,100,3226,49,77,21,148,499,2,2,2,4,5
```

The first record of each file is a column header. It shows the MODBUS addresses for each of the 20 data fields, just as they were entered in datalog.html

Values are transferred as raw 16 bit integers without any decimal points. The decimal point position or multiplier is available as a parameter or can be considered fixed as described in the meter Modbus manual. Log files can simply be combined by using the DOS copy command, eg copy 001BE5* total.csv, and opened in Excel. If the _ character is included as a field separator the date and time can be in separate columns

Network link disruption

If the FTP link is disrupted, the internal 1Mbit memory will continue to store records until full, at which point the oldest records will be overwritten with the most recent values. If the data log interval is 15minutes then records for some 31 days will be stored within the meter.

Meter internal Flash record format with 352bits/20 parameter record is:

Time Stamp (32 bits) + parameter 1 value (16 bits) + parameter 2 value (16 bits)+ parameter 20 value (16 bits)

For a full list of MODBUS parameters & their register addresses see:

[MODBUS Registers & Addresses](#)

Setting Network Address ↑

CubeIP Ethernet Option - Installation

Before you begin:

Ask your network administrator to complete the table below.

CubeIP Settings Required:

Note

Static IP Address	[][] [][] . [][] [][] [][] [][] [][] [][] [][] [][] [][]	
Subnet Mask	[][] [][] [][] [][] [][] [][] [][] [][] [][] [][] [][] [][]	
Gateway Address	[][] [][] [][] [][] [][] [][] [][] [][] [][] [][] [][] [][]	3
DNS Server Primary	[][] [][] [][] [][] [][] [][] [][] [][] [][] [][] [][] [][]	1



DNS Server Secondary [][][]-[][][]-[][][]-[][][] 1

CubeIP MAC¹ Address [][][]-[][][]-[][][]-[][][]-[][][] 2
(from serial number label)

The CubeIP is supplied with a default IP address of 192.168.1.127 and subnetmask of 255.255.255.0. If this is suitable for your network then go to network settings.

To change the CubeIP IP address.

Connect the CubeIP to an Ethernet equipped standalone PC using the CAT5 cable and crossover coupler supplied with the *CubeIP Meter*.

Open a DOS window to access a command prompt.
[Start menu / Accessories /Command Prompts].

At the command prompt enter,

```
arp -s [required IP address from table] [CubeIP MAC address from serial No. label]
```

For example:

```
arp -s 192.168.123.42 00-1B-E5-10-10-09
```

will add a static entry to the arp table for a CubeIP at 192.168.123.42.

Enable the temporary IP address in the CubeIP by pinging it with a packet of length 102.

```
ping -l 102 [required IP address]
```

Open an internet explorer window and enter the permanent IP address for the *CubeIP Meter* in the Address bar. The temporary address set above will be lost when power is removed from the *CubeIP Meter*.

Network Settings – setting a permanent IP address

Once the *CubeIP Meter* web page appears enter http://ip_address/network.html and enter the values from the table above. Javascript must be enabled in the browser. Ensure that network.html is typed in lower case.

You need to be in *Configuration Mode* in order to make changes to the configuration of the CubeIP. If the form fields are greyed out in Internet Explorer then the CubeIP is in *Operator Mode* and not *Configuration Mode*. Configuration mode can be selected in **Setup** and the correct password entered. If two password fields are shown then a password has not yet been set in the Meter and the configuration is unprotected.

Turn OFF power to the Meter, wait 5 seconds, and then reapply power. This completes the network configuration for the *CubeIP Meter*.

Notes

1. **Domain Name Server (DNS)**
This is only required when automatic remote data logging is enabled. A DNS Server is a computer that translates plain text host names into the numeric addresses needed to make a connection. For example, CubeIP.co.uk will be converted to 84.12.108.83 by a DNS server. Data logging with the FTP client option requires access to a DNS server.
2. **CubeIP Meter MAC Address**
The *CubeIP Meter* MAC address is fixed at the time of manufacture and printed on the serial number label. An option to add an alternative MAC address is available.
3. **Gateway Address**
A network is usually divided into a number of more manageable and smaller sub-networks. Gateways, or routers, transfer traffic between these sub-networks. Gateways also provide access to external networks and the internet.

4. ARP in Windows 95

Windows 95 requires the ARP table to have at least one other entry other than its own. At the DOS command prompt enter: "ARP - A" to show all the ARP entries in the ARP table. Ping another PC on the network to add any required additional entry. This is not required in Windows 98 or later Windows versions.

Time and Date synchronisation with Windows XP

Later versions of XP will automatically configure your PC to be an SNTP server. If you decide to use this as your SNTP server then it is always worthwhile setting the *CubelP Meter* to use this server before changing any registry settings on the PC as described in the Microsoft document. Any registry changes are undertaken entirely at your own risk.

The precise date and time the *CubelP Meter* uses for the data log timestamps is acquired from an SNTP servers. The *CubelP Meter* uses the NTP pool which is a dynamic collection of networked computers that volunteer to provide highly accurate time via the Network Time Protocol to clients worldwide. The machines that are "in the pool" are part of the pool.ntp.org domain. More than 1300 time servers provide time to some six million systems around the world.

A Windows XP PC can be used as an SNTP server to provide time to the CubelP. The PC can have its internal hardware clock automatically synchronised to an international standard by setting it to be 'Automatically synchronised with an Internet time server.'

The following links to Microsoft Help and Support pages provide comprehensive information on setting and testing the SNTP service.

[To change the clock synchronization server](#)

[How to configure an authoritative time server in Windows XP](#)

To determine the current configuration of the client, use the following command from a command prompt:

```
C:\>net time /queryntp
The current SNTP value is: pool.ntp.org,0x1
The command completed successfully.

    or if not configured:

This computer is not currently configured to use a specific SNTP server.
```

Note:

SNTP uses User Datagram Protocol (UDP) port 123. If this port is not open to the Internet, you cannot synchronize your server to Internet SNTP servers.

Disclaimer: Modifying the registry can cause serious problems that may require you to reinstall your operating system. We cannot guarantee that problems resulting from modifications to the registry can be solved. Use the information provided at your own risk.

Windows XP FTP server

Windows XP Professional includes Internet Information Services (IIS) with an FTP server which is suitable for receiving files automatically sent by the CubelP. The following note from Microsoft explains how to install IIS if it was not installed with the original installation:

[Internet Information Services](#)

For Vista users, see [Internet Information Services](#).

For general help on FTP, see: [File Transfer Protocol \(FTP\): frequently asked questions](#)

Changing Custom Web Pages

How can the standard web browser pages be changed ?

The master copies of all the web pages served up by the embedded web server are securely stored in non-volatile flash memory and cannot be changed by the user.

An EEPROM, Electrically Erasable Programmable Read Only Memory, or flash memory is provided to store additional custom designed web pages. These may be as simple as a company logo to head a page or as complex as fully animated interactive SCADA pages. The 32K x 8 (256Kbit) EEPROM can hold a substantial number of pages but there is a performance trade off between individually large pages and response times. Web pages are written in standard html appropriate for the browsers that will be used. They are loaded into the web server using TFTP and this should only be carried out over a secure communications link.

How to load Custom Pages

1. These instructions are written for Windows users.
Although the process should work with Linux and other operating systems it has not yet been tested.
2. Check that you have the Microsoft TFTP program loaded. Open a command prompt, DOS window.
3. Type ping 192.168.2.1 replacing 192.168.2.1 with the IP address of the *CubeIP Meter*. You should see a reply from the Meter similar to the one below. This confirms that communications can be established with the *CubeIP Meter*.

```
Pinging 192.168.2.1 with 32 bytes of data:  
Reply from 192.168.2.1: bytes=32 time<lt;1ms TTL=100  
Reply from 192.168.2.1: bytes=32 time<lt;1ms TTL=100  
Reply from 192.168.2.1: bytes=32 time<lt;1ms TTL=100  
Reply from 192.168.2.1: bytes=32 time<lt;1ms TTL=100  
Ping statistics for 192.168.2.1:  
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

4. Type tftp in the DOS window and you should see the following text:
This confirms that tftp is correctly installed on the PC.

```
Microsoft Windows XP [Version 5.x.xxxx]  
(C) Copyright 1985-2001 Microsoft Corp.  
C:\> tftpTransfers files to and from a remote computer running the TFTP service.  
TFTP [-i] host [GET | PUT] source [destination]  
-i Specifies binary image transfer mode (also called octet). In binary image mode the file is moved  
literally, byte by byte. Use this mode when transferring binary files.  
host Specifies the local or remote host.  
GET Transfers the file destination on the remote host to the file source on the local host.  
PUT Transfers the file source on the local host to the file destination on the remote host. source  
Specifies the file to transfer. destination Specifies where to transfer the file
```

5. Type:

```
tftp -i 192.168.2.1 PUT filename.html
```

where 192.168.2.1 is replaced with the IP address of the *CubeIP Meter* and filename.html is replaced by the name of the file to be copied to the Meter.

You should see the following reply:

```
Transfer successful: 2948 bytes in 14 seconds, 210 bytes/s
```

with the values corresponding to the file size transferred.

- The **CubelP Meter** creates a simple directory listing in a file named dir.txt in the EEPROM on the Meter. This can be copied back to the PC by typing:

```
tftp -i 192.168.2.1 GET dir.txt
```

at the command prompt. When the file has been successfully transferred back to the PC it can be viewed using a simple text editor.

- TFTP uses port 69 and the UDP protocol to communicate over the network. If a router is between the PC and the **CubelP Meter** it is essential that this is allowed.

Saving Meter Configuration



CubelP Meter Configuration Save and Restore

The full configuration can be downloaded as a text file, clone.icf, from the **CubelP Meter** by using TFTP. For example, replace 192.168.2.45 with the correct address for the Meter.

```
tftp -i 192.168.2.45 GET clone.icf
```

This file contains a list of addresses and their corresponding settings. The file can be edited with a simple editor such as Wordpad but this is not recommended — the file may be rendered useless if any erroneous values are entered.

The **CubelP Meter** configuration file *clone.icf* should be kept in a secure location to provide a backup of the configuration and form part of any future audit. This configuration file can be restored back to the Meter by using TFTP to PUT the file, again with 192.168.2.45 with the correct address for the Meter.

```
tftp -i 192.168.2.45 PUT clone.icf
```