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PCW-CSR9 Counter Server Installation Guide & User's Manual

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Introduction

Overview

The Counter Server is designed to collect data from wireless counter sensors and display that data through an HTML page that can be viewed with an ordinary browser. The server consists of three parts, the server, a receiver to receive the data from the sensors, and the user's computer, which configures the server and views the data.

The Counter Server gives reports of counts by half hour, hour, day, week and month. The Counter Server also makes this same data available as text files downloadable through the browser using FTP.

The Counter Server can manage up to 16 sensors. It can hold data for those 16 sensors for 3 months at 30 minute intervals, and for 1.5 years at day intervals.

Requirements

Configuring Server

- The Counter Server, both the receiver and the server itself plus at least one counter sensor.
- A computer with an ethernet card for TCP/IP communications
- Web browser, such as Internet Explorer

Viewing Reports

- A web browser such as Internet Explorer
- Access via network to the Counter Server

Getting Started

Hardware Setup

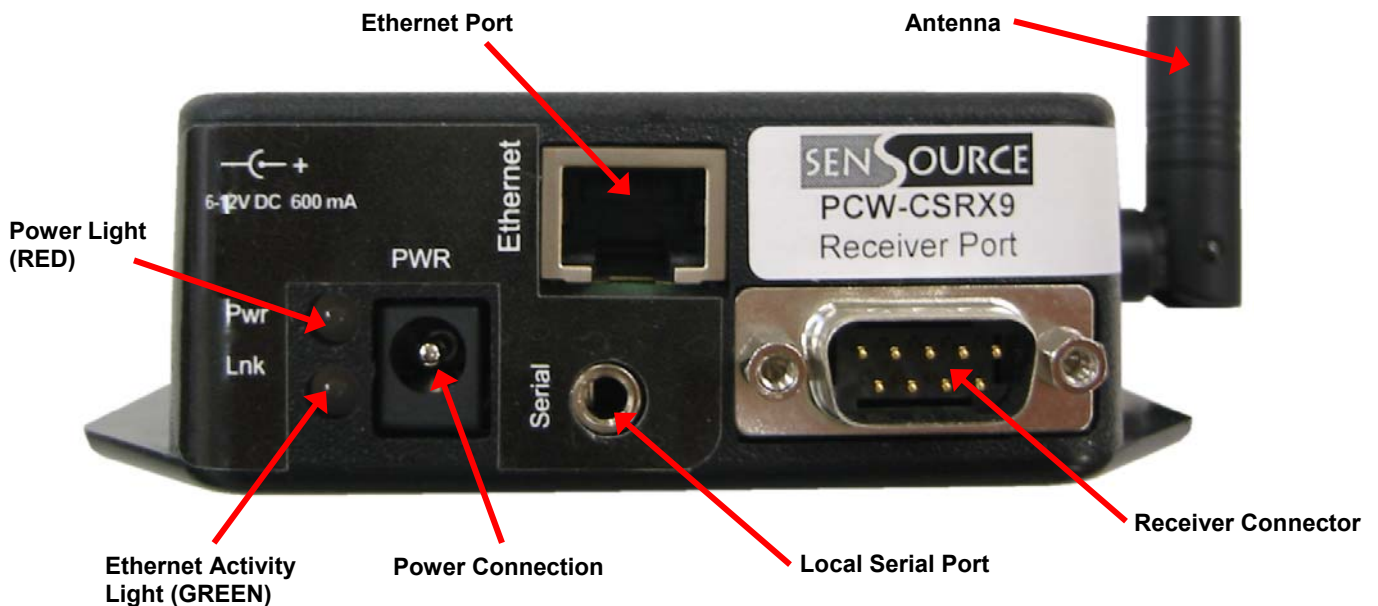


Figure 1

Apply Power

Plug the power supply into the Counter Server and make sure it is connected to a working outlet. The red power light will come on when the Server is plugged in.

The red light indicates that the Counter Server is functioning. The Counter Server also uses the red lights to indicate reception of a packet from a transmitter. The Counter Server's red light will blink momentarily indicating a packet has been received and processed.

Connecting to PC

A crossover cable is included with the Counter Server setup. Plug the crossover cable into the Ethernet port on the back of your computer (see figure 2a) and plug the opposite end into the Ethernet port on the Counter Server (see figure 2b). The 'Lnk' light will turn on indicating a valid Ethernet physical connection.

Alternatively you can connect the Server to your Local Area Network. Your network administrator can help you decide which IP Address to assign to the server.



Figure 2a



Figure 2b

Testing the Connection

To check to see if you have made a connection, open your browser and type in <http://192.168.1.55>. The browser should display the Counter Server count screen. The screen will not show sensors until they are configured.

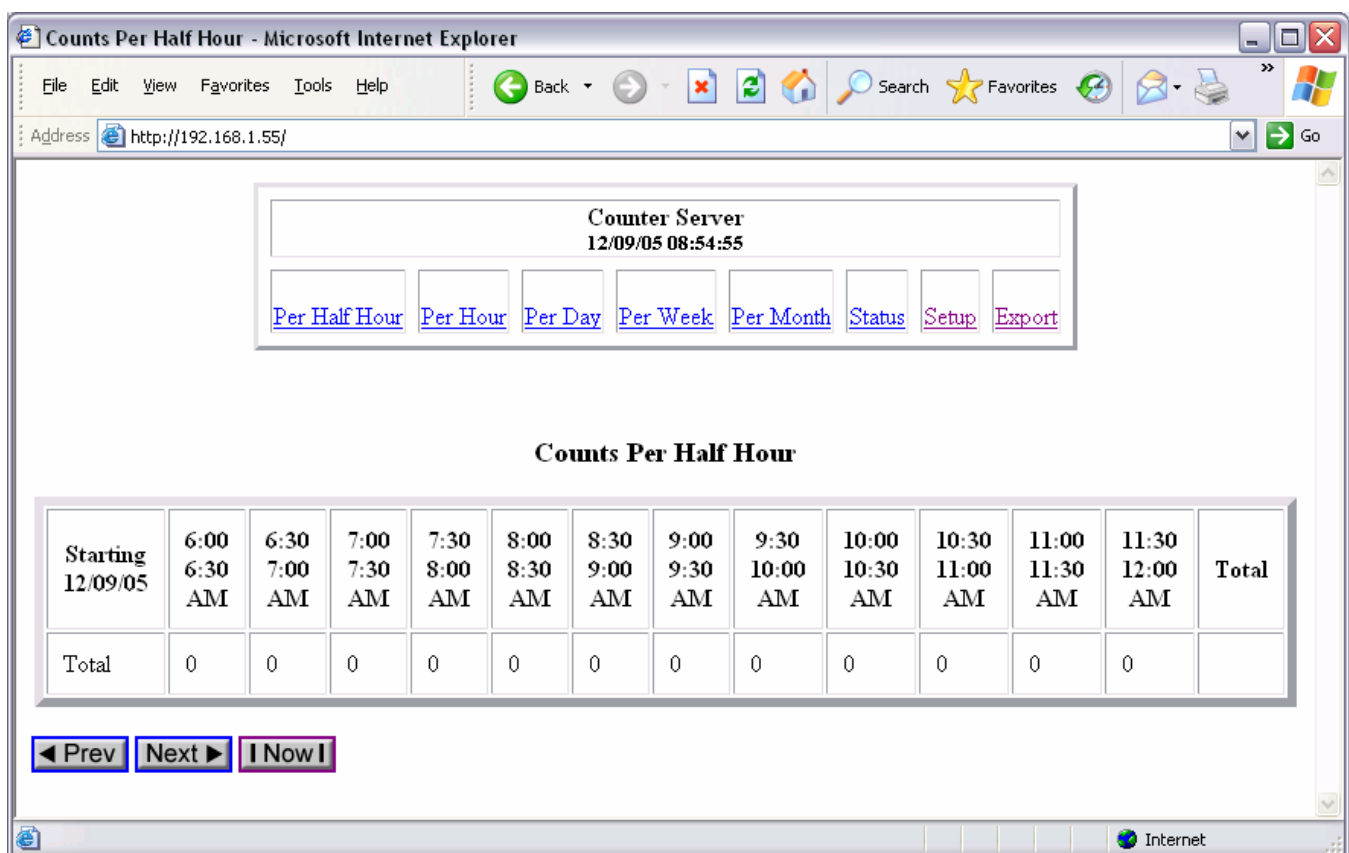


Figure 3

Changing your PC's default IP Address

If you have been unable to see the Server's web page, when connecting directly to your PC, you may need to make changes to your computer's IP configuration.

First, connect the Server directly to the Ethernet port on the back of your computer. Next, change the IP settings on your computer.

To change the IP settings on a computer running the Windows operating system, follow these steps: select the following 'Control Panel → Network and Internet Connections → Network Connections'; right-click on your LAN connection and select Properties (see figure 4a); select the TCP/IP service for your network card and choose 'Properties'. Specify an IP Address' (example: 192.168.1.40 255.255.255.0); and fill in the initial values for Subnet Mask and IP Address (see figure 4b).

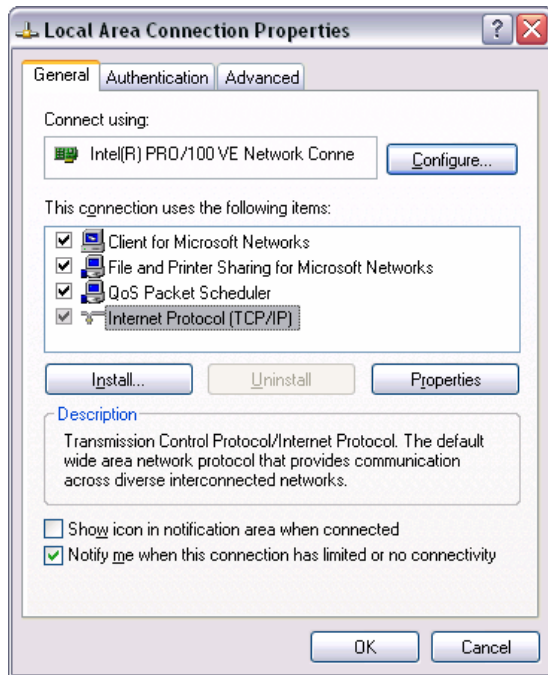


Figure 4a

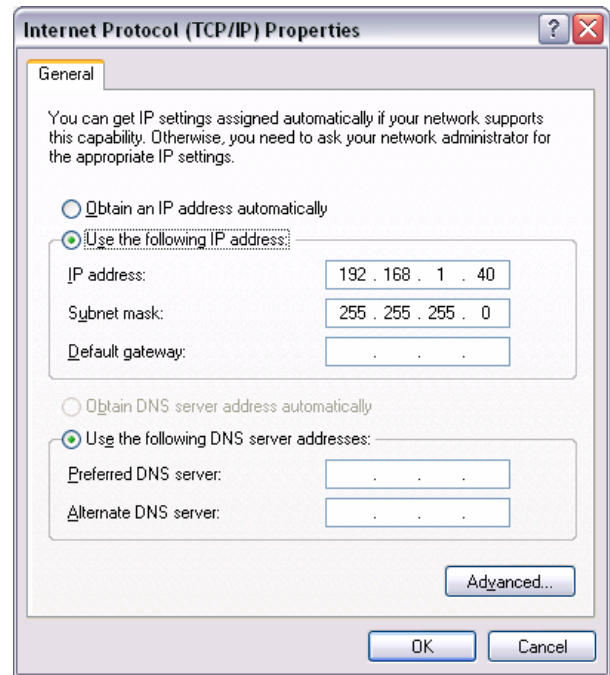


Figure 4b

It is recommended to restart Windows at this time to ensure changes have been made.

From a command prompt found from the start menu, (Start → All Programs → Accessories → Command Prompt), verify TCP/IP changes by running the command IPCONFIG. IP Address and Subnet Mask should match what you've previously entered (see figure 5a). Next, check communication to the Counter Server by using the PING command from the command prompt. Type PING followed by a space and then the IP Address of the Counter Server (default: 192.168.1.55) then wait for a response. A successful PING will receive a reply (see figure 5b).

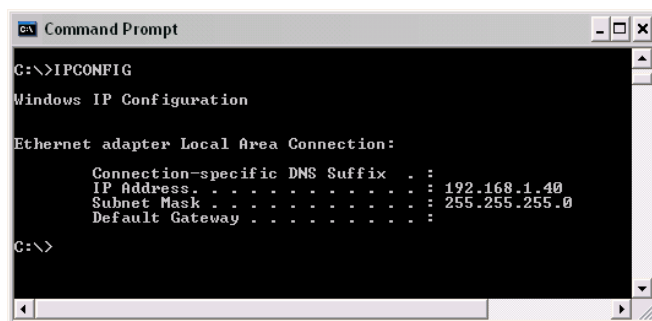


Figure 5a

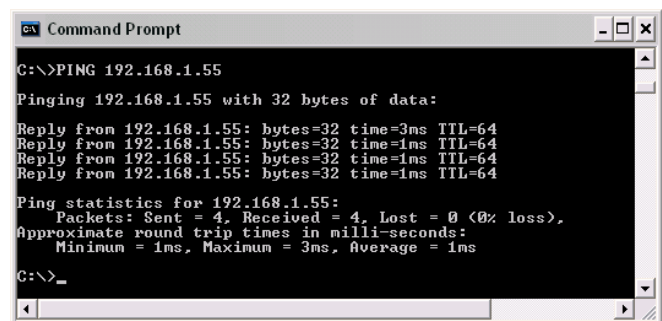


Figure 5b

At this time refer back to 'Testing the Communication' section. You should now be able to type the IP Address of the Counter Server into the address line of your Internet Browser and view your Counter Server (see figure 3). If you are still not able to communicate with the Counter Server, contact your network administrator for additional help.

Change the Server's default IP Address

In order for the Counter Server to communicate TCP/IP, it needs an IP Address, Subnet Mask, and possibly a Gateway Address. If you are connecting the Counter Server to your LAN, you should change the Counter Server's default settings (**IP Address:** 192.168.1.55; **Subnet Mask:** 255.255.255.0; **Gateway:** blank; **DNS Server:** blank).

To change the IP Address and Subnet Mask for the Counter Server go to the "Setup" link and then click on "Communications". There you can enter a new IP Address and Subnet Mask for the Counter Server.

Before you change the IP Address you should PING the new IP Address to make sure that no computers or devices on your network have the IP Address already. Type PING followed by a space and then the new IP Address then wait for a response. If the result of the PING is "Request timed out" (see figure 6) then there is no other devices on that IP Address and you can safely change the IP Address of the Counter Server.

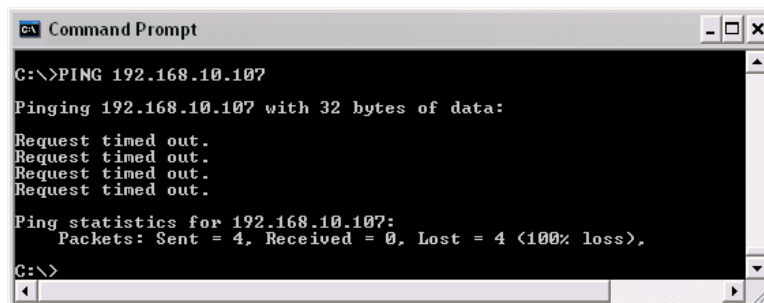


Figure 6

Once you know the IP Address you want, enter it into the "IP Address" box on the Communications Setup screen (see figure 7).

Enter the Subnet Mask also. You may need to ask your network administrator for a Subnet Mask. When you are ready, click the "Submit" button at the bottom of the page. The program will attempt to change the IP Address of the Counter Server. If successful, the browser will redirect to the new IP Address and at the bottom of the screen, in green letters, it will say, "Submission accepted. Parameters updated!" Click on the link "Setup Menu" at the bottom of the page to return to the Setup menu

You may need to reset your PC back to its original IP Address settings at this time if you had previously changed them. Communication with the Counter Server's new IP address may not be possible until this is completed.

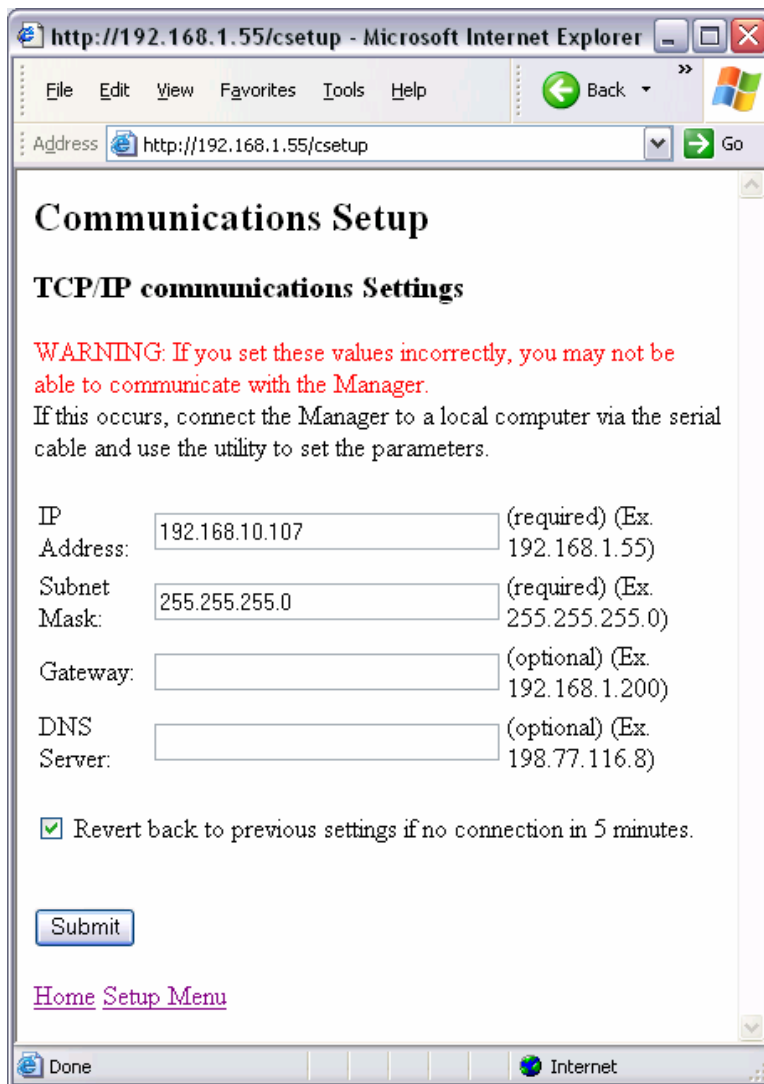


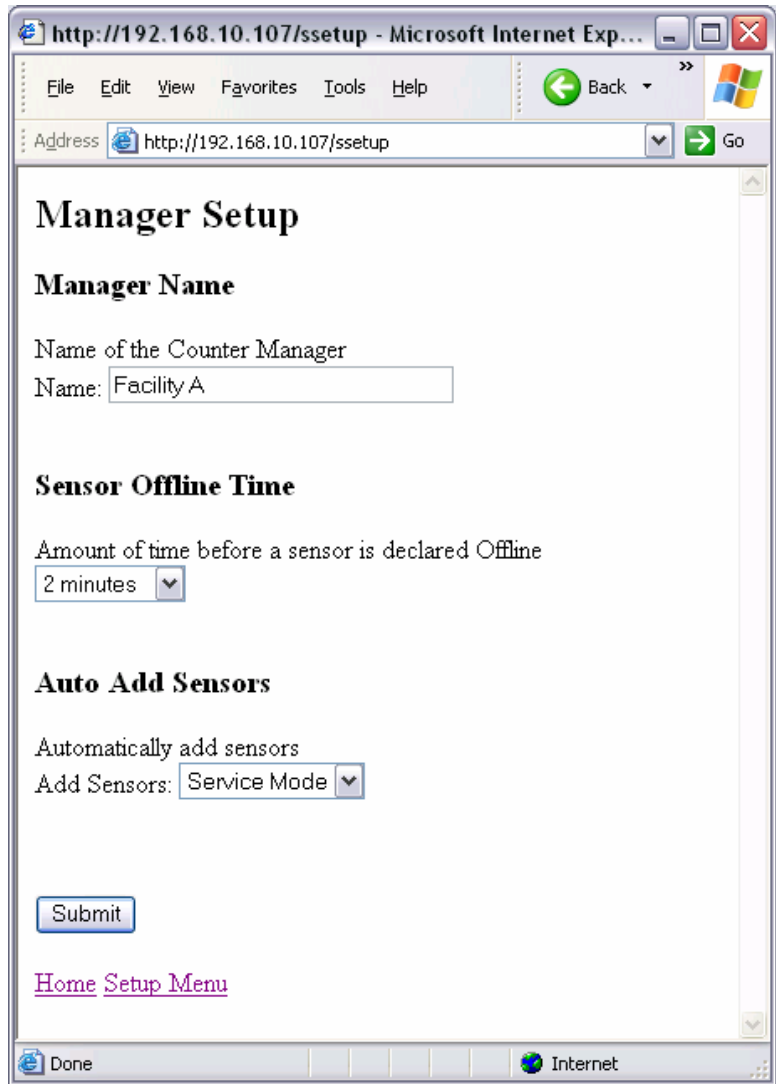
Figure 7

Changing the Server's name

Click on the "Server" link of the setup menu.

From this page you can enter a name for the Counter Server. You can set the maximum amount of time that may pass between sensor transmissions before the sensor is declared offline. You may set the "Auto Add" mode for the Server.

The default "Auto Add" mode is "Service Mode". "Service mode" means the Server will only add sensors to its list if it receives a sensor packet that has been sent by pressing the service button on the transmitter. "All" means that the Server will add a new sensor any time it receives a transmission from a sensor that is not already in its list. "Off" means that the Server will never add new sensors to its sensor table.



The screenshot shows a web browser window titled "http://192.168.10.107/ssetup - Microsoft Internet Exp...". The address bar shows "http://192.168.10.107/ssetup". The page content is titled "Manager Setup" and includes the following sections:

- Manager Name**
Name of the Counter Manager
Name:
- Sensor Offline Time**
Amount of time before a sensor is declared Offline
- Auto Add Sensors**
Automatically add sensors
Add Sensors:

At the bottom of the form is a button and a link [Home Setup Menu](#). The browser's status bar at the bottom shows "Done" and "Internet".

Figure 8

Adding Sensors

The next thing you need to do is set up the sensors that the Counter Server will monitor.

The Server by default adds sensors to its configuration list when it receives a packet that has been transmitted in Service Mode. You can send a transmission in Online Mode by pressing the service mode button on the sensor (see figure 9 or reference sensor manuals) for less than 1 second.

The Counter Server will add them to its configuration and you may view their data from the main HTML screen. You may need to refresh the screen a couple of times before the counter shows up.



Figure 9

Viewing Counts

To view the current sensors and their data, start your Internet Browser and enter the Count Server's IP Address in the "Address:" line.

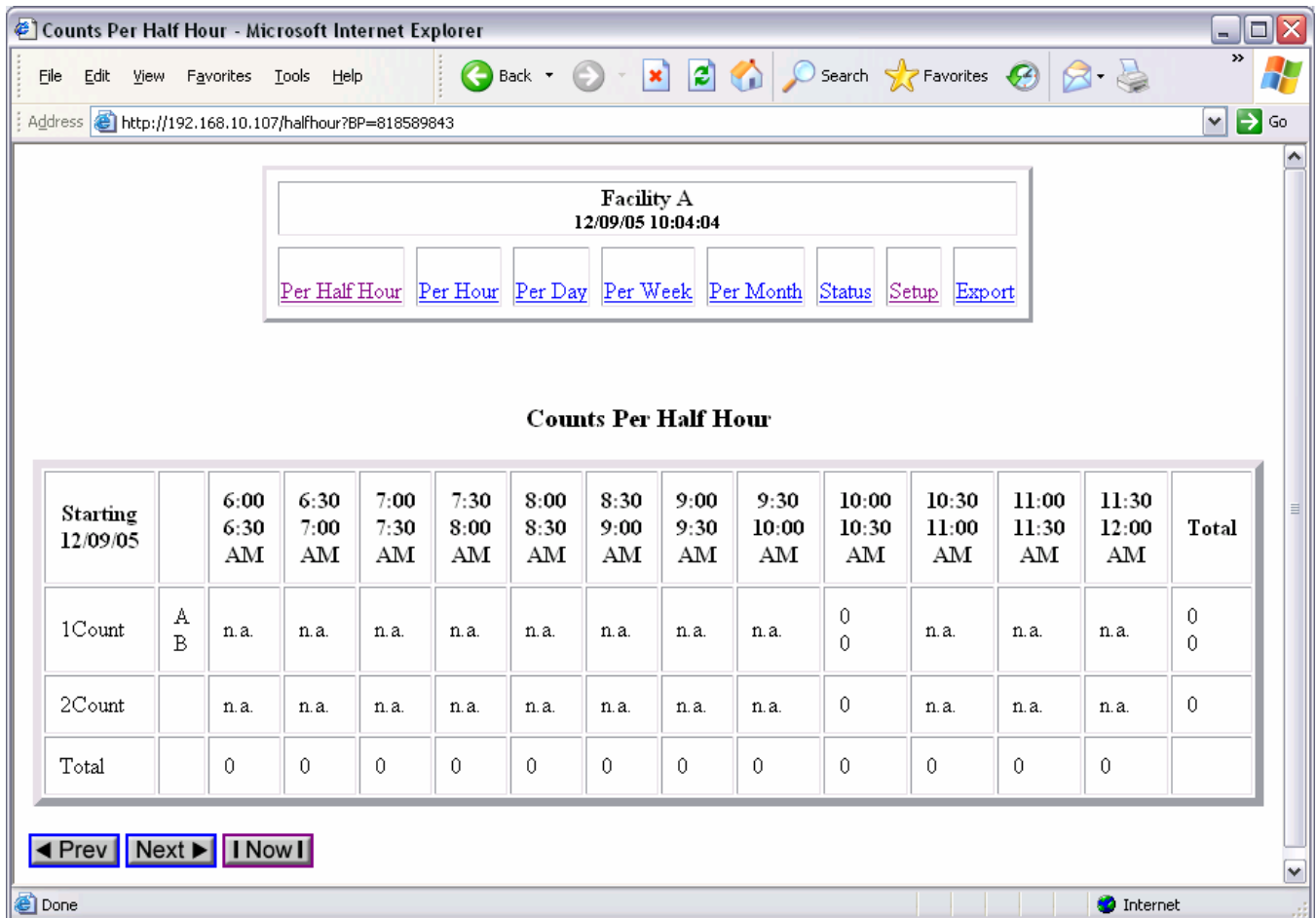


Figure 10

The user can view the count total at different time granularities. The user can view counts summed per Half Hour, per Hour, per Day, per Week, or Per Month. Clicking on the links at the top of the screen will change the time granularity. The user can also navigate through count history by using the "Prev" and "Next" buttons at the bottom of the screen. Clicking the "Now" button will take you to the current date and time. If counts have been recorded for the current view, they will be displayed. Otherwise (for example, if the requested view is in the future or a time earlier than the first sensor transmission) the cell for that time period will display "n.a." (not applicable).

Each configured sensor has a row in the table. Direction counters show counts on two lines for Count A and Count B. The total of all counts for all sensors for that time period will be displayed on the bottom row of the table.

For all time intervals greater than Half Hour, the top row of the table contains links to focus in on a smaller time interval. For example from the "Per Month" view you can click on a specific month, like January, in order to see the weekly breakdown of counts for January.

To get the latest data, click the "Now" button or click the "Refresh" button on the browser. The date and time on the display show the time the report was generated.

You can make the table appear smaller if you want it to fit on the screen better by (in Internet Explorer) going to View | Text Size | Smaller.

Server Setup Options

The Status Screen

The status screen shows detailed information about the sensors currently being monitored. To view the status screen click on the "Status" link from the main screen.

The status table (see table 1) shows, for each sensor, the identifying label name of the sensor ("Sensor"), the serial number of the sensor ("ID"), the number of seconds elapsed since the last transmission ("Age"), whether the last transmission was sent in service mode or not ("Srv"), and the data value of the last reading ("Last Reading"). The last reading is the cumulative recorded on the sensor since startup or since the last reset. If the transmission was sent in service mode, there will be an "X" in the "Srv" column.

When the Counter Server receives a transmission from a new sensor it assigns it a default label which is the sensor position plus the sensor type ("1Count"). You can change the label assigned to the sensor by clicking on the label name in the "Sensor" column.

The status table will highlight in yellow a row in the table if the sensor is in an error state. The browser will show an error message when the mouse pointer is moved over top of the graphic symbol. The following table shows the possible error states:

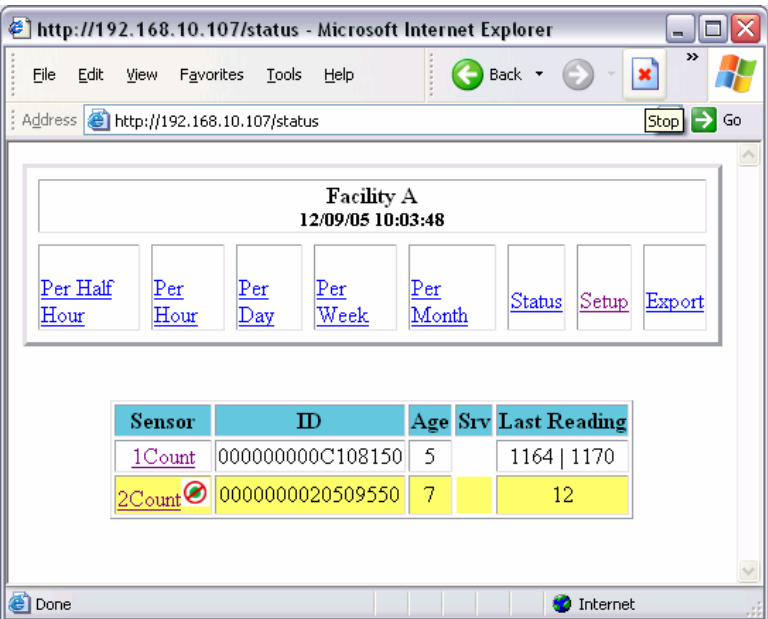


Figure 11

Symbol	Error Message	Description
	Offline	The Server hasn't received a transmission from this sensor within the timeout interval, which is set in the "Server Setup" screen under "Sensor Offline Time".
	Beam blocked	the sensor beam seems to be blocked by some obstruction.
	Check Battery	The battery voltage is low or the battery is not present
	No Line Power	Line power has been removed or is too low.

Table 1

Sensor Setup

Here you can change the sensor name or replace a sensor. Hit "Submit" when you are ready to apply your changes.

Changing the Sensor's Name

Type a new name in the "Sensor Name" box.

Deleting a Sensor

The very last sensor in the table on the status screen can be deleted. Click the "Delete Sensor" box and hit the "Submit" button.

Replacing a Sensor

If you want to swap out a sensor but keep the new sensor in the same position as the old one, simply go to the sensor setup screen for the sensor you want to replace and type in the new sensor's serial number in the "Serial No." box. Hit the "Submit" button and the Counter Server will update its configuration with the new sensor information. As always, enter the serial number with care!

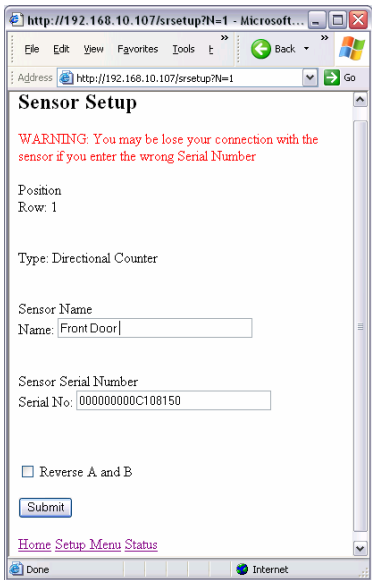


Figure 12

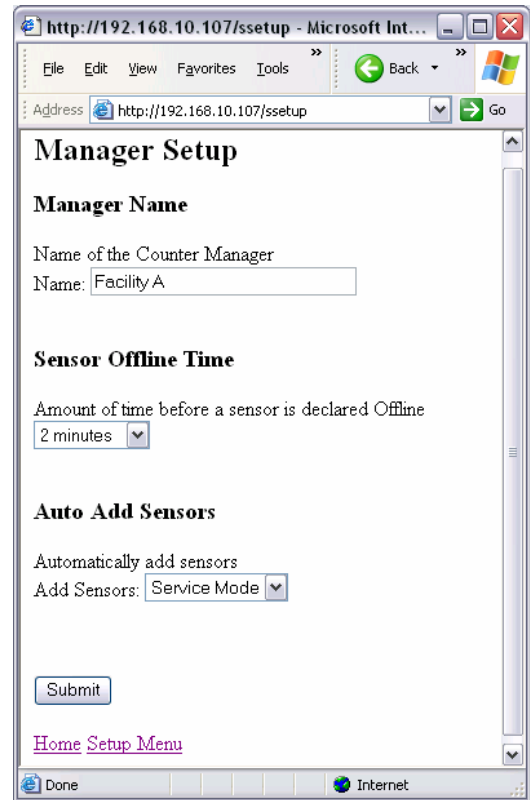
The Server Setup Screen

The setup screen allows you to set some parameters for the Counter Server. You can change the name of the Counter Server. Note: the Server Name is also used as the Login User Name when passwords have been set up.

"Sensor Offline Time" allows you can set the amount of time that can elapse between transmissions from one sensor before the sensor is declared offline.

You can set the "Auto Add" mode on the server. The "Auto Add" mode tells the server what to do when it receives a transmission from a sensor that is not already in the server's sensor table. If "Auto Add" is "Off" then the Server will ignore all transmissions from sensors that are not in the table already. If "Auto Add" is "All", the Server will add a new sensor to the sensor table each time it receives a transmission from a new sensor. If "Auto Add" is "Service Mode" then the Server will only add a new sensor to the table if the transmission is received in service mode.

When you are ready to make changes, press the "Submit" button. Click the "Home" link to see the table of counts and click the "Setup Menu" to go back to the setup menu.



The screenshot shows a web browser window titled "http://192.168.10.107/ssetup - Microsoft Int...". The address bar shows "http://192.168.10.107/ssetup". The page content is titled "Manager Setup". It includes a "Manager Name" section with a text input field containing "Facility A". Below this is a "Sensor Offline Time" section with a label "Amount of time before a sensor is declared Offline" and a dropdown menu set to "2 minutes". The "Auto Add Sensors" section has a label "Automatically add sensors" and a dropdown menu set to "Service Mode". At the bottom, there is a "Submit" button and a link "Home Setup Menu". The browser's status bar shows "Done" and "Internet".

Figure 13

The Communications Setup Screen

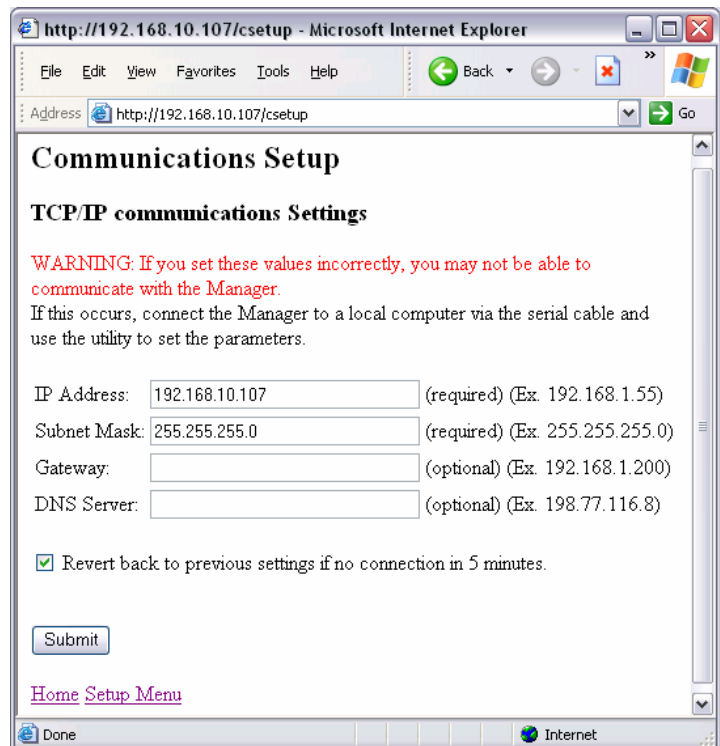
The communications setup screen allows you to change the Counter Server's IP Address, Subnet Mask, and Gateway. Enter these parameters as necessary and click "Submit". The new parameters are sent to the Counter Server and an intermediate screen displays.

If the IP Address is changed successfully, the browser will redirect itself to the new IP Address and there will be a message on the screen saying, "Submission accepted! Parameters updated."

If the change of IP Address was not successful, you will see a browser error page telling you that the file cannot be found.

If you check the box that says, "Revert back to previous settings if no connection in 5 minutes" then the program will try to update the Server's IP Address. If it cannot make a connection within 5 minutes thereafter, it will reset the IP Address to the previous settings.

If the Counter Server will receive data from Sensor Repeaters, you need to set the radio channel.



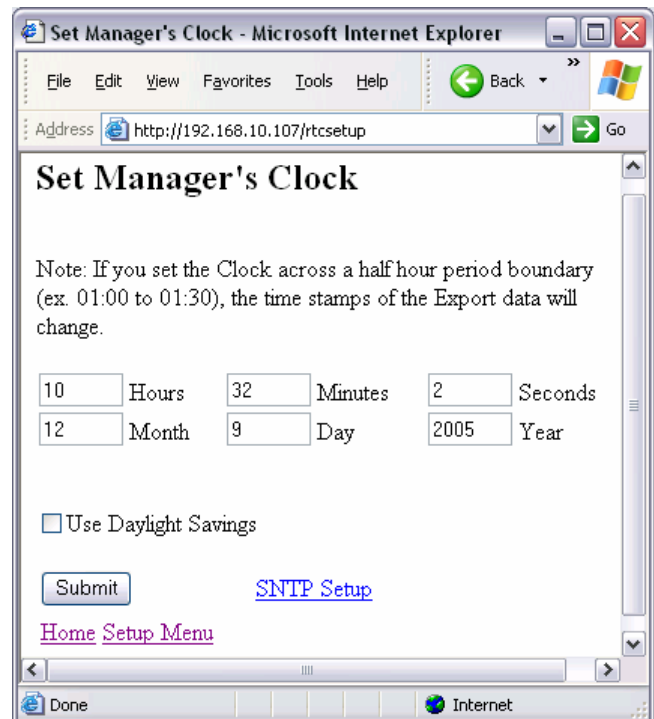
The screenshot shows a web browser window titled "http://192.168.10.107/csetup - Microsoft Internet Explorer". The address bar shows "http://192.168.10.107/csetup". The page content is titled "Communications Setup". It includes a section "TCP/IP communications Settings" with a warning: "WARNING: If you set these values incorrectly, you may not be able to communicate with the Manager. If this occurs, connect the Manager to a local computer via the serial cable and use the utility to set the parameters." Below this are input fields for "IP Address" (192.168.10.107), "Subnet Mask" (255.255.255.0), "Gateway" (empty), and "DNS Server" (empty). Each field has a label indicating it is required or optional. There is a checkbox labeled "Revert back to previous settings if no connection in 5 minutes." which is checked. At the bottom, there is a "Submit" button and a link "Home Setup Menu". The browser's status bar shows "Done" and "Internet".

Figure 14

Set Server's Clock

You will need to make sure the server's clock is set correctly so that it can display the counts and totals correctly. Choose "Set Clock" from the Setup menu, enter the correct values, and click "Submit" to set the Counter Server's clock.

If you set the clock back more than 30 minutes the Counter Server will require you to reset the counts before updating the clock. If you set the clock ahead more than 30 minutes the Server will pad the log with zeroes (0) for the counts for those times.



The screenshot shows a web browser window titled "Set Manager's Clock - Microsoft Internet Explorer". The address bar shows "http://192.168.10.107/rtcsetup". The page content includes a title "Set Manager's Clock", a note about half-hour period boundaries, and a form with input fields for Hours (10), Minutes (32), Seconds (2), Month (12), Day (9), and Year (2005). There is a checkbox for "Use Daylight Savings" and a "Submit" button. Links for "SNTP Setup" and "Home Setup Menu" are also visible.

Figure 15

Passwords

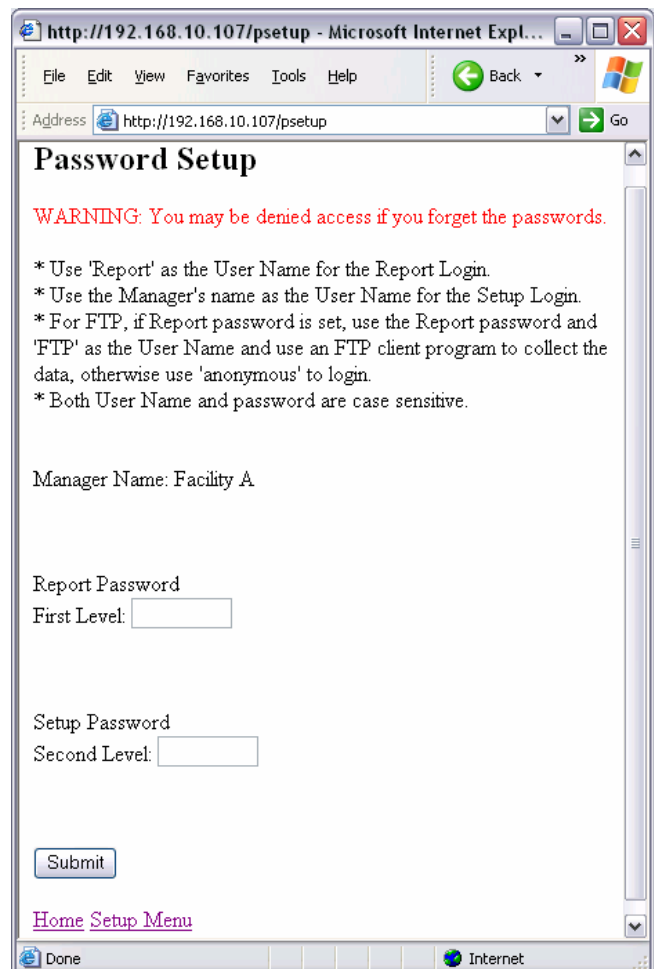
Counter Server controls access to the different resources of the Counter Server through passwords. There are two levels of Login access for the Counter Server: Data and Config. Through the Data Login, the Counter Server allows access to the data portions of the Counter Server like the HTML file, current readings, Historical and Event Logs, and setup information. Through the Config Login, the user can make changes to the Counter Server setup. With the Config Login, the user has all the rights of the Data Login as well. If the Login password has been configured and the user has not logged in yet, the Counter Server will respond with an error message to commands.

If you set up a password to restrict viewing ("Report Password") then changing the setup will be restricted also. If you set up a password for setup ("Setup Password") then viewing is not also restricted.

Click "Submit" to establish password protection in the Counter Server.

After passwords are established, you will encounter a screen requesting a password when attempting to perform an action that is password protected. The screen will ask for a user name; this is the name of the Counter Server. Enter your password and hit "OK".

WARNING: Passwords are case sensitive.



The screenshot shows a web browser window titled "http://192.168.10.107/psetup - Microsoft Internet Expl...". The address bar shows "http://192.168.10.107/psetup". The page content includes a title "Password Setup", a warning message "WARNING: You may be denied access if you forget the passwords.", and a list of instructions for setting up passwords. There are input fields for "Manager Name" (Facility A), "Report Password" (First Level), and "Setup Password" (Second Level). A "Submit" button is at the bottom. Links for "Home Setup Menu" and "Done" are also visible.

Figure 16

Reset Options

Be careful when you reset values. There is no way to undo these changes.

On the reset screen you may select to reset the sensor counts to zero ("Reset Counts"), delete all the sensors from Counter Server's setup table ("Delete All Sensors")* or reset the People Counter Server to factory settings ("Reset People Counter Server").

Resetting the Counter Server to factory settings will reset the IP Address back to the default 192.168.1.55. The browser will not redirect itself and you will need to re-enter the IP Address into the "Address" bar.

* Note: To delete non-active sensors, you must enter the Sensor Setup menu and select the non-active sensor. Check the "Delete Sensor" box and click on "Submit."

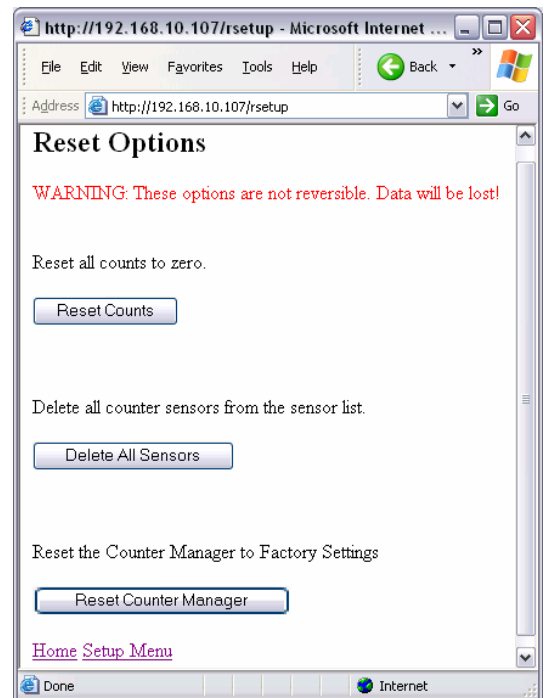


Figure 17

The Reset Enabler

The Reset Enabler allows you to reset and clear all the Counter Server settings in case you become unable to communicate with the server through the browser. Use the Reset Enabler with care, as it will erase the configuration and all data!

To use the Reset Enabler plug it into the serial port on the back of the Counter Server. Power down the Counter Server for 30 seconds or more and then power up. When the Counter Server detects the Reset Enabler it will blink the power light at the rate of twice per second. If the Reset Enabler is **removed within one minute**, the Counter Server will reset itself back to the factory defaults. If the Reset Enabler is left on for longer than a minute, the Counter Server will ignore it.

Export Options

Viewing

From the main screen click on the "Export" link. You will be brought to the reports section. From here you can view and save data in text format. You may also right-click with your mouse on the link. A menu will pop up. If you choose "Save Target As..." you can use the resulting Save dialog box to save the counts report to a text file on your computer. You can view these files with any text editor.

You also view a directory of the available files using the Server's IP Address in the URL: <ftp://192.168.1.55>

There are two file formats. The Standard Format is more compact and provides counts for all sensors for period on each line. The Alternate Format provides a count per line, per sensor, per period.

The files have a title based on the time span of the report plus a timestamp. An example title is this: "CNT24-012003103434.txt"

This is the count file for the last 24 hours and the report was generated on 01/20/03 at 10:34:34 a.m.

The following is a table of the available files:

Web page title	File name
Standard Format	
Counts for the last 24 hours	CNT24- <i>timestamp</i> .txt
Counts for the last 7 days	CNT7DAYS- <i>timestamp</i> .txt
Counts for the last 31 days	CNT31DAYS- <i>timestamp</i> .txt
All Counts for the day Log	CNTPERALL- <i>timestamp</i> .txt
Alternate Format	
Counts for the last 24 hours	REC24- <i>timestamp</i> .txt
Counts for the last 7 days	REC7DAYS- <i>timestamp</i> .txt
Counts for the last 31 days	REC31DAYS- <i>timestamp</i> .txt
All Counts for the day Log	RECPERALL- <i>timestamp</i> .txt

If the server has been password protected at the report level need to login through the ftp client. The user name is the name of the Server and the password is the report level password.

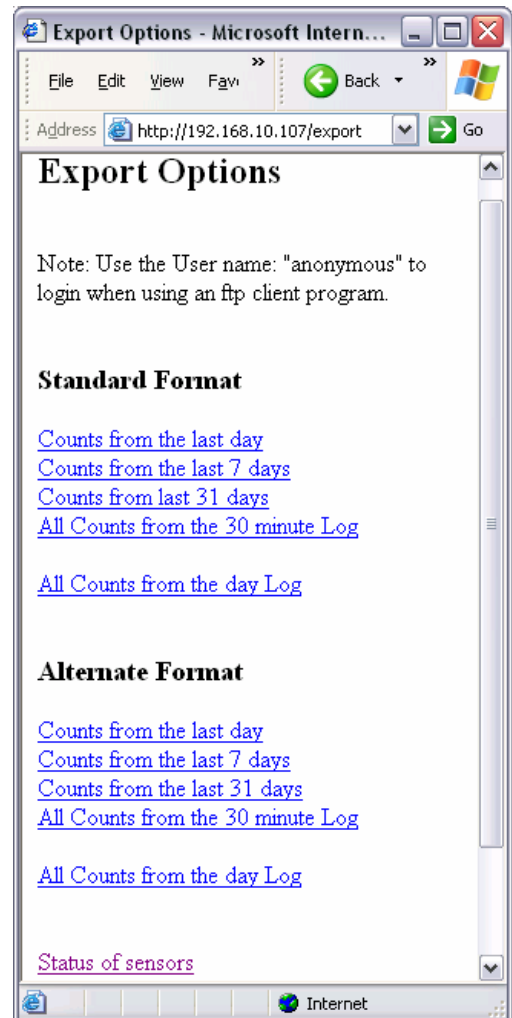


Figure 18

Standard Format

There are eight different record types. Each record starts with a number that tells what kind of record it is.

Server Counter Information

0, date, time, server name, mac, number of sensors, setup timestamp, report start, report finish

Where:

- date – date that the report was generated.
- time – time that the report was generated.
- server name – name of the counter server.
- mac – MAC address of the server.
- number of sensors – the number of sensors currently being monitored.
- setup timestamp – the time stamp of the last setup change.
- report start – the time and date of when the report starts.
- report finish – the time and date of when the report finishes.

Sample record: 0,01/20/03,14:36:02,Sample PC,00:90:C2:C1:0F:D9,2,01/20/03 13:10:17,01/17/03 00:00:00,01/20/03 14:36:01

Sensor Names

1, *date, time, sensor name*₁...*sensor name*_n

date – date that the report was generated.

time – time that the report was generated.

sensor name – name of the sensor

n – number of sensors

Sample record: 1,01/20/03,14:36:02,Main,Warehouse1

Sensor Serial Numbers

2, *date, time, serial number*₁...*serial number*_n

date – date that the report was generated.

time – time that the report was generated.

serial number – serial number of the sensor

n – number of sensors

Sample record: 2,01/20/03,14:36:02,0000000000608220,000000001C110321

Sensor Types

*3, *date, time, sensor type*₁...*sensor type*_n

date – date that the report was generated.

time – time that the report was generated.

sensor type – type of sensor: 1 – people counter; 2 – directional counter

n – number of sensors

Sensor Period A Counts

7, *date, time, countA*₁...*countA*_n

date – date of the period.

time – time of the period.

countA – count for the period for the first set of counts for the sensor. The period is either 30 minutes or 1 day

n – number of sensors

Sample record: 7,01/17/03,00:00:00,127,115

Sensor Current Interval A Counts

8, *date, time, countA*₁...*countA*_n

date – date of the current interval.. This is a partial total for the interval, as the current interval has not been completed yet.

time – time of the current interval.. This is a partial total for the interval, as the current interval has not been completed yet.

countA – count for the current interval for the first set of counts for the sensor.

n – number of sensors

Sample record: 8,01/20/03,00:00:00,176,147,142,1,3,353

Sensor Period B Counts

*9, *date, time, countB*₁...*countB*_n

date – date of the period.

time – time of the period.

countB – count for the period for the second set of counts for the sensor.. The period is either 30 minutes or 1 day

n – number of sensors

Sensor Current Interval B Counts

*10, *date, time, countB*₁...*countB*_n

date – date of the current interval.. This is a partial total for the interval, as the current interval has not been completed yet.

time – time of the current interval.. This is a partial total for the interval, as the current interval has not been completed yet.

countB – count for the current interval for the second set of counts for the sensor.

n – number of sensors

* These records are only included if a Directional Counter is in the sensor list.

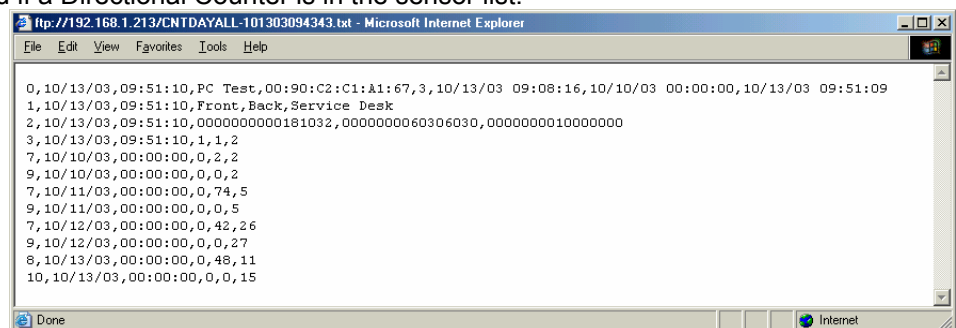


Figure 19

Alternate Format

Header Record

The first record of every file is a header that has titles for every column. The following is an example:

Type, Server Name, MAC, Sensor Name, Serial No, Sensor Type, Start Time, End Time, Count A, Count B

Data Record

Type – type of record: 1 – record contains counts for the full period; 5 – record contains counts for a partial period (the current period which is incomplete).

Server Name – name given to the Server

MAC – serial number of the Server (the Ethernet MAC address)

Sensor Name – name given to the sensor

Serial No – 16 character serial number of the sensor

Sensor Type – 0 – people counter; 1 – directional counter

Start Time – starting date and time of the period

End Time – ending date and time of the period. For record type 5 this time will be less than the full period.

Count A – count for the period

Count B – count for the period. Will always be 0 for Sensor Type 1.

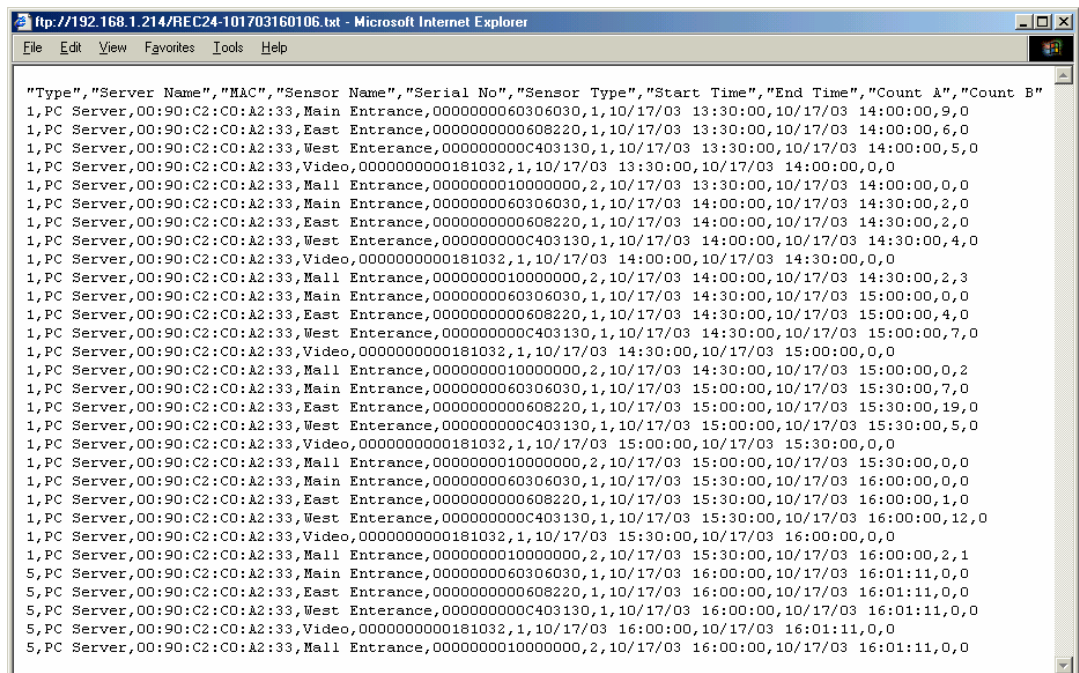


Figure 20

Appendix

Serial Port

The Counter Server has a local serial port. A special cable is provided with the Counter Server that has a DB9 connector and a phono connector. Plug the male phono connector into the connector labeled "serial" on the front of the Counter Server. Connect the DB9 connector to the serial port of the host computer. Counter Server uses RS232 communication parameters of 19200 baud, 8 data bits, 1 stop bit and no parity. The Counter Server does not use any of the RS232 handshaking lines or the standard software handshaking. The Counter Server is a RS232 DCE device.

Note: the Counter Server will automatically log out a user (if a login password is configured) if it does not receive a command within the Inactivity Timeout, which is 1 minute.

Counter Server Protocol

The system for communicating with the Counter Server is based on command-response architecture. Every submitted command will receive a response, as long as there is a connection. Successful commands are responded to with an echo of the primary command, and if the command returns data, the data is appended to the primary command echo after a comma. The primary command is the submitted command string in its entirety or up to but not including the first comma. Sending the next command before receiving a response to the last command is an error.

Each command must be prefixed with an ASCII 02 character (STX) (on most terminal emulation programs, key in Ctrl-B) and must end with an ASCII 13 character (CR) (on most terminal emulation programs, key in Ctrl-M or Enter). This protocol will work with all the Counter Server communication media: local serial port, and TCP/IP.

Example

Command: <STX>S<CR>
Response: <STX>S,6,082701111800,na,na<CR>
Remarks: <STX> is an ASCII 02 (or Ctrl-B on the keyboard)

*<CR> is an ASCII 13 (Ctrl-M or Enter on the keyboard)

There is an additional layer of communications protocol that is media-specific. This has been added to ensure reliability when using media lacking built-in error detection. This protocol is recommended to be used with the Counter Server's **local serial port**. The command must be prefixed with an ASCII 01 character (SOT) (on most terminal emulation programs, key in Ctrl-A), then following the command with a 4-character ASCII hex CRC16. The command is then terminated with an ASCII 13 character (CR) (on most terminal emulation programs, key in Ctrl-M or Enter). The CRC16 must be calculated using the full command but does not include the ASCII 01 (SOT) or the ASCII 13 (CR). An ASCII 01 (SOT) prefixed command not followed by a CRC16 will result in an error. Counter Server will respond with a response prefixed with an ASCII (SOT), followed by a 4-character ASCII hexadecimal CRC16 and terminated with the ASCII 13 (CR). The returned CRC16 is calculated using the full response but does not include the ASCII 01 (SOT) or the ASCII 13 (CR).

Note: The letters of the 4-character ASCII hexadecimal CRC16 must be in uppercase.

Example

Command: <SOT>S**3D40**<CR>
Response: <SOT>S,6,082701111800,na,na**3A3E**<CR>
Remarks: <SOT> is an ASCII 01 (or Ctrl-A on the keyboard);

"3D40" is the calculated CRC16 value in 4-character ASCII hexadecimal of the command "S"; "3A3E" is the calculated CRC16 value in 4-character ASCII hexadecimal of the response "S,6,082701111800,na,na".

CRC16 Algorithm

The CRC16 Algorithm is a sophisticated method of checking the integrity of transmitted data for transmission errors. The algorithm indicates whether or not the data has any error. It does not indicate which bit or how the error occurred. Counter Server ignores data packets that have errors. The host should resend the command if the response from the Counter Server has errors.

Software

The interface to the Counter Server was designed to meet common standards and be easy to use. You can use common software that either comes with your operating system or can be purchased to diagnose common problems and to communicate with the Counter Server. You can use a communication program that has terminal emulation to get familiar with the Counter Server commands and communications. Once you are familiar with the commands, you can automate the communications using common development programming languages. Here are some examples of common software commands:

Microsoft Windows

PING – command to test the TCP/IP connection.

WINIPCFG – utility that shows the computer's IP Address.

IPCONFIG – utility that shows the computer's IP Address (DOS program).

Telnet – command to see responses via TCP/IP. Note: Counter Server uses port 1000 as default.

HyperTerminal – provides terminal emulation program to communicate via TCP/IP, and serial port.

Note: HyperTerminal can answer calls via TCP/IP but does not work very well with the Counter Server in this mode because HyperTerminal echos characters it receives.

Note: The easiest way to configure a sensor is to read the default information and then copy that string to a text editor, edit it, and copy it back to the communications program. Remember to remove the parameter specifying type. When configuring the sensor you do not specify the type. The Counter Server will determine the type when it receives a data packet from the sensor. Therefore, until the Counter Server receives that first packet, it will classify the type as '0', Unknown.

Command Overview

Command Syntax

The following table describes the shorthand used to define each command.

Syntax Element	Purpose
< >	Enclose a set of options, ones of which is required
	Separates elements in a set of options
[]	Enclose an optional expression
...	Denotes variable length
1...x	Marks repeatable expression
n	Only or low row number of a sensor
m	High row number of a sensor
<i>Italics</i>	Strings in italics are place holders for values

Rules governing commands include:

- Command strings may contain no spaces.
- Reserved characters: commas (,), pipes (|), SOT (ASCII 1), STX (ASCII 2), carriage returns (ASCII 10), and the bell code (ASCII 7) are reserved, and may only appear as part of the command syntax. Do not use these characters in label names or state names.
- Command strings have a maximum length of 128 characters.
- When specifying a range, the max is ten sensors. Specifying a range with more than ten will return an error.

Time representations

Date and Time Stamps	Interval or Duration Times
Time and date stamps or times that are set or compared to the real-time clock are always expressed in military time and represented as: <i>mmddyyhhnnss</i> Where <i>mm</i> – month of the year <i>dd</i> – day of the month <i>yy</i> – year starting at year 2000 <i>hh</i> – hours <i>nn</i> – minutes <i>ss</i> – seconds	Times that are duration are always expressed in military time and represented as: <i>hhnnss</i> or <i>ddhhnnss</i> Where <i>dd</i> – number of days <i>hh</i> – number of hours <i>nn</i> – number of minutes <i>ss</i> – number of seconds

Command Outline

Command	Description	Options & Parameters
A<T F R S>	<u>A</u> uto <u>A</u> dd Mode	< <u>T</u> ru <u>e</u> <u>F</u> alse <u>R</u> ead <u>S</u> ervice>
CC<S F R>	<u>C</u> onfigure/ <u>R</u> ead <u>C</u> lock	< <u>S</u> et <u>F</u> orce <u>R</u> ead>(mmddyyhhnnss)
CD<S R>	<u>C</u> onfigure/ <u>R</u> ead <u>C</u> ounter <u>S</u> erver <u>I</u> dentification	< <u>S</u> et <u>R</u> ead>(ID Name)
CFACTORY	<u>C</u> lear the entire configuration of the Server and	reset everything to factory defaults.
CI<S R>	<u>C</u> onfigure/ <u>R</u> ead <u>C</u> ounter <u>S</u> erver <u>I</u> P Address	< <u>S</u> et <u>R</u> ead> (IP Address, Subnet [, Gateway][, Name Server][,Port])
CP<D C>	<u>C</u> onfigure <u>L</u> ogin <u>P</u> assw <u>o</u> rds	< <u>D</u> ata <u>C</u> onfig> (password)
CS<S R C F >[n]	<u>C</u> onfigure/ <u>R</u> ead/ <u>C</u> lear <u>S</u> ensor <u>S</u> etup Analog: (AScale,Offset,Units,Decimal_Places) Integer: (IScale,Offset,Units,Decimal_Places) Data: (D<Y N>)	< <u>S</u> et <u>R</u> ead <u>C</u> lear <u>F</u> orce> (sensor index, serialno, label(I/O point setup(s))) State: (SName ₁ [...Name _x]), sensor type
L<I O>	<u>L</u> ogin/ <u>L</u> ogout	< <u>I</u> n <u>O</u> ut> (password)
IC	<u>I</u> nformation <u>C</u> ounts	
IM	<u>M</u> edia <u>I</u> nformation	
IV	<u>V</u> ersion <u>I</u> nformation	
CRESET<counts all>	<u>R</u> esets all sensor counts to zero <u>R</u> esets counts to zero and clears sensor table	
S	<u>G</u> et <u>S</u> tatus <u>D</u> ata	
CRESTORE	<u>C</u> lears all sensors, counts, and all other parameters except Communication information such as IP Address.	

'A' - Auto Add Mode command

Command Options

Command/Response

Syntax

A<T|F|S|R>

Command: **AT** turn AutoAdd Mode on

Response: **AT**

Command: **AF** turn AutoAdd Mode off

Response: **AF**

Command: **AS** turn on AutoAdd (add when service pressed)

Response: **AS**

Command: **AR** Query AutoAdd Mode

Response: **AR,<T|S|F>**

Parameters

Where: 'T' – true or yes

'F' – false, no or off

'S' – service mode

'R' - read

Login Level

Login Level: **AR** – Data

AT,AF,AS – Config

Description

If AutoAdd mode is on and the Counter Server receives a packet from a sensor not already in the sensor table, it will add the new sensor to the table automatically. When the Counter Server adds a sensor to the sensor table through AutoAdd mode it assumes certain defaults for the parameters based on the type of sensor. You can then modify these parameters using the "CS" command. The Counter Server will add a new sensor to its table either whenever it receives a new sensor's packet [AutoAdd] or when it receives a new sensor's packet sent in service mode [AutoAdd(service)].

AutoAdd(service) gives you a little more control over building your sensor table. You may need to push the service button to transmit the data and have the sensor added. Using AutoAdd(service) you can add sensors to the table in a particular order and segregate sensors between Counter Servers. When a sensor is automatically added to the sensor table because of the AutoAdd mode, Counter Server will assume certain defaults for the setup information for the sensor. For the sensor name, Counter Server prefixes the default name with the row number (sensor index) in the sensor table. Below is a table of the different sensor types with the default setup information. The setup information is expressed as the response to the CSR command.

AutoAdd Mode Default Entries

Sensor Model	Sensor Description	Default Setup (response from the CSR command)
IR Counter	People Counter	6,000000000013D6F1,15Count(S4,trans.,open,closed,error)(I1,0,open,0)(I1,0,close,0)
Directional Counter	Directional Counter	18,000000000013D6F1,1DirectCnt(S4,trans.,open,closed,error)(I1,0,open,0)(I1,0,close,0)

The sensor is given a default name, which is the name of the physical type of sensor. The Counter Server prefixes the default name with the row number in the sensor table. The following is a table that shows the default names:

Sensor Model	Sensor Description	Default Sensor Name
IR Counter	People Counter	"Count"
Direct CNT	Directional Counter	"DirectCnt"

'CC' – Configure/Read Clock

Command Options	CC<S[F] R> F – clear the Historical and Event Logs and set the Counter Server clock S – set the Counter Server clock R – read the current clock setting
Command/Response Syntax	Command: CCS <i>mmddyyhhnnss</i> Response: <i>CCS</i> <i>mmddyyhhnnss</i> Command: CCSF <i>mmddyyhhnnss</i> Response: <i>CCSF</i> <i>mmddyyhhnnss</i> Command: CCR Response: <i>CCR,mmddyyhhnnss</i>
Parameters	Where: <i>mmddyyhhnnss</i> – date and time to set the clock or the date and time of the read clock
Login Level	Login Level: CCS – Configure CCR – Data
Description	<p>The “CC” command configures or reads the Counter Server time of day clock. The Counter Server uses the clock for the Historical Log, Event Log, Event Alarms, and Periodic Timer Callout. Setting the correct time for the Counter Server is crucial for Counter Server operations that concern time. The Counter Server will return an error 16 for the “CCS” command when there are records in the Historical Log or the Event Log. The Historical and Event Logs must be empty before the clock can be set unless the “F” option is used.</p> <p>The Counter Server’s clock is set at the factory to Eastern Standard Time. The Counter Server’s clock will drift over time. The realtime clock should be set periodically.</p> <p>Note: The Counter Server’s clock and internal time registers will rollover in the year 2048.</p>

Examples

Command: CCS082901224100 Response: CCS082901224100 Remarks: set the clock to 08/29/01 22:41:00
--

Command: CCR Response: CCR,082901224212 Remarks: the Counter Server’s clock is set to 08/29/01 22:42:12

'CD' – Configure/Read Counter Server Identification Label

Command Options	CD<S R> S – set the Counter Server Identification Label R – read the Counter Server Identification Label
Command/Response Syntax	Command: CDS <i>label</i> Response: <i>CDS</i> <i>label</i> Command: CDR Response: <i>CDR,MAC,label</i>
Parameters	Where: <i>label</i> –label name used to identify the Counter Server. (maximum 19 characters) <i>MAC</i> – Counter Server’s Ethernet MAC address
Login Level	Login Level: CDS – Configure CDR - None
Description	The Counter Server Identification Label is to uniquely identify the Counter Server. The Identification Label is displayed in the HTML File and used in the subject line in sent emails. The MAC address is permanently part of the Counter Server cannot be changed and is unique for all Ethernet interfaces.

Examples

Command:	CDSmy Counter Server
Response:	CDSmy Counter Server

Command:	CDR
Response:	CDR,00:90:C2:C0:15:D9,my Counter Server
Remarks:	"00:90:C2:C0:15:D9" is the Counter Server's MAC. "my Counter Server" is the identification label for the Counter Server.

'CFACTORY' – Reset Server to factory defaults

<i>Command/Response Syntax</i>	Command: CFACTORY
	Response: CFACTORY

<i>Login Level</i>	Login Level: Configure
--------------------	------------------------

Example

Command:	CFACTORY
Response:	CFACTORY

'CI'- Configure/Read Counter Server IP Address

<i>Command</i>	CI<S R>
----------------	----------------------

<i>Options</i>	S – set the Counter Server IP Address R – read the Counter Server IP Address
----------------	---

<i>Command/Response Syntax</i>	Command: CIS <i>IP Address, Subnet Mask[, Gateway address][,name server] [,port]</i> Response: CIS Command: CIR Response: CIR, <i>S, IP Address, Subnet Mask[, Gateway address][,name server]</i>
--------------------------------	--

<i>Parameters</i>	Where: S – static entry. IP Address – IP Address formatted as xxx.xxx.xxx.xxx Subnet Mask – Subnet Mask formatted as yyy.yyy.yyy.yyy Gateway address – Gateway address formatted as zzz.zzz.zzz.zzz. (required for email support) name server – IP Address of the name server formatted as vvv.vvv.vvv.vvv. (required for email support) port – IP port number (optional) (default is 1000)
<i>Login Level</i>	Login Level: CIS – Configure CIR - Data

<i>Description</i>	In order to use the Counter Server Ethernet interface, the Counter Server must be assigned an IP Address and a Subnet Mask. The Gateway address is optional (if not using email). The name server and Gateway are required when using email. Consult your network administrator for more information. The Counter Server will process the "CI" command through the communication media. The Counter Server will disconnect the current TCP/IP session while changing the IP Address.
--------------------	--

Note: dynamic assignment of the IP Address is not supported.

The default IP Address is 192.168.1.55
The default Subnet Mask is 255.255.255.0
The default Gateway address is "" (null)
The default name server address is "" (null)
The default port is 1000

Examples

Command:	CIS192.168.1.46,255.255.255.0
Response:	CIS192.168.1.46
Remarks:	set IP Address to "192.168.1.46" and the Subnet Mask to "255.255.255.0". No Gateway address and name server were set.

Command:	CIR
Response:	CIR,192.168.1.46,255.255.255.0,,,1000
Remarks:	the Counter Server's IP Address is "192.168.1.46" and the Subnet Mask is "255.255.255.0". No Gateway address and name server were set. The default port of 1000 is being used

Command:	CIS192.168.1.55,255.255.255.0,192.168.1.200,192.168.1.199,1300
Response:	CIS
Remarks:	the Counter Server's IP Address is "192.168.1.55" and the Subnet Mask is "255.255.255.0". Gateways is "192.168.1.200" and the name server is "192.168.1.199". Gateway and the name server are necessary for email. The port number is 1300.

'CPD' & 'CPC' – Configure Login Passwords

Command/Response
Syntax

Command: **CPD***data password*
Response: CPD
Command: **CPC***configure password*
Response: CPC

Parameters

Where:
data password – login data password (7 characters maximum).
Enter a blank password to clear.
config password – login config password (7 characters maximum).
Enter a blank password to clear.

Login Level

Login Level: CPD – Configure
CPC – Configure

Description

Counter Server can control access to the medias through passwords. There are two levels of password access. For "Data" login, Counter Server allows the access of the data information of the system such as the current sensor readings, HTML file, Historical and Event Logs and setup information. For "Configure" login, Counter Server allows the same access as the "Data" login as well as access to change any of the setup information. If the Config login password is blank, the Counter Server will assume the Data Login password for the Config Login. Use the Login command "LI" to control and gain access. To clear the passwords, you must set the Data password to blank and then the Config password to blank.

Note: Login password is case sensitive.

Note: The HTML file login through a browser requires the Data password (if set).

Note: If you forget your password, you will not be able to collect the data in the Counter Server. You will have to reset the Counter Server to factory defaults and setup new passwords.

Examples

Command:	CPDadata
Response:	CPDadata
Remark:	The "Data" login password was configured to "adata".

Command:	CPCaconfig
Response:	CPCaconfig
Remark:	The "Configure" login password was configured to "aconfig".

'CRESET' – Reset some server information

Command Options

CRESET<counts|all>
Counts – set all sensor counts to zero
All – clear sensor table and set counts to zero

Command/Response
Syntax

Command: **CRESETCounts**
Response: **CRESETCOUNTS**
Command: **CRESETAll**
Response: **CRESETALL**

Login Level

Login Level: Configure

Example

Command:	CResetCounts
Response:	CResetCounts

'CRESTORE' – Restore Server Defaults

Command/Response
Syntax

Command: **CRESTORE**
Response: **CRESTORE**

Login Level
Description

Login Level: Configure
CRESTORE deletes the sensor setup, sets all counts to zero, and restores all factory defaults on the Counter Server *except* the communication information such as IP Address.

Example

Command:	CRESTORE
Response:	CRESTORE

'CS' - Configure/Read Sensor Setup

Command Options

CS<S|R|C[F]>[n]

S – set the sensor setup information

R – read the sensor setup information

C – clear the sensor setup table

F – force the sensor setup table to cleared

Command/Response
Syntax

Command: **CSSn**,serial no, label(sensor point setup)₁...(sensor point setup)_x [,sensor type]

Response: **CSSn**

Command: **CSRn**

Response: **CSRn**,sensor type,serial no,label(sensor point setup)₁...(sensor point setup)_x

Command: **CSC**

Response: **CSC**

Command: **CSCF**

Response: **CSCF**

Parameters

Where:

F – force the sensor table to be cleared. The Historical and Event Logs will also be cleared.

n – sensor index. Each sensor is placed in a row in the sensor table.

serial no – unique serial number of the sensor (16 characters)

label – identification label for the sensor. This label is displayed with the sensor information in the HTML file. (16 characters maximum)

sensor I/O point setup – described below

x – number of sensor points (5 maximum). This number depends on the type of sensor. See the table below called "Sensor I/O Definitions".

sensor type – type of sensor enumerated. See table below for possible values.

Sensor Types

Sensor type	Description
6	People Counter
18	Directional Counter

Login Level

Login Level:

CSS – Configure

CSR – Data

CSC - Configure

Description Each sensor fills an entry or row in the Counter Server sensor table. The sensor index then is used to both originally define the where the sensor is located in the sensor table and then used to retrieve sensor information (both data and setup). Once a sensor has been defined and placed in the sensor table, the sensor I/O point type cannot be changed. The Counter Server will return an error 6. You will have to clear the sensor table and send the setup information again for all sensors.

The value of an Integer I/O point will be displayed as (**sensor data - offset**) * **scale**.

Note: If Counter Server is in Auto Add mode (either “AT” or “AS”), the Counter Server may place sensor setup information automatically into the sensor table. When the Counter Server does this, it will append the sensor setup to the end of the sensor table and it will assume default values for the setup. For more information see the command “A” – Auto Add Mode.

Sensor I/O Definitions

Sensor Type	Type Description	No . I/O Pts	I/O Point Types	Example I/O Point Setup String
6	People Counter	3	State, Integer, Integer	(Strans.,open,closed,error)(I1,0,open,0)(I1,0,close,0)
18	Directional Counter	3	State, Integer, Integer	(Strans.,open,closed,error)(I1,0,open,0)(I1,0,close,0)

The “CSC” command clears all the entries in the sensor table. This includes both event information for all sensors and I/O points and sensor setup. Counter Server requires that the Historical Log be cleared before the “CSC” command is honored. If the Historical Log or the Event Log has entries, Counter Server will give an error “16” when processing the “CSC” command.

If a sensor has been setup with the wrong type of I/O Point Type, the Counter Server will display “BAD CFG” for the I/O data in the HTML File and the response to the “D” command. If this condition occurs, you will have to delete the setup entry in the sensor table.

‘IC’ – Information Counts

Command/Response Syntax

Command: **IC**
 Response: IC,*commissioned date*,*Powered up date*,*Powered up*,*hard resets*, *soft resets*,*watchdog resets*

Parameters

Where:
commissioned date – the date of when the Counter Server started operations (*mmddyyhhnnss*)
Powered up date – the date of when the Counter Server powered up (*mmddyyhhnnss*)
Powered up – number of times the Counter Server has powered up
hard resets – number of hardware resets the Counter Server has had
soft resets – number of software resets the Counter Server has had
watchdog resets – number of watchdog resets

Login Level Description

Login Level: Data
 The “IC” command gives information about the performance of the Counter Server. This information is given for diagnostic purposes.

Example

Command: IC Response: IC,090501130703,090601221649,4,3,0,0 Remarks: Counter Server commissioned data: 09/05/01 13:07:03; Counter Server last powered up date: 09/06/01 22:16:49; 4 power ups; 3 hardware resets; 0 software resets; and 0 watchdog resets.
--

'IM' – Media Information

Command/Response
Syntax
Parameters

Command: **IM**
Response: **IM,name,login level,state,last activity,...**
Where:

name – name of the media
login level – current login level (none, data, configure)
state – message that describes the current state of the media.
The possible messages are the following: "Disabled",
"Configuring", "Waiting", "Pushing", "Connected", and "Closing".
last activity – duration of the last connection in seconds.
... - this information is repeated for every media. The media
information will be in the following order: Serial, TCP/IP.

Login Level

Login Level: Data

Example

Command:	IM
Response:	IM,Serial,T,N,686066612,TCP/IP,F,N,2333435

'IV' – Version Information

Command/Response
Syntax
Parameters

Command: **IV**
Response: **IV,version number,supported media list,server type,copyright notice**
Where:

version number – version number of the firmware of the Counter Server
supported media list – list of the supported media for the Counter Server delimited by |.
Server type – the type of server: Counter Server or Point Logger.
copyright notice – copyright notice for the Counter Server software.

Login Level

Login Level: None

Example

Command:	IV
Response:	IV,1.1 Serial TCP/IP,Counter Server,Copyright 2001 SenSource, Inc.

'L' – Login/Logout Commands

Command Options
Command/Response
Syntax

L<I|O>
Command: **L|password** Log in command
Response: **L|password,level**
Command: **LO** Log out command
Response: **LO**

Parameters

Where:

password – either a data or configure password as setup with the Configure Login Password ('CPD' and 'CPC'). The password parameter for this command is case sensitive.
level – level of access authorized by the Counter Server: 1 – 'Data'; 2 – 'Configure'

Login Level

Login Level: none

Description

Counter Server will allow access to a set of commands based on the entered password. There are two levels of access 'Data' and 'Configure'. With the 'Data' login, a user can access the current readings, the HTML file, Historical and Event Logs and other information. With the 'Data' login, the Counter Server will not allow access to commands that change the setup information. With the 'Configure' login, the Counter Server will allow all commands to be processed.

For the "LI" command, if the password does not match the Data or Config password the Counter Server will return a 17 error code.

Note: Login is case sensitive.

Note: If you forget your password, you will not be able to collect the data in the Counter Server. You will have to reset the Counter Server to factory defaults and setup new passwords.

Example

Command:	Lnow
Response:	Lnow,1
Remarks:	Login using the password "now". Logged in at level 1 which is the "Data" login level.

'S' - Get Status Data Command

Command Options
Command/Response
Syntax
Parameters

S
Command: **S**
Response: S,sensor count, last setup change time
Where:
 sensor count – number of sensors in the sensor list
 last setup change time – time and date of the last setup change (mmddyyhhnnss)

Login Level
Description

Login Level: Data
Returns the number of sensors in the configuration table and the when the last alarm from an event or periodic timer occurred.
The *last setup change time* can be used by host to determine if the setup has been changed by a second host.

Examples

Command:	S
Response:	S,3,101303090816,na,na
Remarks:	3 sensors configured in the sensor table. Last setup change occurred at 10/1/03 09:08:16.

Error Codes

Overview

When the Counter Server encounters a problem with the command string it will write out an error response. This response takes the form <BEL>ee,Cmd where <BEL> is the ASCII 07 code (Ctrl-G on most terminal emulation programs); ee is the specific error (see below); Cmd is an echo of the primary command that contained the error. The primary command is the entire command string or the first part of the string up to but not including the first comma.

Error Code List

Error Code	Meaning
01	Invalid command
03	Command syntax error; command cannot be parsed
06	Type cannot be changed or new sensor cannot be this type
07	Table is full
08	Invalid command configuration
09	No password – did not previously logged in
10	Not configured
13	Illegal parameter
17	Password given with the "LI" command does not match the Data or Config passwords

Serial Cable

The following table shows the pin out of the Counter Server Serial Cable.

Counter Server	DB9 Female	1/8 Inch Phono Male
TX	2	Tip
RCV	3	Body
GND	5	Center Band

Specifications

Parameter	Value
Power Supply Voltage	6 to 12 volts
Power Supply Current	250 milliamps
Receiver Frequency	418 MHz
Receiver Range with Sensor	400 feet line of sight
Ethernet	10BaseT (10 MHz / 1.2 MHz effective rate)
Serial Port	19200 baud, no parity, 8 data bits, 1 stop bit
Battery	3.6 Volts TADIRAN TL-5101 1/2AA Backup of the SRAM & real time clock: 6 years without power
30 Minute Log	3 months
Day Log	1 year, 7 months
Number of Sensors	16