Application Note #1184: GP-Pro EX 2.X Web Server, RSS Feeds, FTP Server, Transfer Tool, and GP-Viewer EX Connections via Internet Connection

Introduction

This Application Note is intended to assist users in using the following GP-Pro EX Version 2.1X Features over an Internet connection. This is essentially the same as using Local Area Network (LAN), except that there will be routers, firewalls and ISPs in between. The task is therefore to configure these items to make a clear path between the PC and the AGP over an Internet Connection.

GP-Pro EX Transfer Tool

What is it?

- Download \ Upload GP-Pro EX project to or from an AGP via USB, Serial, Ethernet, or Modem
- Compare project to version running in AGP
- Access CF or USB files
- Display detailed unit and project information

Benefits:

- Remotely upload or download updated projects without an onsite visit
- ***Free, included with GP-Pro EX***

AGP as FTP Server

What is it?

- AGP "serves" up files for remote clients to access via web browser or dedicated FTP Client
- Access files on the USB or CF Card memory from an intranet or the Internet
- Use the User ID\Password capability in GP-Pro EX to limit access to authorized users
- ***Benefits:***
- Remotely upload or download new files (such as images, recipes, log files) with an FTP Client
- In some cases, reduce the need for a Pro-Server EX license to upload or download files
- ***Free, included with GP-Pro EX***

Web Server

What is it?

- View Alarm data via web page
- View runtime and driver information
- Monitor and change internal or PLC address values
- Launch FTP connection to upload or download files to CF or USB memory (AGP is FTP Server)
- Launch GP-Viewer EX application
- Use the User ID\Password capability in GP-Pro EX to limit access to authorized users

Benefits:

- Aid in Remote Troubleshooting
- View status of multiple AGP's from the maintenance office or over the Internet using a web browser
- ***Free, included with GP-Pro EX***

RSS Feeds

What is it?

- View Alarm data by subscribing to RSS feed from the Web Server "Alarm" page
- Subscribe to an alarm, the notification is "pushed" from the AGP to a RSS Feed Reader

Benefits:

- Deliver Alarm Notifications and Messages via Internet Browser, Smartphone, or other Internet enabled device
- Notify Maintenance Personnel immediately of a Production Line problem, no matter where they are (onsite or offsite)
- **Free, included with GP-Pro EX**

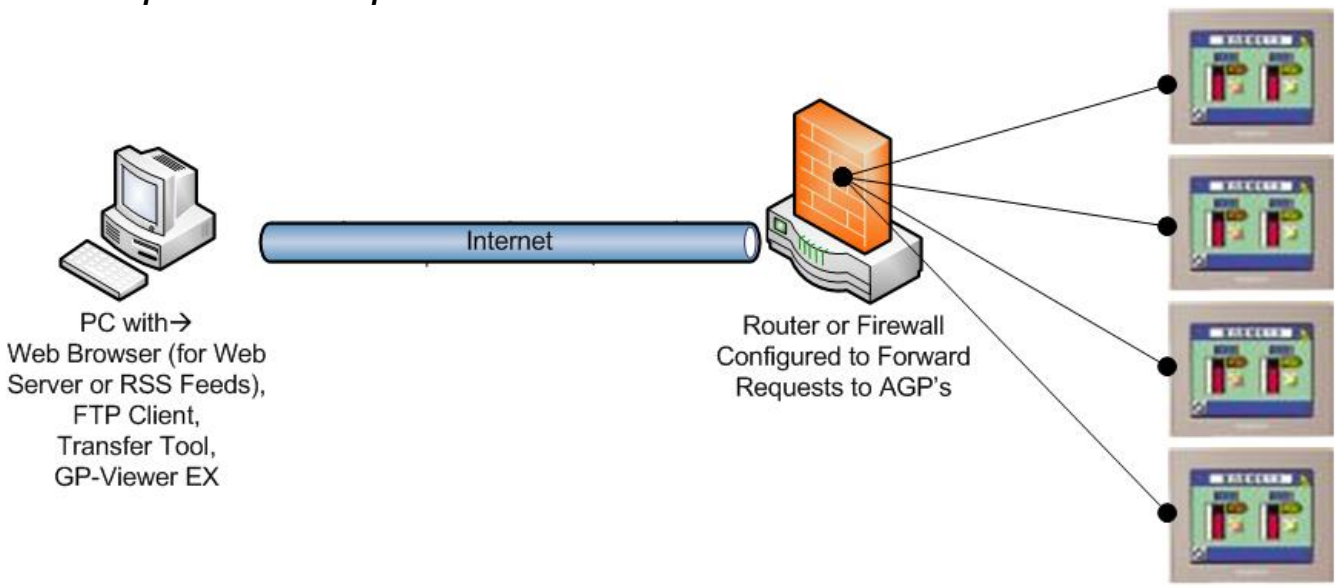
GP-Viewer EX

What is it?

- Remotely access and control AGP screens (synchronously or asynchronously with local operator)
- Create screen captures for documentation
- Update image or audio USB or CF Card files
- Use the User ID\Password capability in GP-Pro EX to limit access to authorized users

Benefits:

- Remote Troubleshooting
- Remote Training
- Remote Maintenance
- Save time and travel expenses
- ***Requires a License per AGP***



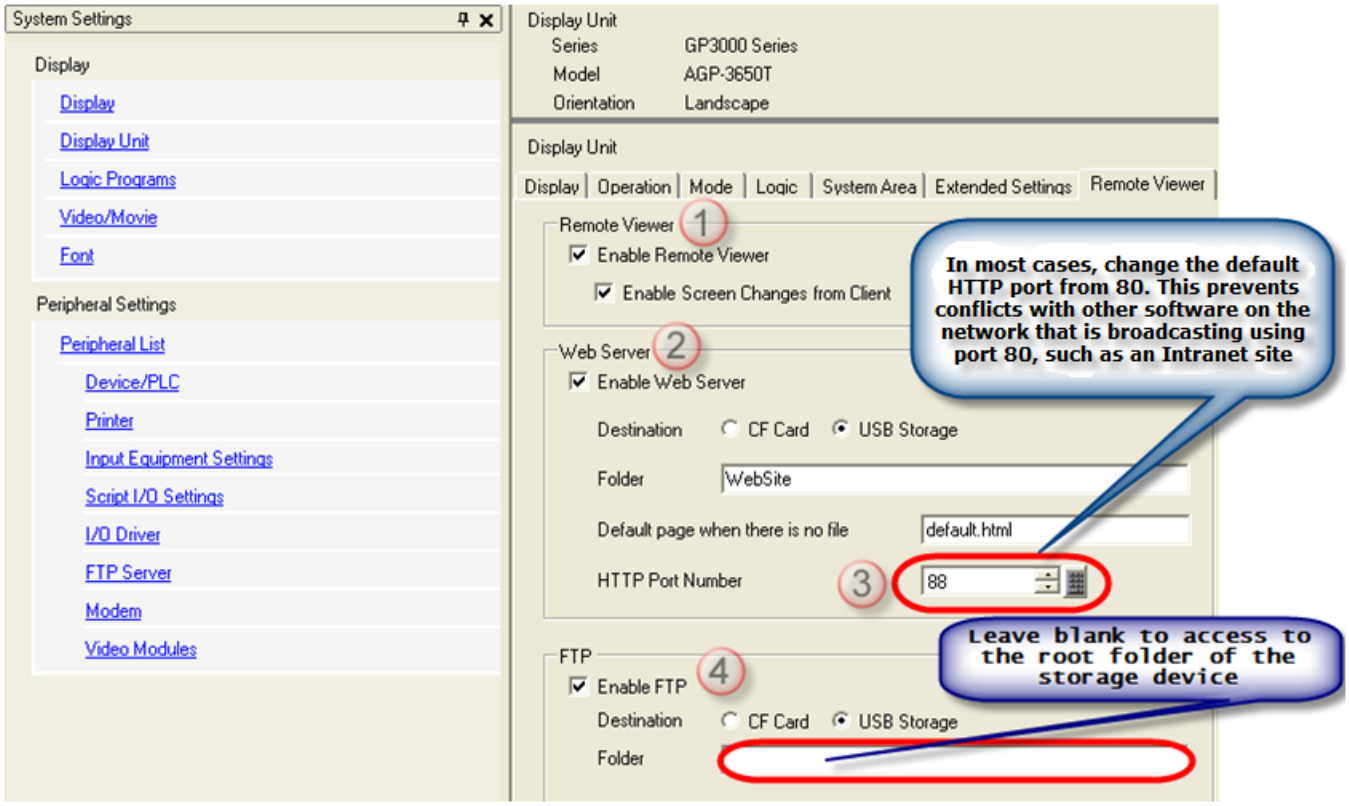
Prerequisites:

1.) GP-Pro EX 2.1X or later installed
2.) AGP3000 Ethernet Enabled HMI
3.) Web Browser for Web Server
4.) RSS Feed Reader software (included in Internet Explorer 7 and Outlook 2007)
5.) Dedicated FTP Client recommended
6.) Network Administrator privileges or assistance for corporate router\firewall changes
7.) Optional: License for GP-Viewer EX for each AGP
8.) Optional: Web Enabled Cellular Phone with Web Browser and RSS Feed Reader

GP-Pro EX Set Up:

The FTP Server, Web Server, and GP-Viewer EX functions must be enabled in the GP-Pro EX project in order to work.

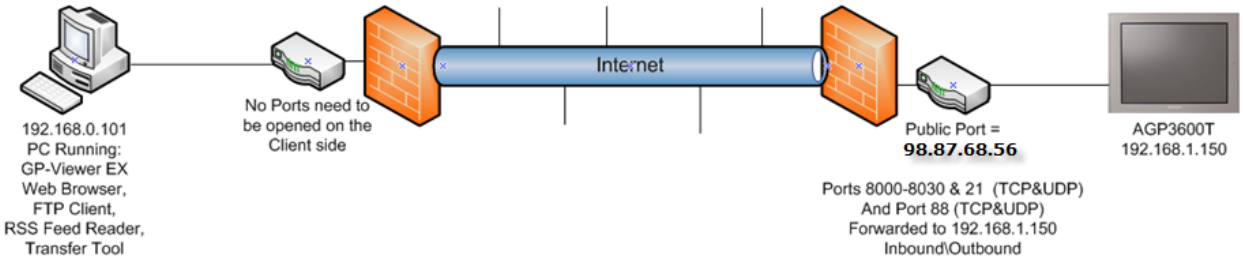
1.) Open GP-Pro EX. Navigate to the System Settings>Display Unit>Remote Viewer Menu
2.) Enable Web Server, FTP Server, and GP-Viewer EX options
    a.) NOTE: GP-Viewer EX requires a license per AGP
    b.) The license is entered into the AGP's Offline Menu
    c.) Web Server, FTP Server, RSS Feeds are free to use
3.) Each AGP on a network can have a different HTTP Port Number for the Web Server and RSS Feeds
    a.) This allows access to multiple AGP's through a router\firewall by Port Number (more on this later)



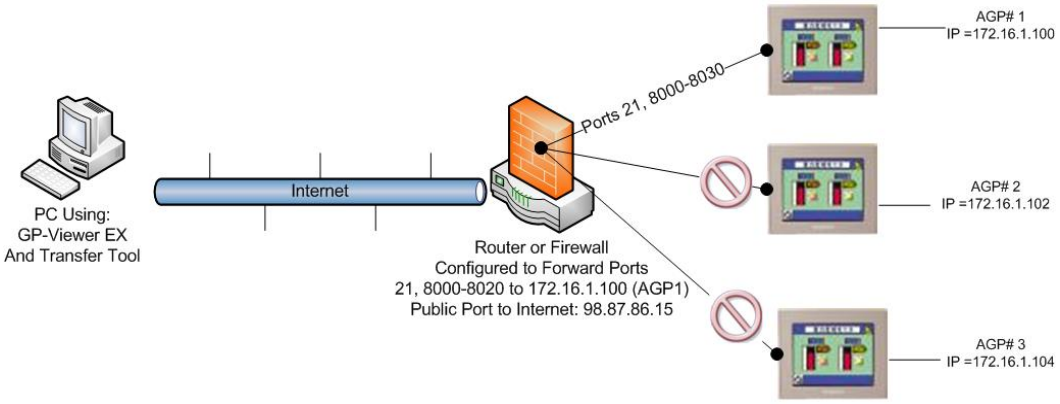
Port Forwarding in the Corporate Firewall and\or Router:

In order for an AGP to receive a request via the Internet for the Web Server, RSS Feeds, GP-Viewer EX, FTP Server, or Transfer Tool functions the router and\or firewall that is directly connected to the Internet on the corporate network must be configured to forward these requests to the AGP. This concept is referred to as Port Forwarding or Port Mapping. This allows a user to have access to a device, such as the AGP, from a remote location. Some corporate networks may use a router with a built in firewall or they may have separate router and firewall devices to protect them from exposing internal equipment from the Internet.

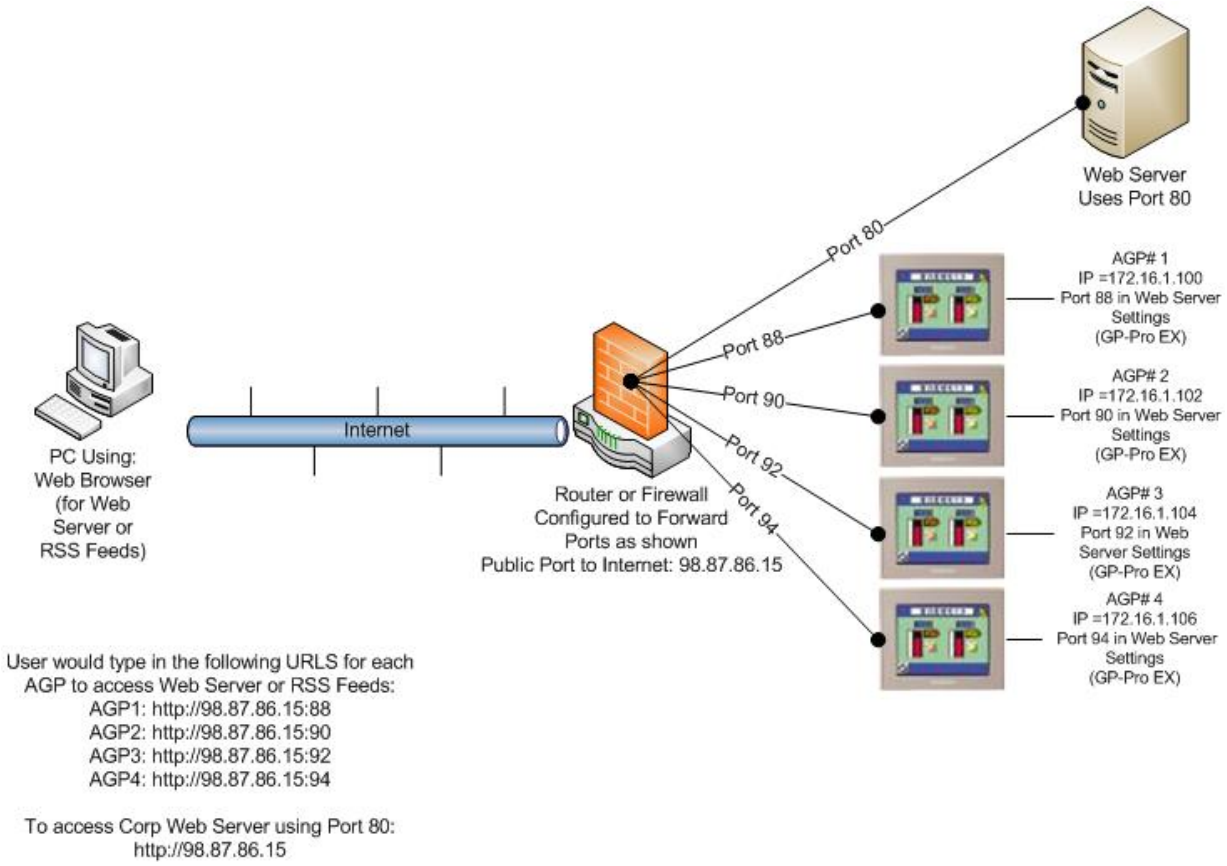
1.) Port mapping (forwarding) is required since the AGP is on the “private” side of a network and is not directly exposed to the Internet
2.) Most software packages use a specific TCP Port to open a channel to a device



3.) The following TCP\UDP Ports need to be opened in the router and mapped to a specific AGP inside the facility network in order for each function to work properly.
    a. GP-Viewer EX and Transfer Tool:
        i. Ports 21, 8000-8030
    b. Web Server & RSS Feed
        i. User defined, defaults to Port 80
    c. FTP Server
        i. Port 21
4.) Can I connect to multiple AGP’s behind the router?
    a. Currently, you will only be able to map one AGP in a firewall\router when using GP-Viewer EX, Transfer Tool, or FTP Server
        i. These 3 functions use Port 21 in order to function properly. GP-Pro EX does not allow a user defined port assignment to replace Port 21.



    b. Currently, you can connect to multiple AGP’s for the Web Server and RSS Feeds by using a different user defined HTTP Port Number for each AGP in the firewall\router and in GP-Pro EX.
        i. Use a different user defined HTTP Port Number for each AGP project
        ii. Map to AGP independently in the firewall\router
            1. Web Server & RSS Feed
                a. User defined, defaults to Port 80
                b. Example: AGP1 = Port 88, AGP2 = Port 90, AGP3 = Port 92

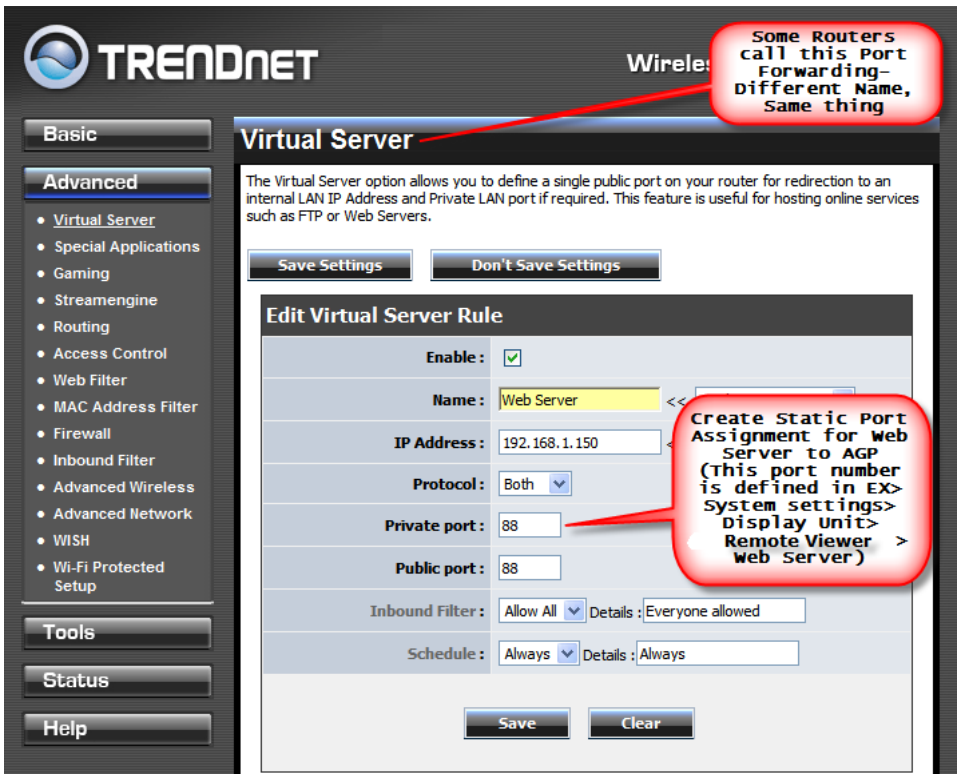


Configuring Port Forwarding or Port Mapping in a Router\Firewall:

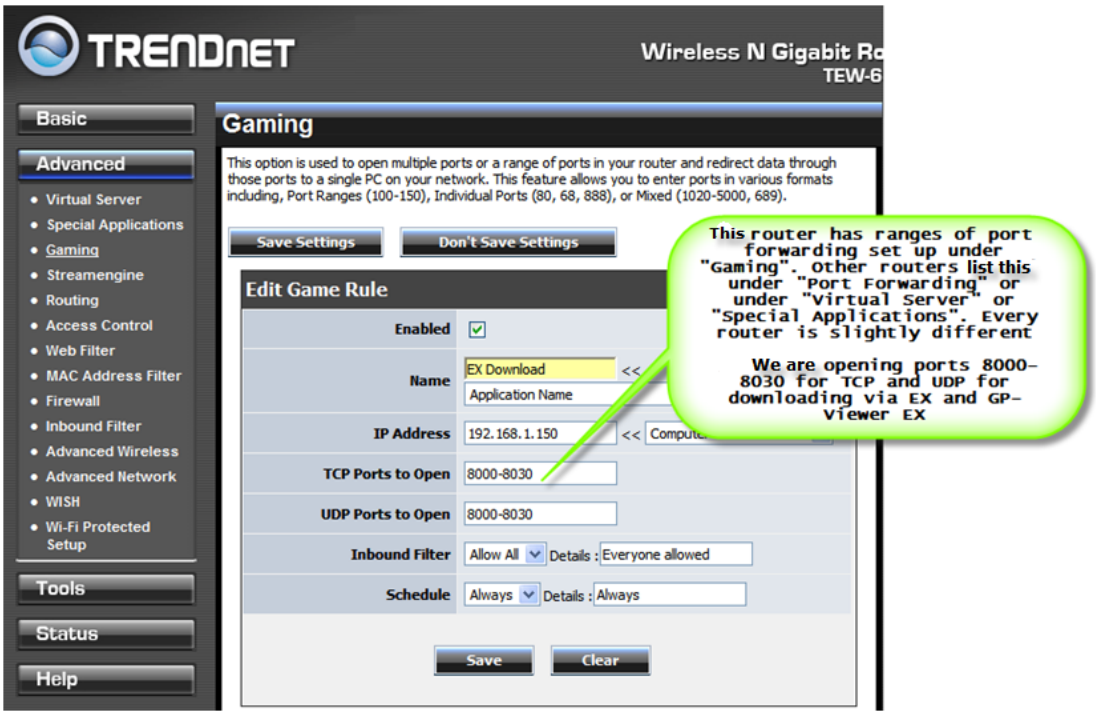
The hardest step in this process is making a connection to or from the AGP to the outside world via the Internet. The following examples use a commercially available router with built in firewall, like you may purchase for your home with high speed internet. Larger facilities may use a high end router or firewall, like a Cisco router or PIX firewall. ***The concepts remain the same, the implementation is different. Your Network Administrator should be able to assist you with these settings.***

Every Router or Firewall vendor has different screens or methods to configure Port Forwarding or Port Mapping. The following examples are from a TRENDnet router that is available for small business or home use.

1.) Web Server and RSS Feed Set Up Example
   a. Use the user defined HTTP Port Number from GP-Pro EX in the router to forward Web Server or RSS Feed requests to the AGP's IP Address on the corporate internal network (behind the firewall).



2.) In this next example, a range of ports are mapped which are used for GP-Viewer EX and the Transfer Tool under a different router menu. The same Port Mapping or Forwarding concept is used; the menu in the router is different.

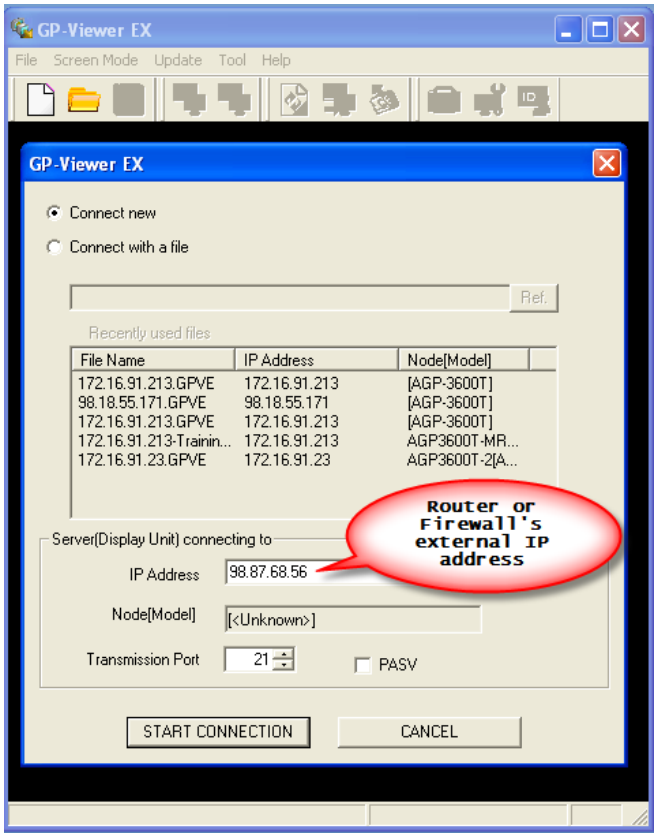


3.) Here is just another example of setting up multiple ports to map or forward in a single setting within the router. Again, the concept is the same, execution is different.

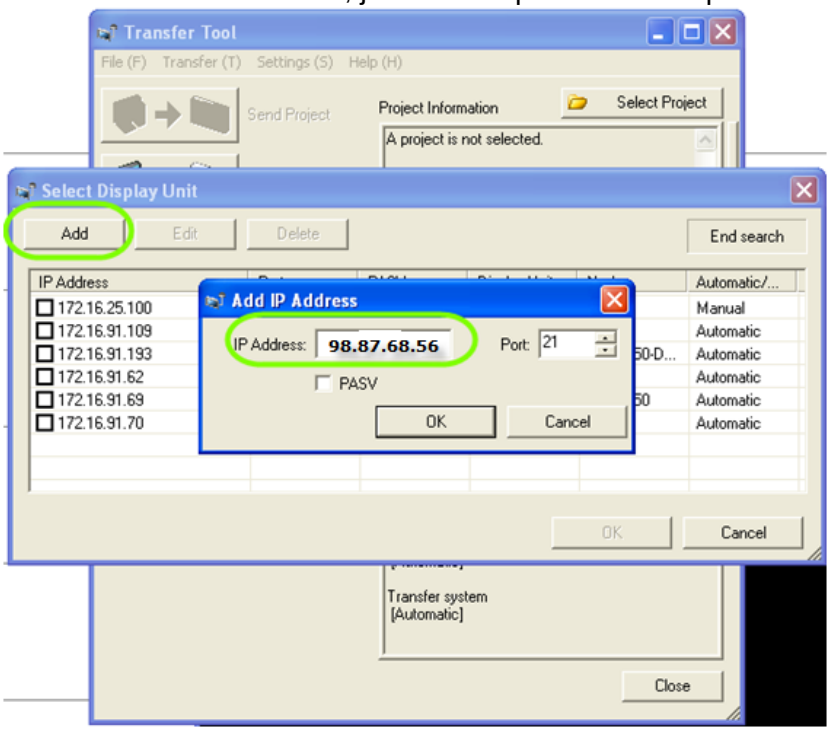
How to access the AGP's from the Internet:

Now that the router or firewall is configured to redirect all Internet requests to the AGP based on the Port Number, how do we use this on the Internet side?

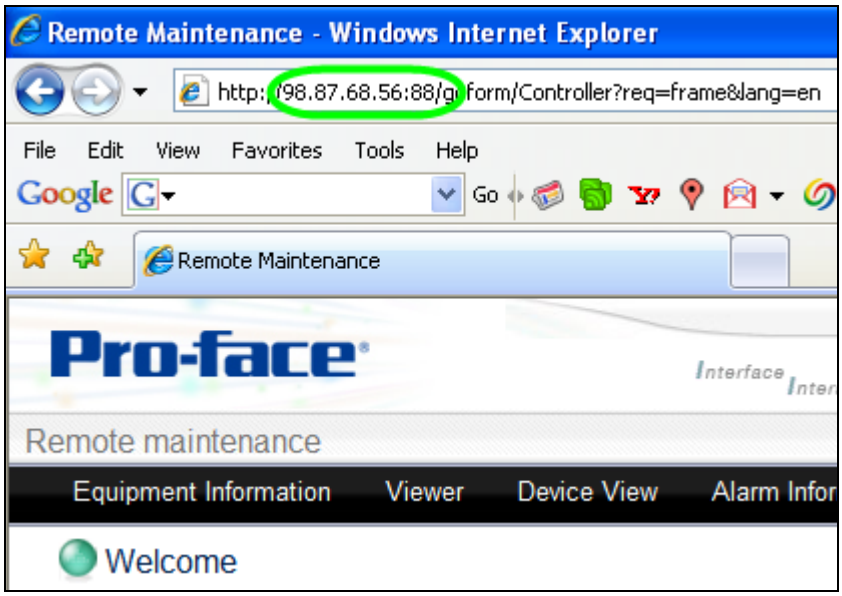
1.) In GP-Viewer EX, manually type in the IP Address for the public side of the router (usually assigned by the Internet Service Provider) then start the connection. The rest of the work is done by the router or firewall. It will see that GP-Viewer EX is making a request using Port Numbers 21 and 8000-8030 and it will redirect the request to our AGP's IP address we set up in the previous steps (for example 192.168.1.150).



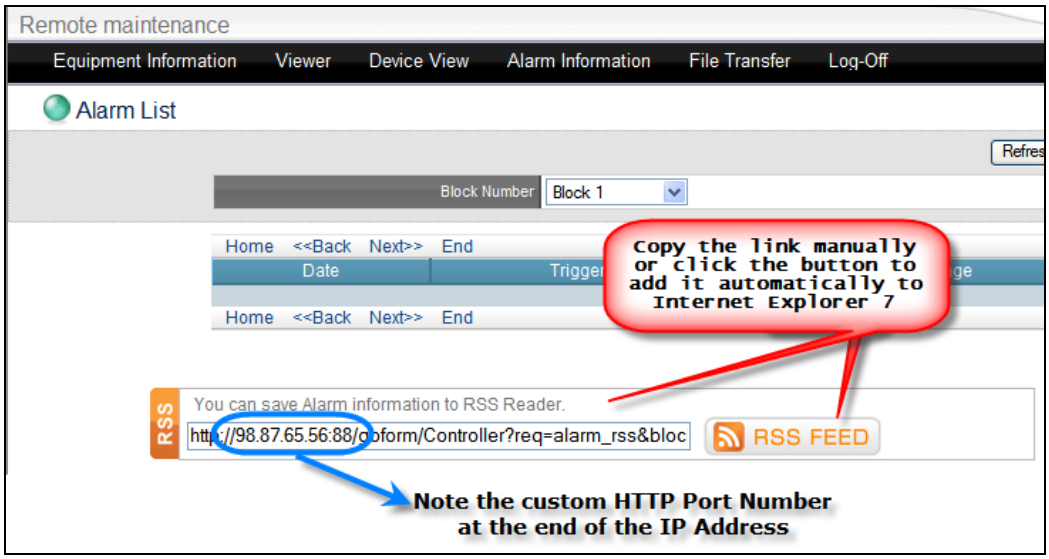
2.) The GP-Pro EX Transfer Tool uses the same concept, manually add the IP Address of the public side of the router or firewall, just like the previous example.

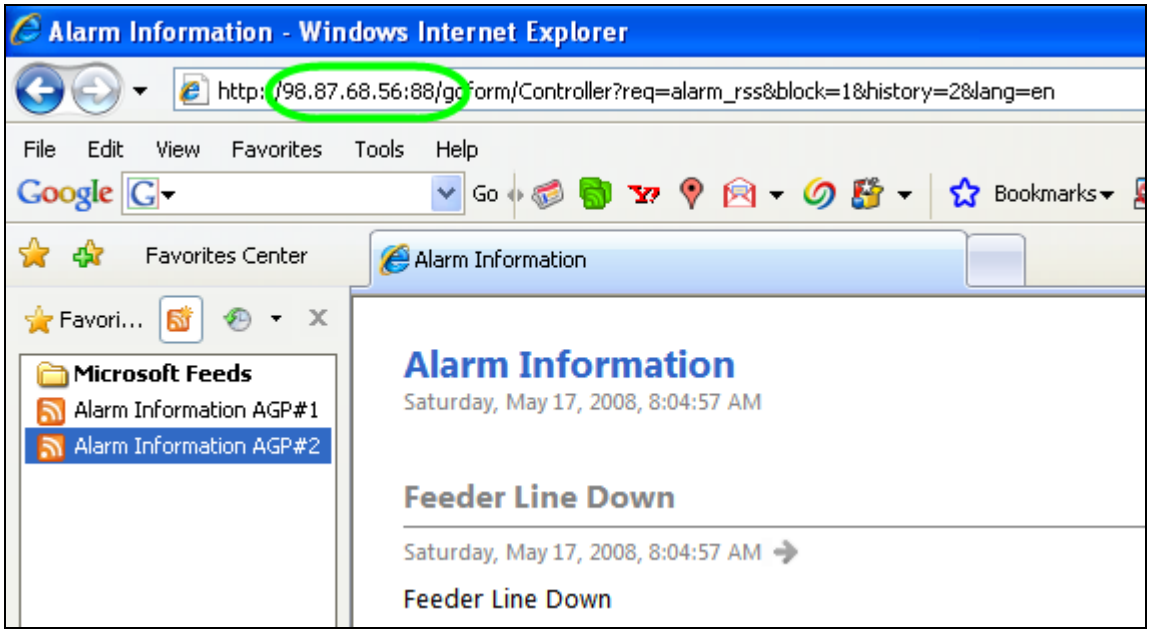


3.) Accessing the Web Server feature can be done by any web browser, like Internet Explorer or Mozilla Firefox. Just type in the address in the following format:
   a. http://<router IP address>:<custom port #>
      i. Example: http://98.87.68.56:88
      ii. The : defines which user defined HTTP Port Number from GP-Pro EX to use
   b. Web Server Configuration
      i. Using Router IP Address & Custom Port #:



4.) Accessing the RSS Feed is easy, just navigate to the Web Server “Alarm Information” screen then copy and paste the RSS Feed link into your clipboard. Use the Internet Explorer 7 or Outlook 2007 built in RSS Feed Reader feature to subscribe to the feed. (Or use the button to add it to IE7 automatically).





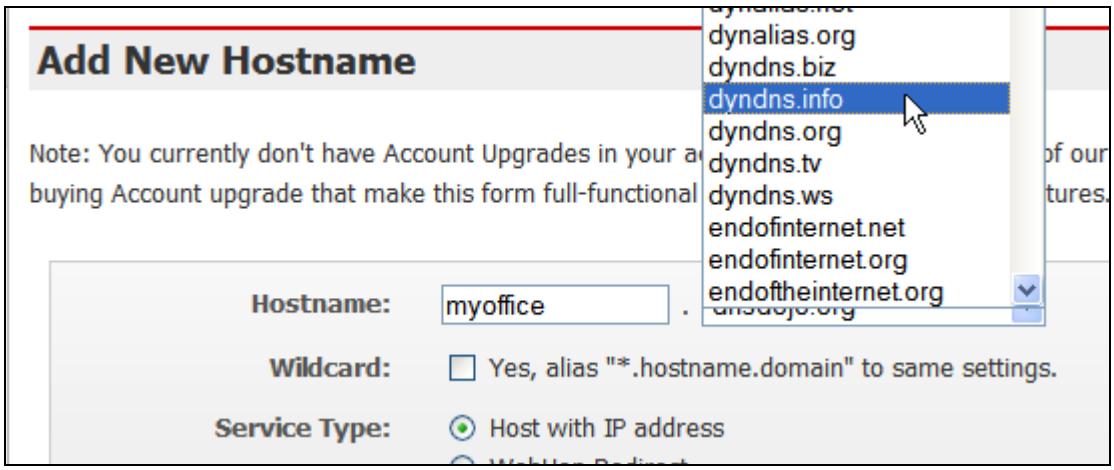
Tricks and Tips:

If the small business is using a commercially available router, like Netgear, D-Link, Linksys, or TRENDnet (used in the above examples), then it is possible that they have a dynamically assigned IP Address given to them by Internet Service Provider. (Larger businesses will usually have a static IP Address assigned to them from their Internet Service Provider) This is referred to as “DHCP” and it means that the Internet Service Provider will assign the router an IP Address for a set period of time then when the “lease” expires, a new IP Address will be given to the router.

If this is the case, how can you access the AGP with the Web Server, FTP Server, or RSS Feeds when the IP Address changes periodically? Or….what if a business does have a static IP Address assigned to the router, how can they use a custom URL, like *http://myoffice.dyndns.info* to access their AGP via the Web Server, RSS Feeds, or FTP Server?

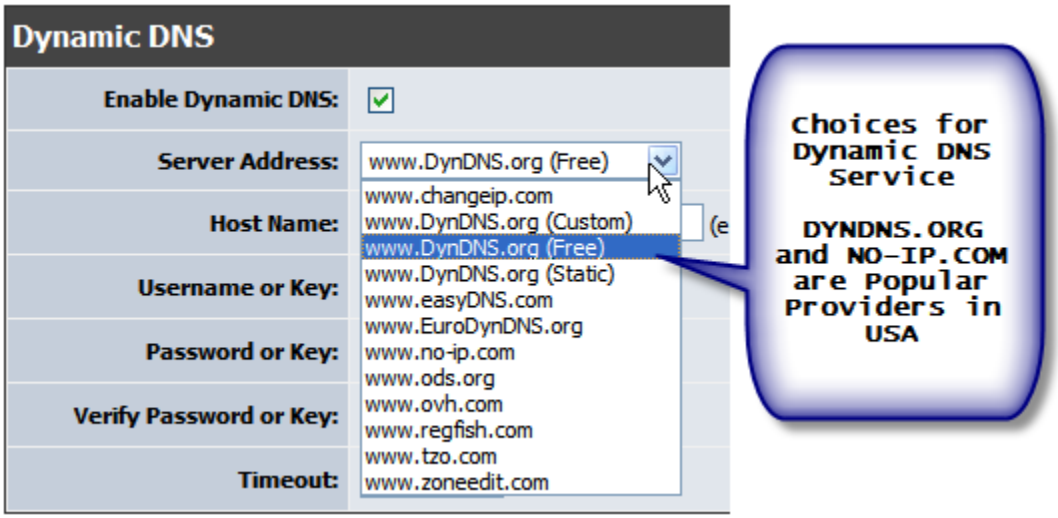
Both of these questions are answered by using a free Dynamic DNS Service to assign domain name to a router or IP Address.

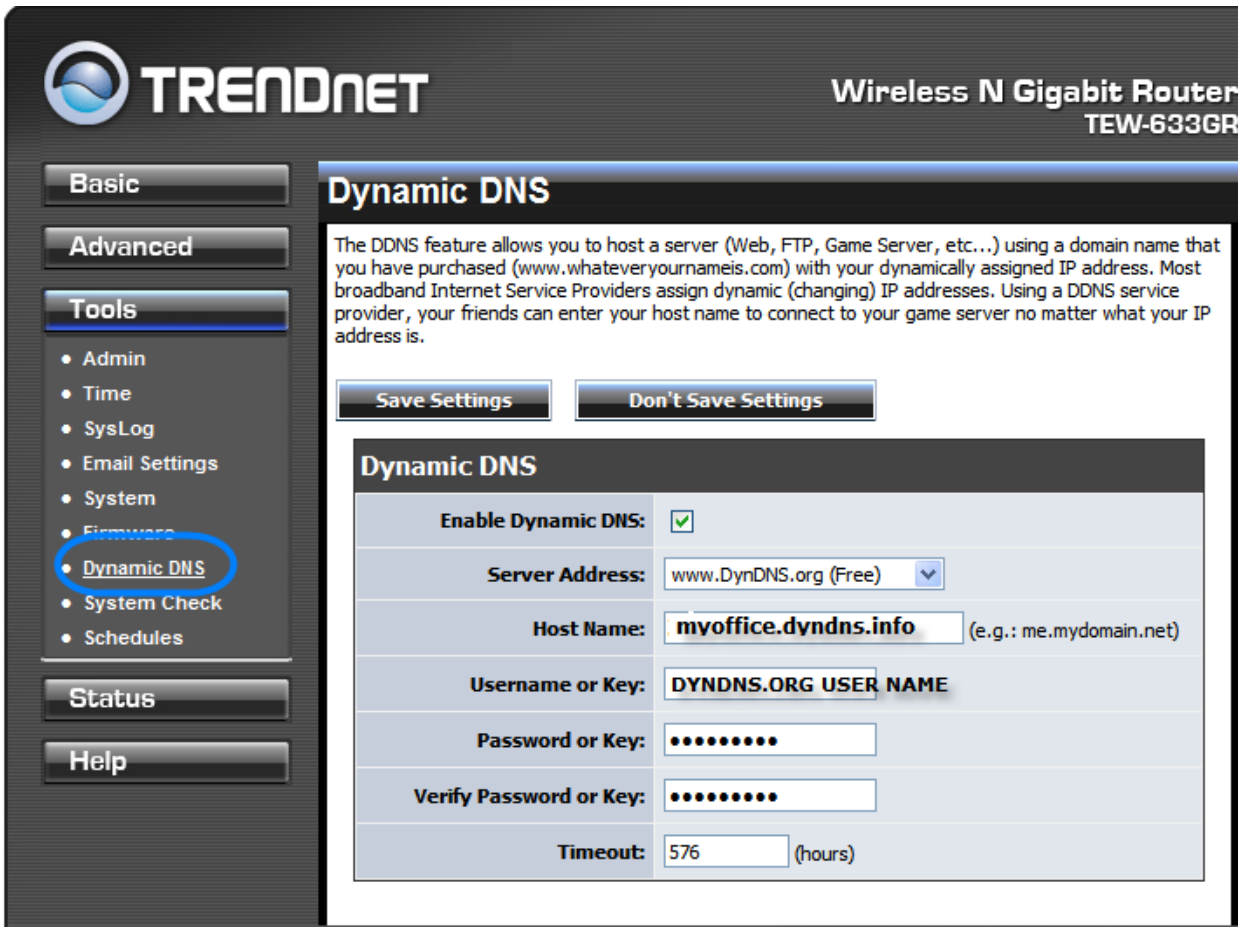
Most of these small office or home routers have the ability to sign up for a free service that will allow you to assign a domain name to your router. These services allow you to create a free account then pick your domain name. Typically you select the first part of the domain name and then pick the ending portion from a list. For example, I may select a name like “myoffice” as the first part of the domain name and then I selected the ending portion offered as “dyndns.info”. My new domain name would be *http://myoffice.dyndns.info*, as seen below:



You will need to check your router to see which vendors are supported for this type of service. Some vendors only support http://www.dyndns.org (which is the largest free company providing this service) or they may support http://www.no-ip.com (which is the second largest company for dynamic domain names).

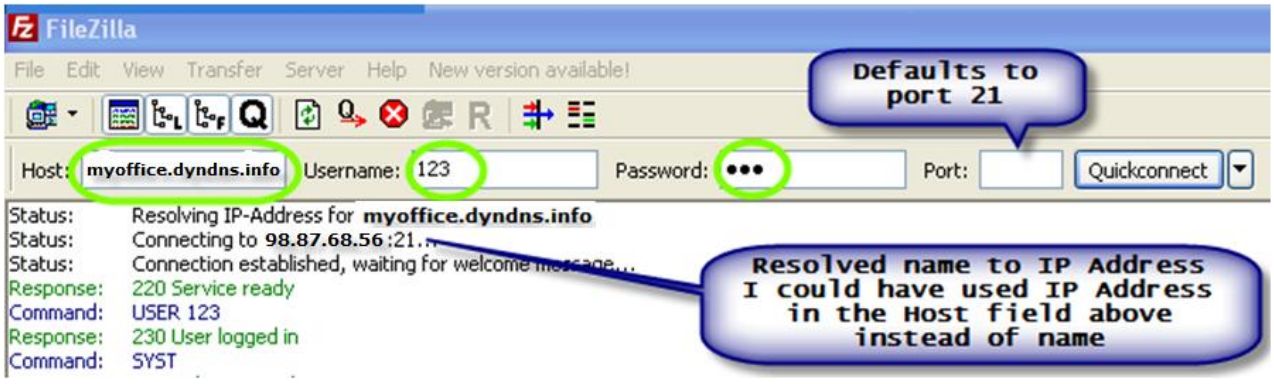
The following examples are from the TRENDnet router used in the rest of this document:



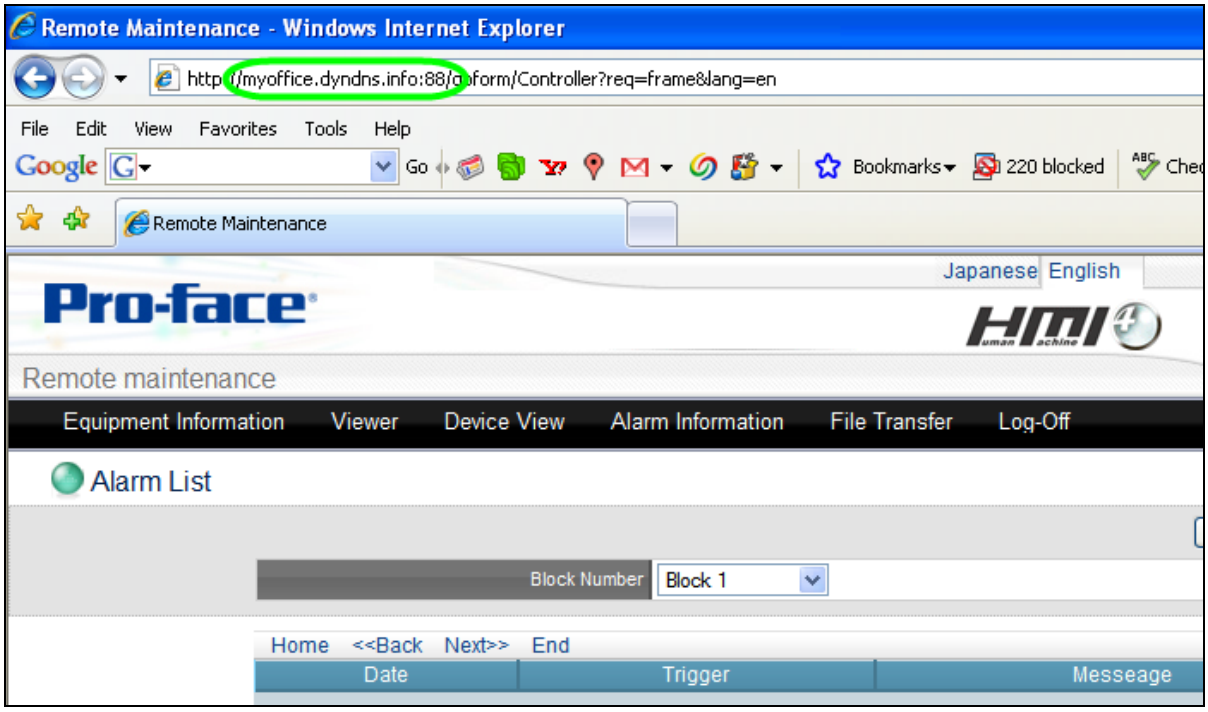


Now that you have the custom domain name set up, here are examples for using it for the Web Server, FTP Server, and RSS Feeds:

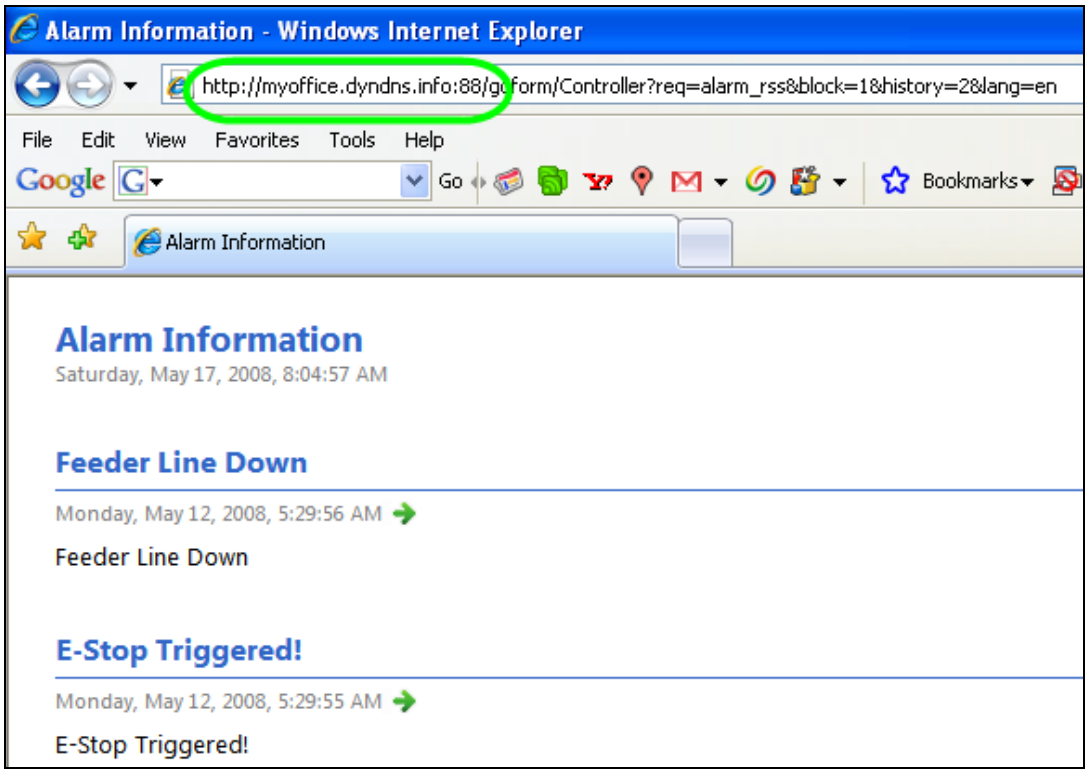
FTP Client using custom domain name instead of Router IP Address
Using Filezilla FTP Client (free to use):



Web Server using Internet Explorer 7:



RSS Feed using Internet Explorer 7:



Some Internet Enabled Phones have Web Browsers and they also have the ability to install RSS Feed Reader Software. Now the Plant Engineers can carry alarm information anywhere they go: