RFIDEAS

Ethernet 241™

USB/Serial Configuration Utility User Manual

99009190 H

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Note: This device complies with Part 15 of the FCC Rules and Industry Canada license-exempt RSS standard(s). 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. This product complies with FCC OET Bulletin 65 radiation exposure limits set forth for an uncontrolled environment.

The reader may not recognize value cards in the presence of high RF fields. If the current reading is erratic, the user shall take the following step: Move the equipment from any known transmitters nearby. For more information contact Tech Support at 866.439.4884.

Contents

The Basics

1

Overview

Product Description

The Ethernet 241 is a two-port switch that connects between a network device, such as a printer, and its network. Included USB and serial ports provide an interface to a wide variety of RF IDeas readers.

The Ethernet 241 forwards network packets to and from the attached printer. The Ethernet 241 can send badge data to the remote computer, or a TCP tunnel can be established between a remote computer to the USB and serial ports. The tunnel provides an additional means for the badge reader data to be read by a remote computer, which will use the badge data information to control the dispatching of jobs to the printer.

Device Features

The Ethernet 241 features include:

- IP address can be assigned statically or obtained automatically via DHCP.
- 2-Port Ethernet switch requiring only one Ethernet drop.
- Each Ethernet port can be independently configured to link modes: auto-negotiate, 100 Mbps Full-Duplex, 10 Mbps full duplex and 10 Mbps half duplex
- TCP tunnel to USB and serial ports.
- Support for pcProx®, pcProx Plus, pcSwipe™ and MFP24 card readers.
- Support for generic USB keypad input device, allowing basic functionality.
- Web interface with firmware upload capability for device configuration and management.
- Discovery protocol provides means for finding all Ethernet 241 devices on a network.
- PC application for monitoring, configuring and maintaining multiple Ethernet 241 devices on a network.
- Command line interface via serial port or Telnet for management and configuration.
- Multi-purpose button to invoke the serial port command line, to reset the configuration, or to print the 241 configuration settings to an attached printer
- Client (push card data to a server synchronously) or Server (polled) modes.
- Selectable encryption of card data using SSL (Secure Socket Layer) in Client mode.
- Client initialization and card data responses can contain embedded ACP (ASCII Command Protocol) commands for automated reader control/initialization.

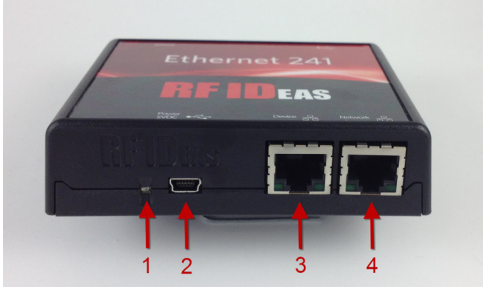
Product Tour

2

Ethernet 241 Device Tour

The Ethernet 241 device is a two port switch that interfaces a networked device with a networked device server through either a serial or USB port. The operational process of the Ethernet 241 begins with a user presenting a card containing data to the associated reader. The data is then transmitted from the card to the network host via the card reader. Once the card data is received, the host determines if the data associated with the user's card ID is pending on the device server. If there are any print jobs associated with the user, a confirmation of association is activated, and the print jobs are then released to the designated printer.

> **Note**: To view the Ethernet 241 Quick Start User Guide, please visit:
> https://www.rfideas.com/files/downloads/guides/Ethernet241-USBSerialQuick_Start_Guide.pdf



1. LED-System Status

Green: Ethernet 241 is powered and operating normally
Solid Red: A fault has occurred
Flashing Red: System settings are being reset to their default values

2. Power Supply Input

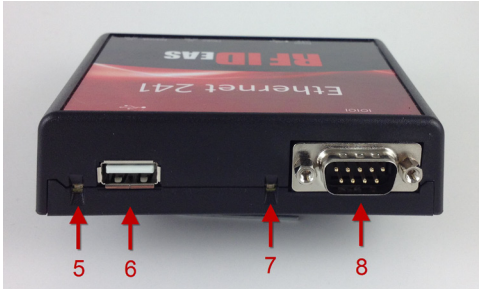
5 VDC, 1A power supply mini USB input (supplied power adapter)

3. Device Ethernet Port

The Ethernet port connection from the Ethernet 241 to a network enabled device (Printer)

4. Network Ethernet Port

The Ethernet port connecting the Ethernet 241 to the network



5. LED-USB Reader Status

Off: No reader connected
Red: Reader connected and initializing
Green: Reader operational, ready for card presentation

6. USB Reader Port

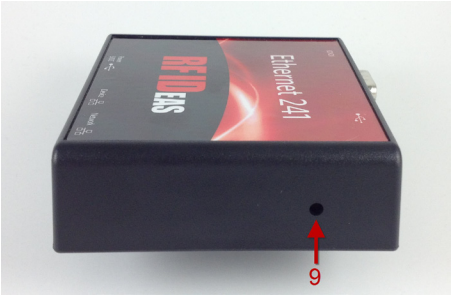
A USB port that supports RF IDeas' pcProx, pcProx Plus, pcSwipe and MFP24 USB readers, as well as USB Keypads.

7. LED-Serial Reader Status

Red: No reader connected
Green: Reader connected and operational

8. Serial Port

The serial interface supports RF IDeas' serial readers and, in conjunction with the *Push* button, can be used as an interface to the Ethernet 241 configuration command line interface.



9. Push-button

When the recessed button is pressed momentarily, the serial port can be used to configure the Ethernet 241 via a serial connection and a terminal emulation program. When pressed and held at power-on, all settings are reset to their factory default values, including the password. When pressed and held after power-on has completed, the Ethernet 241 will send a print command to the attached printer to print the network configuration and system settings.

Configuration 3

Device Configuration

Prior to using the Ethernet 241, some configuration may be required. There are two classes of configuration, network configuration and reader/card data reporting configuration. The Ethernet 241 can be configured through the serial port, the web interface, the 241 Discovery Tool, a configuration file, or through a telnet connection.

Configuration with the Serial Interface

By default, the serial port is available for connection to a serial reader. By pressing the push-button, the serial port is placed into command line mode.

The serial interface is placed into command line mode using the following procedure:

1. Connect a serial null modem cable from the serial port of the Ethernet 241 to your computer
2. Open a Terminal Emulation Program (Putty, TeraTerm, HyperTerminal etc...) on the computer and set the port configuration to 9600 baud 8 data bits, one stop bit no parity (9600-8-1-N) and no float control.
3. Press the push-button (9) on the side of the unit using a tool or a paper clip

Configuration with the Telnet Interface

The Ethernet 241 contains a telnet server. Telnet is a network protocol standard, allowing remote access to the command line interface on the Ethernet 241. To initiate a telnet session, specify the IP address of the Ethernet 241 and the telnet port number. Typically, the telnet port number is 23 and this is the Ethernet 241's default port, however, it is a configurable value within the device's settings.

Configuration with the Web Interface

The Ethernet 241 can be configured using the embedded web interface. Once an Ethernet 241 device has been configured for operation on a network (or the default DHCP settings are used) and it is connected to the network, the web interface can be accessed by typing the IP address of the Ethernet 241 in the address bar of a web browser. Once open, the Ethernet 241 configuration can be updated. The status of the Ethernet 241 and the attached devices can be determined and the corresponding Ethernet 241 firmware can be updated.

Configuration with the Discovery Tool

The 241 Discovery Tool PC application can be used to configure one or more Ethernet 241 devices at a time. (Please refer to the 241 Discovery Tool User Guide for details).

Initial Configuration

In the factory default configuration, the Ethernet 241 is in DHCP addressing mode. Assuming there is a DHCP server on your network, the device will obtain its network setting automatically. At that time, you can communicate with the Ethernet 241 via the web interface or a telnet connection.

Command Line Network Configuration

If a DHCP server is not available on your network, you must then configure the Ethernet 241 manually, over the serial port, by setting the device's addressing mode to **static**.

You will be required to contact your network administrator to obtain a unique **IP address** for your device as well as values for the **network mask, gateway address** and **DNS server address(s).**

The below changes will take effect on the next reboot and/or power cycle. After reboot, the Ethernet 241 can be configured by the web interface or a telnet connection.

> **Note:** Chapter 4 lists and describes the full set of commands available for Ethernet 241 configuration.

> **Example:** (See Table 2 on page 15 for Parameters)
>
> RF IDeas 241, enable echo [Y|N]>y
> Session: 2:
> RF IDeas{}>set ip_addr_mode static
> 000:OK
> RF IDeas{}>set ip_addr 10.10.10.200
> 000:OK
> RF IDeas{}>set ip_mask 255.255.255.0
> 000:OK
> RF IDeas{}>set gw_addr 10.10.10.1
> 000:OK
> RF IDeas{}>set dns1_addr 10.10.10.11
> 000:OK

Operation 4

Commands

As previously stated, the command line interface is available via the serial port and the telnet network protocol. It is designed to accommodate human interaction or automate scripted operation. Character echo may be optionally disabled to support machine-to-machine communication.

When a command line connection has been made to the Ethernet 241, a prompt is displayed asking if typed characters should be echoed as they are entered at the command prompt. Generally, if a user is typing at the console, echo should be enabled, so the user can easily see what is being typed. If an automated script is used to communicate with the command prompt, echo can be disabled.

'enable echo[Y|N]>' can accept upper and lower case responses.

```
RF IDeas 241, enable echo [Y|N]>
RF IDeas{}>
```

If a password has been previously set, you will be prompted to enter the password to access the command line.

```
RF IDeas 241, enable echo [Y|N]>

Password>***
RF IDeas{}>
```

If you have forgotten your password, you will be required to restore the Ethernet 241 to its factory defaults by pressing and holding the push-button for 5 seconds while powering up the device.

Commands are entered in the form of a keyword and may be followed by additional parameters. When a command is processed, the command processor will print a status reply, a carriage return, a newline, and a new prompt. The status reply will be a 3-digit status code followed by a colon and a mnemonic for the status. The number is provided so that an automated script may easily parse the result of a command. The mnemonics are provided to assist user interaction with the command prompt.

Status	Description
000:OK	Command processed successfully
001:REBOOT	The device is rebooting. The host system must wait several seconds before attempting to communicate again with the device.
002:CLOSED	The telnet session has been closed. There will not be a command prompt after this message.
100:CMD-BAD	Command not understood
101:PARAM-BAD	The parameter name for the set / show commands does not match one accepted by this device.
102:PARAM-VAL	The value specified for the selected parameter is out of range.
107:TIMEOUT	Command session terminates after 30 seconds

Table 1 - Status Response Codes

Help
Syntax: **help | ? [-v] [<command name>]**

Help lists the available commands or can provide help for a specified command. For more detailed information about a command, the -v (verbose) option can be included.

Example:

```
RF IDeas{}>help

Command List:
-------------
help            - List the supported commands, -v gives more detail
baud_rate       - Change/display the baud rate of the serial interface
echo            - Enable/disable echoing of characters to the console
exit            - Close console connection
factory_reset   - Reset all settings to their factory default values
log             - Control log output to serial port and/or network
net_status      - Display the status of both network ports and interfaces
password        - Change the password
reboot          - Force the 241 to immediately restart
set             - Change the value of a parameter
show            - Display the value of a specified parameter or all parameters
version         - Display the version of the software


000:OK

RF IDeas{}>help baud_rate

baud_rate     - Change/display the baud rate of the serial interface

000:OK

RF IDeas{}>? -v baud_rate

baud_rate       - Change/display the baud rate of the serial interface
   Usage   :  baud [9600 | 57600 | 115200]
   Default :  9600
         If no parameter, it will display the current baud rate. With a parameter, change the
         current baud rate of the serial interface. The baud rate remains in effect until the
         system is rebooted or changed by this command.  The baud rate will default to 9600
         when the system is restarted

000:OK
```

Echo
Syntax: **echo on|off**

This command provides control over whether or not characters will be echoed as they are entered at the command prompt. Normally when a user is using the console, echo will be enabled to allow the user to view what is being typed. If an automated script is used to communicate with the command prompt, echo can be disabled.

Exit
Syntax: **exit**

The exit command terminates the current command line session. A response message will be sent before the exit operation is performed. When a command line session over the serial port has ended, the serial interface will begin polling to see if a serial reader is attached.

factory_reset
Syntax: **factory_reset**

This command will reset all parameters to their factory default values (Table 2) and the password will be cleared.

> **Note:** Parameters may also be reset by holding the *Push* button closed for 5 seconds during power up. The system LED will turn red and then flash, at which point the button can then be released. Note that parameters may also be individually reset using the "set -d <parameter>" command.

Log
Syntax: **log [+ | -][s | n] [0-3]**

The log command affects log messages that are sent to the serial command line (s) or to the network (n) on port 514. (This is separate from the Log window on the web interface). A '+' option will enable log output, the '-' will disable it. Output levels are: 0 = system, 1 = warn, 2 = info (default), 3 = debug.

Examples:

```
RF IDeas{}>log +s3
000:OK

RF IDeas{}>log -n
000:OK
```

The first example will enable all log messages to the serial port.

The second example disables network output.

Reboot
Syntax: **reboot**

This command causes the Ethernet 241 to reboot. Upon receipt of this command, the Ethernet 241 will output the response message "001:REBOOT."

Password
Syntax: **password**

This command will set the password. It will prompt twice for the password to be entered. The password will not be displayed as it is typed. If the password is entered the same way twice, the change will be stored. Entering an empty line at the two prompts will clear the password.

Example:

```
RF IDeas 241, enable echo [Y|N]>y
RF IDeas{}>password
Type New Password:>***
Re-type Password:>***
000:OK
```

Net_status
Syntax: **net_status**

Net_status outputs the current state of the network Ethernet port (Eth0) and the state of the device Ethernet port (Eth1). The same information is available on the Status web page.

Example:

```
RF IDeas{}>net_status
Port Eth0 (Network)
Link Status          : Up - 100 HD
MAC Address          : 00:03:f4:06:4e:e7
IP Address           : 10.10.10.191
IP Mask              : 255.255.255.0
Gateway Address      : 10.10.10.1
DNS1 Address         : 10.10.10.11
DNS2 Address         : 10.10.10.13

Port Eth1 (Device)
Link Status          : Disconnected
MAC Address          : 00:00:00:00:00:00
IP Address           : 0.0.0.0

000:OK
RF IDeas{}>
```

Set
Syntax: **set [-d] <parameter name> <parameter value>**

This command will change the value of a parameter where 'parameter name' identifies the parameter to be changed and 'parameter value' must be a valid value for that parameter. With the exception of the network address and network port speed settings, changes to parameters will take effect immediately.

If you use [-d] to omit the parameter value, the parameter will be set to its default value.

Note: See Table 2 for Parameters and Defaults.

Example:

```
RF IDeas{}>set ip_addr 10.10.10.25
000:OK
RF IDeas{}>
```

Show

Syntax: **show <parameter name>|all**

This parameter displays the value for a specified parameter or if the "all" keyword is given it will display a list of parameter names and values.

```
RF IDeas{}>show ip_addr
10.10.10.25
000:OK
RF IDeas{}>
```

Version

Syntax: **version**

This command displays the version number of the Ethernet 241 firmware. The firmware version will be in the format vx.yy where x is the major revision level and yy is the minor revision level.

Parameter Name	Default	Parameter Range	Description
baud_rate	9600	9600, 57600	Serial port baud rate (bps)
telnet_port	23	1 through 65535 (inclusive)	Network to 241 Telnet port #
tunnel_port0	2000	1 through 65535 (inclusive)	Network to Reader port #0 – Serial
tunnel_port1	2001	1 through 65535 (inclusive)	Network to Reader port #1 – USB0
ip_addr_mode	dhcp	dhcp, static	Address Mode
ip_addr	192.168.1.2	0.0.0.0 through 255.255.255.255 (inclusive)	Static IP Address
ip_mask	255.255.255.0	0.0.0.0 through 255.255.255.255 (inclusive)	Static IP Mask
gw_addr	0.0.0.0	0.0.0.0 through 255.255.255.255 (inclusive)	Static Gateway Address
dns1_addr	0.0.0.0	0.0.0.0 through 255.255.255.255 (inclusive)	Static DNS address
dns2_addr	0.0.0.0	0.0.0.0 through 255.255.255.255 (inclusive)	Static DNS address
eth0_mode	Auto-negotiate	10 Half Dup, 10Full Dup., 100 Full Dup, Auto	Ethernet (Network)Mode
eth1_mode	Auto-negotiate	10 Half Dup, 10Full Dup., 100 Full Dup, Auto	Ethernet (Device) Mode
location	""	40 ASCII Characters	Location string
serv_client	server	server, client	Card data is polled or pushed
ssl_enabled	No	No (default), Yes	SSL state
ssl_port	443 (HTTPS)	1 through 65355 (inclusive)	SSL port number
ssh_enabled	No	No (default), Yes	SSH state
ssh_port	22 (SSH)	1 through 65355 (inclusive)	SSH port number
init_serv_url	""	200 characters	URL of Reader initialization server
init_serv_port	80 (HTTP)	0 through 65535 (inclusive)	Reader initialization Server Port #
init_str	""	200 characters	Reader initialization String
init_retry_count	10	0 through 255 (inclusive)	Retry limit if connection attempts fail
init_retry_sleep	2	1 through 255 (inclusive)	Interval between retries
init_long_beep	2	1-2 (beep.now = 101 | 102)	Long beeps if server init connect fails
init_short_beep	5	1-5 (beep.now = 1 | 2 | 3 | 4 | 5)	Short beeps if server init connect fails
data_serv_url	""	200 characters (inclusive)	URL with parameter string
data_serv_port	80 (HTTP)	1 through 65535 (inclusive)	Reader Data Server Port #
data_str	""	200 characters	Reader Data String
data_retry_count	10	0 through 255 (inclusive)	Retry limit if connection attempts fail
data_retry_sleep	2	1 through 255 (inclusive)	Interval between retries
data_long_beep	2	1-2 (beep.now = 101 | 102)	Long beeps if server data connect fails
data_short_beep	5	1-5 (beep.now = 1 | 2 | 3 | 4 | 5)	Short beeps if server data connect fails
web_serv_port	80 (HTTP)	1-65535	The port number of the 241 web server
password	""	20 characters	The telnet/tunnel/web password

Table 2 - Parameters (Strings can be cleared by specifying empty parameter value)

Ethernet 241 & RF IDeas' Readers 5

The Ethernet 241 supports RF IDeas' serial and USB readers. Both reader ports on the Ethernet 241 device are active and can be used simultaneously.

Serial Readers

When the serial port is not being used for command input, the Ethernet 241 outputs a carriage return character every few seconds. When a pcProx® serial reader is attached, the reader will respond to the carriage return and initiate a connection. When the connection is complete, the serial port LED will change state from RED to GREEN. Conversely, when the reader is detached from the port, the LED will change from GREEN to RED.

USB Readers

When a USB reader is inserted into the USB connector, the Ethernet 241 begins a process of identifying the reader type and performing the appropriate initialization for the reader type. Initially the USB port LED is in the OFF state. When an attached device is detected, the LED changes to RED. When the device has been initialized and is ready for use, the LED changes to GREEN.

Readers are identified by two values, the VID (vendor id) and the PID (product id). The Ethernet 241 uses these numbers to correctly identify and enumerate as it prepares for use. Recognized USB readers include the pcProx, pcProx Plus, MFP 24 and pcSwipe. If a device is inserted that the Ethernet 241 does not recognize, it will default to a generic HID keyboard/keypad.

Communicating with the Readers

Network connections are employed to communicate with readers that are attached and identified by the Ethernet 241. There are two types of network connections: Client and Server (The terms client and server refer to the relationship between two computer programs – the client initiates actions and the server responds to connection and command requests from the client).

Client

When the Ethernet 241 is acting as a client, it initiates a connection to the server and sends data that the server then processes. The server responds to the request with a status code and may optionally return reader configuration/command information in the form of ACP commands. The Ethernet 241 initiates a connection when a reader is initialized (init request) and when a card is presented to the reader (data request). When the request and the response are processed, the connection is closed. The init request, data request and response messages can be protected using SSL (see next section).

An Ethernet 241 init request is in the form:

http://<init_serv_url | init_serv_ip>:<init_serv_port> GET < init_serv_str>

An Ethernet 241 data request is in the form:

http://<data_serv_url | data_serv_ip>:<data_serv_port> GET < data_serv_str>

The user defined parameters for each request type are listed in the following table:

Init Request Parameters	Data Request Parameters
init_serv_port	data_serv_port
init_serv_ip	data_serv_ip
init_serv_url	data_serv_url
init_str	data_str

Table 3 - Init Request Parameters

The Ethernet 241 can use either an IP address (i.e. 10.10.10.10) or a URL (i.e. www.RFIDeas.com). If the IP address is non-zero (0.0.0.0) it is used, otherwise, the URL is used. If the URL is used, the Ethernet 241 uses DNS to determine the IP address, therefore, the network parameters dns1_addr and/or dns2_addr must be properly specified.

The port number can be any valid IP port number. Its value should be set to the port number that the server is listening to for a connection.

GET is the request response method between the client and server. The GET method adds data to the request in the form of name/value pairs. Each name/value pair is separated by a '&' character. The request can be at most 2048 characters and can only contain ASCII characters.

The content of the name/value is user definable and is specified in the "init_str" and "data_str" parameters. The names are user definable, whereas the values are special character sequences in the form of $(1-9,a-e) that are expanded at run-time according to the following table.

URL Parameter	Expands to
$1	The card Id from the reader as a string of decimal characters.
$2	The 241 Network port MAC address as 12 lower case hexadecimal digits
$3	The 4 digit hex LUID as read from the reader by the 241 after power-up and initialization
$4	A 16-bit sequence number initialized to 0 on start-up and incremented on each successful server connect
$5	The IP Address of the 241 (example: 192.1.168.2)
$6	The MAC address of the printer (lower case hexadecimal, no colons)
$7	The IP address of the printer
$8	The reader port number (0 = serial, 1 = USB)
$9	The 241 firmware version (vx.xx)
$a	The number of bits in the card Id
$b	The card Id from the reader from 1 to 32 hexadecimal characters in length (leading spaces stripped)
$c	PcSwipe Track 1 data
$d	PcSwipe Track 2 data
$e	PcSwipe Track 3 data

Table 4 - URL Parameters

Example:

init_str:
"/demo/init/init.php$csn=$1&mac=$2&luid=$3&seq=$4&ip=$5&devmac=$6&devip=$7&rdr=$8&fwver=$9"

Will expand at run-time to:
"/demo/init/init.php$csn=&mac=68ab8a864ee7&luid=&seq=0&ip=10.10.10.191&devmac=0011436fa74a&devip=10.10.10.64&rdr=1&fwver=v2.00.3"

This is then sent to the server as an HTTP GET request message. In response to the request written to the server, the server should acknowledge the receipt of the data , returning a web page (in this example, /demo/init/init.php). The server reply may include embedded ACP commands. These commands are forwarded to the reader and can provide configuration information or simply change the state of the reader's LED or audible indicator. The web page can also be set up to perform other actions, such as sending an e-mail with data taken from the name/value pairs.

The ACP commands are embedded with the tags <RFIDeasACP> and </RFIDeasACP>. All text lines starting with "rfid:" and the strings sleep and set delay are sent to the card reader that initiated the request.

The following example response results in the reader's beeper outputting two short beeps:

Example 1:

```
HTTP/1.0 200 OK
Date: Tue, 05 Nov 2013 19:29:15 GMT
Server: Apache
Vary: Accept-Encoding
Content-Type: text/html
X-Cache: MISS from barracuda.rfideas.local
Via: 1.0 barracuda.rfideas.local:8080 (http_scan/4.0.2.6.19)
Connection: close

<HTML><HEAD><TITLE></TITLE></HEAD><BODY>
<!--  first, a PHP section to show e-mail example, followed by ACP commands -->
<?
$mac=$_REQUEST["mac"];
$luid=$_REQUEST["luid"];
$seq=$_REQUEST["seq"];
$ip=$_REQUEST["ip"];
$rdr=$_REQUEST["rdr"];
$devip=$_REQUEST["devip"];
$devmac=$_REQUEST["devmac"];
$fwver=$_REQUEST["fwver"];
$csn=$_REQUEST["csn"];

# mail (<addr>, <subject>, <body>);
mail(  "241admin@rfideas.com",    " Reader ".$rdr." online",
        " " . $csn . " seq #" . $seq . " mac=" . $mac . ", luid= " .$luid);
?>
<RFIDeasACP>
rfid:beep.now=2
</RFIDeasACP>

</BODY></HTML>
```

Example 2:

This example selects the reader configuration 1, sets the card type to 0xf302, HiTag1/1S, and sets the data format. Reader configuration is generally done during a reader initialization response. When changing card types, it is important to properly set the data format to ensure the card data format matches the format of the enrolled card data.

```
HTTP/1.0 200 OK
Date: Tue, 05 Nov 2013 19:29:15 GMT
Server: Apache
Vary: Accept-Encoding
Content-Type: text/html
X-Cache: MISS from barracuda.rfideas.local
Via: 1.0 barracuda.rfideas.local:8080 (http_scan/4.0.2.6.19)
Connection: close

<HTML><HEAD><TITLE></TITLE></HEAD><BODY>

<RFIDeasACP>

        rfid:cfg=1
        rfid:cfg.card.type=0xf302

        rfid:wieg.strip.lead.bits=0
        rfid:wieg.strip.trail.bits=0
        rfid:disp.fac.send=0
        rfid:disp.fac.hex=0
        rfid:disp.id.send=1
        rfid:disp.id.hex=0
        rfid:wieg.id.bits=32
        rfid:disp.fac.digits=0
        rfid:disp.id.digits=0
        rfid:wieg.qual.bits=0
        rfid:wieg.inv=1
        rfid:chr.fac=58
        rfid:disp.64bit=1
        rfid:wieg.rev.bytes=0
        rfid:wieg.rev.bits=0
        rfid:disp.fac.64bit=0

        rfid:cfg.write
        sleep(500)

</RFIDeasACP>

</BODY></HTML>
```

Note: The ACP commands are write only in client mode and no status is returned to the server. Not all readers support all commands.

Command	Data Type	R, W	Definition
rfid:beep.now	INT	W	sounds the beeper immediately up to 5 short beeps or 2 long beeps.
			beep.now variables:
			1 – single short beep
			2 – two short beeps
			3 – three short beeps
			4 – four short beeps
			5 – five short beeps
			101 – single long beeps
			102 – two long beeps
rfid:cfg	INT	R/W	Verify or Set current configuration in RAM (Config 1 or 2)
rfid:cfg.card.hipri	BOOL	R/W	Enable priority card read. IF True, current configuration is given priority over the alternate configuration
rfid:cfg.card.type	INT (hex)	R/W	Verify or Set Card type for current configuration in RAM as 16 bit INT (0x0000..0xFFFF)
rfid:cfg.read	Function		Read the flash memory settings in to RAM.
rfid:cfg.reset	Function		Reset the flash memory to the factory defaults.
rfid:cfg.write	Function		Write the variables from RAM in to flash memory.
rfid:chr.1	CHAR	R/W	1st pre - credential data delimiter character (A - Z, 0 - 9, a - z or ASCII \0x00 ….\0x0D)ö
rfid:chr.2	CHAR	R/W	2nd pre - credential data delimiter character (A - Z, 0 - 9, a - z or ASCII \0x00 ….\0x0D)ö
rfid:chr.3	CHAR	R/W	3rd pre - credential data delimiter character (A - Z, 0 - 9, a - z or ASCII \0x00 ….\0x0D)ö
rfid:chr.count.lead	INT	R/W	Verify or Set the leading character count (0 to 3)ö
rfid:chr.count.trail	INT	R/W	Verify or Set the trailing character count (0 to 3)ö
rfid:chr.eol	CHAR	R/W	Verify or set end of line termination character (A - Z, 0 - 9, a - z or ASCII \0x00 ….\0x0D)
rfid:chr.fac	CHAR	R/W	Verify or set separating character between the facility code and ID data(A - Z, 0 - 9, a - z or ASCII \0x00 ….\0x0D) Ex: 123 ; 456789
rfid:chr.gone.1	CHAR	R/W	1st character sent when card is removed (A - Z, 0 - 9, a - z or ASCII \0x00 ….\0x0D)
rfid:chr.gone.2	CHAR	R/W	2nd character sent when card is removed (A - Z, 0 - 9, a - z or ASCII \0x00 ….\0x0D)
rfid:cmd.echo	BOOL	R/W	IF True, enable echo of user input and use of backspace key
rfid:cmd.prompt	BOOL	R/W	IF True, enable RF IDeas command prompt
rfid:dev.luid	INT (hex)	R/W	Verify or set the logical unique identifier as 16 bit INT (0x0000..0xFFFF)
rfid:dev.part	Function		Read the device part number
rfid:dev.ver	Function		Read firmware version (major . minor . variant)
rfid:disp.64bit	BOOL	R/W	IF True, use 64 bit math on ID data
rfid:disp.fac.64bit	BOOL	R/W	IF True, use 64 bit math on facility code data
rfid:disp.fac.digits	INT	R/W	Verify or set Length of facility code output (up to 25 digits)
rfid:disp.fac.hex	BOOL	R/W	IF True, enable facility code output as hex
rfid:disp.fac.send	BOOL	R/W	enable output of facility code
rfid:disp.fac.strip	BOOL	R/W	Set to True to separate ID and FAC. False processes ID and FAC together.
rfid:disp.id.digits	INT	R/W	Verify or Set ID data length (0 to 25 digits) Note: If value is shorter than actual Id length the left most significant digits will be truncated
rfid:disp.id.hex	BOOL	R/W	IF True, enable ID data output as hex
rfid:op.beep	BOOL	R/W	Beeper output control True=beep, False=silent
rfid:op.cont	BOOL	R/W	Continuous read mode True=continuous output, False=single output of credential data
rfid:op.sdk	BOOL	R/W	IF True, enable Quiet mode. (IE: Credential data is not displayed) Note: data can still be retrieved using function rfid:qid.
rfid:out.led		R/W	LED output control
			0=off, 1=red, 2=green, 3=Amber (Immediate out w\o write)
			255=Automatic control by reader (requires write to flash)
			red on standby, green when credential is read
rfid:time.hold	INT	R/W	Verify or set current data hold time setting in multiples of 48ms. (0 - 200) Also controls duration of Green LED during Auto mode.
rfid:wieg.id.bits		R/W	Verify or set card data output bit count (0 - 255)

Table 5 - Commands

rfid:wieg.inv.bits	BOOL	R/W	IF True, Invert card data output bits (1 to 0, 0 to 1)
rfid:wieg.qual	BOOL	R/W	IF True, use wiegand qualifier to verify card bit count
rfid:wieg.qual.bits	INT	R/W	Wiegand Qualifier: Number of bits (0 - 255) card data must have to be acknowledged as a read
rfid:wieg.rev.bits	BOOL	R/W	IF True, reverse bits of credential output lsb to msb
rfid:wieg.rev.bytes	BOOL	R/W	IF True, reverse the bytes of credential output LSB to MSB
rfid:wieg.strip.lead.bits	INT	R/W	Leading parity bit count to be stripped from credential data (options: 0 = none, 1 to 142 bits)
rfid:wieg.strip.trail.bits	INT	R/W	Trailing parity bit count to be stripped from credential data (options: 0 = none, 1 to 142 bits)

Table 5 - Commands -- Continued

Key:

R = read only command
W = Write only command

Using SSL in Client Mode

SSL (Secure Socket Layer) is the protocol standard for sending and receiving encrypted data across a network. The Ethernet 241 acts as the client, requesting a connection from the host computer. SSL is used for transmitting card reader initialization and card ID information. Other data does not use SSL. In particular, for access to the configuration, the serial port, telnet and the web interface instead can be set to use a password to connect.

To enable SSL on the Ethernet 241 simply enter "set ssl enabled" at the command line interface, or enable SSL on the Ports page of the web interface. This will need an SSL server to be enabled on the host computer.

As an example, this can be done on a Windows 7 computer by the following steps:

1. Turn IIS feature on: In the control panel, select 'Programs', then under 'Programs ant Features', select 'Turn Windows features on or off'. Select 'Internet Information Services' (IIS) and click on OK.
2. Open IIS Manager: In the control panel, select 'System and Security', then select 'Administrative Tools'. Another window opens up, double-click on 'Internet Information Services (IIS) Manager'.
3. In the IIS Manager (Features View), you will need to add a new web site or select an existing one. In the connections pane, click on sites, then the desired web site. (Use the 'Add Web Site...' action in the right pane if needed to set up a page without SSL).
4. Create a certificate: Select the top connection in the left pane (computer name). Double-click on 'Server Certificates'. Click on 'Create Self-Signed Certificate' and enter a name.
5. Set website to use SSL: In the Connections pane, select the desired web site. In the Actions pane, click on 'Bindings'. Click on 'Add'. Set the type to https, and choose the certificate that was just created. Click OK.
6. In the center pane, double-click on SSL Settings. Click on Require SSL, and select Apply in the Actions pane.

Client Mode Example

When the Ethernet 241 init_serv and data_serv parameters are in their default configuration, the Ethernet 241 will connect to an RF IDeas server and post initialization and data request to a web page. The page is located at www.RFIDeas241.com/demo/view. This configuration can be used to test your network connection and, using a tool such as Wireshark, serves as a live example of data transfer between a server and the Ethernet 241 that your application can be modeled after.

RF IDeas E241 Data Entries

Sorted by date

Last 500 entries for the previous 8 hours since **2014-05-08 05:55:00**

Refresh View as CSV

#	Date Created	Domain IP	241 MAC Address	241 IP	Reader	Reader LUID	Seq #	Card CSN	Device Mac	Device IP
1	2014-05-08 13:47:36	[redacted]	68-AB-8A-10-02-8E	10.20.100.239	Serial	0000	0	_INIT_POWERUP_ /	-----	
2	2014-05-08 09:30:14	[redacted]	68-AB-8A-10-01-64	172.16.90.50	Serial	0000	5	1930	9C-93-4E-2F-A4-97	172.16.90.195
3	2014-05-08 07:46:04	[redacted]	68-AB-8A-10-01-53	172.16.90.157	Serial	0000	5	1959	9C-93-4E-1E-0E-D9	172.16.90.17

Server Mode

Regardless of the state of the serv_client setting, server mode is available as a TCP/IP tunnel to the serial and USB readers. Server mode opens communication between a client program and a reader. The serial tunnel port default to port 2000 and the USB tunnel port defaults to port 2001.

SDK vs ACP

The operation of the tunnel to the USB reader depends on the type of reader you are using. Serial readers (Serial and Virtual Serial over USB) can be accessed using ACP commands. When a card is presented, the card ID will be output as ASCII text. Other readers will require the use of the pcProx® API library version 7.01.5 or above with the exception of pcSwipe and MFP-24 readers.

Discovery (Finding 241 Devices on the Network) 6

The Ethernet 241 provides a discovery service. This process listens on port 11000 for a Discovery UDP Request message. When a request message is received, the Ethernet 241 sends a response to the requesting host at the hosts IP and port number. Contact RF IDeas for an example host application.

A discovery request has the following format:

Byte Offset	Length	Description
0	8	'RFIDDISC'
8	1	1 (Message Type 1= Discovery Request, 3 = Discovery Reset Request)
9	1	0 (Message Type Qualifier)

Table 6 - Byte Offset

The message type at byte offset 8 determines how the Ethernet 241 will interpret the request.

When the message type of request is 1, the Ethernet 241 returns a structure that identifies the device and informs the host of its status.

Byte Offset	Length	Description
0	8	'RFIDDISC'
8	1	2 (Message Type 2= Discovery Reply)
9	1	HW Version (1 =241B, 2=241C)
10	4	0xF4 0xF0 0xF2 0xF0
14	14	'-RFIDeas/-241- '
28	1	0x0
29	6	Network port MAC address
35	1	Pad (0)
36	4	Network port IP Address
40	4	Net mask
44	4	Gateway Address
48	40	Null terminated location string
88	4	Network Status bit mask (see
92	4	Telnet connection IP address
96	4	Tunnel0 connection IP address
100	2	Tunnel0 Port Number
102	6	Device port MAC address
108	4	Device port IP Address
112	4	Tunnel1 connection IP address
116	2	Tunnel1 Port Number
118	10	Reserved (0)

Table 7 - Byte Offset

The network Status Bit mask is defined as:

Bit Offset	Description
1:0	Network Port Status 0=link down 01=link up 10 Mbps half duplex 10=link up 10 Mbps full duplex 11=link up 100 Mbps full duplex
3:2	Printer port status 0 = link down 01 = link up 10 Mbps half duplex 10 = link up 10 Mbps full duplex 11 = link up 100 Mbps full duplex
4	Tunnel 0 status 0 = idle 1 = active
5	Telnet status 0 = idle 1 = active
6	Tunnel 1 status 0 = idle 1 = active
7	Reserved (0)
11:8	Software status 0 = normal operation 1 = corrupted configuration 2-15 = Reserved
31:12	Reserved (0)

Table 8 - Bit Offset

In addition to device discovery, the discovery protocol supports a parameter reset command. The reset command causes the parameters to be reset to a user specified mode and forces the Ethernet 241 to reboot after sending the acknowledgment response message.

The format of a discovery reset command is as follows:

Byte Offset	Length	Description
0	8	'RFIDDISC'
8	1	3 (Message Type 3= Discovery Reset)
9	1	Mode 1 = Reset all parameters to their default values 2 = Set IP mode to static and reset all static IP value to their default 3 = Reset all parameters except IP address mode and static settings

Table 9 - Bit Offset

The Mode field determines the action that the Ethernet 241 will take upon receipt of a reset packet.

If 1 is specified, all parameters will be reset to their factory default values.

If 2 is specified, the IP addressing mode will be set to static and all static IP address values will be set to their default values. All other parameters will remain unchanged.

If 3 is specified, all parameters will be set to their default values except the address mode and the static IP values.

Once the operation is complete and prior to reboot, the discovery reset reply will be sent to the initialing host.

Byte Offset	Length	Description
0	8	'RFIDDISC'
8	1	4 (Message Type 4= Discovery Reset Reply)

Table 10 - Byte Offset

Web Interface

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The Ethernet 241 has an embedded web server allowing users to configure it and view the status of all the ports. The Status page shows the real-time status of both Ethernet ports and the details of the connected readers. The Log page dynamically displays the internal actions of the system and is useful in determining the resolution of communication issues. The System page allows for the updating of the Ethernet 241 firmware without any additional application. Enter the IP address of the specific Ethernet 241 in the web browser address bar to access the interface.

IP Page

The IP page allows you to set the network configuration of the Ethernet 241. Any change to the addressing mode or Ethernet port speeds will require the device to be rebooted prior to the changes taking effect. If the Ethernet 241 does need to be rebooted, a Reboot button will appear at the bottom of the page.

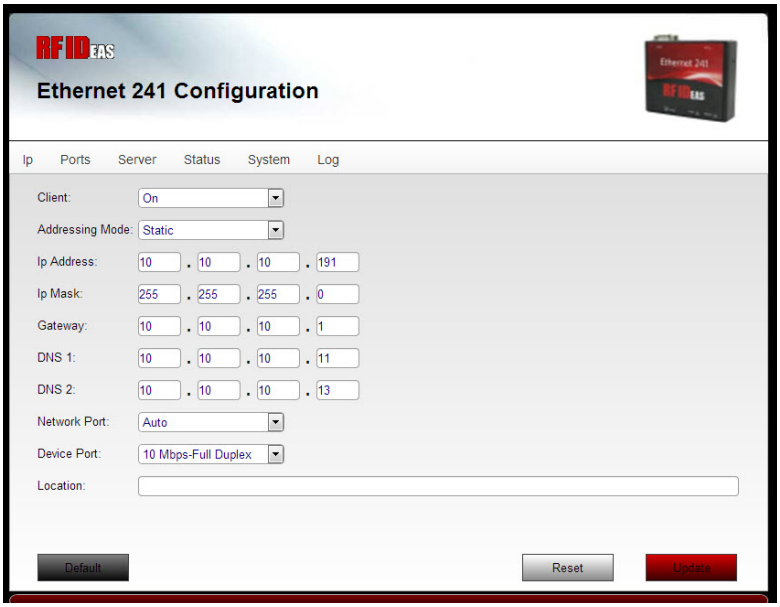
The Default button will reset all of the parameters on the page to their default values. This action occurs once the button is pressed.

The Reset button will reset any un-submitted changes to their previous values. It does not reset the Ethernet 241.

Update will submit any changes to the Ethernet 241 device. Until this button is pressed, no changes are stored. When the addressing mode is changing from Static to DHCP, the static value will be 'grayed' out and will not be available for editing.

Please note that these values may not reflect the actual state of the Ethernet ports. To see the real time state of the Ethernet port and the attached readers, go to the Status page.

The IP page of the web interface is shown below:



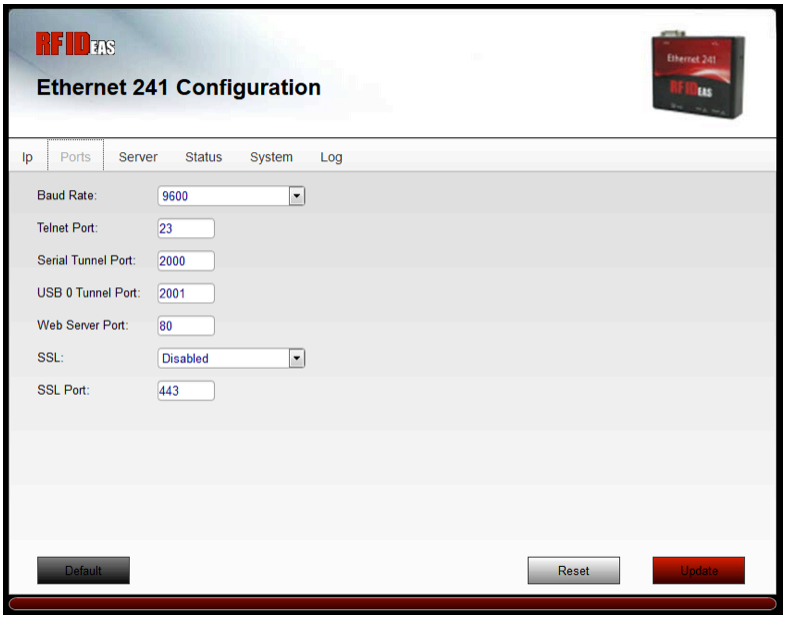
Ports Page

The Ports page allows you to change the values of the network communication ports.

The Default button will reset all of the parameters on the page to their default values. This action occurs once the button is pressed.

SSL and SSL Port allow SSL to be enabled for all card data transmission. This requires an SSL server to be set up on the host computer, and the Ethernet 241 to be operating in client mode.
The Reset button will reset any un-submitted changes to their previous values. It does not reset the 241.

Update will submit any changes to the Ethernet 241. Until this button is pressed, no changes are stored.



Server Page

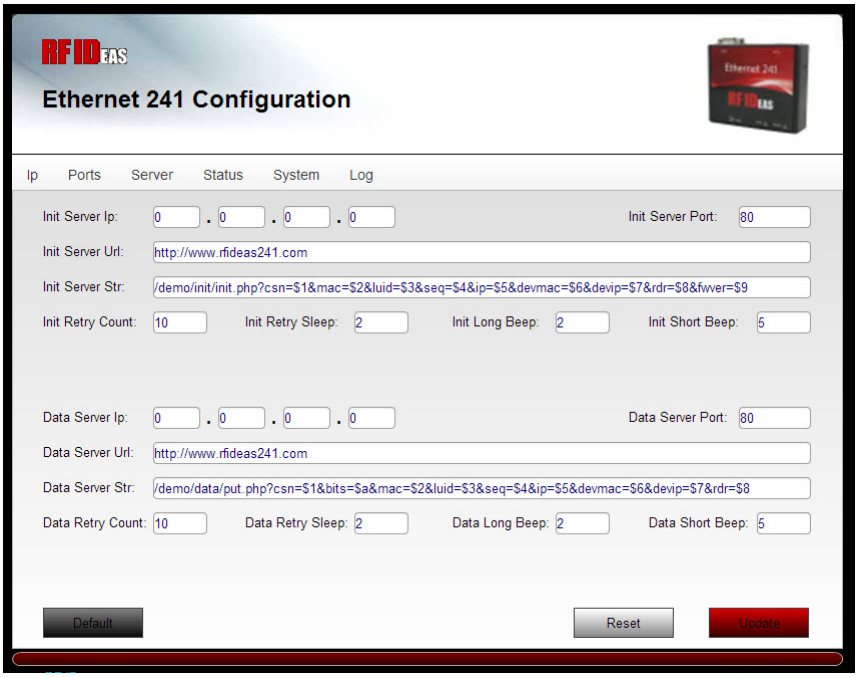
The Server page allows you to change the operation of the communication between the Ethernet 241 and a server. When the device is in client mode, these settings will determine what is sent to the server.

If the Init Server IP value is not set (all zeroes) the Ethernet 241 will use the URL as the server address. Similarly, if the Data Server IP value is not set (all zeroes) the Ethernet 241 will use the URL as the server address.

The Default button will reset all of the parameters on the page to their default values. This action occurs once the button is pressed.

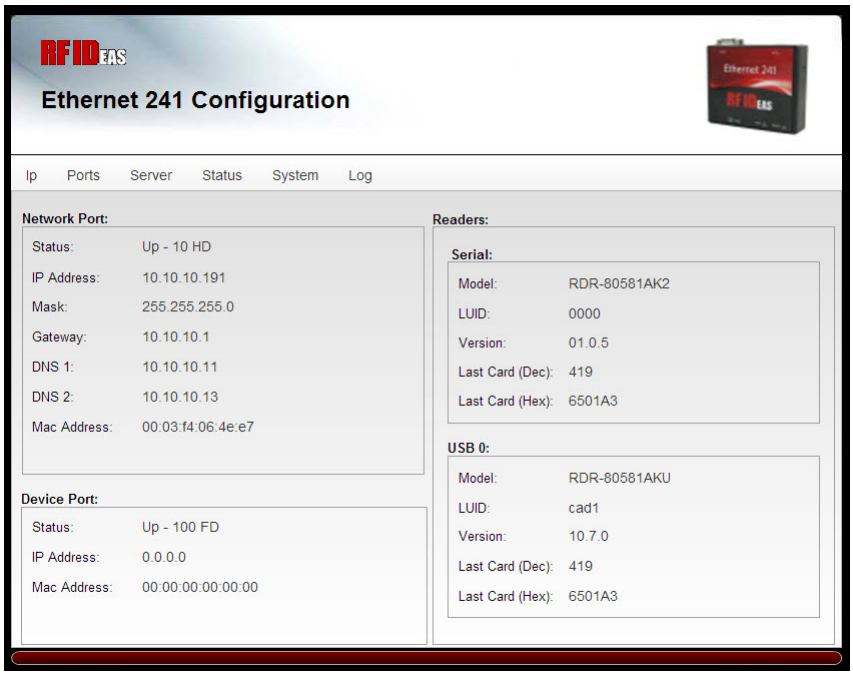
The Reset button will reset any un-submitted changes to their previous values. It does not reset the Ethernet 241.

Update will submit any changes to the Ethernet 241. Until this button is pressed, no changes are stored.



Status Page

The Status page shows the real-time status of the system ports. This may not match changes made on the Ip page if the Ethernet 241 has not yet been restarted. Current status of any connected reader is also shown. Some readers may not support both decimal and hexadecimal output, and will show "unsupported" for those fields.

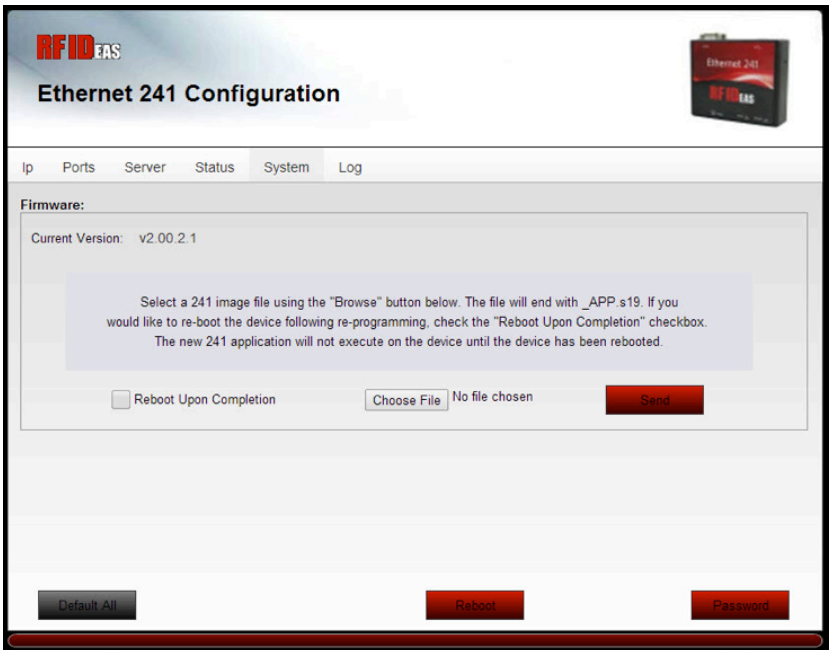


System Page

The system page shows the current version of firmware on the Ethernet 241 and provides access to several system utilities. From this page, the Ethernet 241 firmware can be updated by uploading a file. Instructions are provided in the utility.

All Ethernet 241 user defined parameters can be set to their factory default values. The system password can be set.

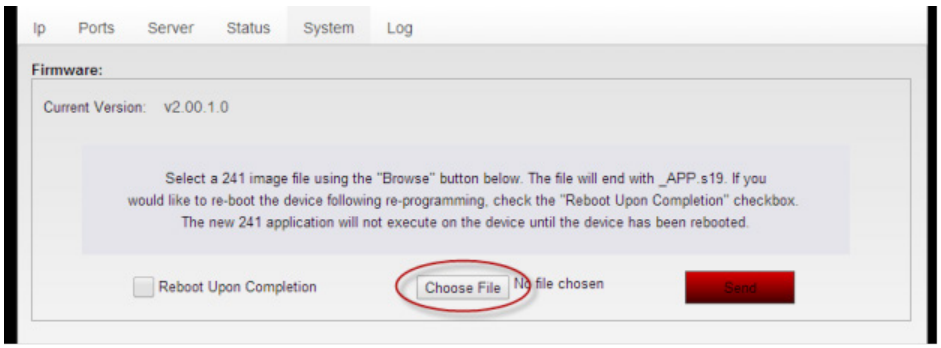
The Ethernet 241 can be manually rebooted.



Updating 241 Firmware

In addition to updating the Ethernet 241 via the web interface (see steps below), updates can also be made through the 241 Discovery Tool (see the 241 Discovery Tool User Guide).

1. On the System page, click on the 'Choose File' Button

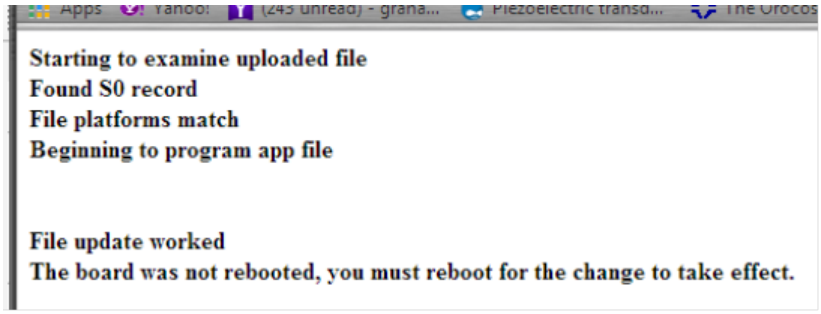


2. Use the file selection dialog to navigate to the firmware binary and select 'Open'. Valid 241-C image file names are appended with 'APP' and have a .s19 extension.

3. To begin the file upload and update process, select 'Send'.

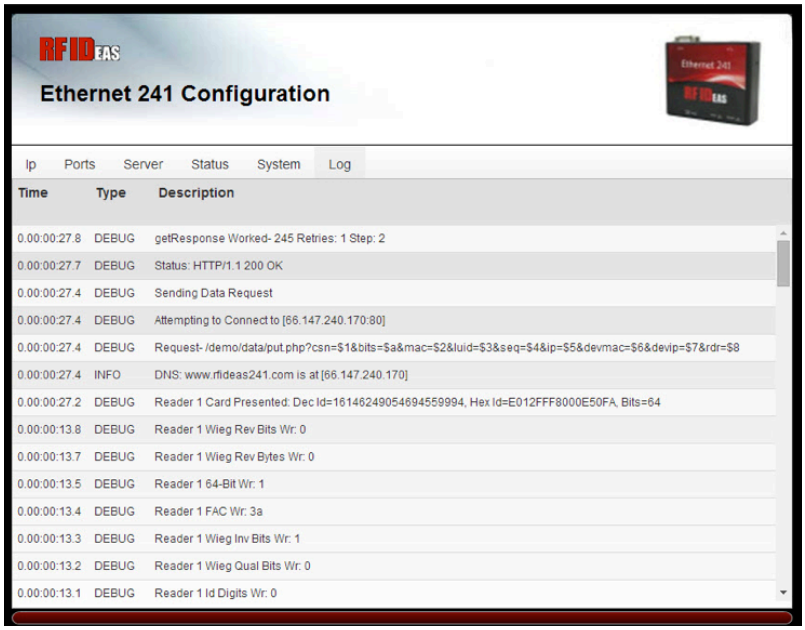
4. The web interface will display the uploading and update process status. Wait for the message that the upload has completed. Reboot the 241 for the update to take effect. It is recommended to close the web page and re-open it to view the updated information.

   CAUTION – Refreshing the screen will result in a prompt asking if you want to repeat the last action. In this case clicking on "Yes" will result in the firmware image being sent again. If this is started it needs to run to completion or there is risk of rendering the unit unusable.



The Log Page

The Ethernet 241 logs events that are displayed on the log page. These events can aid in troubleshooting any issues with the device. The log page shown below, shows the Ethernet 241 receiving discovery requests from a remote host.



Please feel free to call, e-mail or visit our web site for a full list of applications, products, configuration options, supported cards and form factor specifications. Our web site includes application videos, support materials, case studies and detailed information about our product line.

Every effort has been made to ensure that the information in this manual is accurate. RF IDeas is not responsible for printing or clerical errors.