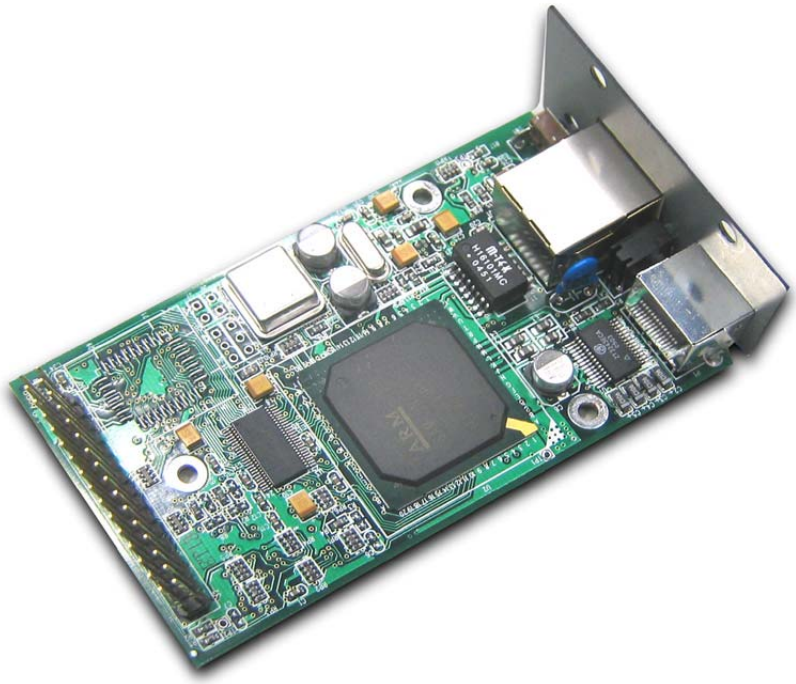
USER MANUAL

ET100R

ET100R router module for ETU/TTU Access Units and MUX devices.



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This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual may cause harmful interference in which case the user will be required to correct the interference at their own expense.

NOTICES:
(1) The changes or modifications not expressively approved by the party responsible for compliance could void the user's authority to operate the equipment.
(2) Shielded interface cables and AC power cord, if any, must be used in order to comply with the emission limits.
(3) This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

CISPR PUB.22 Class A COMPLIANCE:
This device complies with EMC directive of the European Community and meets or exceeds the following technical standard. EN 55022 - Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment. This device complies with CISPR Class A.

CE NOTICE
Marking by the symbol CE indicates compliance of this equipment to the EMC directive of the European Community. Such marking is indicative that this equipment meets or exceeds the following technical standards: EN 55022:1994/A1:1995/A2:1997 Class A and EN61000-3-2:1995, EN61000-3-3:1995 and EN50082-1:1997

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ET00R
ETU/TTU Access and Multiplexer Series Internet Protocol Routing Module

User Manual
Version 0.99 Nov 2006 Final Draft (Pre-Release)

This manual supports the following models:
ET100R Router Module

This document is the final draft or pre-release manual. Please check CTC Union's website for any updated manual or contact us by E-mail at info@ctcu.com. Please address any comments for improving this manual or to point out omissions or errors to marketing@ctcu.com. Thank you.

CTC Union maintains a support web site (support.ctcu.com) where you may obtain the latest manual, quick installation guide, and operational firmware. Membership to this web site is free, however, you must be a registered member in order to access any software updates.

Table of Contents

Chapter 1 Introduction

Thank you for choosing the ET100R router module. The ET100R router module has been designed to provide SME's (Small to Medium Enterprises) with fast, cost effective network connections. When installed into one of our DSU/CSUs or multiplexers, the ET100R allows SMBs to share information, connect remote users, or access the Internet over E1 or T1 leased lines.

This chapter will introduce the features and specifications of the ET100R router module.

1.1 Features

The ET100R is an advanced networking device, used by SMBs, with the following hardware and software features.

Hardware

* Samsung ARM9 166MHz communications processor.
* 8 MB Flash.
* 32MB SDRAM.
* Auto sensing, Auto MDIX, 10/100 Ethernet Interface.
* Synchronous Nx56/Nx64 WAN connection speed up to full, unframed T1 or E1.
* Hardware module for any one of our standalone ETU or TTU series DSU/CSUs.

Software

* Static routing table (up to 32 entries)
* RIP I, RIP II, send or receive on WAN or Ethernet
* DCHP client/server function
* DNS Proxy
* NAT function
* PPP, HDLC and Cisco™ HDLC WAN protocol encapsulation
* IP mapping / client filtering functions
* TFTP upgradeable firmware
* Web based management
* SNMP MIB-II (RFC1213) supported

Physical

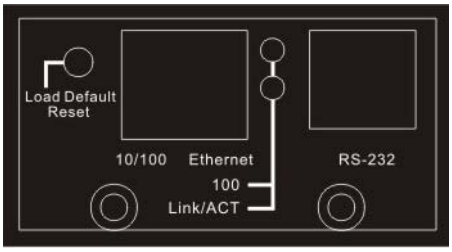
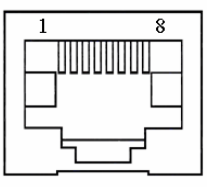


Figure: ET100R Cover Plate

1. A push button switch is provided with the following function:
   Pressing and holding this switch for 8 seconds when powering on will return the router to factory defaults.



Normal
1.Tx+
2.Tx-
3.Rx+
6.Rx-

Figure: ET100R RJ-45 Ethernet Connector

2. The Ethernet connector for the ET100R supports 10/100 Half/Full auto negotiation and auto MDIX.

3. The Two LEDs have the following meanings:

a. 100, when lit this LED indicates the Ethernet is 100Base-TX, when off the Ethernet is 10Base-T

b. Link/ACT, when lit the LED indicates the Ethernet has link, when flashing it indicates activity

4. The RS-232 uses a 9pin mini-DIN connector. A mini-DIN to DB9 serial cable is provided with the router for console configuration.

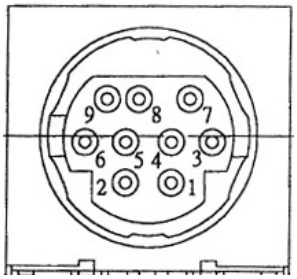


Figure: Mini-DIN 9 Pin Assignment

Pin	Circuit	Direction	Description
1	NC		
2	RD	Output	Receive Data
3	TD	Input	Transmit Data
4	DTR	Input	
5	GND	--	Signal Ground
6	DSR	Output	Data Set Ready
7	RTS	Input	Request To Send
8	CTS	Output	Clear To Send
9	NC		

Table: Mini-DIN Pin Assignment

Whether included in the original purchase of one of our DSU/CSU units or purchased separately as an upgrade item, we would again like to thank you for choosing the ET100R router module.

Chapter 2 Installation

This chapter will describe the procedure for installing the ET100R router module into one of our typical DSU/CSU units.

Figure 2-1 Package Contents

Item	Package Contents
1	DB9F to mini-DIN9, Serial console cable
2	Cover, beauty plate Mounting screws x 3 Cover screws x 2
3	ET100R module, PCB Assembly
4	User's Manual CDROM
5	Quick Start Guide, Hard Copy (not shown)

Table: Package Contents

Safety Recommendations

Follow these guidelines to ensure general safety:

* Keep the chassis area clear and dust-free during and after installation.
* Before working on a chassis or working near power supplies, unplug the power cord on AC units; disconnect the power at the circuit breaker on DC units.
* Keep tools away from walk areas where you and others could fall over them.
* Do not wear loose clothing that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.
* Wear safety glasses if you are working under any conditions that might be hazardous to your eyes.
* Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
* Never assume that power is disconnected from a circuit. Always check.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. It occurs when electronic components are improperly handled and can result in complete or intermittent failures. Always follow ESD-prevention procedures when removing and replacing components. Ensure that the chassis is electrically connected to earth ground. Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the chassis frame to safely channel unwanted ESD voltages to ground. To properly guard against ESD damage and shocks, the wrist strap and cord must operate effectively. If no wrist strap is available, ground yourself by touching the metal part of a grounded chassis.

2.1 Installation Procedure

The ET100R Router Module is designed for installation into one of the following ETU/TTU series units:
ETU01, TTU01, ETU01-U, ETU01A, ETU02-MUX, or TTU02-MUX

1. Disconnect all power and signal lines from the unit.
2. Place the unit on a well lit work bench.
3. Loosen the two rear thumb screws and slide the PCBA assemble out the rear of the unit. (See Figure 2-2)
4. If there is already an ETU/TTU module in the unit, remove the rear face cover (if applicable) and the three screws that secure the module to the unit. Pull up the connector header end and remove the module.
5. Before installing the ET100R module, check to be sure the header pins are straight and not bent.
6. Install the module by placing the connector end (serial DIN, RJ-45 Ethernet connector) into the rear panel's chassis hole from the inside. (See Figure 2-3)
7. Align the header pins with the socket on the main PCB assembly. (See Figure 2-4)
8. Seat the module in the header until the module rests on the main PCBA's standoffs.
9. Install the three holding screws for the module and tighten moderately tight, but do not over tighten. (See Figure 2-5)
10. From the rear of the unit, align the beauty plate with the LEDs, connectors and reset switch.
11. Use the two flat-head screws to secure the beauty plate. (See Figure 2-6)
12. Return the PCBA to the housing of the ETU/TTU unit, seating it fully and retightening the two rear panel thumb screws. (See Figure 2-7)

Figure 2-2: Open ETU/TTU Series Unit

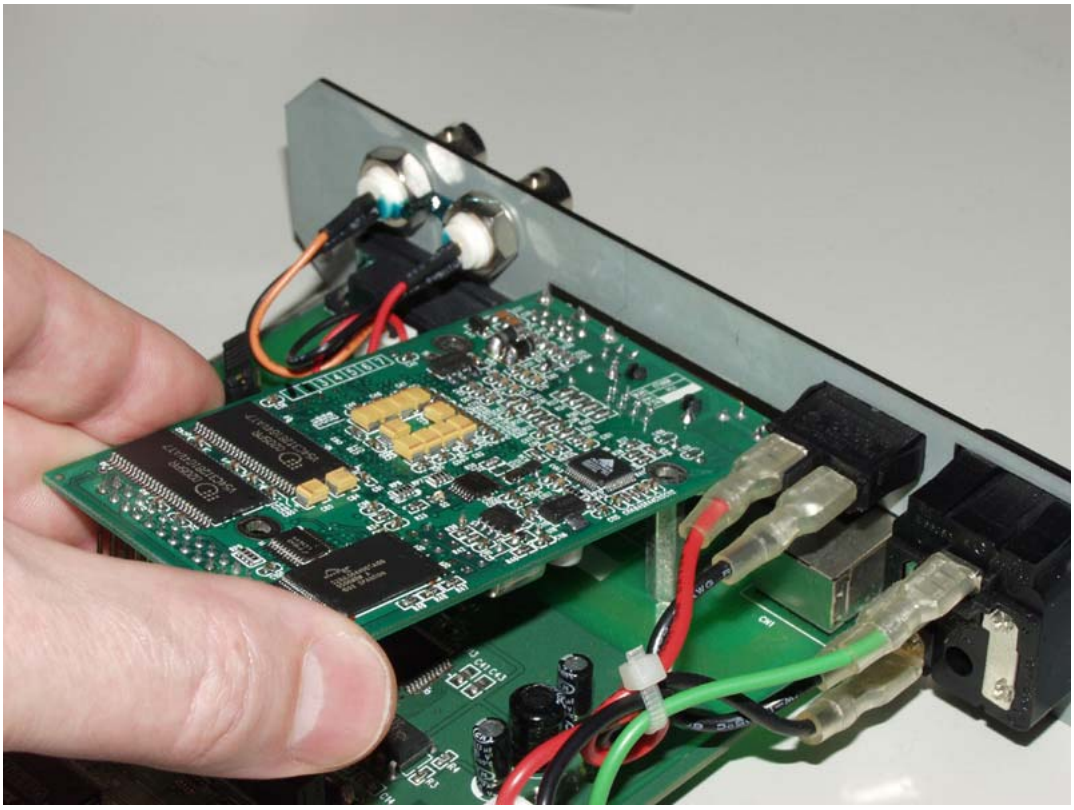


Figure 2-3: Insert the ET100R module

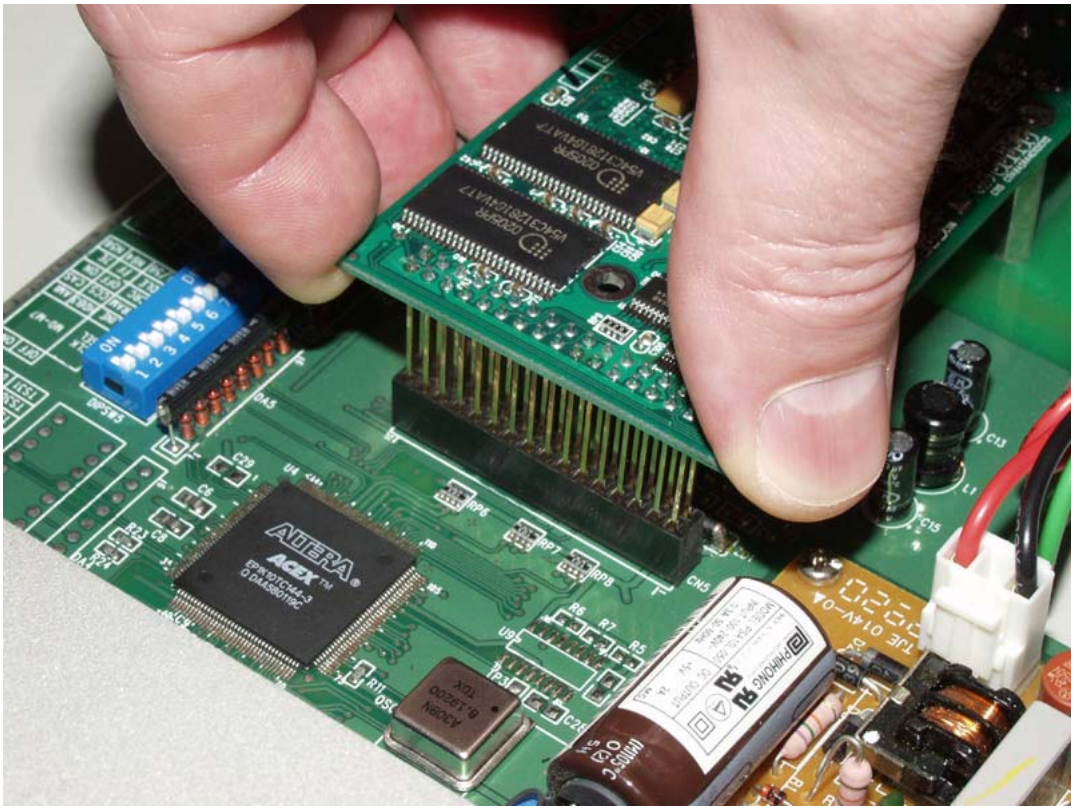


Figure 2-4: Align the header pins to PCB header.

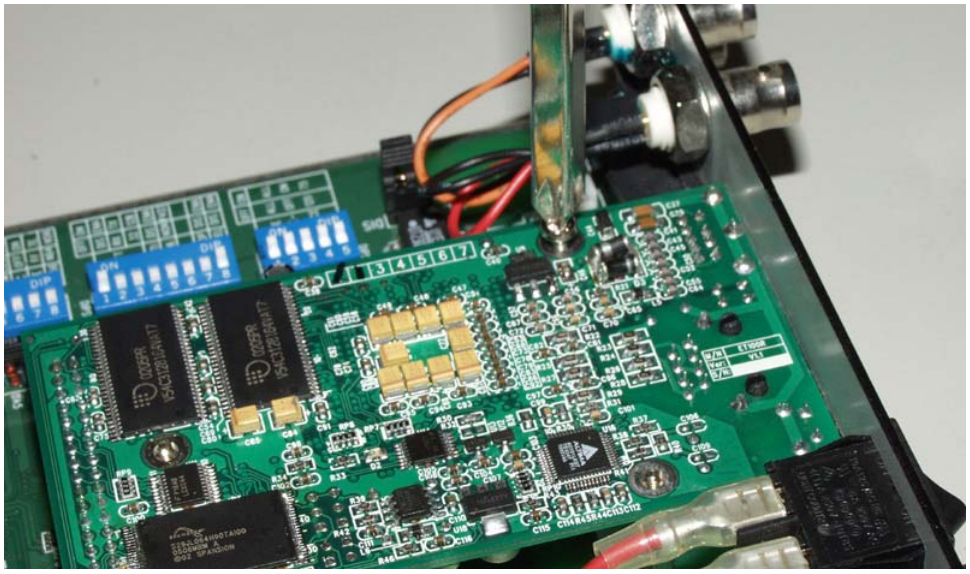


Figure 2-5: Secure the module with three supplied screws.

Figure 2-6: Install the beauty panel.

Figure 2-7: Final Installation Complete

This completes the physical assembling of the ET100R module. Please refer to Chapter 3 for the Provisioning of the ET100R Router.

Chapter 3 Provisioning

This chapter provides the provisioning steps for the ET100R Router using the Command Line Interface (CLI) in detail. They are all Cisco like commands. Typical application examples are provided for setting the major features of the ET100R. The complete CLI Reference is outlined in a separate chapter.

3.1 Console Configuration

A notebook computer has become an invaluable tool of the Systems Engineer. The ET100R acts as a DCE to the PC's DTE communications port. The ET100R is provided with a mini-DIN 9 to DB9 cable for easy connection to a PC's RS-232 COM: port with the console port of ET100R. A convenient application, provided with the Microsoft Windows® 9X, NT®, or XP operating systems, is "HyperTerminal™". Set the properties to match the ET100R's console port factory defaults as follows: Baud=115.2K, Data bits=8, Parity=None, Stop bits=1, and handshaking=none. If you are using "HyperTerminal " the display should look like the following.

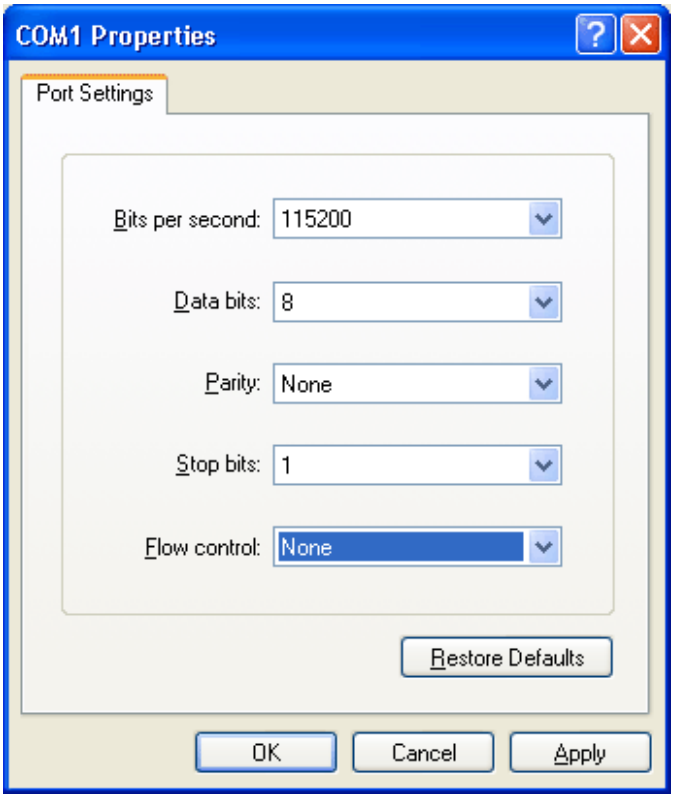


Figure 3-1: HyperTerminal Properties

Make the appropriate connections, start the terminal application, and apply power to the ET100R. There are two operational modes for the ET100R, basic mode and privileged mode. The user may login to basic mode by entering the default "admin" username at the login prompt. There will be a ">" prompt on every command line. Privileged mode is required to make any configuration changes to the ET100R router. The user will login to privileged mode from basic mode by entering the "enable" command, followed by the privileged mode password. In privileged mode, there will be a "#" prompt on every command line. Enter the "disable" command to go back to basic mode. Entering the "quit" command, will logout of both the basic and the privileged modes.

3.2 Applications

3.2.1 Cisco HDLC Encapsulation

3.2.1.1 Scenario

This is a typical application using CTC Union's ET100R with E1/T1 series access units or multiplexers. The ET100R router module with Cisco HDLC WAN encapsulation enables you to access the Intranet or Internet resource through Cisco routers or other ET100R in E1/T1 connection.

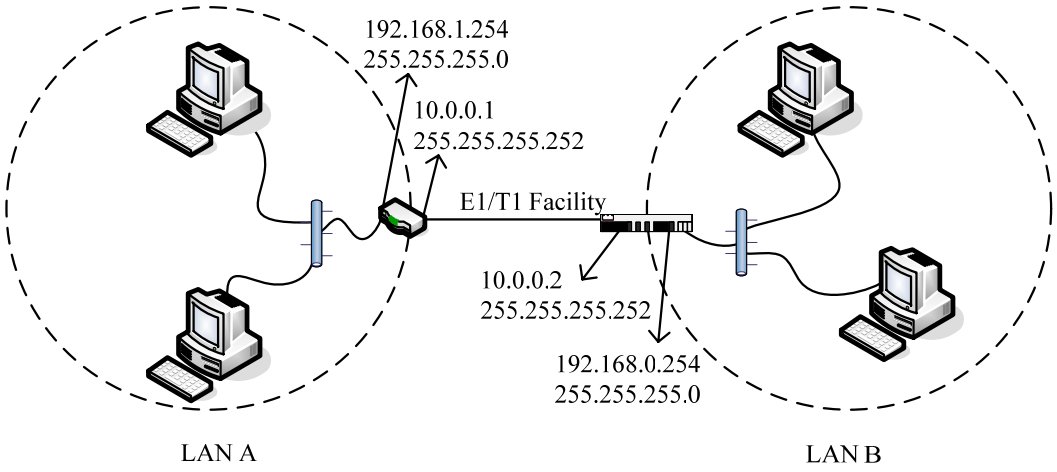


Figure 3-2: ET100R Point-to-Point Application with Cisco router

3.2.1.2 Preparation

Although this is a simple point-to-point application, you must deal with it very carefully. There are some reference points to consider regarding this application.

- E1 or T1 connectivity establishment.
- IP addressing scheme and planning. (Table 3-1)

LAN A	LAN IP	Netmask	WAN IP	Netmask	Peer IP
Network ID	192.168.1.0	255.255.255.0			
PC	192.168.1.1	255.255.255.0			
ET100R	192.168.1.254	255.255.255.0	10.0.0.1	255.255.255.252	10.0.0.2
LANB	LAN IP	Netmask	WAN IP	Netmask	Peer IP
Network ID	192.168.0.0	255.255.255.0			
PC	192.168.0.1	255.255.255.0			
ET100R	192.168.0.254	255.255.255.0	10.0.0.2	255.255.255.252	10.0.0.1

Table 3-1 Address scheme and planning

- Routing protocol: Static route
- Encapsulation: Cisco HDLC
- Administration: System name, System information, Configuration check, Interface summary
- Deployment: CLI commands

3.2.1.3 Deployment procedures

1. E1 or T1 connectivity establishment.
Please refer to CTC Union's E1/T1 DSU/CSU product manual for further operation.

2. IP addressing setting: Configure static IP addresses in PCs on LAN A (local) and LAN B (remote).

3. Local ET100R CLI commands.

System status check: System, Interface Summary, Routing Table, System Memory…
CLI Commands:
show config
show system
show memory
show interface summary
show ip route

```
ET100R login: admin

Welcome to

     CTC UNION TECH. CO., LTD.

           ET100R  Router

ET100R>enable
  Enter Password:

ET100R#show config
# this is the running configuration file


ET100R#show system

  Model: ET100R
  Serial Number : none
  Firmware Version: 1.00.b76
  Firmware Build Time: Sat Jun 10 02:34:14 PDT 2006
  TxClk invert: off

  System Name: ET100R
  Login Name: admin
  Session Timeout: 10 min
  System Time: Thu Jan 01 12:00:45 AM 1970
  System Up Time:  00:00:45 up 0 min, load average: 1.12, 0.30, 0.10

ET100R#show memory
        total:    used:    free:  shared: buffers:  cached:
Mem:  30908416  5644288 25264128        0    12288    28672
Swap:        0        0        0
MemTotal:        30184 kB
MemFree:         24672 kB
MemShared:           0 kB
Buffers:            12 kB
Active:              8 kB
Inactive:           32 kB
HighTotal:           0 kB
HighFree:            0 kB
LowTotal:        30184 kB
LowFree:         24672 kB
SwapTotal:           0 kB
SwapFree:            0 kB


ET100R#
```

```
ET100R#show interface summary

name      hw type    hw addr            ip addr       ip mask     status

eth1      Ethernet   00:02:AB:06:00:01  192.168.0.1   255.255.255.0   up
hdlc1     UNSPEC     ------             192.168.1.1   255.255.255.192 up
lo        Loopback   ------             127.0.0.1     255.0.0.0       up


ET100R#show ip route


Kernel IP routing table
Destination   Gateway      Genmask         Flags Metric Ref    Use Iface
192.168.1.0   0.0.0.0      255.255.255.192 U     0      0        0 hdlc1
192.168.0.0   0.0.0.0      255.255.255.0   U     0      0        0 eth1


ET100R#
```

Configure and Verify Local ET100R router module.
CLI commands: (must be in enable)

config system name local
config ip rip off
config interface eth1 off
config interface eth1 ip 0 addr 192.168.1.254 netmask 255.255.255.0
config interface hdlc1 off
config interface hdlc1 encap cisco
config interface hdlc1 ip 0 addr 10.0.0.1 netmask 255.255.255.252
config ip route add net 0.0.0.0 netmask 0.0.0.0 gw 10.0.0.2 if hdlc1
config interface hdlc1 on
config interface eth1 on
config save
show interface summary
show ip route

Note: You may type configuration commands to a text file, copy them and paste them into HyperTerminal and it will "run" similar to a run-config-script. Please refer to the scripts folder on the CDROM for many pre-written scripts.

```
ET100R>enable
  Enter Password:

ET100R#config system name local

local#config ip rip off

local#config interface eth1 off

local#config interface eth1 ip 0 addr 192.168.1.254 netmask
255.255.255.0
```

(Continued on the next page)

```
local#config interface hdlc1 off

local#config interface hdlc1 encap cisco

local#config interface hdlc1 ip 0 addr 10.0.0.1 netmask 255.255.255.252

local#config ip route add net 0.0.0.0 netmask 0.0.0.0 gw 10.0.0.2 if
hdlc1

local#config interface hdlc1 on

local#config interface eth1 on

local#config save
  Saving configuration... Please wait!

  Configuration saved.

local#show interface summary

name   hw type   hw addr            ip addr        ip mask        status

eth1   Ethernet  00:02:AB:06:00:01  192.168.1.254  255.255.255.0   up
hdlc1  UNSPEC    ------             10.0.0.1       255.255.255.252 down
lo     Loopback   ------            127.0.0.1      255.0.0.0       up

local#show ip route

Kernel IP routing table
Destination    Gateway    Genmask         Flags Metric Ref    Use Iface
10.0.0.0       0.0.0.0    255.255.255.252 U     0      0        0 hdlc1
192.168.1.0    0.0.0.0    255.255.255.0   U     0      0        0 eth1
0.0.0.0       10.0.0.2    0.0.0.0         UG    0      0        0 hdlc1

local#
```

4. Remote ET100R CLI commands.

System status check: System, Interface Summary, Routing Table, System Memory…
CLI Commands:

show config
show system
show memory
show interface summary
show ip route

```
ET100R login: admin

Welcome to

     CTC UNION TECH. CO., LTD.

           ET100R  Router

ET100R>enable
  Enter Password:

ET100R#show config
# this is the running configuration file

ET100R#show system

  Model: ET100R
  Serial Number : none
  Firmware Version: 1.00.b76
  Firmware Build Time: Sat Jun 10 02:34:14 PDT 2006
  TxClk invert: off

  System Name: ET100R
  Login Name: admin
  Session Timeout: 10 min
  System Time: Thu Jan 01 12:00:45 AM 1970
  System Up Time:  00:00:45 up 0 min, load average: 1.12, 0.30, 0.10

ET100R#show memory
        total:    used:    free:  shared: buffers:  cached:
Mem:  30908416  5644288 25264128        0    12288    28672
Swap:        0        0        0
MemTotal:        30184 kB
MemFree:         24672 kB
MemShared:           0 kB
Buffers:            12 kB
Active:              8 kB
Inactive:           32 kB
HighTotal:           0 kB
HighFree:            0 kB
LowTotal:        30184 kB
LowFree:         24672 kB
SwapTotal:           0 kB
SwapFree:            0 kB

ET100R#show interface summary

name    hw type   hw addr            ip addr        ip mask       status

eth1    Ethernet  00:02:AB:06:00:23  192.168.0.1    255.255.255.0   up
hdlc1   UNSPEC    ------             192.168.1.1    255.255.255.192 up
lo      Loopback  ------             127.0.0.1      255.0.0.0       up

ET100R#show ip route

Kernel IP routing table
Destination   Gateway    Genmask         Flags Metric Ref    Use Iface
192.168.1.0   0.0.0.0    255.255.255.192 U     0      0        0 hdlc1
192.168.0.0   0.0.0.0    255.255.255.0   U     0      0        0 eth1
ET100R#
```

Configure and Verify Remote ET100R router module.
CLI commands: (must be in enable)

config system name Remote
config ip rip off
config interface eth1 off
config interface eth1 ip 0 addr 192.168.0.254 netmask 255.255.255.0
config interface hdlc1 off
config interface hdlc1 encap cisco
config interface hdlc1 ip 0 addr 10.0.0.2 netmask 255.255.255.252
config ip route add net 0.0.0.0 netmask 0.0.0.0 gw 10.0.0.1 if hdlc1
config interface hdlc1 on
config interface eth1 on
config save
show interface summary
show ip route
ping 192.168.1.254 ---- This should be successful pinging to PC in LAN A
ping 10.0.0.1 ---- This should be successful pinging to WAN I/F in ET100R located in LAN A.

Note: You may type configuration commands to a text file, copy them and paste them into HyperTerminal and it will "run" similar to a run-config-script. Please refer to the scripts folder on the CDROM for many pre-written scripts.

```
ET100R>enable
  Enter Password:

ET100R#config system name remote

remote#config ip rip off

remote#config interface eth1 off

remote#config interface eth1 ip 0 addr 192.168.0.254 netmask
255.255.255.0

remote#config interface hdlc1 off

remote#config interface hdlc1 encap cisco

remote#config interface hdlc1 ip 0 addr 10.0.0.2 netmask 255.255.255.252

remote#config ip route add net 0.0.0.0 netmask 0.0.0.0 gw 10.0.0.1 if
hdlc1

remote#config interface hdlc1 on

remote#config interface eth1 on

remote#config save
  Saving configuration... Please wait!

  Configuration saved.
```

(continued on next page)

```
remote#show interface summary

name   hw type   hw addr            ip addr        ip mask        status

eth1   Ethernet  00:02:AB:06:00:23  192.168.0.254  255.255.255.0   up
hdlc1  UNSPEC    ------             10.0.0.2       255.255.255.252 up
lo     Loopback   ------            127.0.0.1      255.0.0.0       up

remote#show ip route

 Kernel IP routing table
Destination    Gateway    Genmask          Flags Metric Ref    Use Iface
10.0.0.0       0.0.0.0    255.255.255.252 U     0      0        0 hdlc1
192.168.0.0    0.0.0.0    255.255.255.0   U     0      0        0 eth1
0.0.0.0       10.0.0.1    0.0.0.0         UG    0      0        0 hdlc1

remote#ping 192.168.1.254
PING 192.168.1.254 (192.168.1.254): 56 data bytes
64 bytes from 192.168.1.254: icmp_seq=0 ttl=64 time=9.0 ms
64 bytes from 192.168.1.254: icmp_seq=1 ttl=64 time=8.5 ms
64 bytes from 192.168.1.254: icmp_seq=2 ttl=64 time=8.6 ms
64 bytes from 192.168.1.254: icmp_seq=3 ttl=64 time=8.6 ms

--- 192.168.1.254 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 8.5/8.6/9.0 ms

remote#ping 10.0.0.1
PING 10.0.0.1 (10.0.0.1): 56 data bytes
64 bytes from 10.0.0.1: icmp_seq=0 ttl=64 time=8.6 ms
64 bytes from 10.0.0.1: icmp_seq=1 ttl=64 time=8.6 ms
64 bytes from 10.0.0.1: icmp_seq=2 ttl=64 time=8.6 ms
64 bytes from 10.0.0.1: icmp_seq=3 ttl=64 time=8.7 ms

--- 10.0.0.1 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 8.6/8.6/8.7 ms

remote#
```

3.2.2 Raw HDLC Encapsulation

3.2.2.1 Scenario

This is a typical application using CTC Union's ET100R with E1/T1 series access units or multiplexers. The ET100R router module with Raw HDLC WAN encapsulation enables you to access the Intranet or Internet resource through the E1/T1 connection.

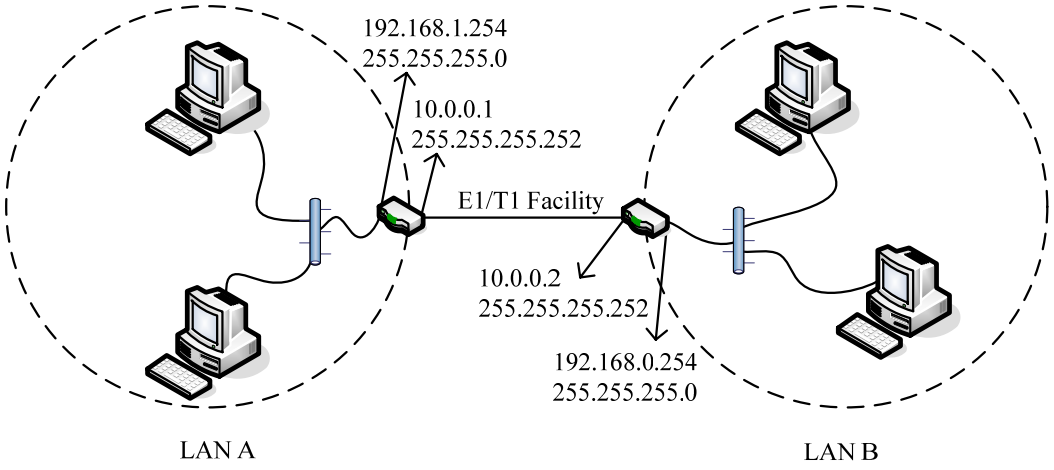


Figure 3-3 ET100R Point-to-Point Application example

3.2.2.2 Preparation

Although this is a simple point-to-point application, you must deal with it very carefully. There are some reference points to consider regarding this application.

- E1 or T1 connectivity establishment.
- IP addressing scheme and planning.(Table 3-2)

LAN A	LAN IP	Netmask	WAN IP	Netmask	Peer IP
Network ID	192.168.1.0	255.255.255.0			
PC	192.168.1.1	255.255.255.0			
ET100R	192.168.1.254	255.255.255.0	10.0.0.1	255.255.255.252	10.0.0.2
LANB	LAN IP	Netmask	WAN IP	Netmask	Peer IP
Network ID	192.168.0.0	255.255.255.0			
PC	192.168.0.1	255.255.255.0			
ET100R	192.168.0.254	255.255.255.0	10.0.0.0.2	255.255.255.252	10.0.0.1

Table 3-2 Addressing scheme and planning

- Routing protocol: Static route
- Encapsulation: Raw HDLC.
- Administration: System name, System information, Configuration check, Interface summary.
- Deployment: CLI commands.

3.2.2.3 Deployment procedures

1. E1 or T1 connectivity establishment.
Please refer to CTC Union's E1/T1 DSU/CSU product manual for further operation.

2. IP addressing setting: Configure static IP addresses in PCs on LAN A (local) and LAN B (remote).

3. Local ET100R CLI commands.

System status check; System, Interface summary, Route table, System memory…
CLI Commands:
show config
show system
show memory
show interface summary
show ip route

Configure and Verify Local ET100R router module.
CLI commands: (must be in enable)
config system name Local
config ip rip off
config interface eth1 off
config interface eth1 ip 0 addr 192.168.1.254 netmask 255.255.255.0
config interface hdlc1 off
config interface hdlc1 encap hdlc
config interface hdlc1 ip 0 addr 10.0.0.1 netmask 255.255.255.252
config ip route add net 0.0.0.0 netmask 0.0.0.0 gw 10.0.0.2 if hdlc1
config interface hdlc1 on
config interface eth1 on
config save
show interface summary
show ip route

Note: You may type configuration commands to a text file, copy them and paste them into HyperTerminal and it will "run" similar to a run-config-script. Please refer to the scripts folder on the CDROM for many pre-written scripts.

4. Remote ET100R CLI commands.

System status check; System, Interface summary, Route table, System memory…
CLI Commands:
show config
show system
show memory
show interface summary
show ip route

Configure and Verify Remote ET100R router module.
CLI commands: (must be in enable)
config system name Remote
config ip rip off
config interface eth1 off
config interface eth1 ip 0 addr 192.168.0.254 netmask 255.255.255.0
config interface hdlc1 off
config interface hdlc1 encap hdlc
config interface hdlc1 ip 0 addr 10.0.0.2 netmask 255.255.255.252
config ip route add net 0.0.0.0 netmask 0.0.0.0 gw 10.0.0.1 if hdlc1
config interface hdlc1 on
config interface eth1 on
config save
show interface summary
show ip route
ping 192.168.1. 254 ---- This should be successful pinging to PC in LAN A
ping 10.0.0.1 ---- This should be successful pinging to WAN I/F in ET100R located in LAN A.

Note: You may type configuration commands to a text file, copy them and paste them into HyperTerminal and it will "run" similar to a run-config-script. Please refer to the scripts folder on the CDROM for many pre-written scripts.

3.2.3 PPP Encapsulation

3.2.3.1 Scenario

This is a typical application using CTC Union's ET100R with E1/T1 series access units or multiplexers. The ET100R router module with PPP WAN encapsulation enables you to access the Intranet or Internet resource through the E1/T1 connection.

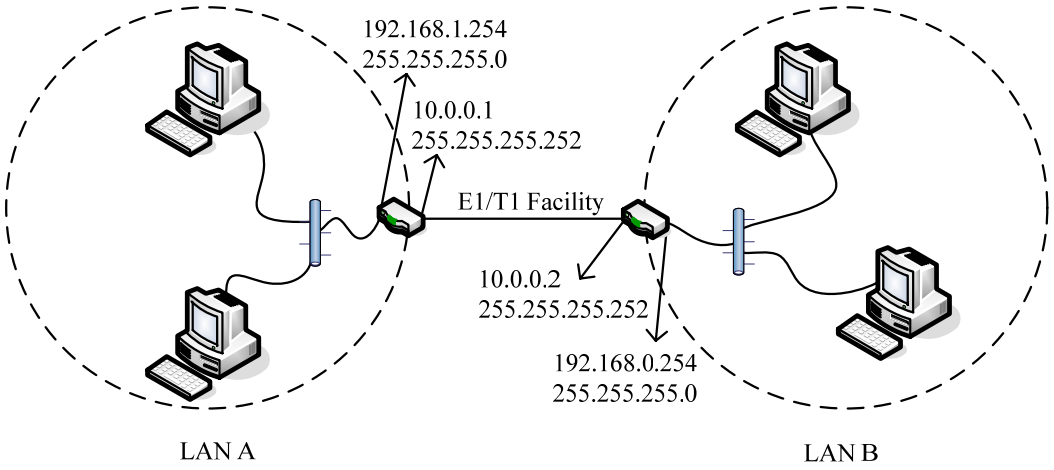


Figure 3-4 ET100R Point-to-Point Application example

3.2.3.2 Preparation

Although this is a simple point-to-point application, you must deal with it very carefully. There are some reference points to consider regarding this application.

- E1 or T1 connectivity establishment.
- IP addressing scheme and planning.(Table 3-3)

LAN A	LAN IP	Netmask	WAN IP	Netmask	Peer IP
Network ID	192.168.1.0	255.255.255.0			
PC	192.168.1.1	255.255.255.0			
ET100R	192.168.1.254	255.255.255.0	10.0.0.1	255.255.255.252	10.0.0.2
LANB	LAN IP	Netmask	WAN IP	Netmask	Peer IP
Network ID	192.168.0.0	255.255.255.0			
PC	192.168.0.1	255.255.255.0			
ET100R	192.168.0.254	255.255.255.0	10.0.0.0.2	255.255.255.252	10.0.0.1

Table 3-3 Addressing scheme and planning

- Routing protocol: Static route
- Encapsulation: PPP.
- Administration: System name, System information, Configuration check, Interface summary.
- Deployment: CLI commands.

3.2.3.3 Deployment procedures

1. E1 or T1 connectivity establishment.
Please refer to CTC Union's E1/T1 DSU/CSU product manual for further operation.

2. IP addressing setting: Configure static IP addresses in PCs on LAN A (local) and LAN B (remote).

3. Local ET100R CLI commands.

System status check; System, Interface summary, Route table, System memory…
CLI Commands:
show config
show system
show memory
show interface summary
show ip route

Configure and Verify Local ET100R router module.
CLI commands: (must be in enable)
config system name Near
config ip rip off
config interface eth1 off
config interface eth1 ip 0 addr 192.168.1.254 netmask 255.255.255.0
config interface hdlc1 off
config interface hdlc1 encap ppp
config interface hdlc1 ip 0 addr 10.0.0.1 netmask 255.255.255.252
config ip route add net 0.0.0.0 netmask 0.0.0.0 gw 10.0.0.2 if hdlc1
config interface hdlc1 on
config interface eth1 on
config save
show interface summary
show ip route

Note: You may type configuration commands to a text file, copy them and paste them into HyperTerminal and it will "run" similar to a run-config-script. Please refer to the scripts folder on the CDROM for many pre-written scripts.

4. Remote ET100R CLI commands.

System status check; System, Interface summary, Route table, System memory…
CLI Commands:
show config
show system
show memory
show interface summary
show ip route

Configure and Verify Remote ET100R router module.
CLI commands: (must be in enable)
config system name Remote
config ip rip off
config interface eth1 off
config interface eth1 ip 0 addr 192.168.0.254 netmask 255.255.255.0
config interface hdlc1 off
config interface hdlc1 encap ppp
config interface hdlc1 ip 0 addr 10.0.0.2 netmask 255.255.255.252
config ip route add net 0.0.0.0 netmask 0.0.0.0 gw 10.0.0.1 if hdlc1
config interface hdlc1 on
config interface eth1 on
config save
show interface summary
show ip route
ping 192.168.1.254 ---- This should be successful pinging to PC in LAN A
ping 10.0.0.1 ---- This should be successful pinging to WAN I/F in ET100R located in LAN A.

Note: You may type configuration commands to a text file, copy them and paste them into HyperTerminal and it will "run" similar to a run-config-script. Please refer to the scripts folder on the CDROM for many pre-written scripts.

3.2.4 Static Routing Table Example

3.2.4.1 Scenario

This is a typical application using CTC Union's ET100R with E1/T1 series access units or multiplexers. The ET100R router module with PPP WAN encapsulation enables you to access both Intranet and Internet resource through E1/T1 connections.

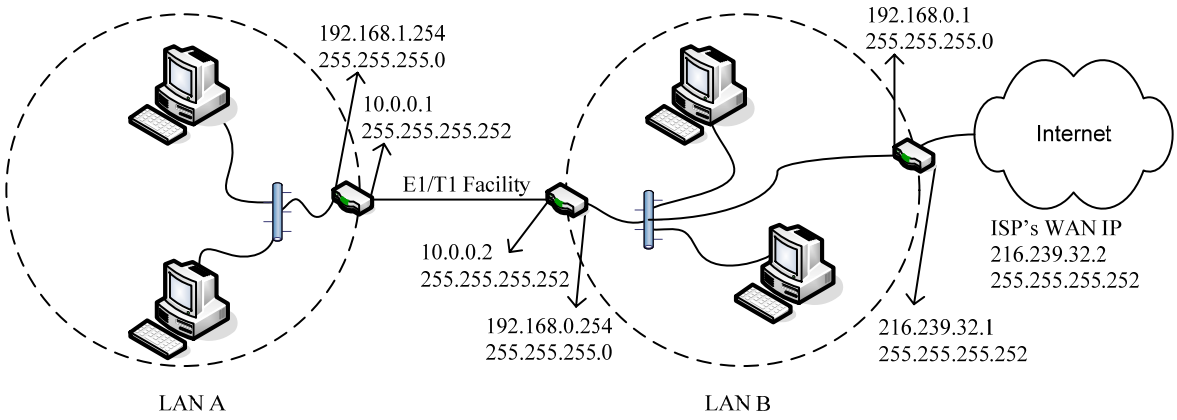


Figure 3-5 ET100R Static Routing Example

3.2.4.2 Preparation

This is a more complex application where LAN B now has 2 routers, one for Internet access and one for LAN-to-LAN access over E1/T1.

- E1 or T1 connectivity establishment.
- IP addressing scheme and planning.(Table 3-4)

LAN A	LAN IP	Netmask	WAN IP	Netmask	Peer IP
Network ID	192.168.1.0	255.255.255.0			
PC	192.168.1.1	255.255.255.0			
ET100R	192.168.1.254	255.255.255.0	10.0.0.1	255.255.255.252	10.0.0.2
LANB	LAN IP	Netmask	WAN IP	Netmask	Peer IP
Network ID	192.168.0.0	255.255.255.0			
PC	192.168.0.10	255.255.255.0			
ET100R	192.168.0.254	255.255.255.0	10.0.0.0.2	255.255.255.252	10.0.0.1
ET100R-2	192.168.0.1	255.255.255.0	216.239.32.1	255.255.255.252	216.239.32.2

Table 3-4 Addressing scheme and planning.

- Routing protocol: Static route
- Encapsulation: PPP.
- Administration: System name, System information, Configuration check, Interface summary.
- Deployment: CLI commands.

3.2.4.3 Deployment procedures

1. E1 or T1 connectivity establishment.
Please refer to CTC Union's E1/T1 DSU/CSU product manual for further operation.

2. IP addressing setting: Configure static IP addresses in PCs on LAN A (local) and LAN B (remote).

3. Local ET100R CLI commands.

Follow the procedures in previous Cisco, HDLC or PPP examples for configuring the local ET100R.

4. Remote LAN-to-LAN ET100R CLI commands.
CLI commands: (must be in enable)
config system name Remote
config ip rip off
config interface eth1 off
config interface eth1 ip 0 addr 192.168.0.254 netmask 255.255.255.0
config interface hdlc1 off
config interface hdlc1 encap ppp **<<use the right encapsulation for your application**
config interface hdlc1 ip 0 addr 10.0.0.2 netmask 255.255.255.252
config ip route add net 192.168.1.0 netmask 255.255.255.0 gw 10.0.0.1 if hdlc1
config ip route add net 0.0.0.0 netmask 0.0.0.0 gw 192.168.0.1 if eth1
config interface hdlc1 on
config interface eth1 on
config save
show interface summary
show ip route
ping 192.168.1.254 ---- This should be successful pinging to PC in LAN A
ping 10.0.0.1 ---- This should be successful pinging to WAN I/F in ET100R located in LAN A.

5. Internet Access ET100R CLI commands.
CLI commands: (must be in enable)
config system name Internet
config ip rip off
config interface eth1 off
config interface eth1 ip 0 addr 192.168.0.1 netmask 255.255.255.0
config interface hdlc1 off
config interface hdlc1 encap cisco **<<use the encapsulation required by your ISP**
config interface hdlc1 ip 0 addr 216.239.32.1 netmask 255.255.255.252
config ip route add net 192.168.1.0 netmask 255.255.255.0 gw 192.168.0.254 if eth1
config ip route add net 0.0.0.0 netmask 0.0.0.0 gw 216.239.32.2 if hdlc1
config interface hdlc1 on
config interface eth1 on
config save
show interface summary
show ip route
ping 192.168.1.254 ---- This should be successful pinging to PC in LAN A
ping 216.239.32.2 ---- This should be successful pinging to WAN I/F of ISP

Note: You may type configuration commands to a text file, copy them and paste them into HyperTerminal and it will "run" similar to a run-config-script. Please refer to the scripts folder on the CDROM for many pre-written scripts.

3.2.5 RIP Configuration

3.2.5.1 Scenario

This is a typical application using CTC Union's ET100R with E1/T1 series access units or multiplexers. The ET100R router module performs either RIP 1, RIP 2 IP packets forwarding function from network to network, enabling you to access the Intranet or Internet resource through the E1/T1 connection.

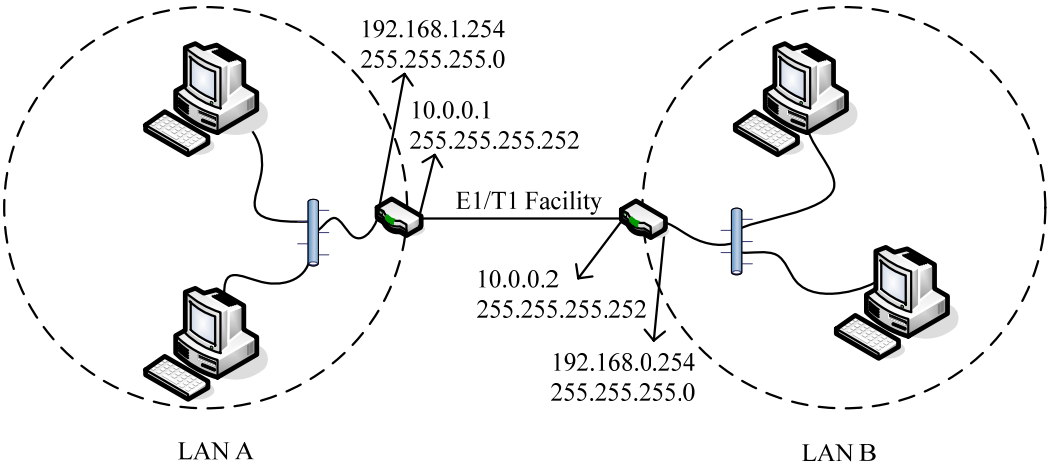


Figure 3-6 ET100R Point-to-Point Application and RIP implementation

3.2.5.2 Preparation

Using RIP, the routing applications can be simplified with dynamic routing tables replacing static ones. There are some reference points to consider regarding this application.

- E1 or T1 connectivity establishment.
- IP addressing scheme and planning.(Table 3-5)

LAN A	LAN IP	Netmask	WAN IP	Netmask	Peer IP
Network ID	192.168.1.0	255.255.255.0			
PC	192.168.1.1	255.255.255.0			
ET100R	192.168.1.254	255.255.255.0	10.0.0.1	255.255.255.252	10.0.0.2
LANB	LAN IP	Netmask	WAN IP	Netmask	Peer IP
Network ID	192.168.0.0	255.255.255.0			
PC	192.168.0.1	255.255.255.0			
ET100R	192.168.0.254	255.255.255.0	10.0.0.0.2	255.255.255.252	10.0.0.1

Table 3-5 Addressing scheme and planning.

- Routing protocol: RIPv1, RIPv2
- Encapsulation: Cisco HDLC, Raw HDLC, or PPP
- Administration: System name, System information, Configuration check, Interface summary.
- Deployment: CLI commands.

3.2.5.3 Deployment procedures

1. E1 or T1 connectivity establishment.
Please refer to CTC Union's E1/T1 DSU/CSU product manual for further operation.

2. IP addressing setting: Configure static IP addresses in PCs on LAN A (local) and LAN B (remote).

3. Local ET100R CLI commands.

System status check; System, Interface summary, Route table, System memory…
CLI Commands:
show config
show system
show memory
show interface summary
show ip route

4. Configure and Verify Local ET100R router module.
CLI commands: (must be in enable)
config system name Local
config interface eth1 off
config interface eth1 ip 0 addr 192.168.1.254 netmask 255.255.255.0
config interface hdlc1 off
config interface hdlc1 encap cisco
config interface hdlc1 ip 0 addr 10.0.0.1 netmask 255.255.255.252
config interface hdlc1 on
config interface hdlc1 ip 0 peer 10.0.0.2
config ip rip ifadd eth1
config ip rip ifadd hdlc1
config ip rip on
config ip rip version 1 *Refer to Note 2
config save
reboot

Note 1: You may type configuration commands to a text file, copy them and paste them into HyperTerminal and it will "run" similar to a run-config-script. Please refer to the scripts folder on the CDROM for many pre-written scripts.

(Please confirm the settings by using the commands below after the ET100R boots up.)
show interface summary
show ip route

Note 2:
In the example we used the RIP version 1. IF you would like to use RIP version 2, please change the command to 'config ip rip version 2'.

5. Remote ET100R CLI commands.

System status check; System, Interface summary, Route table, System memory…
CLI Commands:
show config
show system
show memory
show interface summary
show ip route

6. Configure and Verify Remote ET100R router module.
CLI commands: (must be in enable)
config system name Remote
config interface eth1 off
config interface eth1 ip 0 addr 192.168.0.254 netmask 255.255.255.0
config interface hdlc1 off
config interface hdlc1 encap cisco
config interface hdlc1 ip 0 addr 10.0.0.2 netmask 255.255.255.252
config interface hdlc1 on
config interface hdlc1 ip 0 peer 10.0.0.1
config ip rip ifadd eth1
config ip rip ifadd hdlc1
config ip rip on
config ip rip version 1
config save
reboot

Note: You may type configuration commands to a text file, copy them and paste them into HyperTerminal and it will "run" similar to a run-config-script. Please refer to the scripts folder on the CDROM for many pre-written scripts.

(Please confirm the settings by using commands below after ET100R boots up.)
show interface summary
show ip route
ping 192.168.1.254 ---- This should successfully ping to PC in LAN A.
ping 10.0.0.1 ---- This should successfully ping to WAN I/F in ET100R located in LAN A.

3.2.6 DNS Proxy Configuration

CTC Union ET100R router module may provide DNS proxy service for your network. With this feature, there is no need to install an extra DNS server in your network. The configuration is easy to perform, using only a few commands.

3.2.6.1 Deployment procedures

Before enabling this function, please complete the ET100R functional configuration, then configure the DNS proxy service in the ET100R router module.

1. Review the basic routing function deployment in the ET100R router module.
CLI commands:
(please refer to previous sections)

2. DNS proxy service configuration.
CLI commands: (must be in enable)
config ip dns primary 216.239.32.10 **<<please use DNS server of your ISP**
config ip dns secondary 216.239.32.11
config ip dnsproxy on
config save

3. Verifying the name resolution function.
CLI commands:
ping www.google.com
ping www.yahoo.com

3.2.7 DHCP Client Configuration

CTC Union's ET100R router module can act as a DHCP client, to automatically acquire an IP address from your network's DHCP server. In this configuration, we also enable the RIP function for automatic router discovery. By using DHCP client and RIP, the router becomes almost "plug-and-play", being able to dynamically change IP or routing depending on the network configuration.

3.2.7.1 Deployment procedures

1. Configure for DHCP client and RIP
CLI commands: (must be in enable)
config interface eth1 off
config interface eth1 ip 0 addr mode dhcp
config interface hdlc1 off
config interface hdlc1 encap cisco
config interface hdlc1 ip 0 addr 10.0.0.1 netmask 255.255.255.252
config interface hdlc1 on
config interface hdlc1 ip 0 peer 10.0.0.2
config ip rip ifadd eth1
config ip rip ifadd hdlc1
config ip rip on
config ip rip version 1
config save
reboot

3.2.8 DHCP Server Configuration

CTC Union's ET100R router module provides DHCP service for your network. With this feature, it is very easy to deploy DHCP service for your network. Just simply perform a few commands and you will have this service.

3.2.8.1 Deployment procedures

1. Review the basic routing function deployment in the ET100R router module.

2. DHCP Server service configuration.
CLI commands: (must be in enable)
config ip dhcp on
config ip dhcp pool 0 on
config ip dhcp pool 0 dns 192.168.1.254 *Note
config ip dhcp pool 0 net 192.168.1.0
config ip dhcp pool 0 gw 192.168.1.254
config ip dhcp pool 0 lease_time 3600
config ip dhcp pool 0 netmask 255.255.255.0
config ip dhcp pool 0 range_start 192.168.0.100
config ip dhcp pool 0 range_end 192.168.0.120
config save

Note: If ET100R performs a DNS proxy service, you should set this field to LAN interface of ET100R. Otherwise, this IP address should be a real DNS server's IP.

3. Verifying the DHCP server function.
Please set up any PC to Obtain an IP address automatically and from command window do "ipconfig /renew" to obtain an IP address automatically from the assigned address pool in the ET100R. Check the IP and DNS information with the command 'ipconfig /all'.

3.2.9 NAT Configuration

CTC Union's ET100R router module is able to provide NAT service for your network. With this feature, it's easy to deploy IP sharing features with DHCP service for your network. Just simply perform few a commands and you will have this service.

3.2.9.1 Deployment procedures

1. Review the basic routing function deployment in ET100R router module.

2. Enable NAT service either in Local end or Remote end router.

Near end CLI commands:
config ip nat off
config ip nat add type dnat nat_ip 10.0.0.2 if hdlc1 protocol icmp
config ip nat add type snat nat_ip 10.0.0.1 if hdlc1
config ip nat on
config save

Remote end CLI commands:
config ip nat off
config ip nat add type dnat nat_ip 10.0.0.1 if hdlc1 protocol icmp
config ip nat add type snat nat_ip 10.0.0.2 if hdlc1
config ip nat on
config save

3.2.10 SNMP management

CTC Union's ET100R router module provides SNMP management functions via standard MIB-II (RFC1213).

3.2.10.1 Deployment procedures

1. Review the basic routing function deployment in ET100R router module.

2. SNMP management configuration
CLI commands: (must be in enable)
config snmp on
config snmp read_only community public *
config snmp read_write community secret **
config save

* 'public' is typically the default community string for read only access to the SNMP.
** 'secret' is an example for the read/write community string. Use this string as your password for SNMP and don't use the 'public' community string for read/write as it may present a security risk.

3.2.11 Resetting the ET100R to factory default

CTC Union's ET100R router module may be reset completely to the original factory configuration by either hardware or software. The hardware method must be used if console password is forgotten and the unit cannot be accessed. Software reset can be performed via CLI command (must be in enable).

1. Hardware Reset
Locate the reset push button switch on the rear panel of the ET100R router. With the unit powered off, press and hold the reset switch. Power on the unit and continue to hold the reset switch for at least 8 seconds. Release the switch and wait for the router to fully boot.

2. Software Reset
CLI commands: (must be in enable)
reset

All the current system configuration will be reset to default
Do you want to reset? (y/n) y
Reset system configuration to manufactory default...

3. Soft Reboot
CLI commands: (must be in enable)
reboot

Note: Be careful, there is no further confirmation, the router will immediately reboot.

3.2.12 Firmware upgrade

CTC Union's ET100R router module may be upgraded whenever new firmware becomes available. The upgrade process requires a TFTP server. We provide a free TFTP server for Windows in the 'tools' folder of the CDROM that comes with any ET100R router.

3.2.12.1 Deployment procedures

Before starting to upgrade, please finish the basic setting of the ET100R Ethernet interface.

1. Basic Ethernet interface configuration for ET100R router module.
CLI commands: (must be in enable)
config interface eth1 off
config interface eth1 ip 0 addr 192.168.0.1 netmask 255.255.255.0
config interface eth1 on

2. Setup TFTP server
Connect a PC with IP set on same network as the ET100R (192.168.0.254 in our example). Launch the TFTP server application and place the ET100R F/W code into the TFTP server root directory.

3. Start to upgrade the ET100R F/W code.
CLI commands: (must be in enable)
upgrade tftp server 192.168.0.254 file Timage.b76

Switch from the console window to that of the TFTP server; the screen should be showing the file transfer taking place.

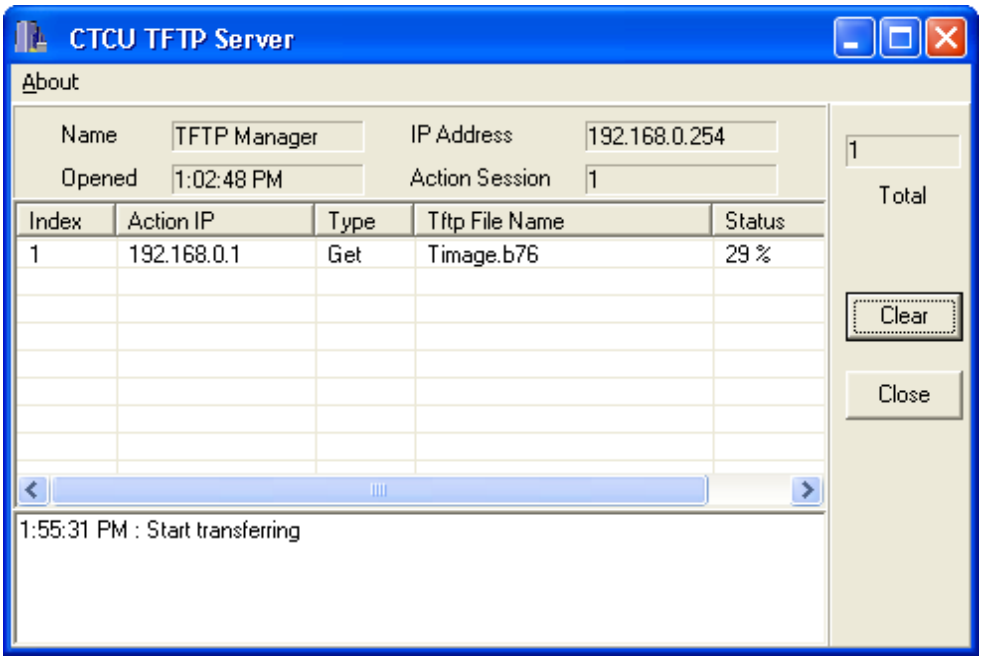


Figure 3-7

complete tftp transfer
start to upgrade the firmware
write block 14
start to upgrade the web
write block 16
start to upgrade the kernel
write block 64
Restarting system.

The router will now reboot normally. It is recommended by our engineers to repeat the upgrade procedure again.

The latest F/W may be found on our support website at http://support.ctcu.com/.

3.2.13 User and Password Configuration

CTC Union's ET100R router provides two levels of management access: user and super-user. User access only allows you to view the operating values; you cannot change any values. Super-user access gives you the power to view and configure all of the router's operating parameters.

1. To create or change the password for the initial login to the ET100R.
CLI commands: (must be in enable)
config system password
Changing password for admin
Enter the new password
Enter new password: *****
Bad password: too simple.

Warning: weak password (continuing).
Re-enter new password: *****
Password changed.

Note: If the password length is under 8 characters, the system will flag it as being too simple of a password, but it will still allow the password change. If the password is 8 or more characters there will be no such warning.

2. To create or change the password for the super-user or 'enable' password of the ET100R.
CLI commands: (must be in enable)
config system enable_password
Enter the new password:
New Password: ********
Re-confirmed: ********

If you forget either the user password or the super-user password, you must perform the hardware reset as described in 3.2.11.

Chapter 4 Web UI Management

CTC Union's ET100R router provides not only the CLI command interface, either directly connected to console port or Telnet session from any connected network to access the ET100R management function, but also, provides a Web UI (User Interface) for accessing the OAM management. This chapter will describe the Web UI interface and how to configure the ET100R router through the Web UI interface.

Using the Web UI interface provides an easy method to configure the ET100R router. Using any standard web browser enables you to launch the ET100R management interface without any extra management software installed. It is an easy and cost-effective way to manage your devices located anywhere.

4.1 Web UI Interface

When using CTC Union Web UI interface at first time, the factory default IP address setting of the ET100R Ethernet interface is 192.168.0.1/255.255.255.0. Or when you finished configuring the ET100R LAN IP setting through terminal console. Then you can launch the Web UI interface using any Internet explorer to access the ET100R router. Figure 5-1 is an example of Web UI interface window.

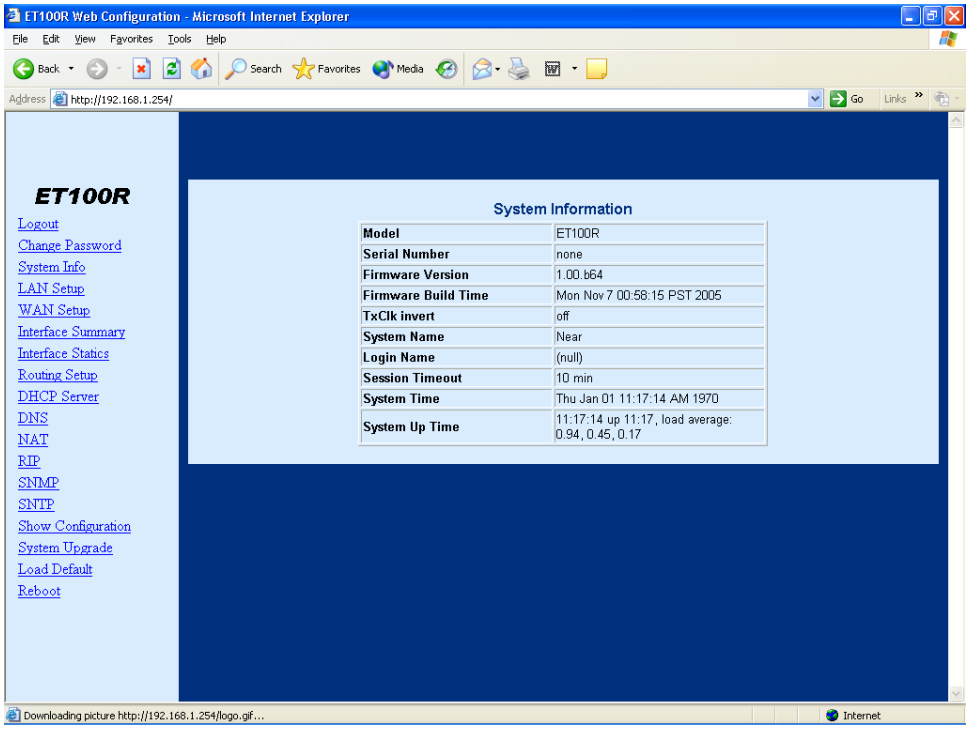


Figure4-1 Web UI interface window

4.2 Web UI Operation

In the CTC Union ET100R Web UI Management interface, we provide OAM&P functions for retrieving configuration data, statistics data, and system information. The commands that for the ET100R Web UI management interface are shown in table 4-1.

Item	Command	Function	Item	Command	Function
1	Logout	Log out system	10	DNS	Domain Name service/server configuration
2	Change password	User management changing password	11	NAT	Network address Translating service configuration
3	system Info	Retrieve system information	12	RIP	Routing Information Protocol configuration
4	LAN Setup	LAN interface configuration	13	SNMP	Simple Network Management Protocol configuration
5	WAN Setup	WAN interface configuration	14	SNTP	Simple Network Time Protocol configuration
6	Interface Summary	Retrieve interface either LAN, WAN and Loopback interface summary	15	show Configuration	Retrieve system running configuration
7	Interface Statistics	Performance testing either LAN and WAN interface	16	System Upgrade	F/W code Upgrade only
8	Routing setup	Routing configuration	14	Load Default	Load the factory default value
9	DHCP Server	Dynamic Host Configuration Protocol setting	18	Reboot	Restart the ET100R router

Table 4-1

4.2.1 Log-In and Log-Out

Launch Internet Explorer or any web browser and type the ET100R IP address. The Log-in window will appear as shown below (Figure 4-2). Please input the username and password to launch the Web UI management interface. The default username is 'admin' and the password ' ' (null). Before placing the ET100R router on a live public network, please change user name and password. After logging in successfully, the screen will show the ET100R system information.

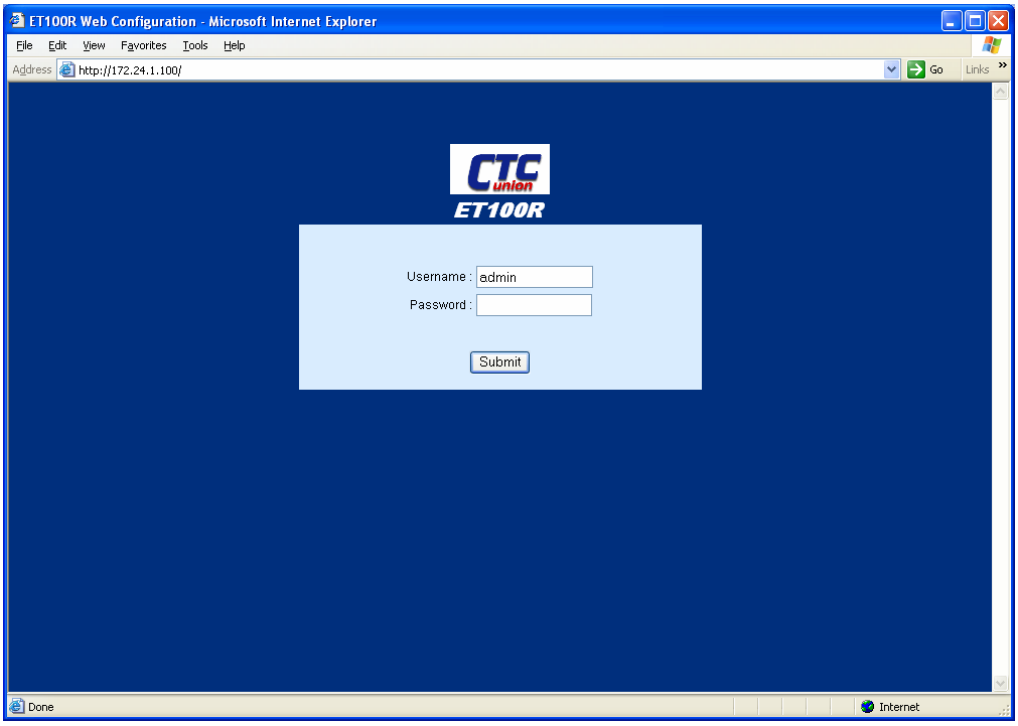


Figure 4-3 Log-in window

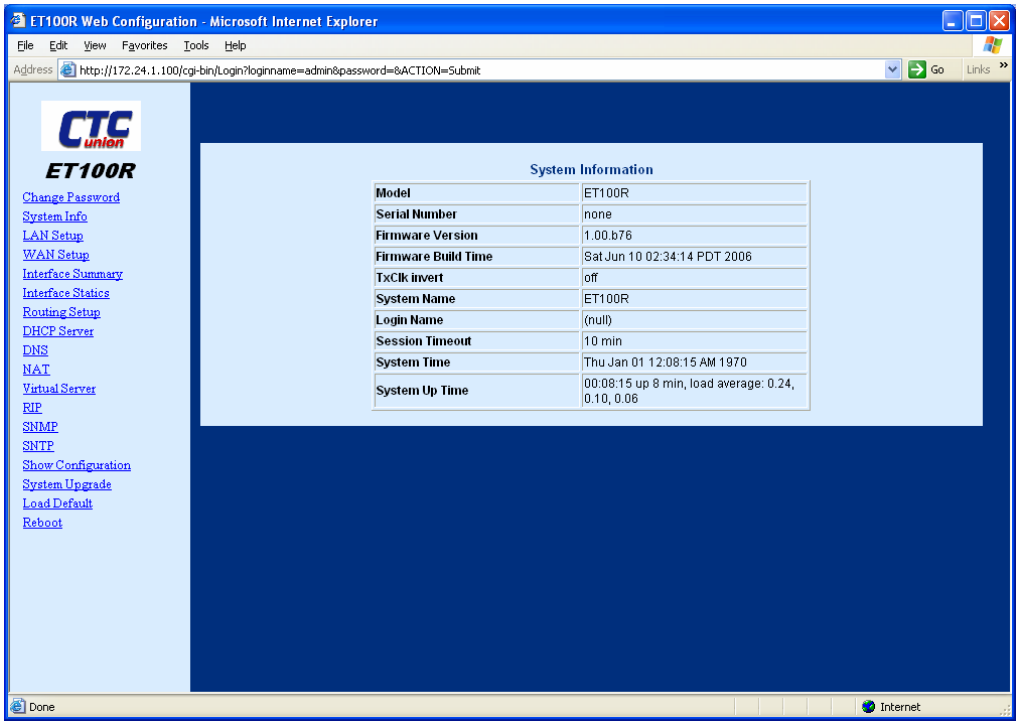


Figure 4-4 First display after login

4.2.2 System information

Retrieve ET100R router system information.

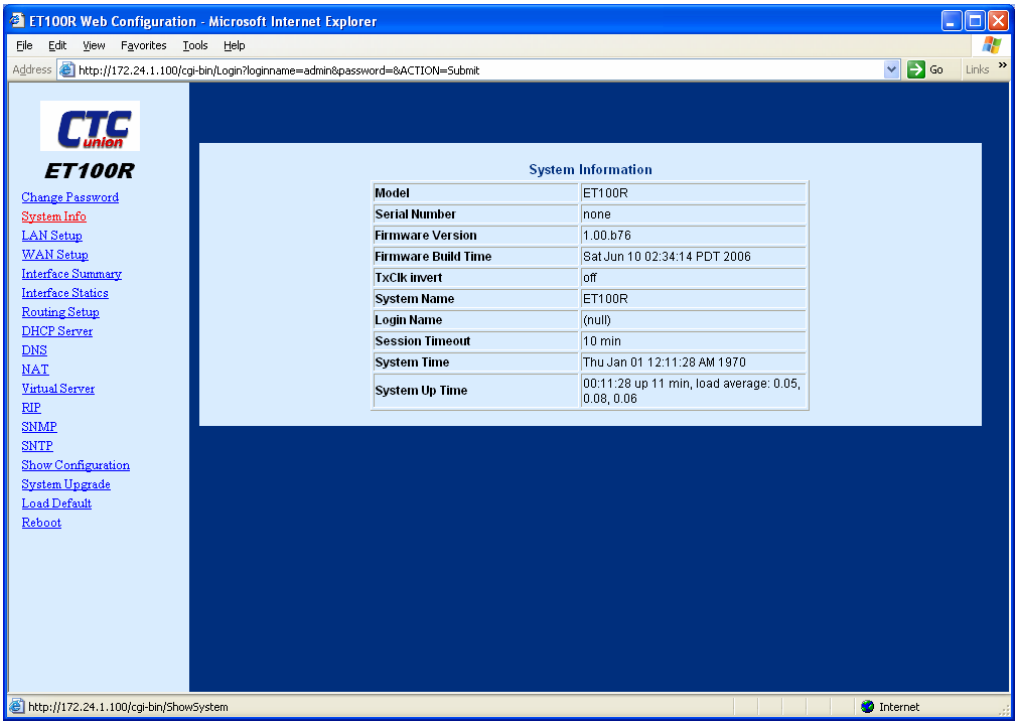


Figure 4-5 System Information

4.2.3 Changing the password & System Name

To change the user password and ET100R router system name, just click on the 'Change Password' menu item and key in the new password. After clicking on the 'Save' icon the settings will take effect immediately. The Web UI interface will show a confirmation message.

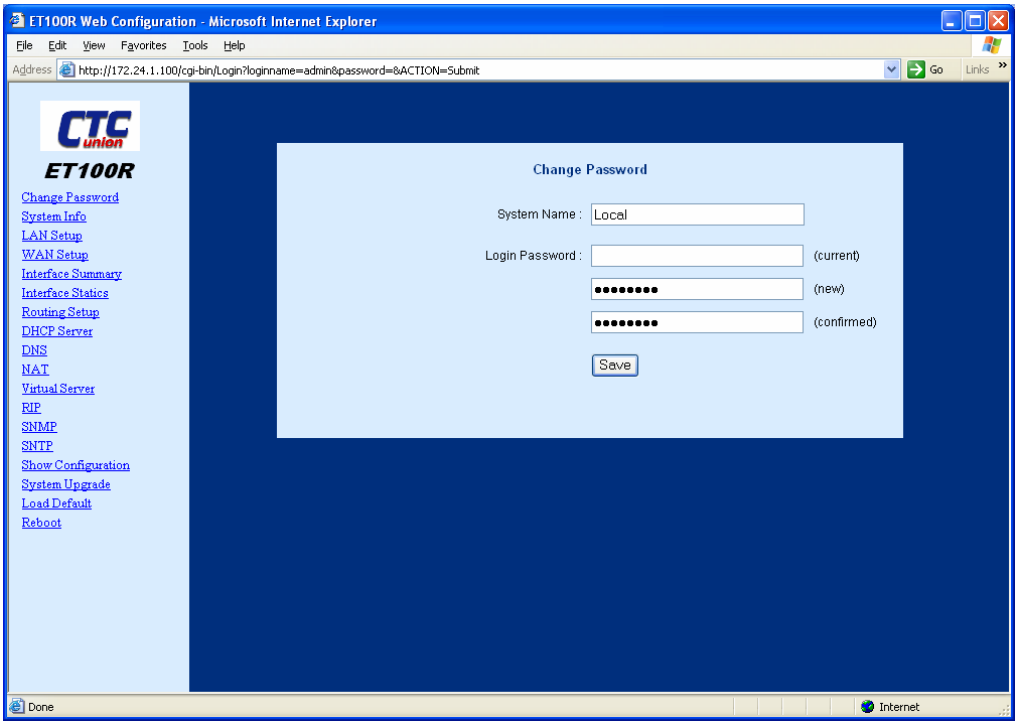


Figure 4-6 Changing System Name & Password

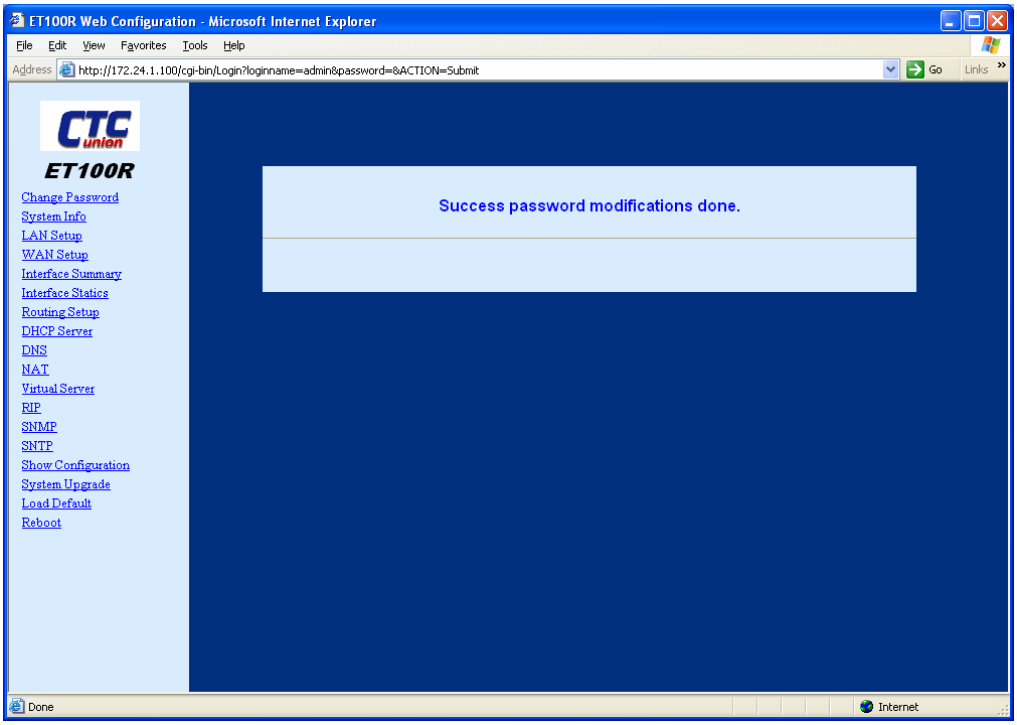


Figure 4-7 Password change confirmation message

4.2.4 LAN Interface Configuration

In the 'LAN Setup' section, the system allows you to bind different IP address settings to the ET100R Ethernet interface. When clicking on 'LAN Setup', the system will show the configuration of the LAN interface. You can add a different IP address to Ethernet LAN interface. If you need to configure the LAN Settings, please click on 'Add' icon.

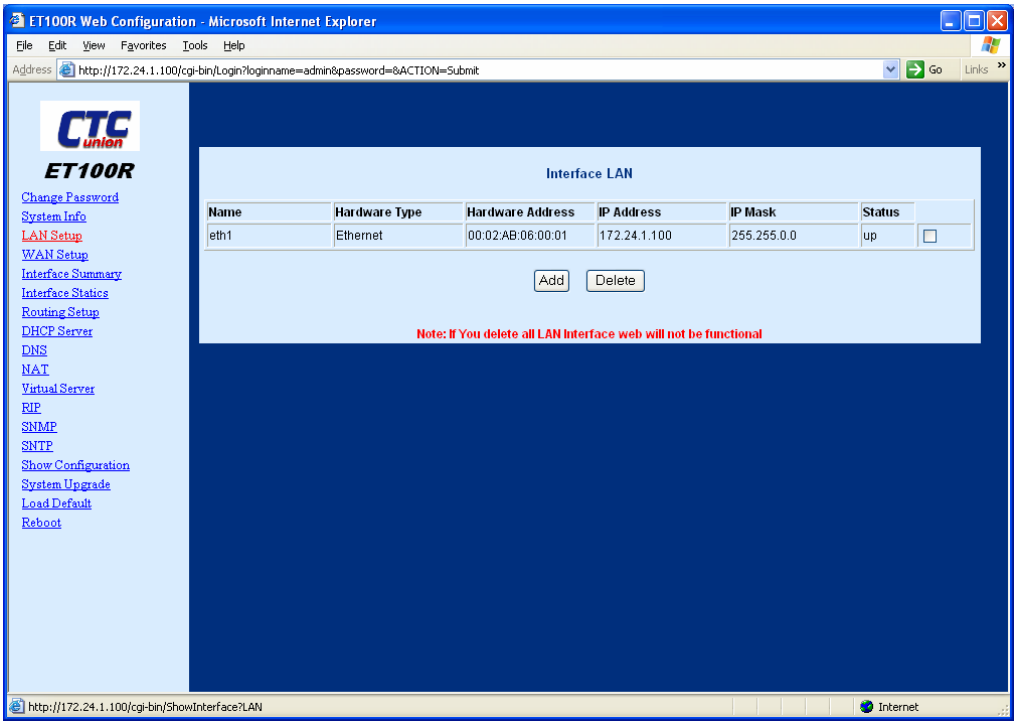


Figure 4-8 LAN Settings

In the 'IP Serial No.:' pull-down, there are 5 LAN IP entries that can be set. The IP binding function enables you to bind different IP address on the Eth1 interface.
When you change the LAN IP 0 to a different IP, you will need to input the same new IP address in the browser to continue to access the Web UI interface.

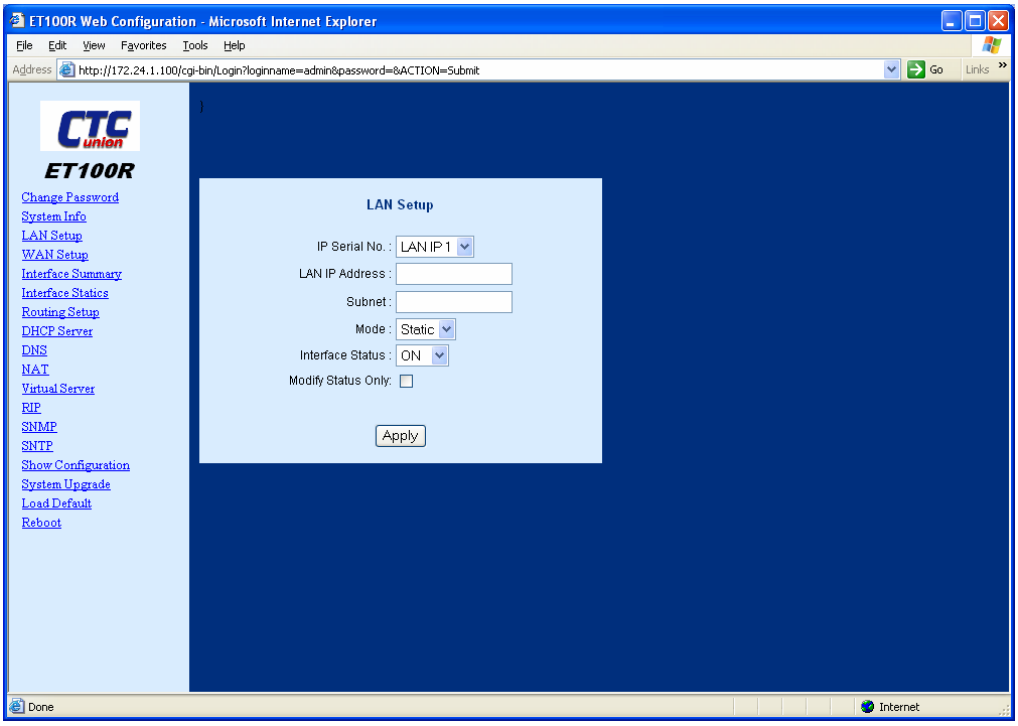


Figure 4-9 LAN Setup

Add the IP address to LAN interface of ET100R router. Please input the proper values into the correct fields. Ex: LAN IP 1, LAN IP Address:192.168.1.254 Subnet 255.255.255.0. Finish by clicking the 'Apply' button.

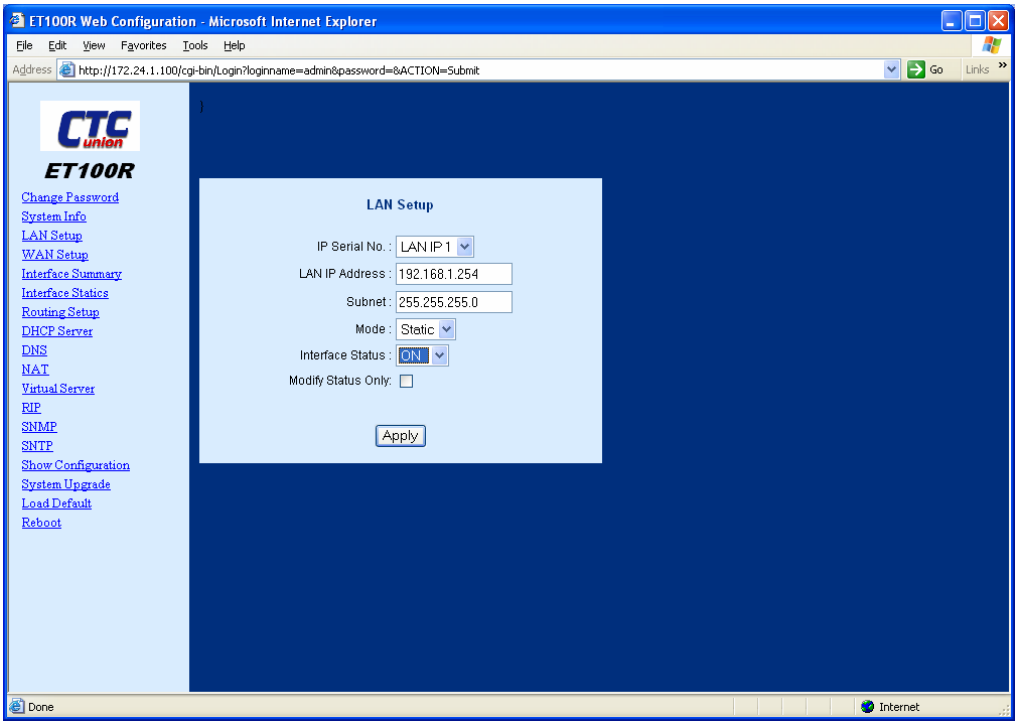


Figure 4-10 IP binding

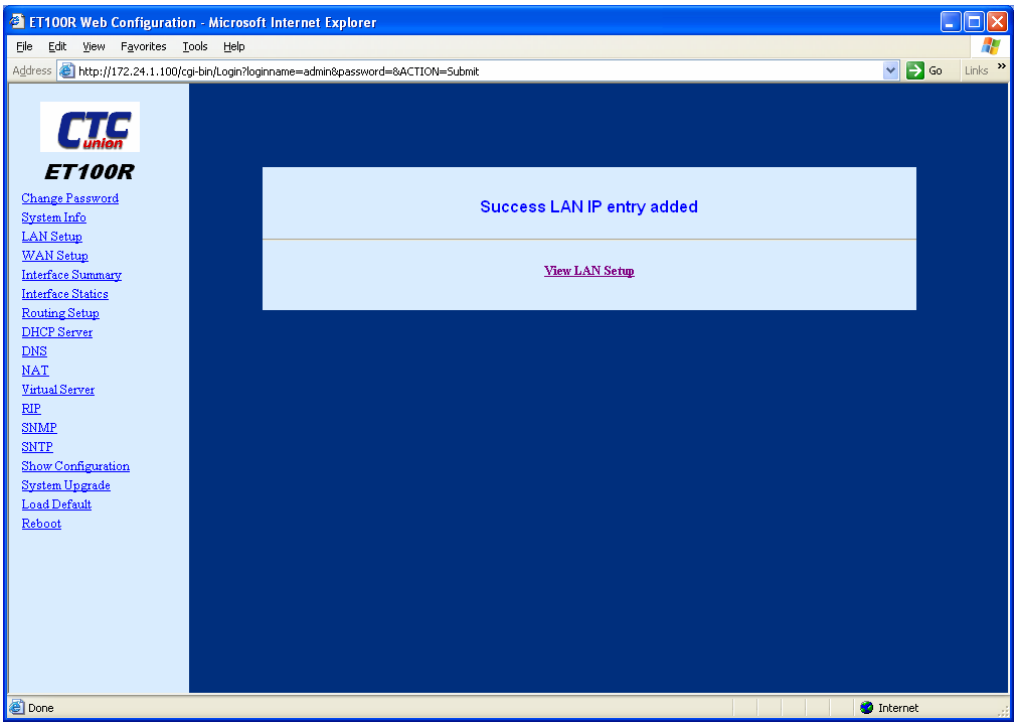


Figure 4-11 Success LAN IP entry added.

Click 'View LAN Setup' to review the LAN settings.

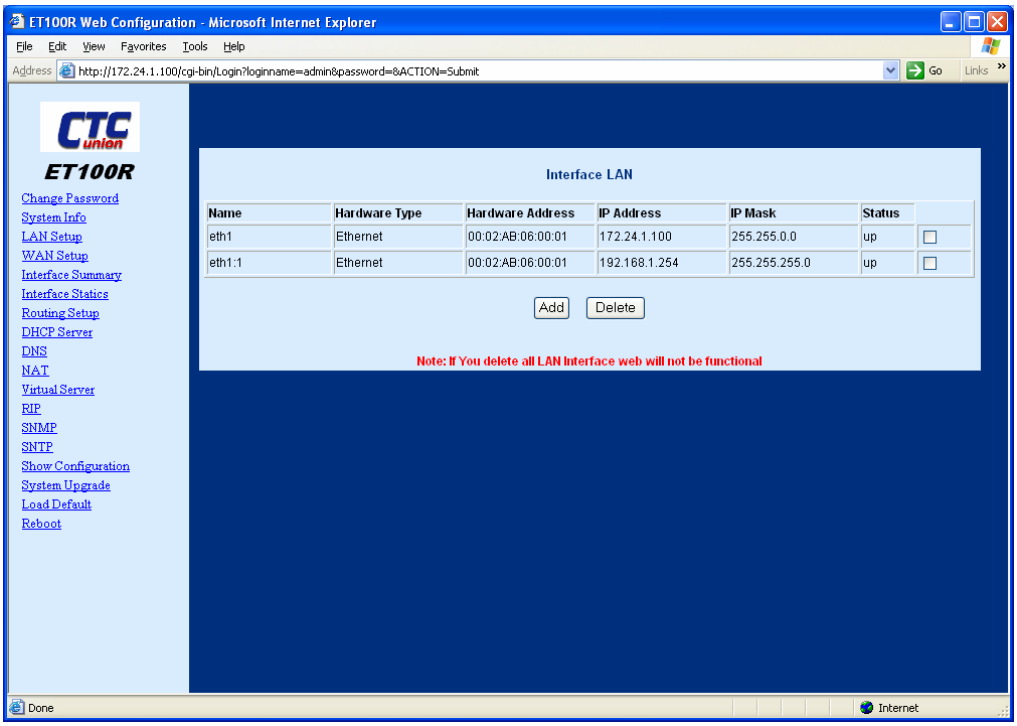


Figure 4-12 LAN interface added as Name 'eth1:1'

To delete any LAN entry, click on the check box, then click on the 'Delete' button.

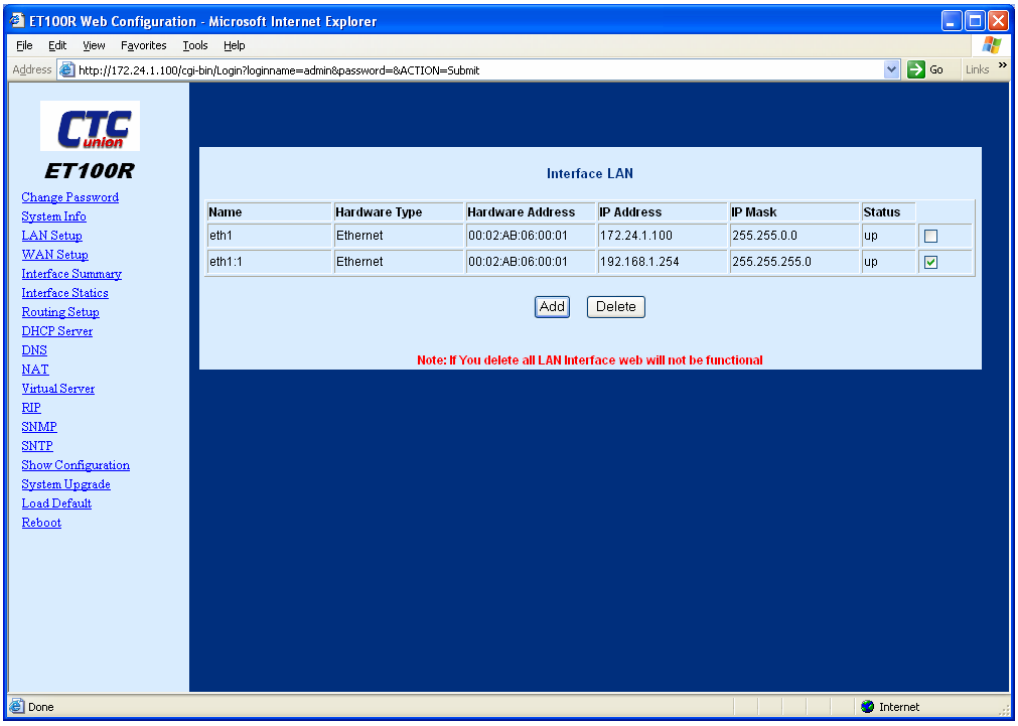


Figure 4-13 Delete Entry

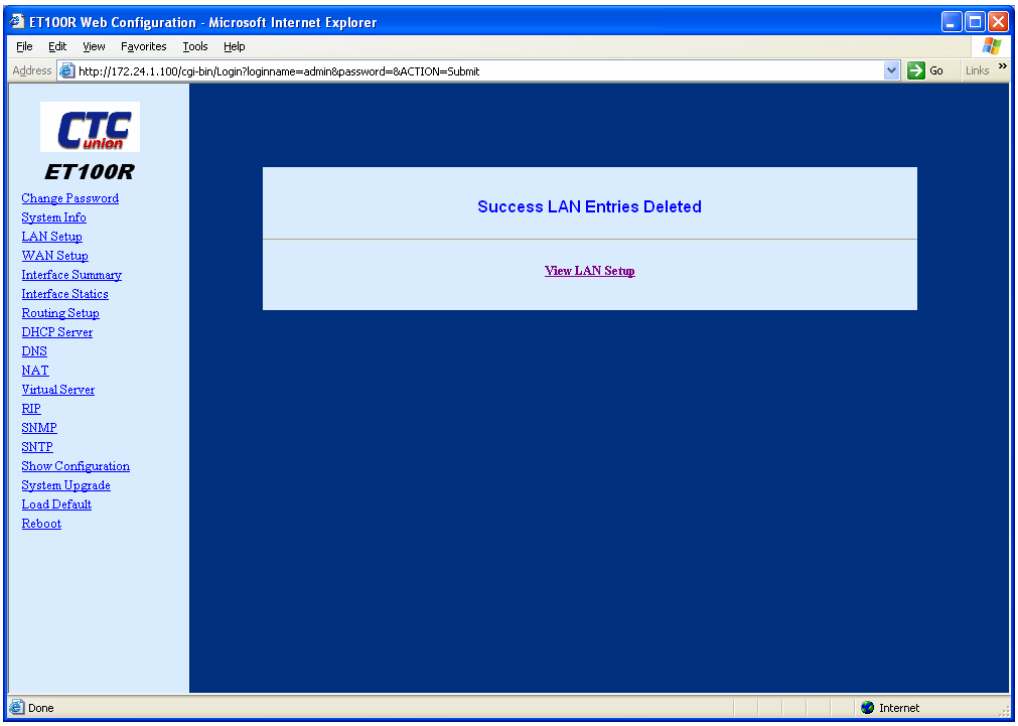


Figure 4-14 LAN entry Deleted successfully

4.2.5 WAN interface configuration

Click on 'WAN Setup' menu item to enable the WAN interface configuration function.

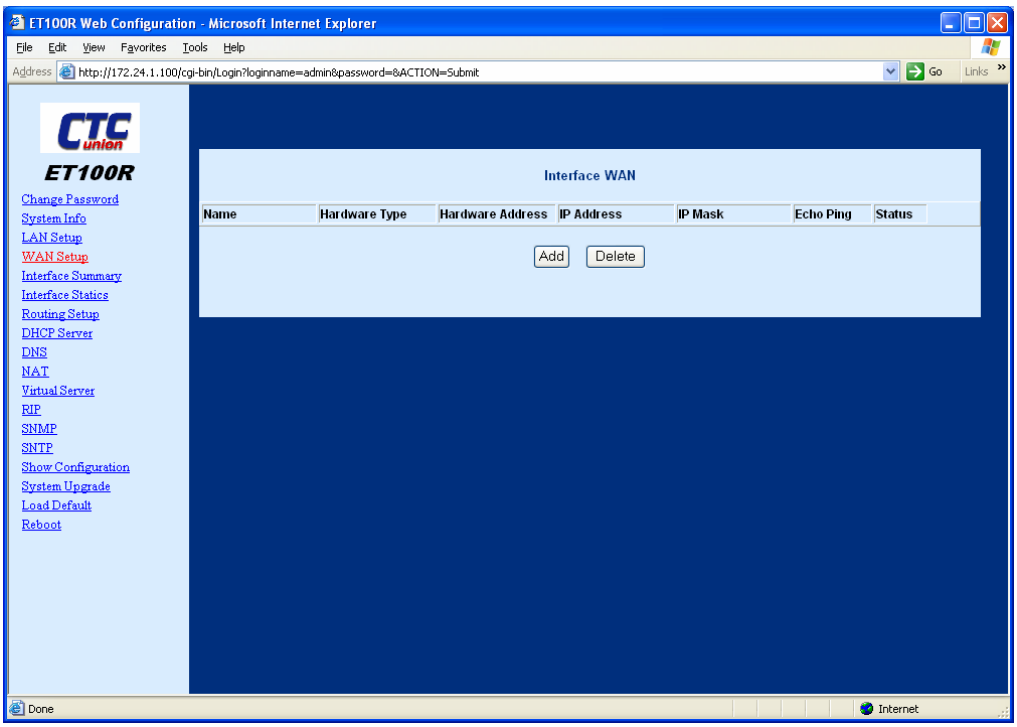


Figure 4-15 WAN Setup function

Click the 'Add' button. Input the proper WAN values for IP address, subnet mask, peer (gateway) address, encapsulation and status, then click the 'Apply' button.

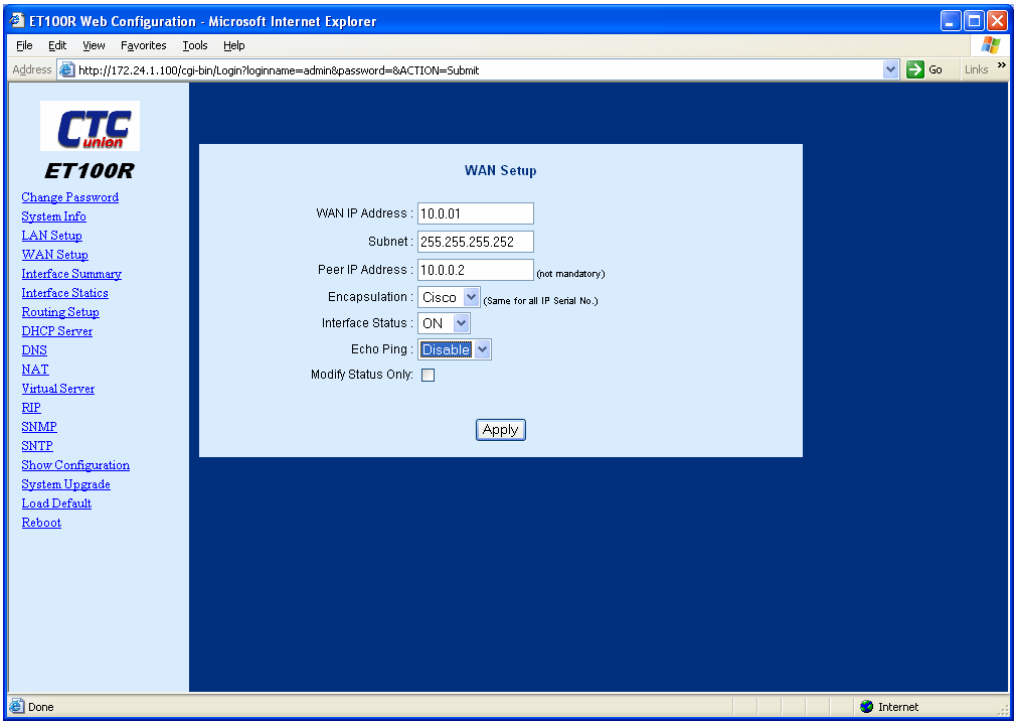


Figure 4-16 Input the proper WAN values

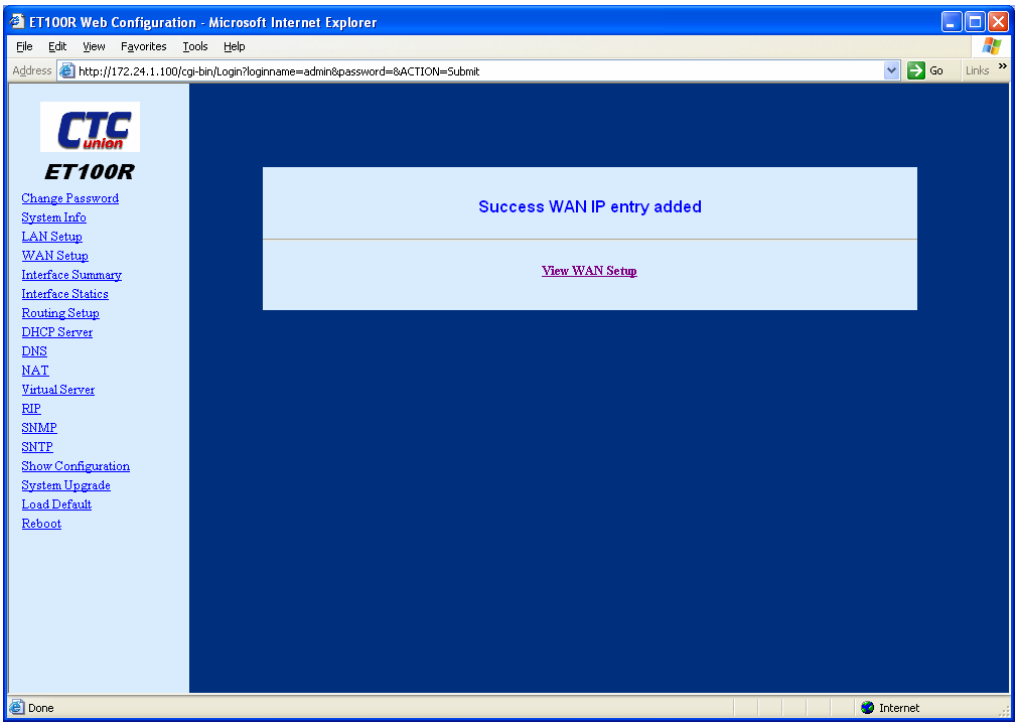


Figure 4-17 Successful WAN IP entry added

Click 'View WAN Setup' to review the WAN settings.

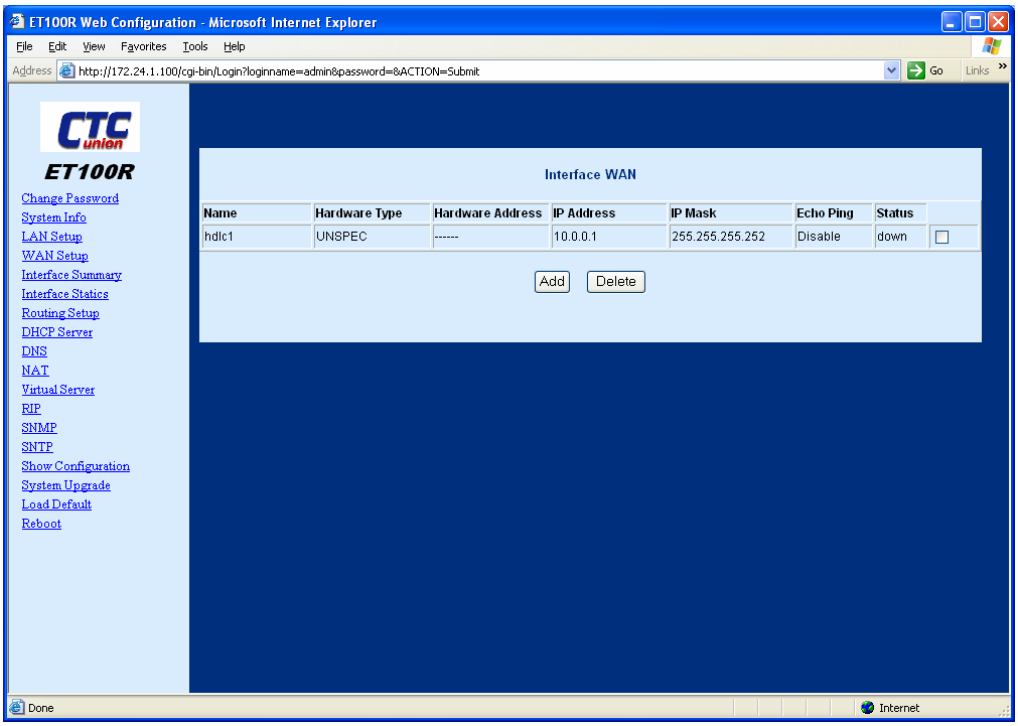


Figure 4-18 View the WAN settings

To delete a WAN entry, click the check box for the WAN entry, then click the 'Delete' button.

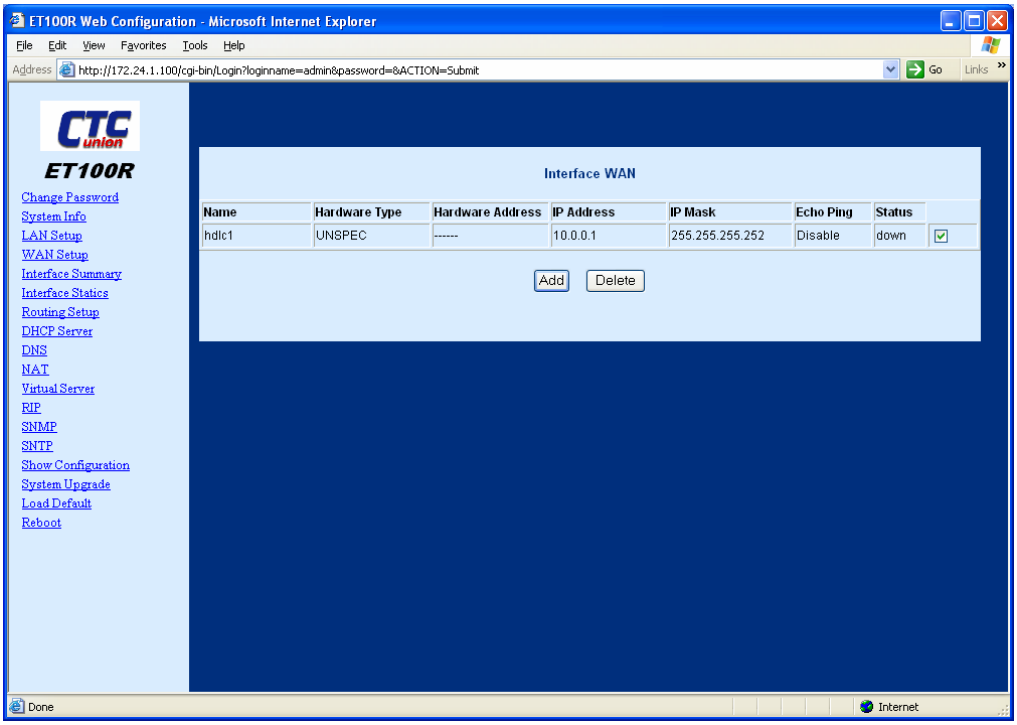


Figure 4-19 Delete WAN interface

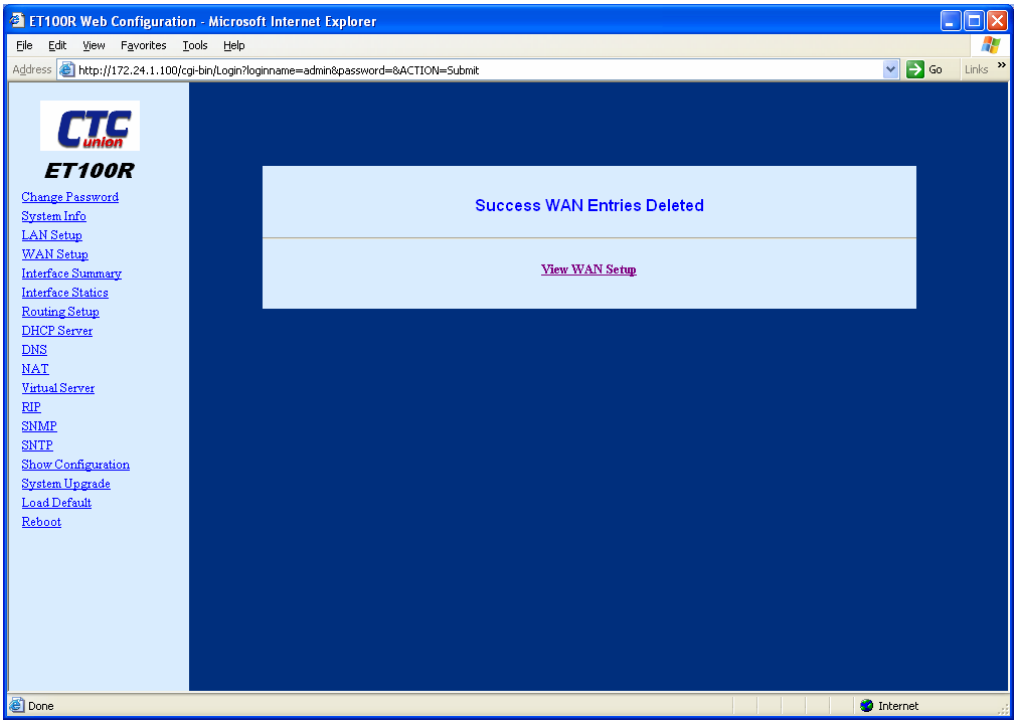


Figure 4-20 Successfully deleted WAN entries

4.2.6 Interface Summary and Statistics

To view the interface summary page, click on the 'Interface Summary' menu item. The following window will be displayed.

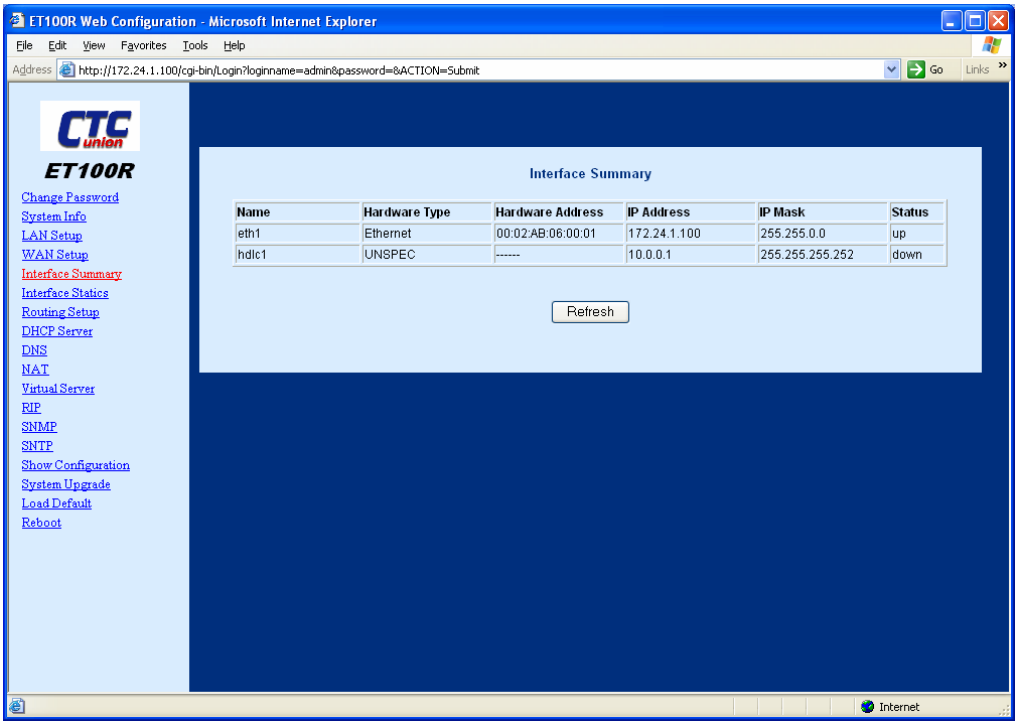


Figure 4-21 Retrieving interface summary

To view the interface statistics page, click on the 'Interface Statistics' menu item. The following window will be displayed.

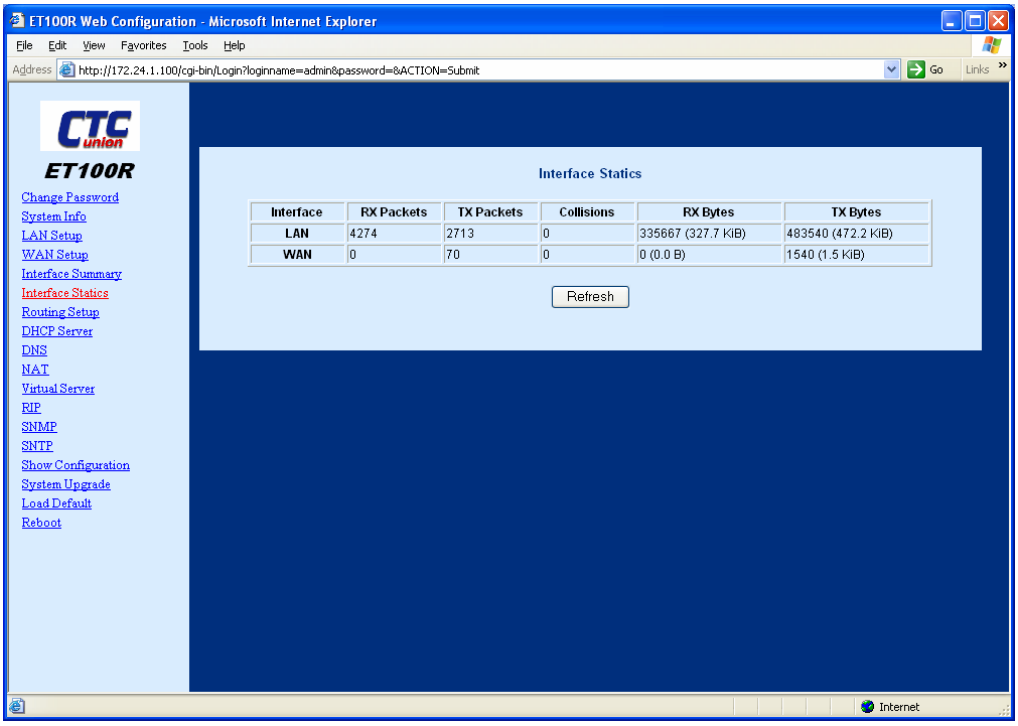


Figure 4-22 Retrieving Interface Statistics

4.2.7 Routing Configuration

To view the routing table summary page, click on the 'Routing Setup' menu item. The following window will be displayed.

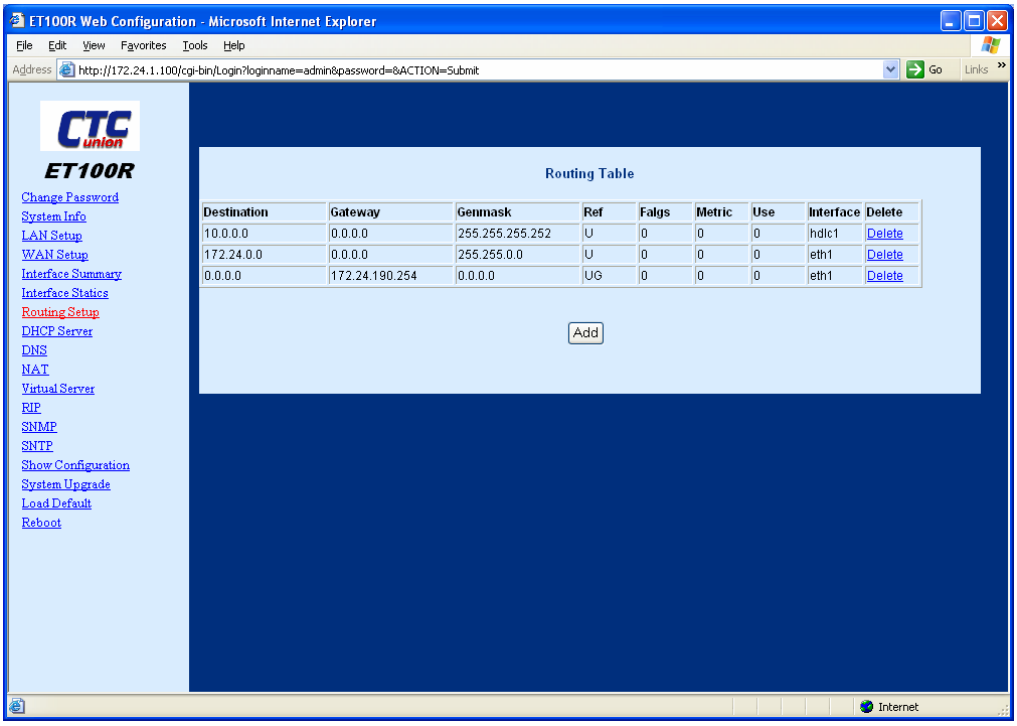


Figure 4-23 Retrieving Routing Table

To add an entry to the routing table, click on the 'Add' button. The following window will be displayed. Key in the values for IP network, subnet, gateway, and interface, click on 'Add' checkbox and then lastly click 'Apply'

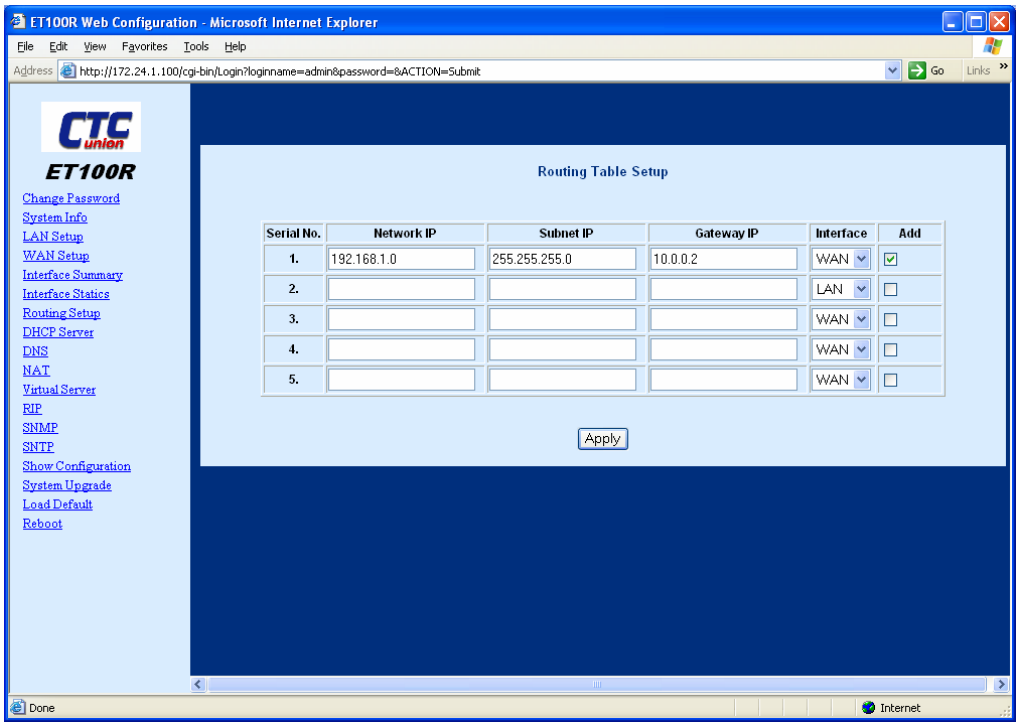


Figure 4-24 Adding routing table entries

Here are the results of a successful routing table entry addition.

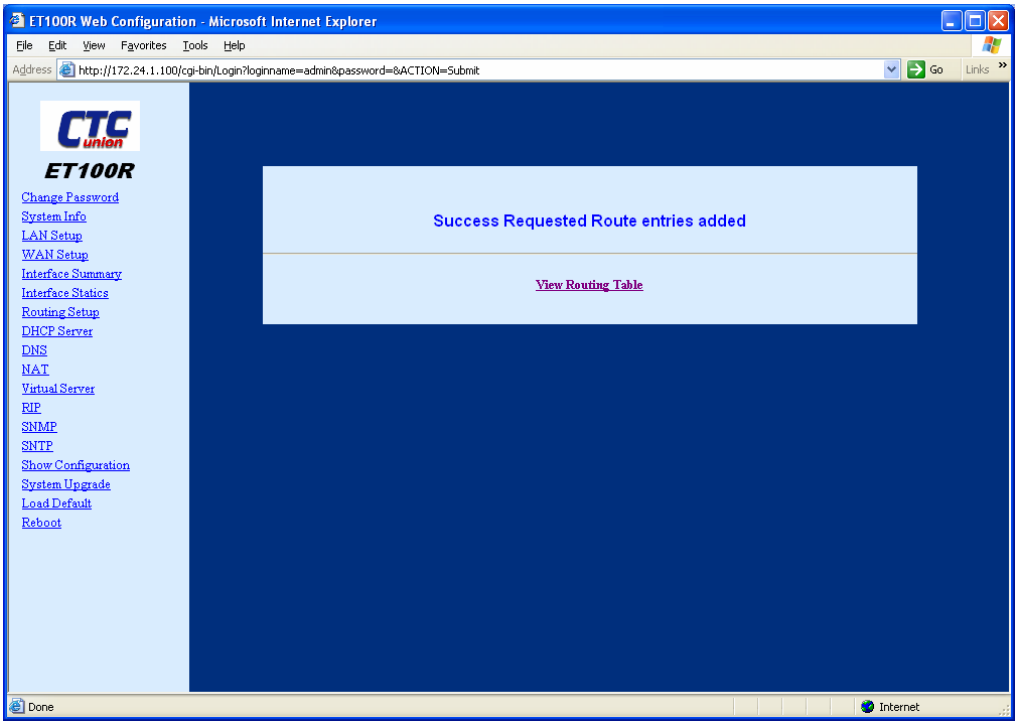


Figure 4-25 Adding Routing entry successful

To view the results, click on the 'View Routing Table' link.

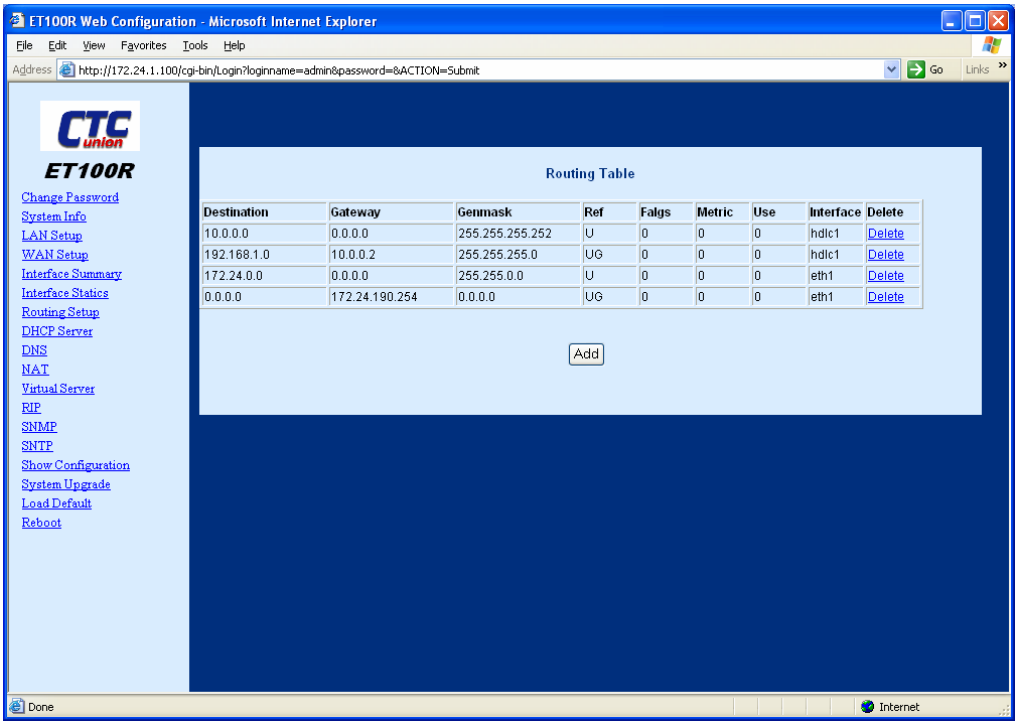


Figure 4-26 Delete a routing table entry

To delete any of the entries, just click on the 'Delete' command that belongs to the entry you wish to delete.

Here are the results of a successful routing table entry deletion.

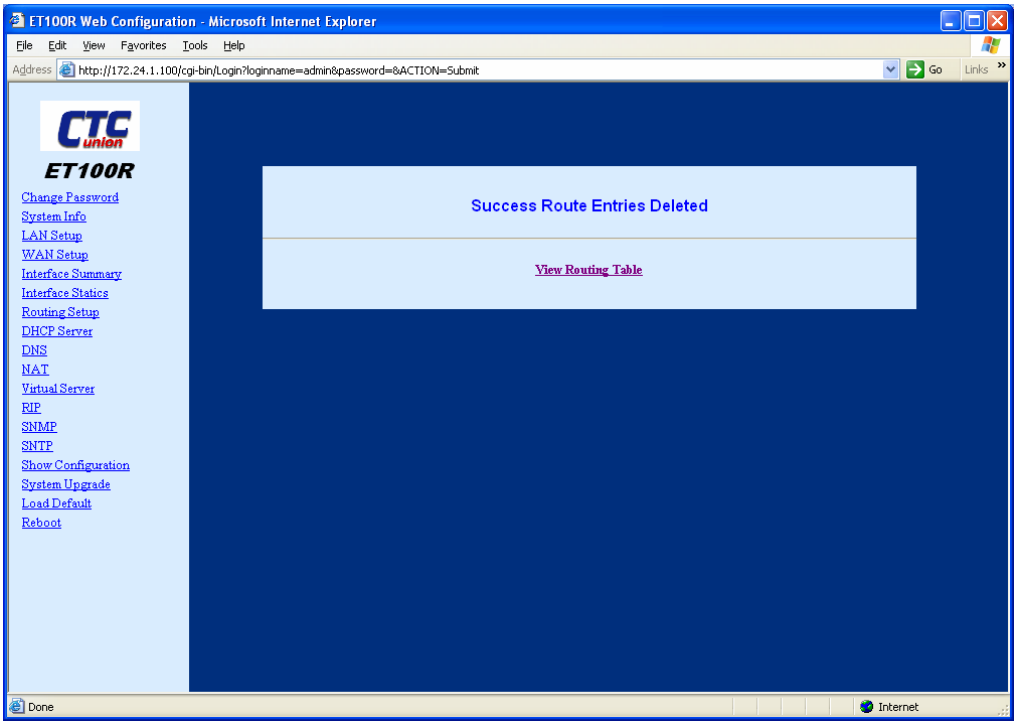


Figure 4-28 Successful deletion of a the routing table entry

4.2.8 DHCP service configuration

To activate the DHCP (Dynamic Host Configuration Protocol) service, click on the 'DHCP Server' menu item, then click the 'ADD' button.

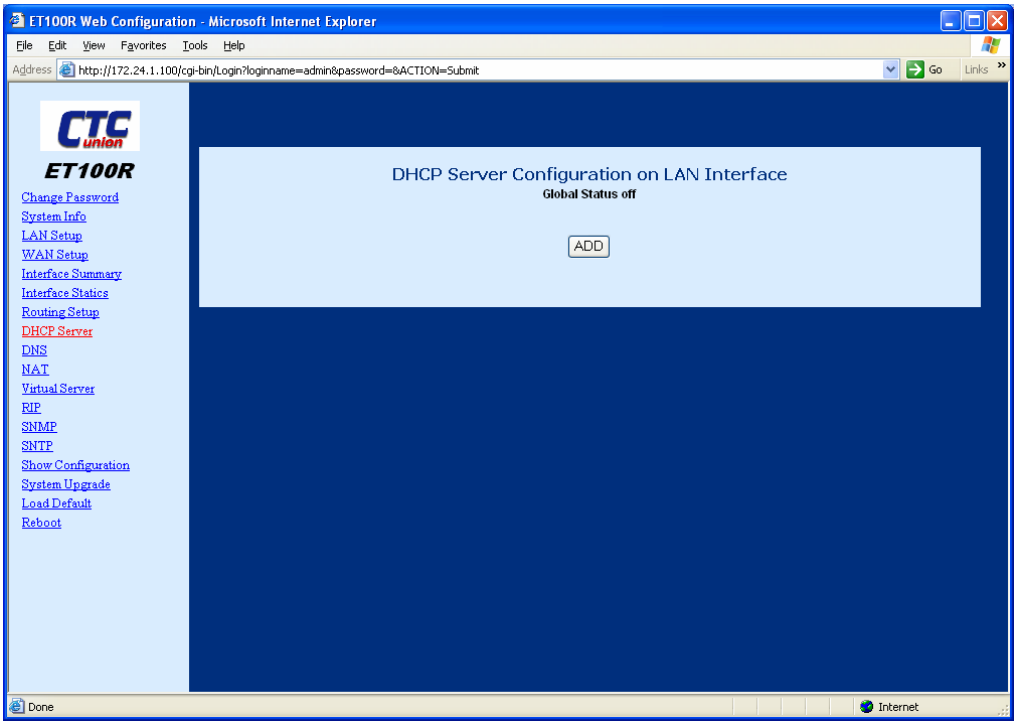


Figure 4-29 DHCP server configuration on LAN Interface

Enter the parameters in the 'DHCP Server of LAN Port Configure' parameter fields, referring to the example below.

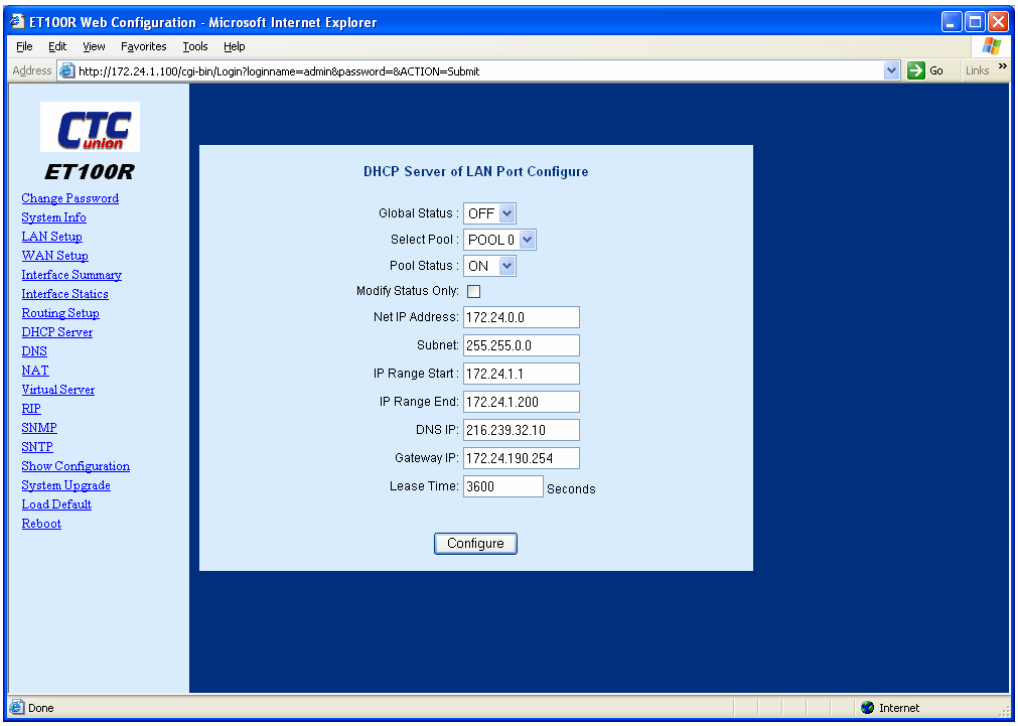


Figure 4-30 DHCP server parameters

To view the results, click on the 'View DHCP Server Settings' link.

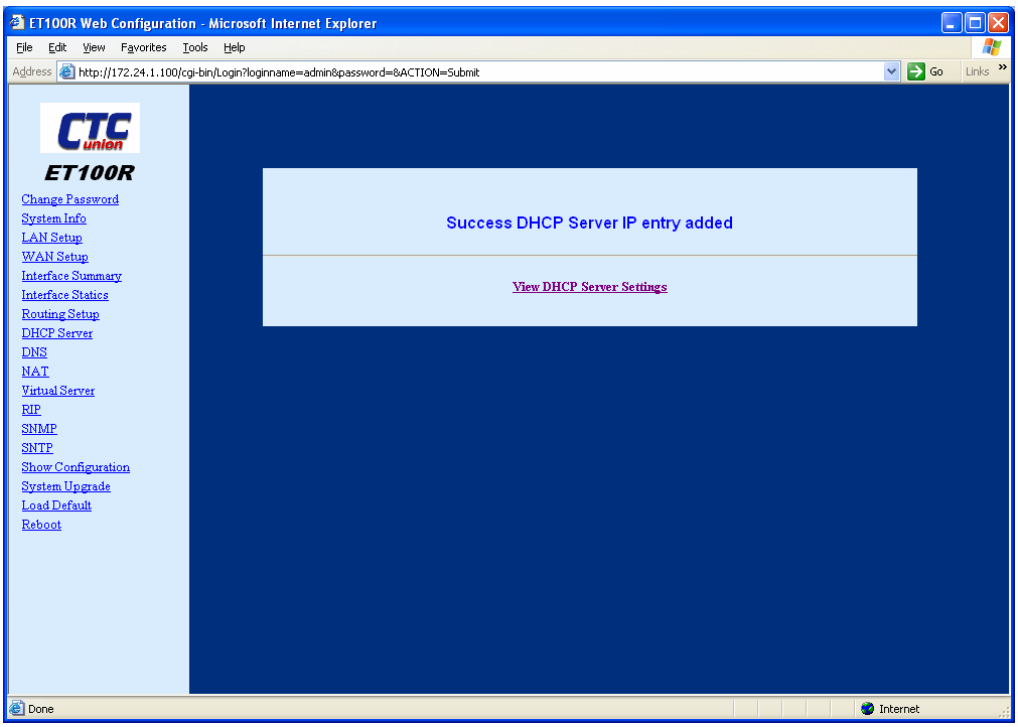


Figure 4-31 Success message when adding the DHCP Server IP entry

Summary of the DHCP server settings.

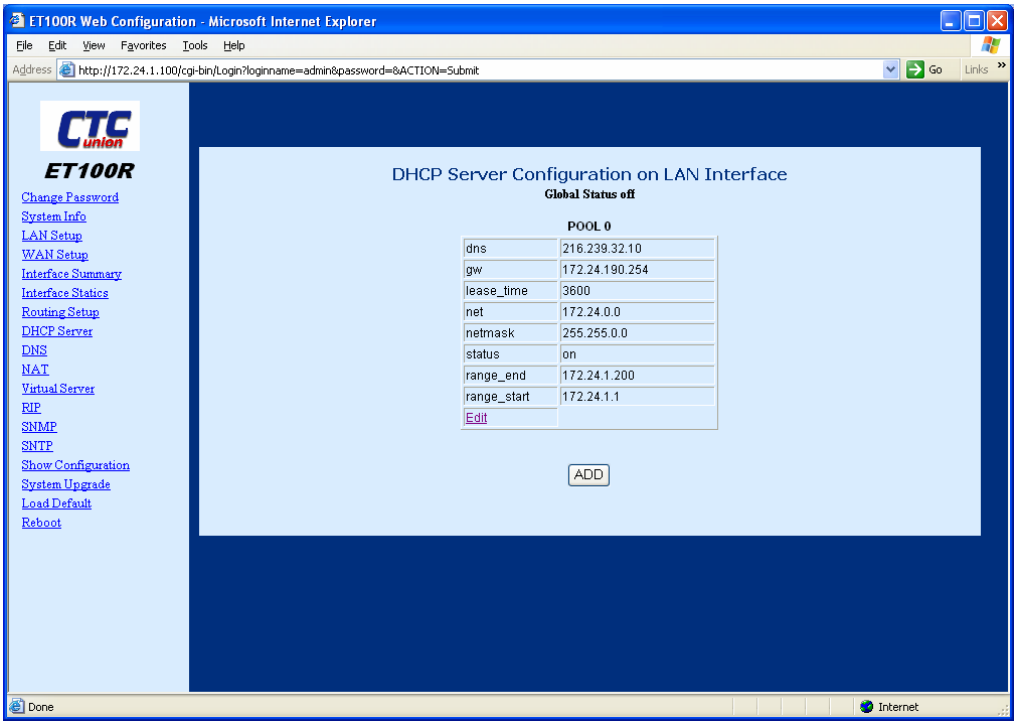


Figure 4-32 Summary of DHCP Server Configuration

Additional IP address pools may be added by using the 'Select Pool' pull-down and selecting another pool. Enter the values for that pool and click the 'Configure' button.

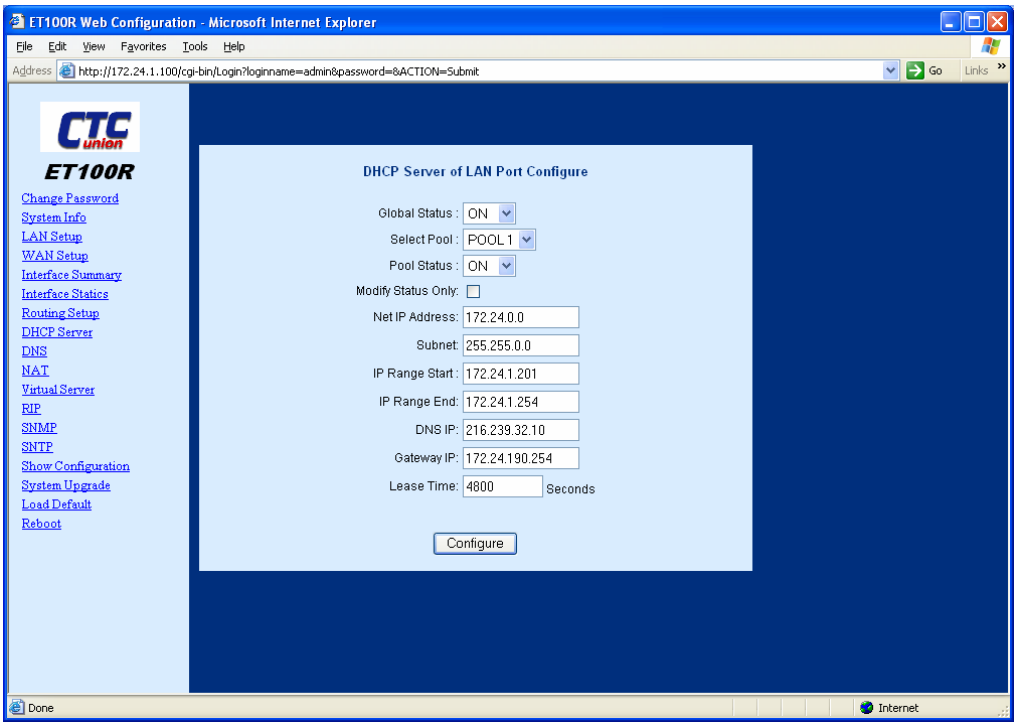


Figure 4-33 Adding Pool 1 DHCP Server Configuration

View the results of the DCHP server configuration.

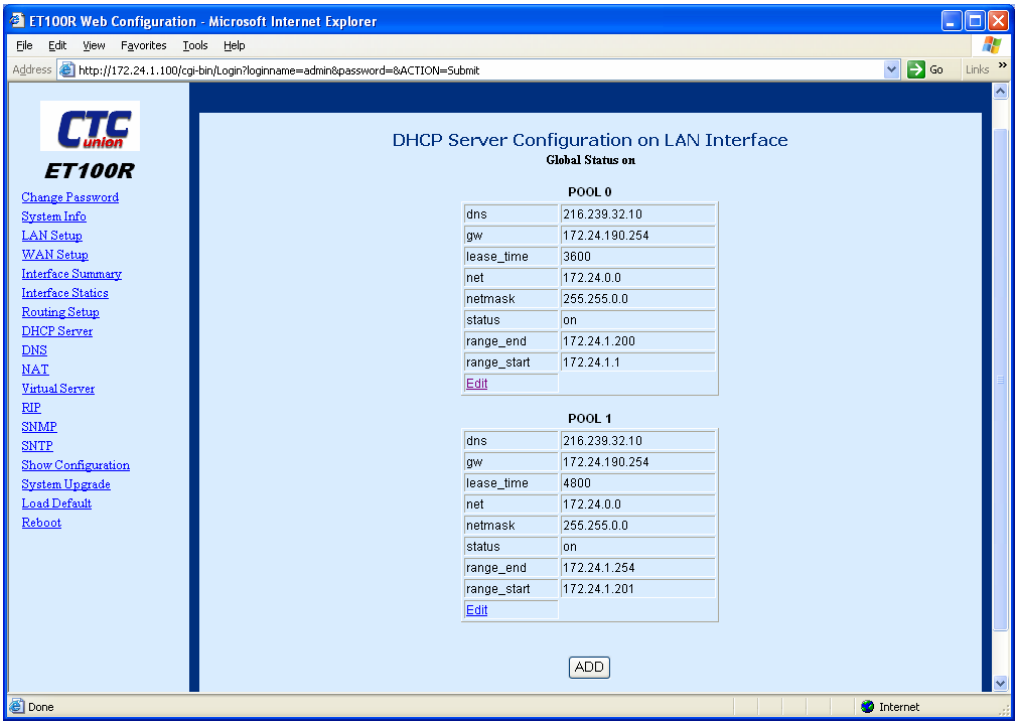


Figure 4-34 Pool 0 and Pool 1 DHCP Server Configuration

4.2.9 DNS service configuration

To configure the DNS Proxy (Domain Name Service), click on the 'DNS' menu item, then click the 'EDIT' button.

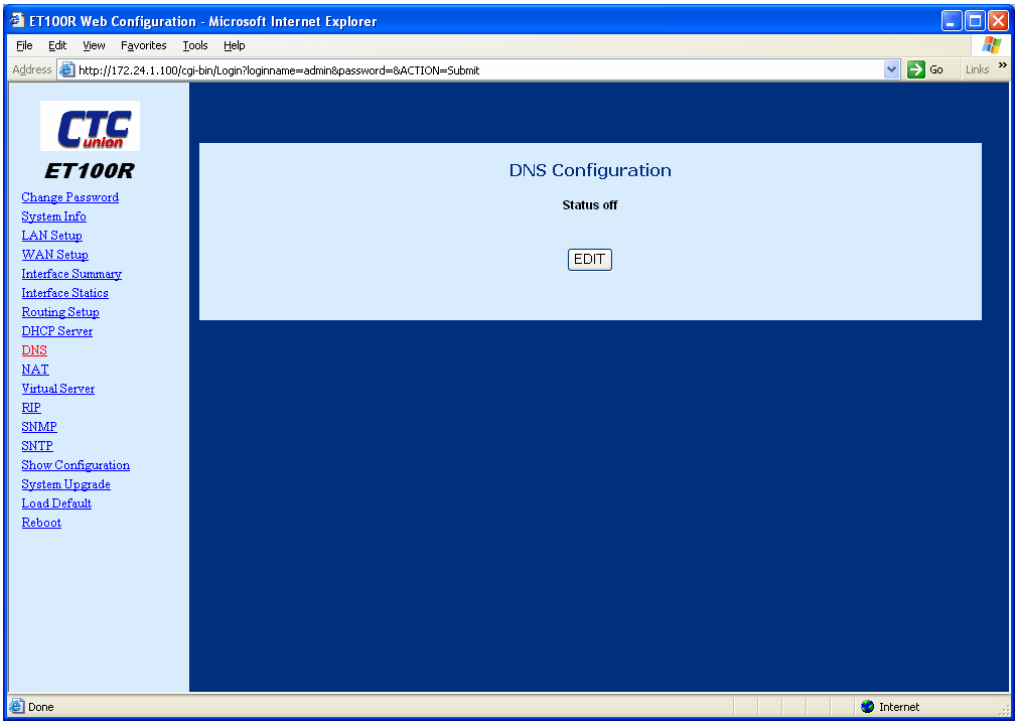


Figure 4-35 DNS Configuration

Enter the Primary and Secondary DNS IP addresses for the ET100R to proxy. Select the status 'ON'.

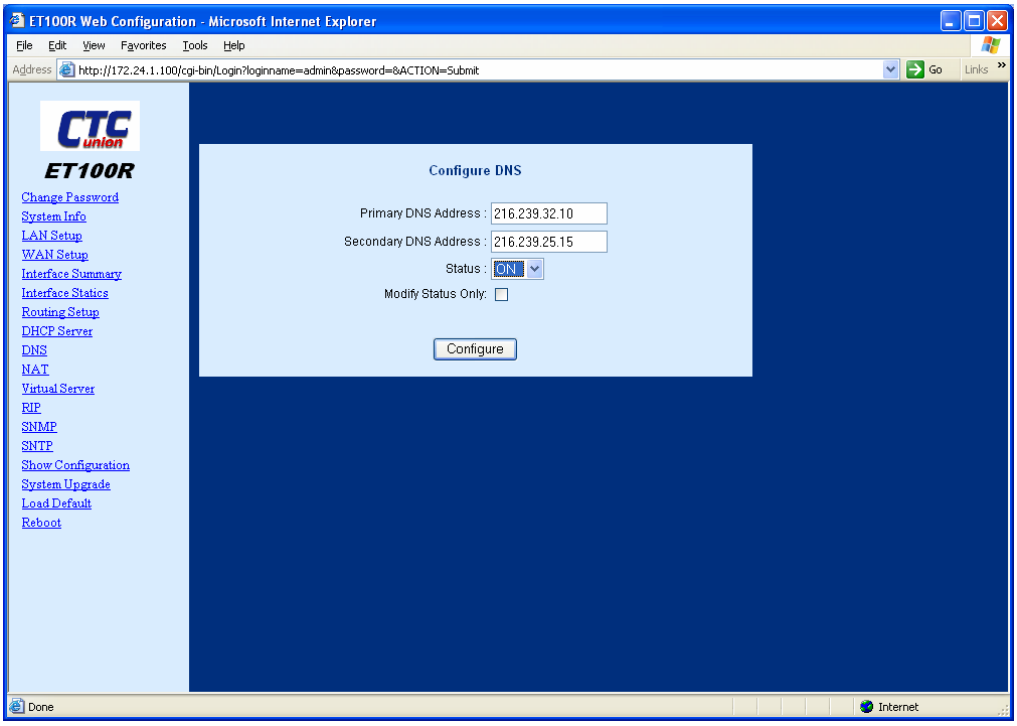


Figure 4-36 DNS Configuring

Click the 'Configure' button to submit the changes.

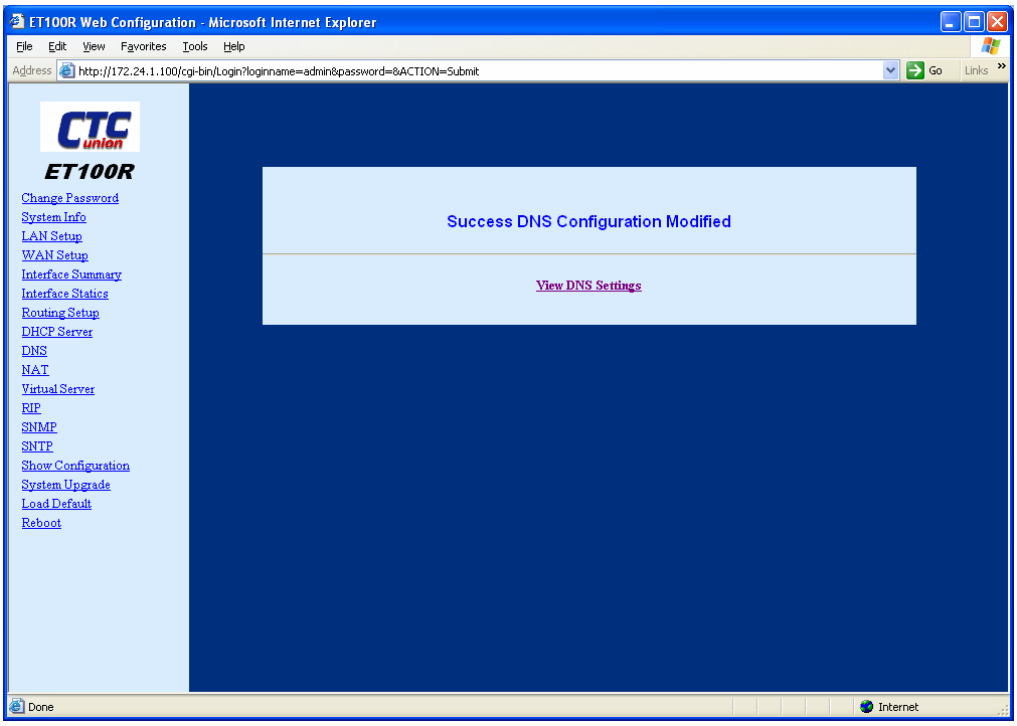


Figure 4-37 Success DNS Configuration modified

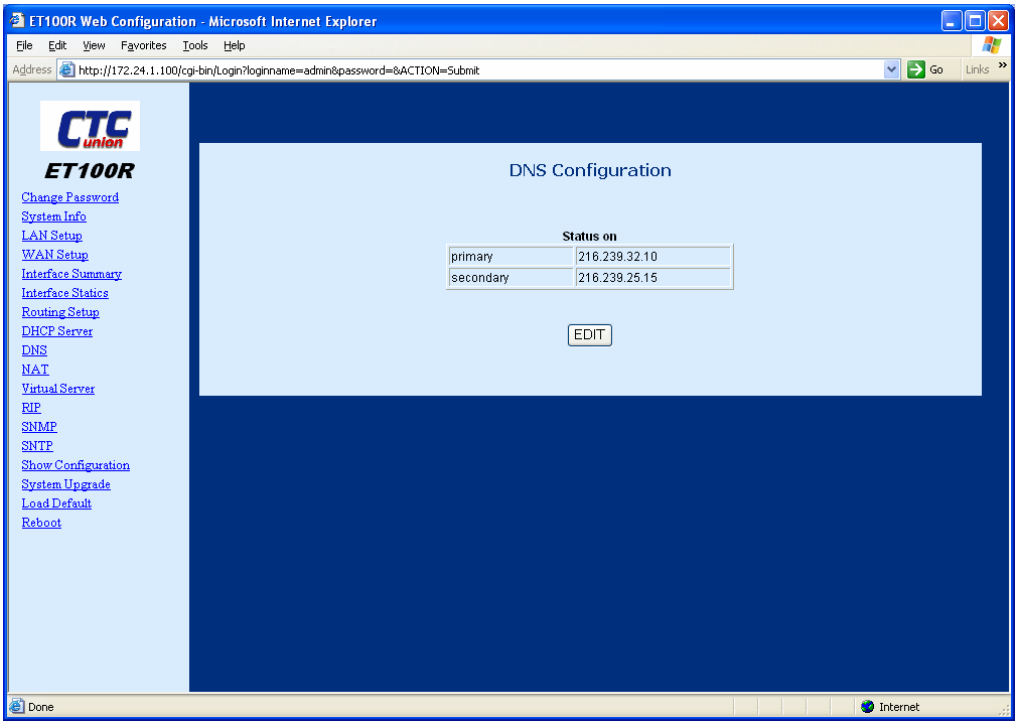


Figure 4-38 DNS Configuration sample

4.2.10 NAT service configuration

In the NAT service configuration section, there are two different ways to configure the NAT service through the Web UI management interface.

NAT Function
Multi-NAT

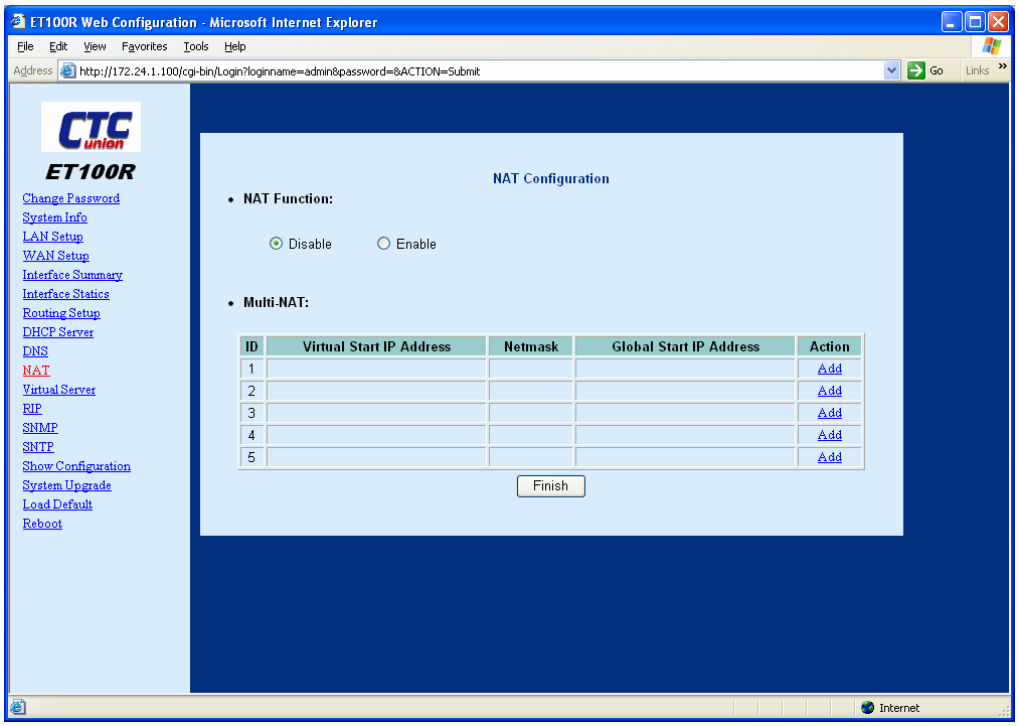


Figure 4-39 NAT service Configuration

For the NAT Function, click the 'Enable' radio button then click the 'Finish' button.

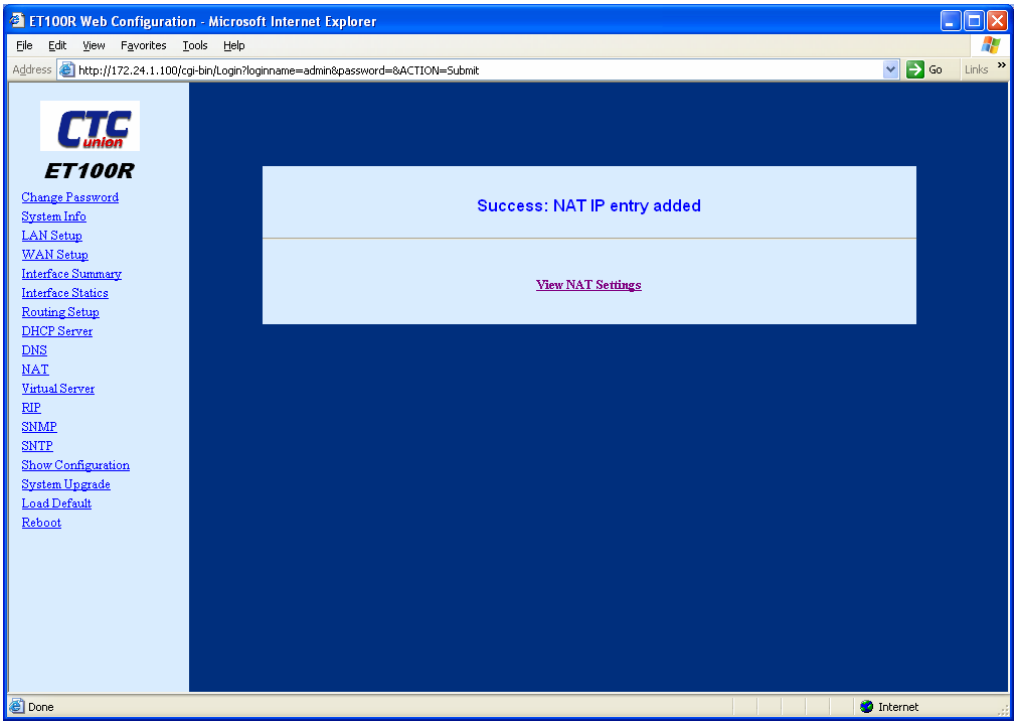


Figure 4-40 Successfully enabled NAT function

To configure the multi-NAT, click the 'Add' link from the NAT service configuration window.

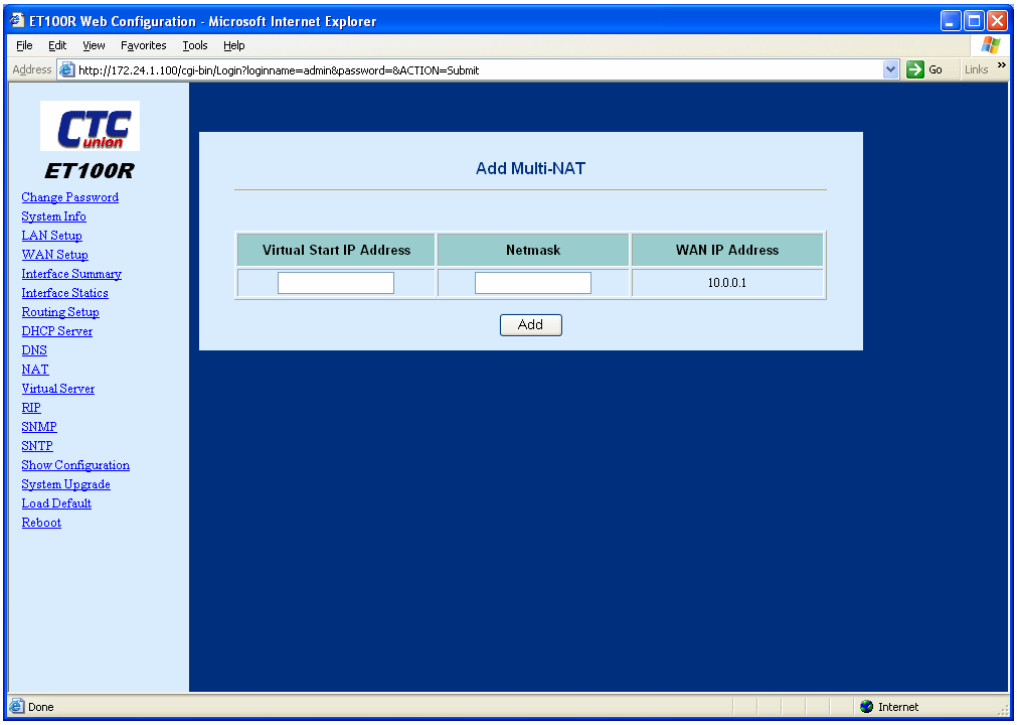


Figure 4-41 Add a Multi-NAT

4.2.11 Virtual Server configuration

Virtual server configuration allows a port to be mapped to the public IP through the NAT. In this way a machine running a Web server (port 80) or FTP (port 21) can be accessed from the public IP, even though the server resides on the private address range with private IP.

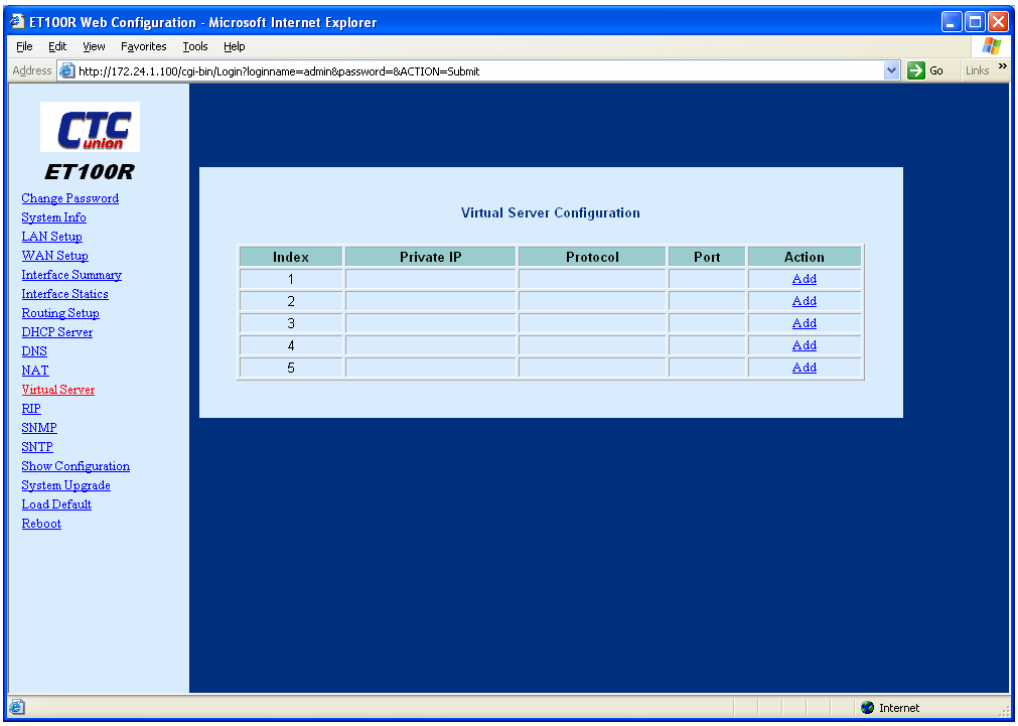


Figure 4-42 Add a Virtual Server

Key in IP, protocol, and port for the Virtual Server, then click the 'Apply' button.

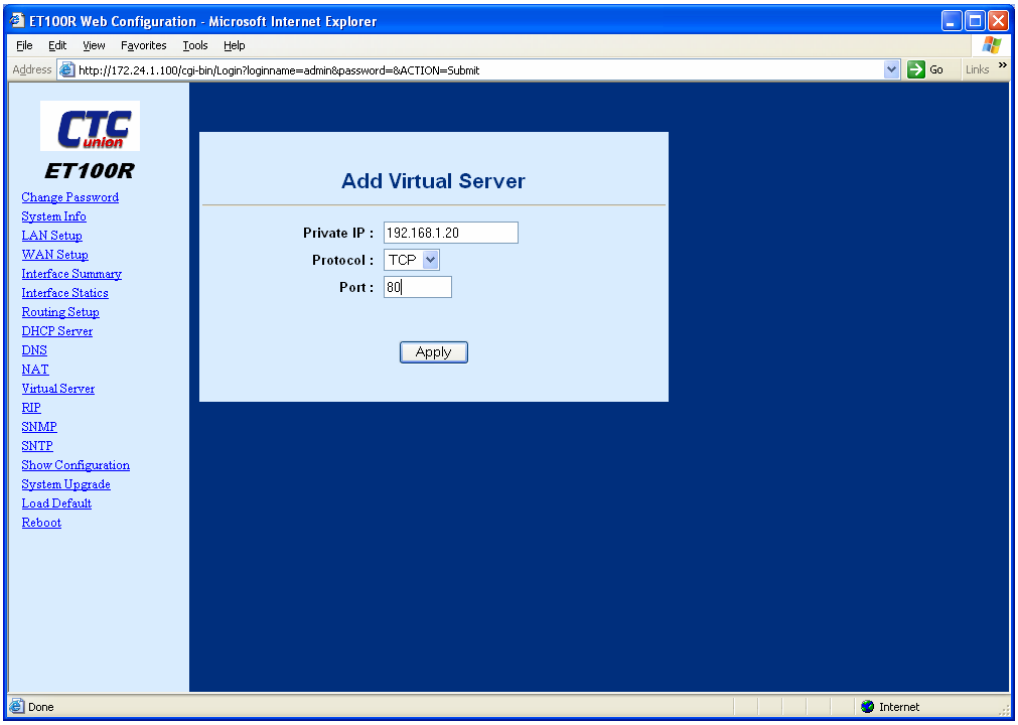


Figure 4-43 Key in IP, protocol, and port for the Virtual Server

4.2.12 RIP configuration

Choose the RIP item from the menu. Click the 'Edit' button.

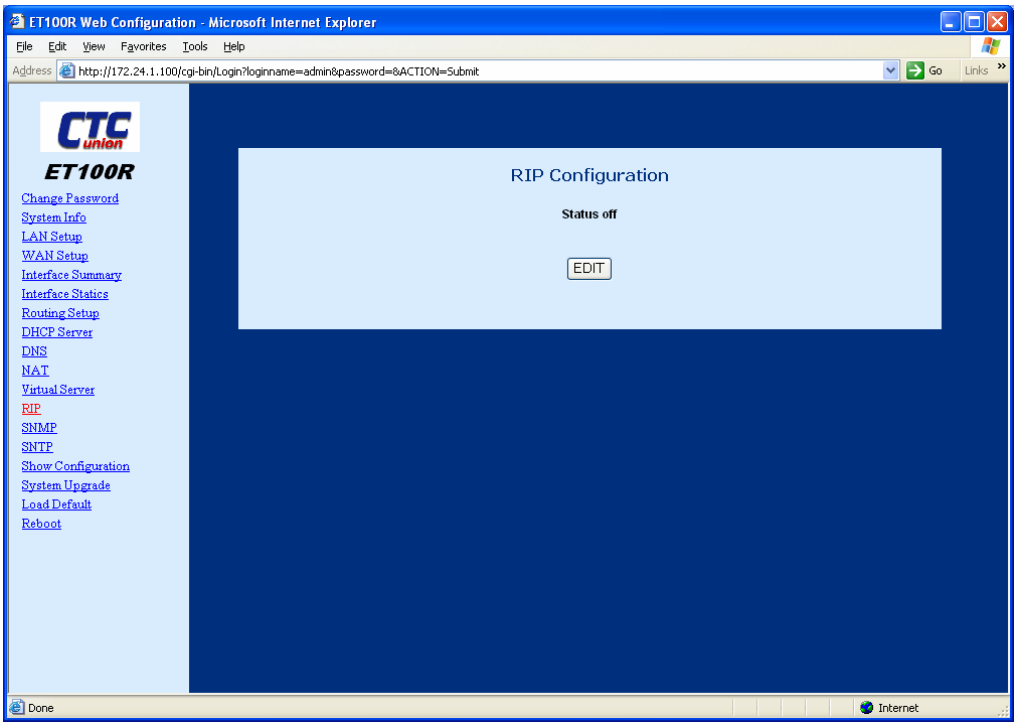


Figure 4-44 Edit the RIP configuration

In the example here, RIP is activated for both the LAN and WAN. We have set values for garbage collection, timeout and update time. Lastly make status ON, select RIP version (1 or 2) and click 'Configure'.

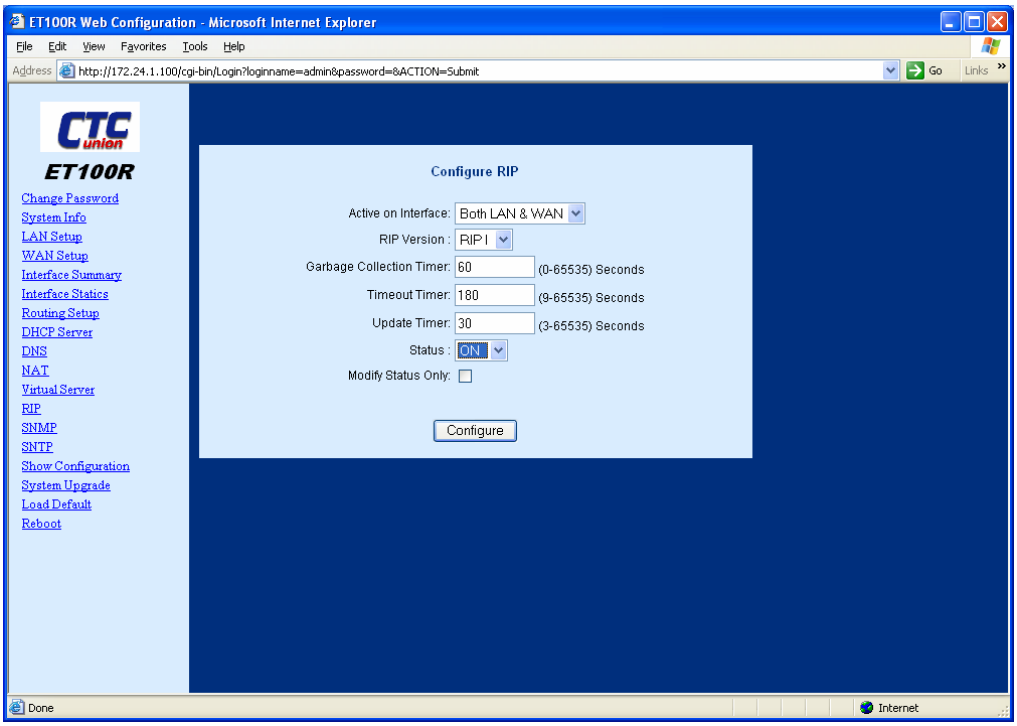


Figure 4-45 RIP configuration

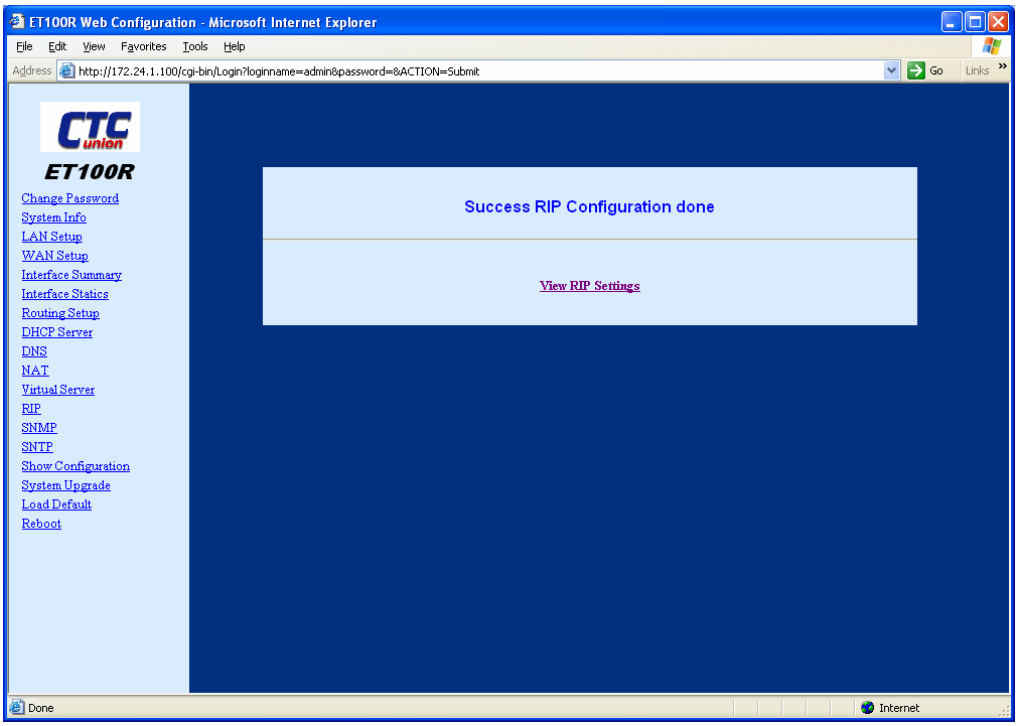


Figure 4-46 Successful RIP configuration

Click the link 'View RIP Settings' to review or further edit the RIP configuration.

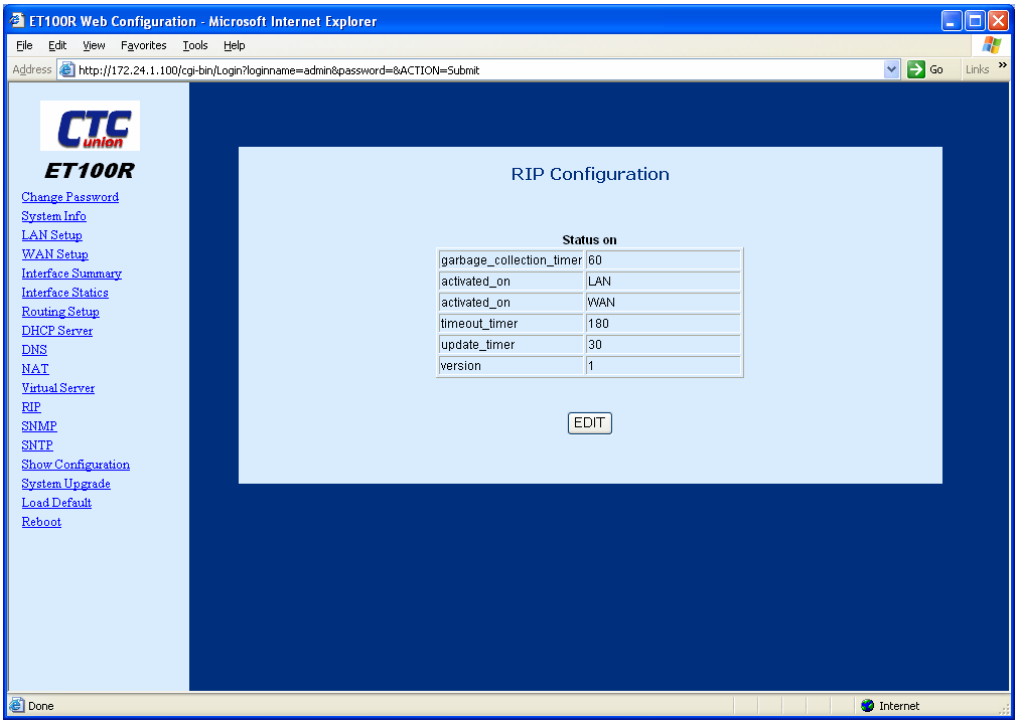


Figure 4-47 View and/or Edit RIP configuration

4.2.13 SNMP configuration

SNMP is the Simple Network Management Protocol. Choose the SNMP item from the menu. Click the 'Edit' button.

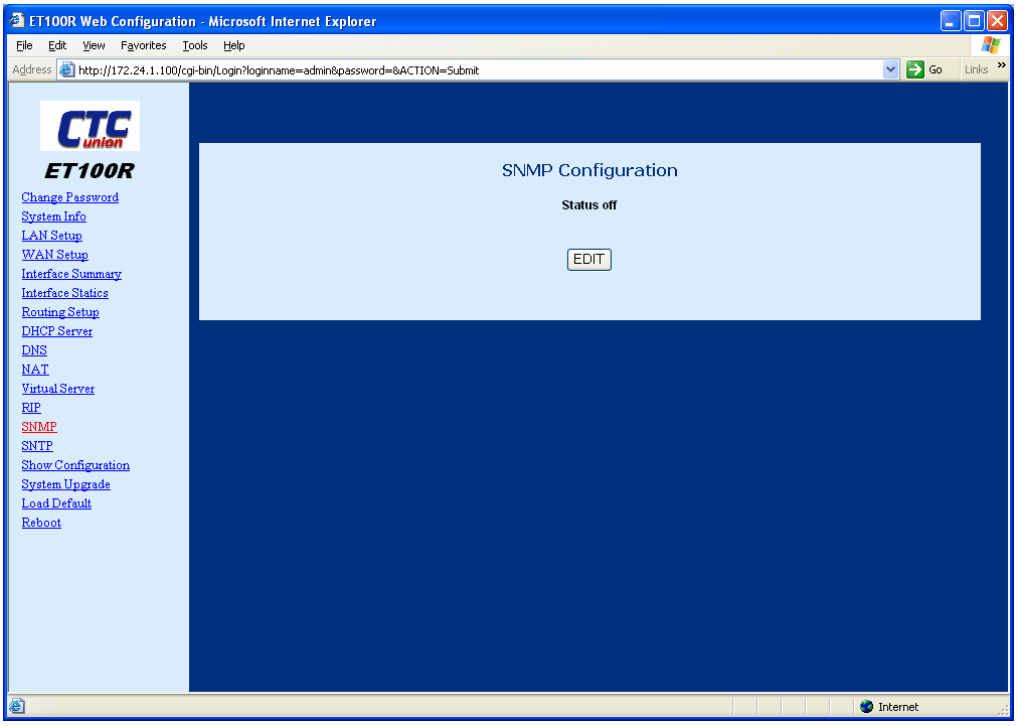


Figure 4-48 SNMP configuration

Fill in the community strings for read only and read write and make status 'ON', then click the 'Configure' button.

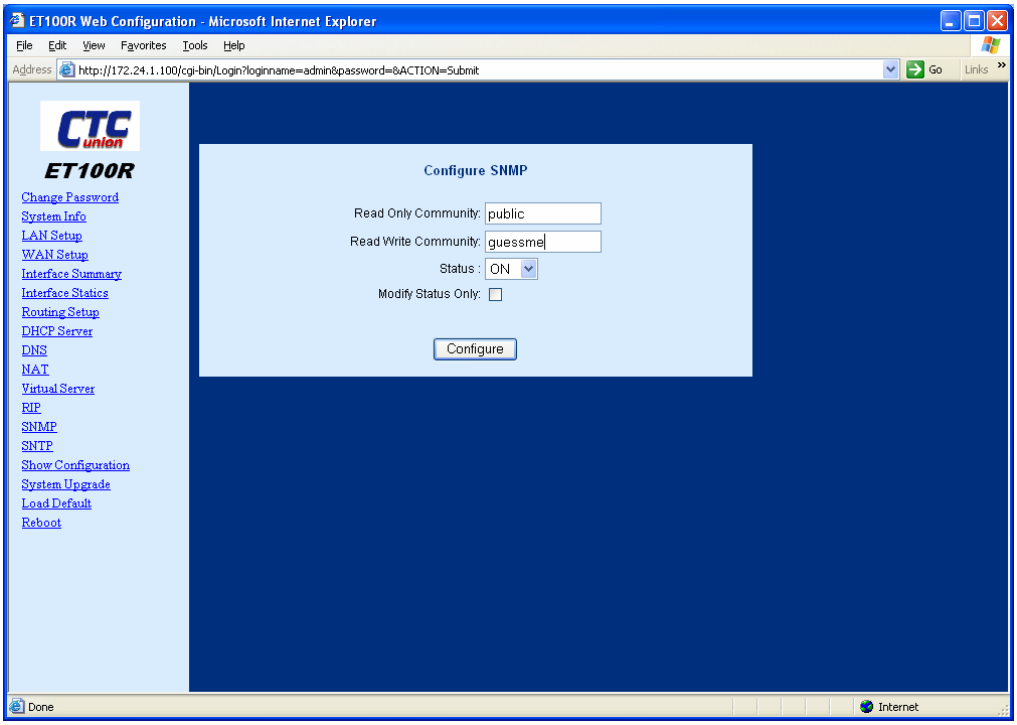


Figure 4-49 SNMP values input

4.2.14 SNTP configuration

SNTP is the Simple Network Time Protocol. Choose the SNTP item from the menu.

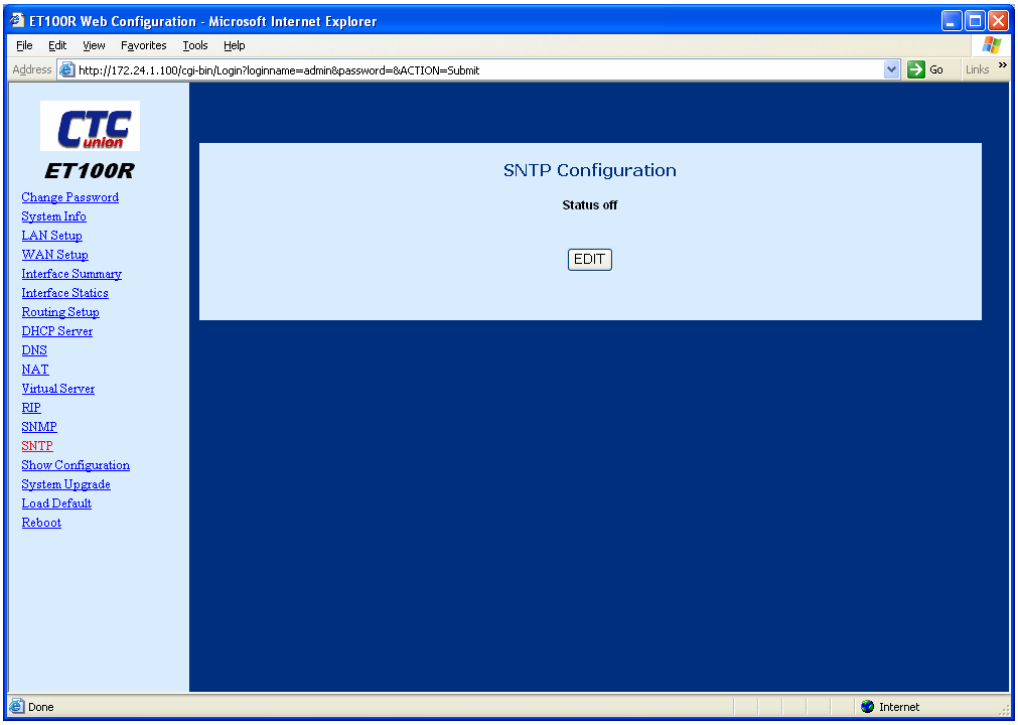


Figure 4-50 SNTP configuration

Click the 'Edit' button.

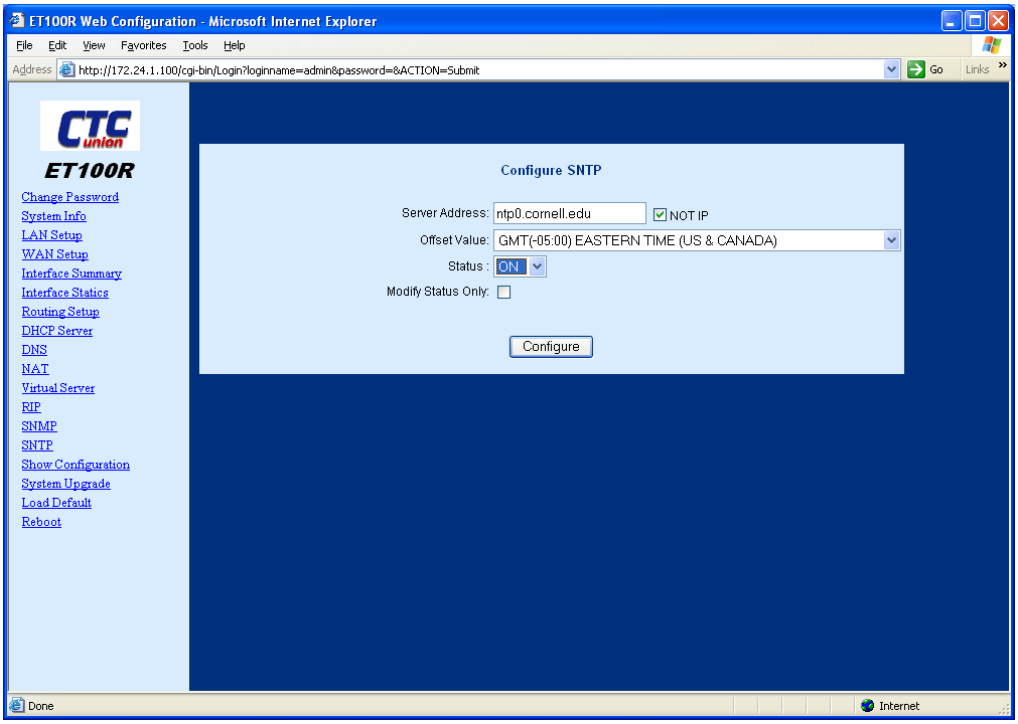


Figure 4-51 SNTP values input

Fill in the values for Time server and time offset. If the Time Server is called by name, click the 'NOT IP' check box (DNS must be working). A good place to find a time server close to your geographical area is to use the NTP search site:
http://ntp.isc.org/bin/view/Servers/WebHome

4.2.15 Show configuration

Choose the 'Show Configuration' item from the menu. All the current configuration setting will be displayed on one page.

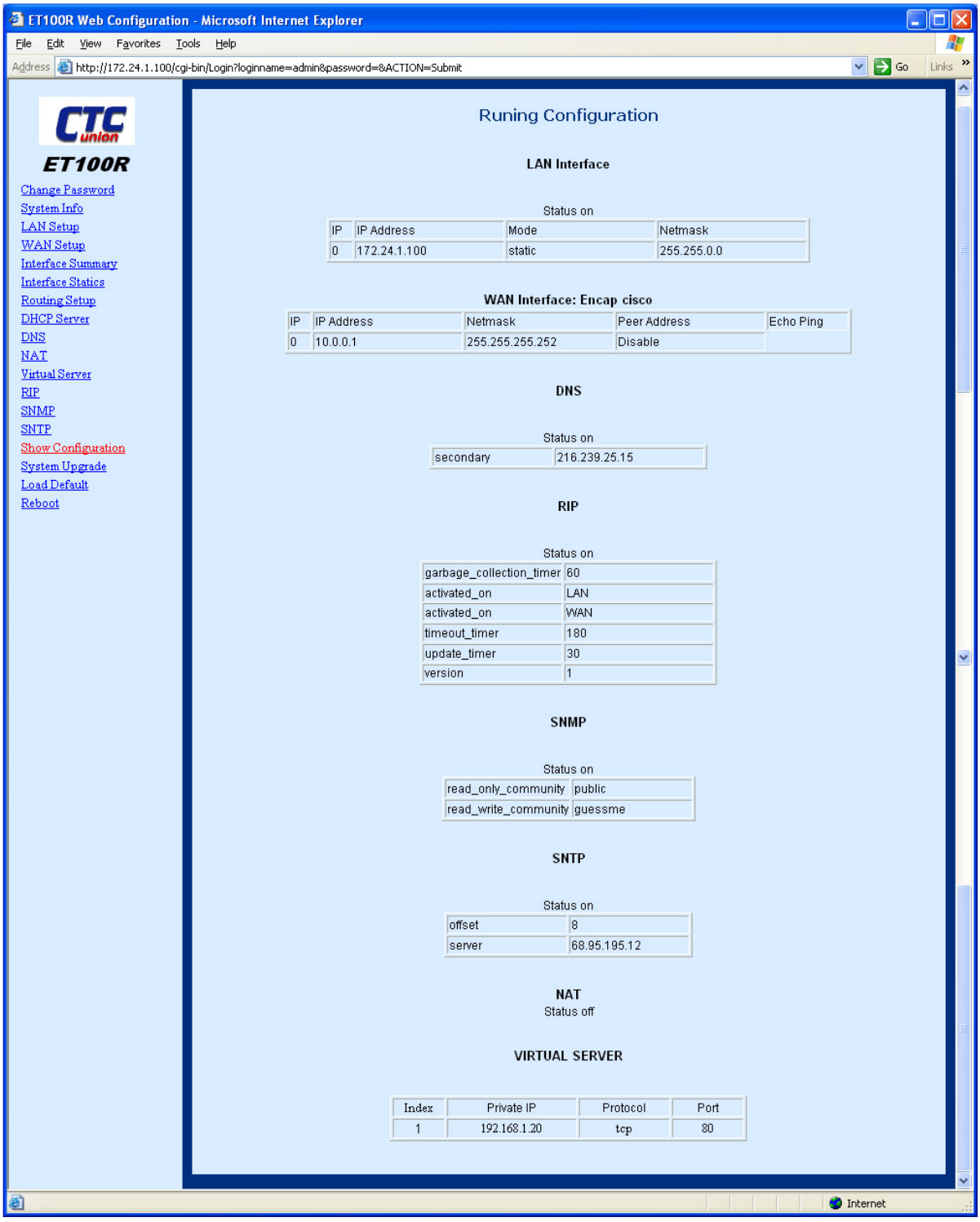


Figure 4-52 Show Configuration

4.2.16 System Upgrade

Occasionally there may be software enhancements or fixes that require updating the code in the router. This may be done through the Web Interface as well as console or Telnet CLI. The process still requires a working TFTP server. The ET100R has a Windows bases TFTP server in the 'tools' directory of the CDROM. Enter the TFTP's IP address in the 'Server IP Address' field and the image filename in its field. Click the 'Upgrade' button.

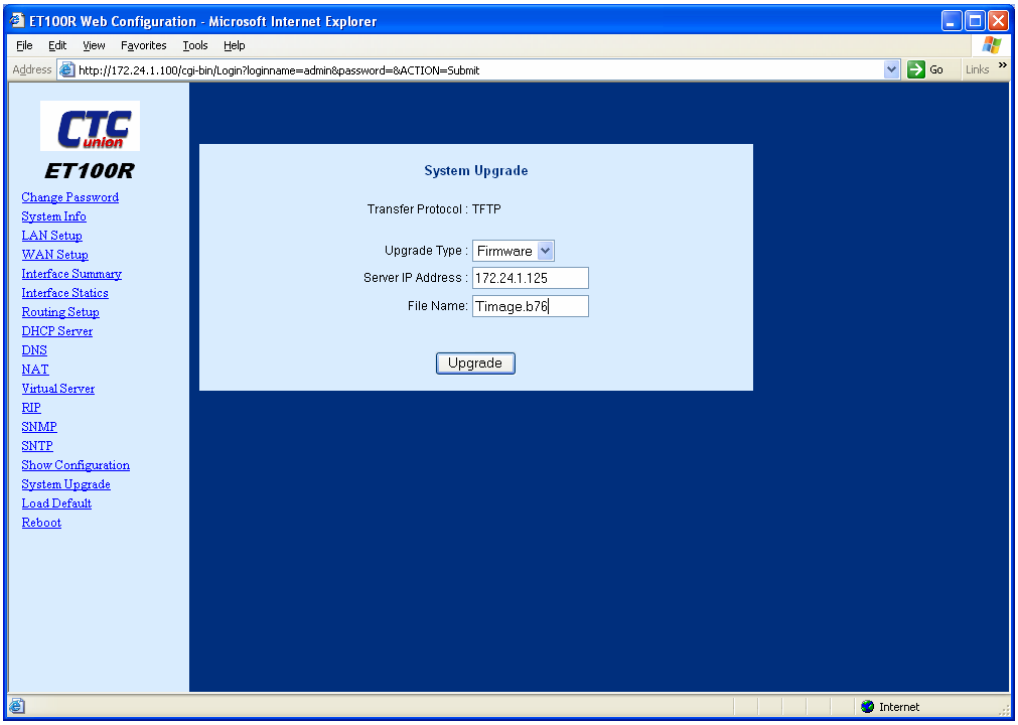


Figure 4-53 System Upgrade

4.2.18 Load Defaults

Choose the 'Load Default' item from the menu. The confirmation screen will be displayed.

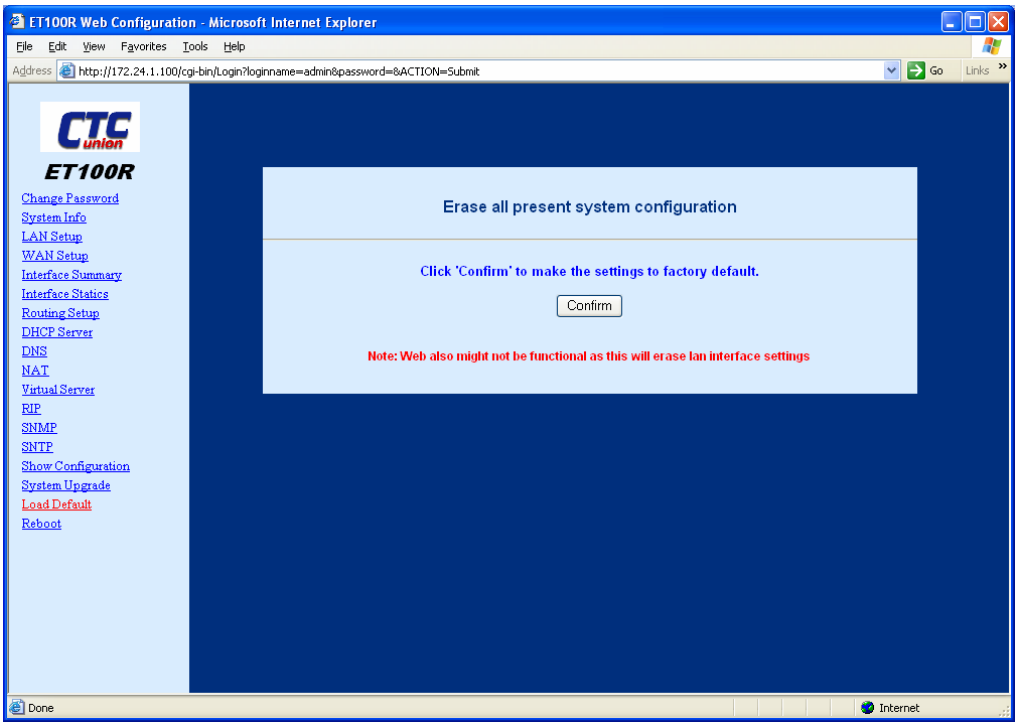
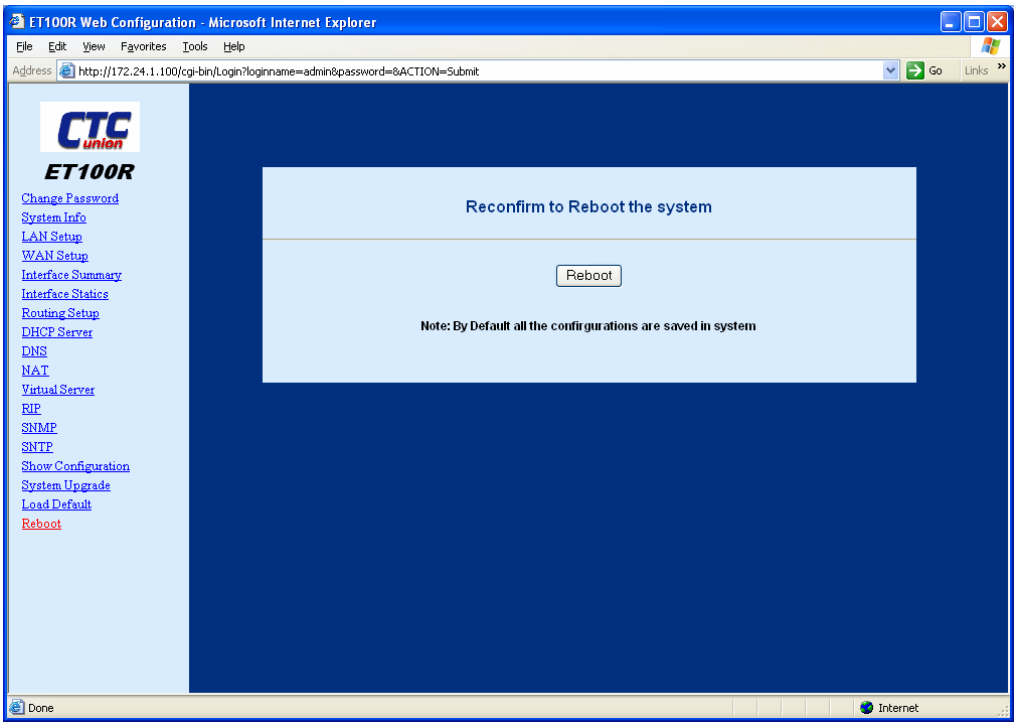


Figure 4-54 Load Default Confirmation message

4.2.19 Reboot

Choose the 'Reboot' item from the menu. The confirmation screen will be displayed.



This completes the Web GUI interface operation.

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Appendix A - CLI Command Reference

A.1. CLI Overview

The ET100R router includes a mini-DIM 9 to DB9 cable to connect a PC's RS-232 COM: port to the console port of the ET100R. The network engineer may use PC HyperTerminal as the console application. The configuration settings are 115200 bps, 8 bits, no parity, 1 stop bit, and no flow control.

There are two access levels of operation for the ET100R, basic mode and privileged mode.

The basic login requires the username 'admin' and has no password set by default. Basic level allows browsing all settings but does not allow any changes to be made.

The network administrator may advance to privileged mode from basic mode by entering the **enable** command, followed by the privileged mode password. The default privileged mode password is also set to a null value, just press enter directly when asked for the password.

In basic mode there will be a ">" prompt on every command line while in privileged mode, there will be a "#" prompt on every command line. Enter the **disable** command to go back to basic mode. Entering the **quit** command, will logout of both basic and privileged modes.

This appendix will provide the functional details of the Command Line Interface (CLI). They are all "Cisco like" commands.

A.2. Command Types

The shell commands can be categorized into the following different types.

A.2.1. System Support Commands

These include enable, disable, quit, exit, help,?, and upgrade commands.

A.2.2. Show Commands

These include all of the show commands and can be run from non-privileged mode (basic mode).

A.2.3. Configure Commands

These include the config commands and are only available in privileged mode.

A.2.4. Net Tool Commands

These include the ping, traceroute, and arp commands.

A.2.5. Miscellaneous Commands

These include up arrow and down arrow. Making it easy to review a history of commands.

A.3. Command Line Syntax Rules

Command	Base command.
<string>	Depends s on specific interface type, item, or value. If the string is **interface name**, it could be **eth1** for Ethernet or **hdlc1** for WAN port.
<string a | string b>	The string can be “string a” or “string b”.
[option]	Optional item or value.
{A|B|C}	Value A, B, or C. Must select one of them.

A.4. Command List

A.4.1 Base Commands

A.4.1.1 enable

Syntax:

enable

Description:

This command allows the user to enter the privileged mode to do configuration.

Example:

enable

A.4.1.2 disable

Syntax:

disable

Description:

This command allows the user to leave the privileged mode and return back to basic mode.

Example:

disable

A.4.1.3 quit

Syntax:

quit

Description:

This command will log out the user from either basic or privileged mode.

Example:

quit

A.4.1.4 exit

Syntax:

exit

Description:

This command will log out the user from either basic or privileged mode. It has the same function as **quit**.

Example:

exit

A.4.1.5 up arrow

Syntax:

Description:

This key allows the user to review the history of commands used in a round-robin fashion.

Example:

A.4.1.6 down arrow

Syntax:

Description:

This key allows the user to review the history of commands used in a round-robin fashion.

Example:

A.4.1.7 help, or ?

Syntax:

help

Description:

List all of the available commands.

Example:

help

A.4.1.8 show

Syntax:

show {arp … | config … | interface … | ip … | memory | system }

Description:

Show commands.

Example:

show system

A.4.1.9 config

Syntax:
config {interface … | ip … | save | system …}

Description:
Configure commands.

Example:
config interface hdlc1 encap ppp

A.4.2 Interface Commands

A.4.2.1 show interface

Syntax:
show interface {summary | <if name>}

Description:
Display interface information.
<if name>=eth1: Ethernet port information.
<if name>=hdlc1 WAN port information.

Example:
show interface summary
show interface eth1
show interface hdlc1

A.4.2.2 config interface

Syntax:
config interface <if name> <on | off>

Description:
Enable or disable interface.

Example:
config interface hdlc1 off

A.4.2.3 config interface <if name> ip <#>

Syntax:
config interface <if_name> ip <#>
{[addr <ip address>] [netmask <netmask address>] [mode static] | mode dhcp }

Description:
Setup interface IP address and netmask.
If the mode is dhcp, this interface will perform in DHCP client mode;
if the mode is static or ignore, it is static IP mode.

Example:
config interface eth1 ip 0 addr 192.168.100.1 netmask 255.255.255.0
config interface hdlc1 ip 0 addr 192.168.200.1 netmask 255.255.255.0
config interface eth1 ip 0 mode dhcp

A.4.2.4 config interface hdlc1 encap

Syntax:

config interface hdlc1 encap {hdlc | ppp | cisco}

Description:

Configure WAN port encapsulation protocol.
hdlc: Encapsulate raw HDLC protocol.
ppp: Encapsulate PPP protocol.
cisco: Encapsulate Cisco HDLC protocol.

Example:

config interface hdlc1 encap hdlc
config interface hdlc1 encap ppp
config interface hdlc1 encap cisco

A.4.3 IP Routing Commands

A.4.3.1 show ip

Syntax:

show ip {dhcp | dns | nat | rip | route }

Description:

dhcp: Display DHCP related information.
dns: Display DNS related information.
nat: Display NAT related information.
rip: Display RIP related information.
route: Display routing table related information.

Example:

See 'show ip dhcp', 'show ip dns', 'show ip nat', 'show ip rip', and 'show ip route' sections for details.

A.4.3.2 show ip dhcp

Syntax:

show ip dhcp

Description:

Display DHCP summary information.

Example:

show ip dhcp

A.4.3.3 show ip dhcp table

Syntax:

show ip dhcp table

Description:

Display client IP assignment information of DHCP server.

Example:

show ip dhcp table

A.4.3.4 show ip dhcp pool

Syntax:

show ip dhcp pool <pool id>

Description:

Display specified DHCP pool detailed information.

Example:

show ip dhcp pool 0

A.4.3.5 show ip dns

Syntax:

show ip dns

Description:

Display DNS related information.

Example:

show ip dns

A.4.3.6 show ip nat

Syntax:

show ip nat

Description:

Display NAT related information.

Example:

show ip nat

A.4.3.7 show ip nat table

Syntax:

show ip nat table

Description:

Display NAT table information.

Example:

show ip nat table

A.4.3.8 show ip rip

Syntax:

show ip rip

Description:

Display RIP related information.

Example:

show ip rip

A.4.3.9 show ip route

Syntax:
show ip route

Description:
Display routing table related information.

Example:
show ip route

A.4.3.10 config ip

Syntax:
config ip {dhcp … | dns … | nat … | rip … | route …}

Description:
dhcp: Configure DHCP server related operations.
dns: Configure DNS related operations.
nat: Configure NAT related operations.
rip: Configure RIP related operations.
route: Configure routing table related operations.

Example:
See 'config ip dhcp', 'config ip dns', 'config ip nat', 'config ip rip', and 'config ip route' sections for details.

A.4.3.11 config ip dhcp

Syntax:
config ip dhcp <on | off>

Description:
Turn on or off DHCP server global switch.

Example:
config ip dhcp on
config ip dhcp off

A.4.3.12 config ip dhcp pool

Syntax:
Config ip dhcp pool <pool id> {<on | off> |
[net <net address>]
[netmask <netmask address>]
[range_start <ip address>]
[range_end <ip address>]
[dns <ip address>]
[wins <ip address>]
[gateway <ip address>]
[lease_time <time in seconds>]}

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Description:

<pool id>: It ranges from 0 to 4.
<on | off>: The on/off switch of the specified DHCP pool.
net <net address>: The network address of the specified DHCP pool.
netmask <netmask address>: The network mask address of the specified DHCP pool.

Example:

```
config ip dhcp pool 0 off
config ip dhcp pool 1 net 10.60.0.0 netmask 255.255.0.0
config ip dhcp pool on
```

A.4.3.13 config ip dns

Syntax:

```
config ip dns {primary < ip address> | secondary <ip address>}
```

Description:

Configure the primary and secondary DNS server.

Example:

```
config ip dns primary 206.13.28.12
config ip dns secondary 206.13.29.12
```

A.4.3.14 config ip nat

Syntax:

```
config ip nat {     <on | off> |
                    max_table_size <integer> |
                    {add | del} {       type <snat | dnat>
                                        nat_ip <ip address>
                                        [src_net <net address>]
                                        [src_netmask <netmask address>]
                                        [protocol <tcp | udp | icmp>]
                                        [src_port <port # start[:port # end]>]
                                        [dst_port <port #>[:port # end]]
                                }
                }
```

Description:

Setup the NAT environment.
The Source NAT is typical NAT application.
The Destination NAT is virtual server application..

Example:

```
config ip nat max_table_size 8192
config ip nat add type snat nat_ip 66.100.1.20
config ip nat add type snat src_net 192.168.1.0 src_netmask 255.255.255.0 nat_ip 66.100.1.20
config ip nat add type dnat dst_port 80 nat_ip 192.168.1.1
config ip nat del type dnat nat_ip 192.168.1.1
config ip nat on
```

A.4.3.15 config ip rip

Syntax:

config ip rip {<on | off> |
version <1 | 2> |
update_timer <time in second> |
timeout_timer <time in second>|
garbage_collection_timer < time in second> ||
{ifadd | ifdel} <if name>
}

Description:

Configure RIP related operations.

Example:

config ip rip on
config ip rip ifadd eth1
config ip rip ifdel hdlc1
config ip rip version 2
config ip rip update_timer 30
config ip rip timeout_timer 180
config ip rip garbage_collection_timer 60

A.4.3.16 config ip route add

Syntax:
config ip route add
{net <net address> netmask <netmask address> [gw <ip address>] if <if name>
| net 0.0.0.0 netmask 0.0.0.0 [gw <ip address>] if <if name> }

Description:

add: Add a route entry in the routing table.
net <net address>: The network address of the specified route will apply.
netmask <netmask address>: The network mask address of the specified route will apply
net 0.0.0.0 netmask 0.0.0.0: Default gateway.
gw <ip address>: The gateway ip address of the specified route will apply.
if <if name>: The interface of the specified route will apply.

Example:

config ip route add net 10.60.0.0 netmask 255.255.0.0 if eth1
config ip route add net 0.0.0.0 netmask 0.0.0.0 gw 67.100.23.68 if eth1

A.4.3.17config ip route del

Syntax:
config ip route del
{net <net address> netmask <netmask address> [gw <ip address>] [if <if name>]
| net 0.0.0.0 netmask 0.0.0.0 [gw <ip address>] [if <if name>] }

Description:

del: Delete a route entry in the routing table.
net <net address>: The network address of the specified route will apply.
netmask <netmask address>: The network mask address of the specified route will apply
net 0.0.0.0 netmask 0.0.0.0: Default gateway.
gw <ip address>: The gateway ip address of the specified route will apply.
if <if name>: The interface of the specified route will apply.

Example:

config ip route del net 10.60.0.0 netmask 255.255.0.0

A.4.4 Management Commands

A.4.4.1 SNMP

Syntax:

config snmp { <on | off> |
read_only_community <string> |
read_write_community <string>
}

Description:

Set SNMP MIB-II feature on or off.
Modify SNMP community string.

Example:

config snmp on
config snmp read_write_community public

A.4.4.2 web

Syntax:

config web <on | off>

Description:

Set web management feature on or off.

Example:

config web on

A.4.5 Net Utility Commands

A.4.5.1 ping

Syntax:

ping <host>

Description:

Ping function.

Example:

ping 100.100.100.1

A.4.5.2 traceroute

Syntax:

traceroute <host>

Description:

Show the route packets take to network host..

Example:

traceroute 168.95.1.1

A.4.6 System Support Commands

A.4.6.1 show config

Syntax:

show config

Description:

Show the running configuration file.

Example:

show config

A.4.6.2 config save

Syntax:

config save

Description:

Save the whole system configuration into non-volatile memory.

Example:

config save

A.4.6.3 show system

Syntax:

show system

Description:

Show the system information.

Example:

>show system

Model: ET100R
Serial Number : none
Firmware Version: 1.00.b76
Firmware Build Time: Sat Jun 10 02:34:14 PDT 2006
TxClk invert: off

System Name: ET100R
Login Name: admin
Session Timeout: 10 min
System Time: Thu Jan 01 12:00:45 AM 1970
System Up Time: 00:00:45 up 0 min, load average: 1.12, 0.30, 0.10

A.4.6.4 config system

Syntax:

config system {[name <string>]
| [password <string>]
| [enable_password <string>]
| [mac <mac address>]}

Description:

name <string>: Change router system name.
password <string>: Change basic mode password.
enable_password <string>: Change privileged mode password.

Example:

config system name ET100R
config system password admin
config system enable_password 0000

A.4.6.5 upgrade

Syntax:

upgrade tftp server <host> file <file name>

Description:

User may upgrade new firmware by TFTP.
<host>: TFTP server
<file name>: the filename of new firmware.
Please make sure the LAN IP is configured properly first..

Example:

upgrade ftp server 10.10.10.123 file firmware09012004.bin

A.4.7 Miscellaneous Commands

A.4.7.1 show arp

Syntax:

show arp

Description:

Display arp table information.

Example:

show arp

A.4.7.2 config arp

Syntax:

```
config arp {        add <ip address> hwaddr <mac address> |
                    del <ip address>
            }
```

Description:

Configure arp table.

Example:

```
config arp add 1.1.1.1 hwaddr 00:11:22:aa:bb:cc
config arp del 1.1.1.1
```

A.4.7.3 show memory

Syntax:

```
show memory
```

Description:

Display system memory usage information.

Example:

```
show memory
```

A.4.7.4 config sntp

Syntax:

```
config sntp { <on | off> |
                    server  … |
                    offset …
             }
```

Description:

Setup the Simple Network Time Protocol feature. User may assign SNTP server IP and time offset.

Example:

```
config sntp on
config sntp server 198.82.1.202
config sntp offset 1
```

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Ethernet Series

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