

APEX 1930 PCS Band Repeater

User's Manual



Please read this manual before operating this product.
After you finish reading this manual, store it in a safe place for future reference.

TABLE OF CONTENTS

1. GENERAL	1
1.1. NOTICE	1
1.2. SAFETY PRECAUTIONS	2
1.3. VERSION HISTORY	3
1.3.1. Manual Version History List	3
1.3.2. Firmware Version History List	3
1.3.3. WEB GUI Version History List	3
1.4. GLOSSARY	3
2. INTRODUCTION	5
2.1. APEX1930	5
2.2. APEX1930 KEY FEATURES	6
2.3. COMPONENTS	6
2.3.1. APEX1930	6
2.4. DESCRIPTION	6
2.4.1. Overview	7
2.4.2. INTERNAL CONFIGURATION	7
2.4.3. RFU (RF Unit)	8
2.4.4. Duplexer	8
2.4.5. PSU (Power Supply Unit)	9
2.4.6. MCU (Main Control Unit)	9
3. MECHANICAL INSTALLATION	10
3.1. MOUNTING	10
4. CABLE INSTALLATION	11
4.1. CABLE CONNECTION	11
4.2. POWER ON	12
4.3. GROUNDING	13
5. GUI OPERATION	13
5.1. GUI OPERATION FLOW CHART	14
5.2. INTERNET NETWORK SETUP	14
5.2.1. Windows 7	14
5.3. GUI LOGIN	16
5.4. GUI NETWORK SETUP	16
5.4.1. Time Setting	16
5.4.2. Network Set-up	17
5.4.3. User Note	18
5.4.4. User Comment	18
5.5. GUI SYSTEM CONTROL	18
5.5.1. SYSTEM CONTROL	19
5.5.2. Operating Control	20
5.5.3. Alarm Control	21
5.5.4. Band select	21
5.6. GUI SYSTEM CONTROL	21
5.6.1. MANUAL SETTING [RECOMMENDED]	21
5.6.2. Easy Setup [NOT Recommended]	24
5.7. GUI STATUS	28
5.7.1. System	28
5.7.2. Operating	28
5.7.3. Alarm	29
5.8. FILE UPDATE	29
5.8.1. MCU Firmware Download	29
5.8.2. Web GUI Download	31
5.9. ATTACHMENT	32
5.9.1. Internet Network Setting	32

6. TROUBLESHOOTING	34
6.1 LED ALARM	34
6.2 GUI ALARM	35
6.3 COMMUNICATION ALARM	37
7. SPECIFICATIONS	39
7.1 RF CHARACTERISTICS	39
7.2 ENVIRONMENTAL SPECIFICATION	39
7.3 ELECTRONIC SPECIFICATION	40
7.4 MECHANICAL SPECIFICATION	40
8. APPENDIX	41
8.1 US PCS CHANNEL	41
8.2 WARRANTY	41
8.3 RETURN MATERIAL AUTHORIZATION (RMA) PROCEDURE	42

1. General

1.1. Notice

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Notice

This document describes the specifications, installation, and operation of the APEX 1930 repeater.

Hardware and software mentioned in this document are subject to continuous development and improvement.

Consequently, there may be minor discrepancies between the information in the document, performance, and design of the product.

Specifications, dimensions, and other statements mentioned in this document are subject to change without notice.

Questions or Comments

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1.2. Safety Precautions

Warning

Opening the APEX 1930 equipment could result in electric shock and may cause severe injury.

Warning

Connect the equipment frame ground to the building ground.

Warning

Operating the APEX 1930 with antennas in very close proximity facing each other can lead to severe damage to the repeater.

Caution

RF EXPOSURE INFORMATION

A minimum separation distance of 7.9 inches (20cm) must be maintained between the user and the external antenna of the repeater to satisfy FCC RF exposure requirements. For more information about RF exposure, please visit the FCC website at www.fcc.gov

Caution

This equipment is for indoor use only and enables the communication wiring to communicate inside the building.

1.3. Version History

1.3.1. Manual Version History List

Revision History		Date	Item/Description	Reason
Approval Ver.	Issue Ver.			

1.3.2. Firmware Version History List

Revision History		Date	Item/Description	Reason
Approval Ver.	Issue Ver.			

1.3.3. WEB GUI Version History List

Revision History		Date	Item/Description	Reason
Approval Ver.	Issue Ver.			

1.4. Glossary

The following is a list of abbreviations and terms used in this manual.

Abbreviation	Definition
AC	Alternating Current
CDMA	Code Division Multiple Access
DC	Direct Current
DL	Downlink
GUI	Graphic User Interface
LED	Light Emitting Diode
PSU	Power Supply Unit
RF	Radio Frequency
UL	Uplink
VSWR	Voltage Standing Wave Ratio

AGC (Automatic Gain Control)

AGC prevents the repeater from exceeding its maximum output power by reducing the gain automatically. AGC is used to adjust the gain to an appropriate level for a range of input signal levels.

ASD (Automatic Shutdown)

ASD does not:

1. prevent oscillation
2. protect from excessive input.

ASD helps protect the amplifier from over load. ASD helps protect the network by preventing excessive signal output power.

There are three parameters: **ASD Level**, **ASD Time**, and **ASD Iteration**.

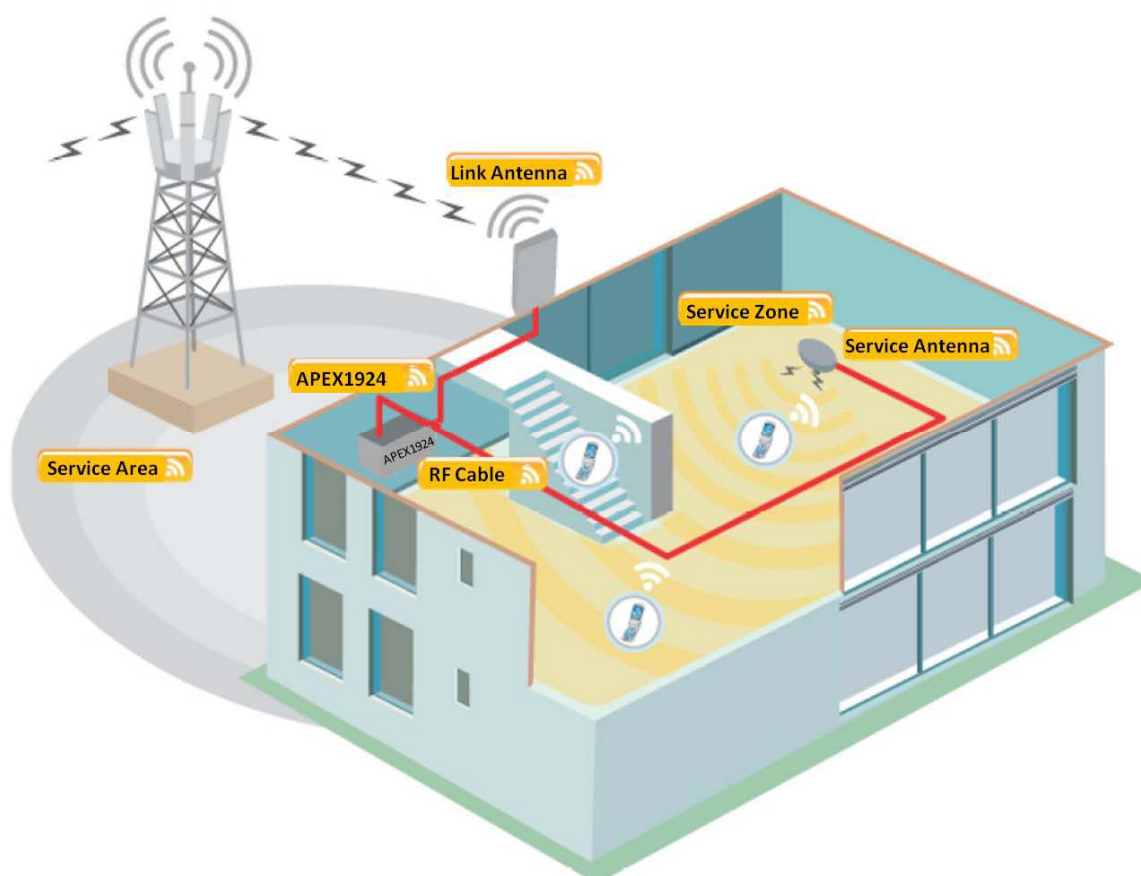
If the output power exceeds higher than the “**ASD LEVEL**”, the repeater will shut down for “**ASD TIME**” seconds. If shutdown repeats “Iteration” times, the repeater will require manual re-start.

2. Introduction

2.1. APEX1930

APEX1930 is used to fill out areas in APEX1900-24 systems, such as base station fringe areas, business and industrial building, etc.

APEX1930 receives signals from a base station, amplifies and retransmits the signals to the mobile stations. It also receives, amplifies and retransmits signals in the opposite direction. Both directions are served simultaneously with the following features:



< Basic Organization >

2.2. APEX1930 Key Features

◆ Design

- Multiple APEX repeaters may be stacked together to created quad band service with a single control interface.
- Digital filtering allows for customized channel selections.
- Digital filtering high quality, out of band rejection, and high performance

◆ User friendly design.

- Local monitoring and control through the Web GUI interface
- Remote monitoring and control through the Web GUI interface.
- Reports the status of connection as a function of SNMP regularly and reports an alarm if the event occurred.

◆ Protection function

- Isolation Check
- Auto Gain Control
- Auto Shutdown

2.3. Components

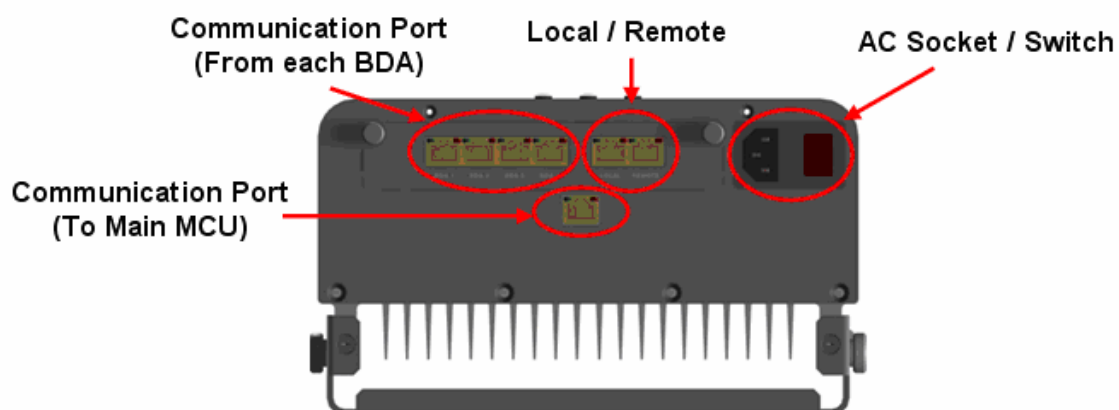
2.3.1. APEX1930



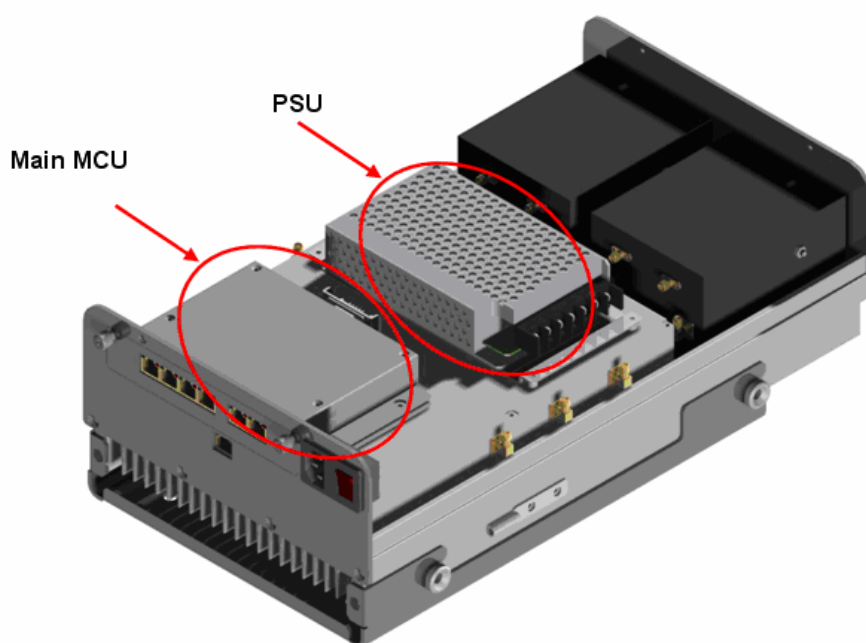
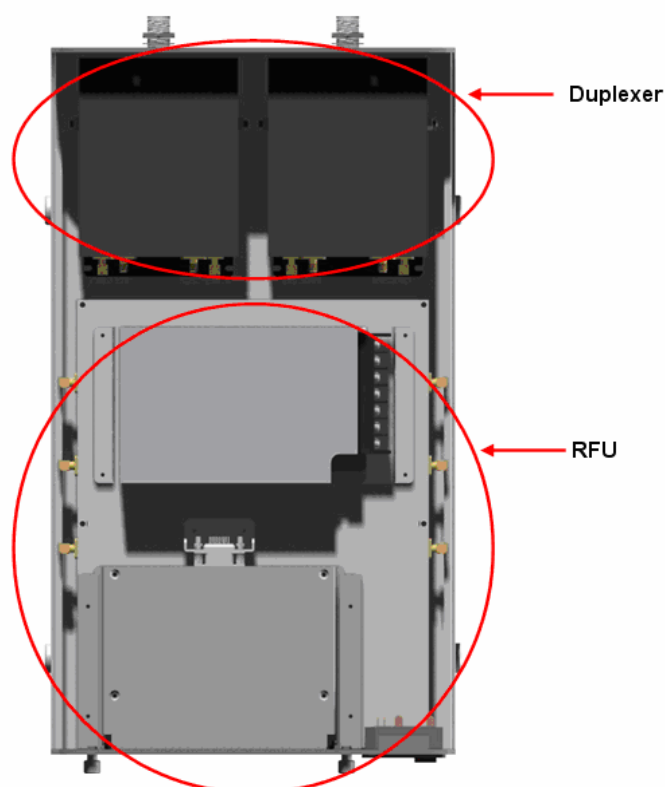
APEX1930 Package		
Index	Items	Q'ty
1	Repeater	1
2	LAN Cable	1
3	AC Cable	1
4	Direct LAN Cable	1
5	Bolt	4
6	Quick Guide	1
7	User's Manual CD	1

2.4. Description

2.4.1. Overview



2.4.2. Internal Configuration



2.4.3. RFU (RF Unit)

The RFU (RF Unit) is a bi-directional amplifier that sharply filters out unwanted noise.

2.4.4. Duplexer

A duplexer is a device that combines two or more signals onto a common channel or medium to

increase its transmission efficiency.

2.4.5. PSU (Power Supply Unit)

The AC-DC adaptor supplies a steady DC power to the APEX1930 equipment by drawing power from the general in-wall AC outlets.

2.4.6. MCU (Main Control Unit)

The MCU (Main Control Unit) is the control unit of the APEX1930. The MCU controls and monitors operational parameters, alarms, records event and performs many other functions.

3. Mechanical Installation

The installation procedure is as follows:

- Confirm Items from List
- Mounting
- Grounding
- RF Cable Connection
- Power On

3.1. Mounting

Step 1: Drill holes directly through the template. Attach the mounting bracket to the wall using provided bolts or extra screws.



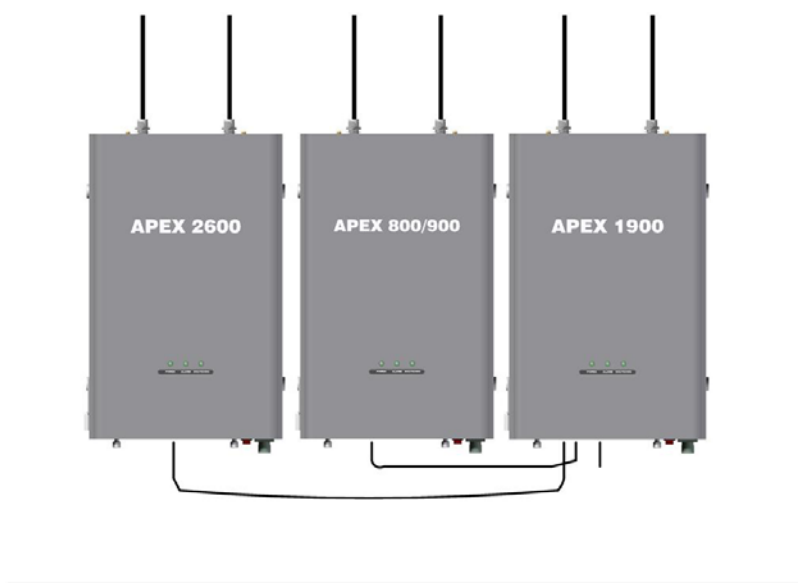
Step 2: Lean the APEX1930 to hang the topside of the Guide Ring on the mounting bracket, and push toward the wall to mount.



Step 3: Fix the repeater using the 4 screws provided.



Step 4: Example



4. Cable Installation

4.1. Cable Connection

Step 1: Connect a cable from the donor antenna to the Donor Antenna Port.

Step 2: Connect a cable from a repeater's service antenna to the Sever Antenna Port.



DO NOT connect or disconnect the coaxial cable while the power is on.

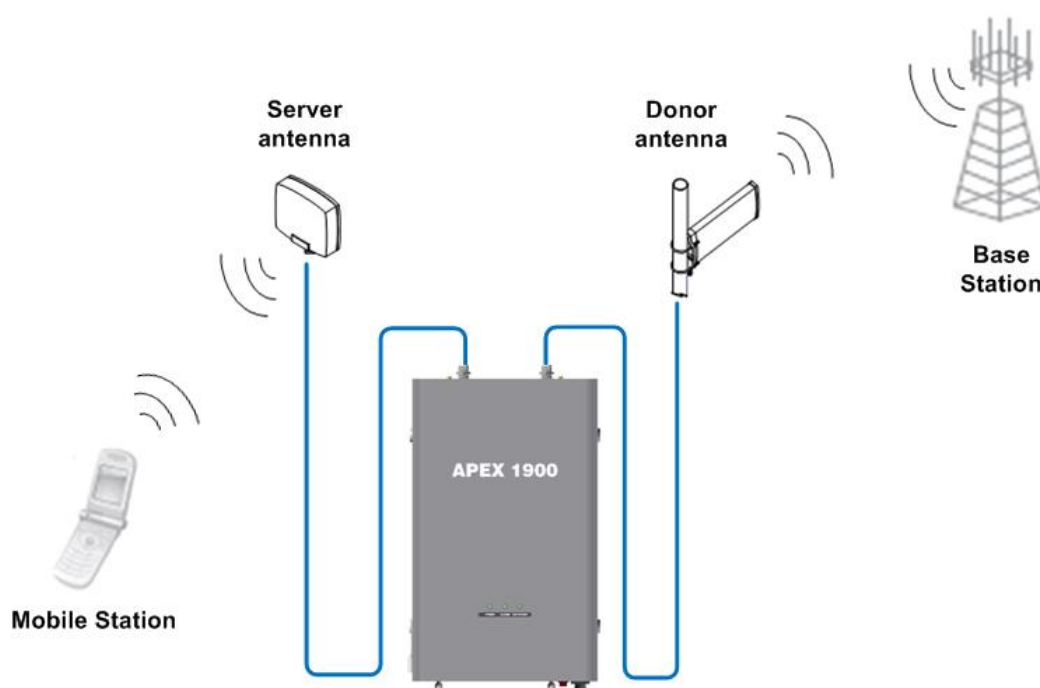
Note

Enough isolation?

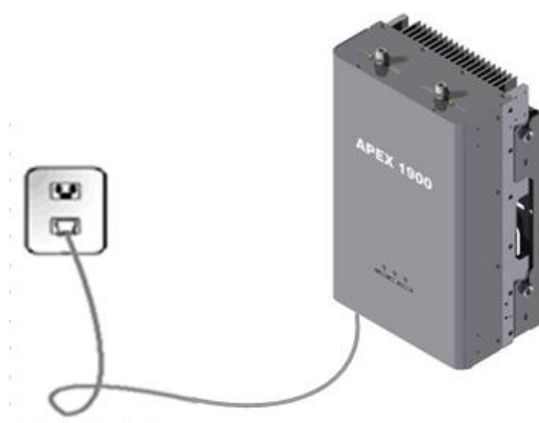
Antenna isolation = Path loss between the server antenna port and the donor antenna port

Antenna isolation $\geq$ Repeater max. gain +15dB

If antenna isolation < Repeater max. gain +15dB $\rightarrow$ System oscillation or Low gain



4.2. Power On



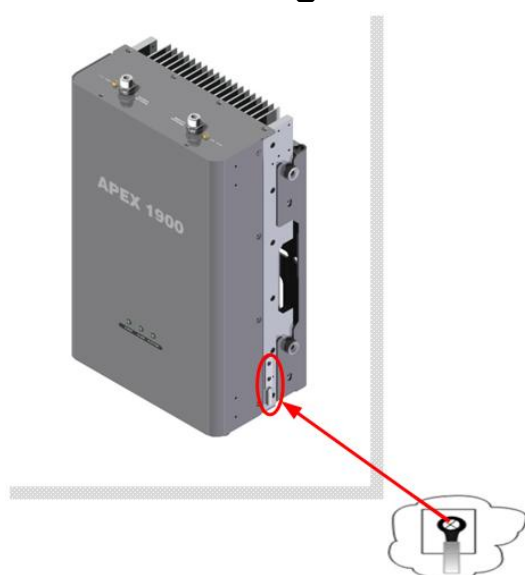
Step 1: Connect the power cord to the Repeater

Step 2: Plug the power cord into a wall outlet.

Step 3: Turn the red power button on

Step 4: Check if the green LED at the Top turns on.

4.3. Grounding



Step 1: A rod on the left side is intended for a building ground.

Step 2: Connect the ground cable to the rod.



Warning

Dangerously high voltages may occur and damage the equipment if the equipment is not grounded properly.

5. GUI Operation

APEX1930 operates on a customer provided PC based platform with the following system requirements:

- Windows® XP or Windows® Vista, Windows 7
- Internet Explorer 6.0(Recommended) or higher
- 128 MB RAM or higher
- Pentium III processor or higher
- RJ-45 jack required

5.1. GUI Operation Flow Chart

[1] Internet Network Setup

Setting in order to acquire the IP address automatically.



[2] GUI Log-in

APEX1924 operation access to Web GUI and Log in.

User ID	operator
Password	•••••

[3] GUI Network Setup

1. Time Setting

Automatically set to your PC time.

>> System Information : Date / Time	
Date:	04 / 14 / 2011 (MM/DD/YYYY)
Time:	10 : 25 : 23 (HH:MM:SS)

2. System Information Input

Input Cascade Code and Location Information.

>> Cascade Code	
Cascade Code	APEX
>> Location Information	
Latitude	12.3095
Longitude	-86.7802

3. Ethernet Setting

IP address and SNMP IP Input.

>> Ethernet	
IP mode	Static
IP Address	192.168.1.1
Subnet mask	255.255.255.0
Gateway	192.168.1.1
>> SNMP	
ServerIP	192.168.1.1
RAC Address	00:00:00:00:00:00
>> Heartbeat	
Heartbeat Interval (seconds)	30

[4] GUI System Control

The user can control the repeater locally using the built-in WEB GUI.

1. Band Select

Click the band you want to operate for Web GUI control.

>> BAND SELECT	
Filter Rejection: ☒ Normal ☐ High	
Center Frequency (MHz)	
Down Link	Up Link
1st	1940.00 1860.00 18.75
2nd	1962.50 1882.50 18.75
3rd	1985.00 1905.00 18.75

2. Isolation Check

Isolation will calculate the Available Maximum Gain.

>> Isolation Check	
Execute	
>> Factory Default	
Execute	
>> Repeater Reset	
Execute	

3. AGC control

AGC automatically assigns gain.

>> Automatic Gain Control (AGC)	
AGC Mode	☒ On ☐ Off
AGC Level [dBm]	24
UL Gain Offset [dB]	0.0

4. Manual Control

Gain value setting by User.

>> Automatic Gain Control (AGC)	
AGC Mode	☐ On ☒ Off
AGC Level [dBm]	24
UL Gain Offset [dB]	0.0

[5] GUI Status Check

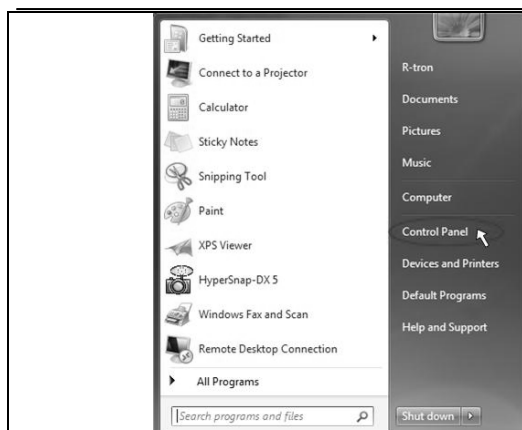
You can see system, operating, and alarm information on Status page.

5.2. Internet Network Setup

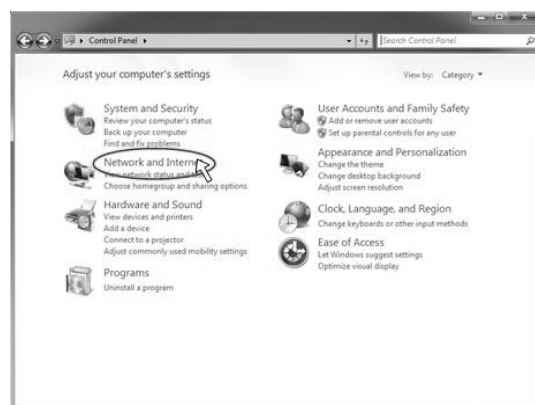
5.2.1. Windows 7

Step 1: Click the Start button and select Control Panel.

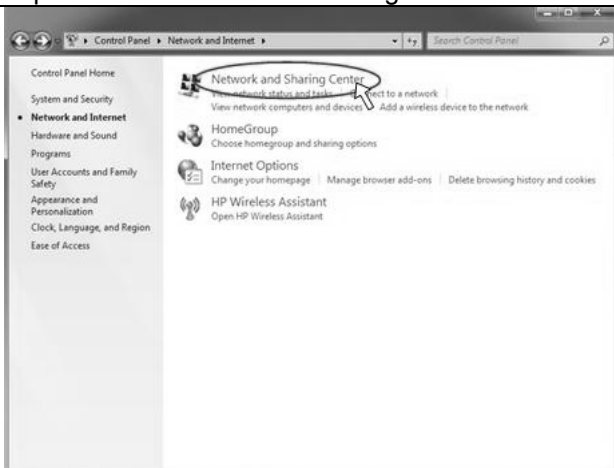
Step 2: Click **Network and Internet**.



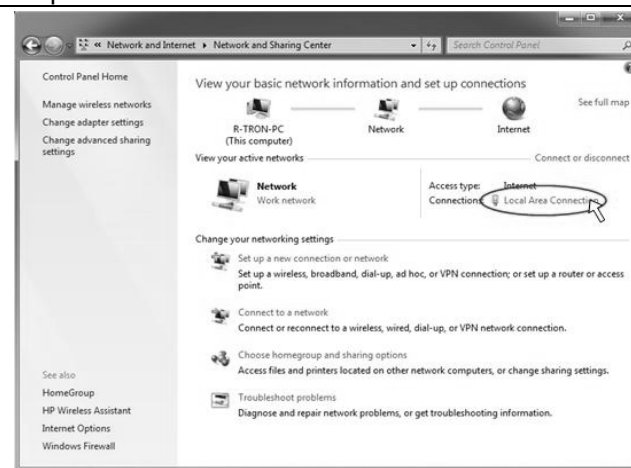
Step 3: Click Network and Sharing Center.



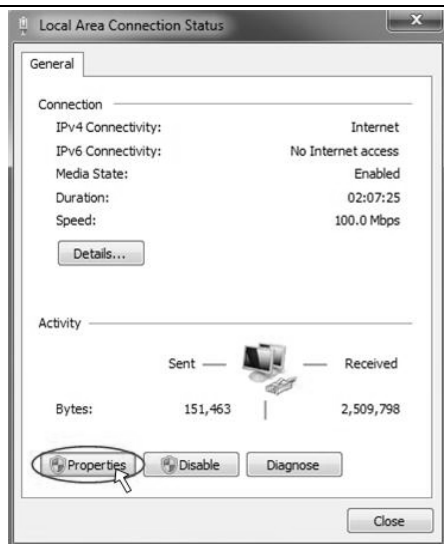
Step 4: Click View status of Local Area Connection.



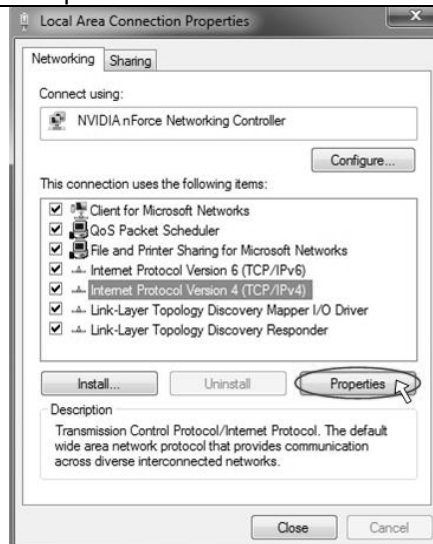
Step 5: Click Properties and a caution pop-up window will appear. Click OK.



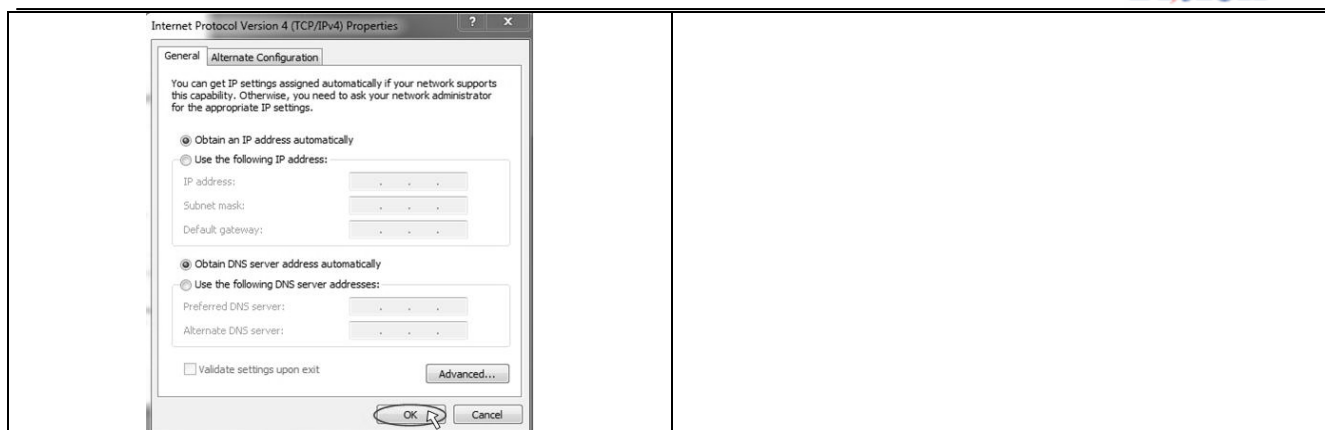
Step 6: Select Internet Protocol Version 4 (TCP/IPv4) and click Properties.



Step 7: Check Obtain an IP address automatically and click OK.



Step 8: Close all windows.



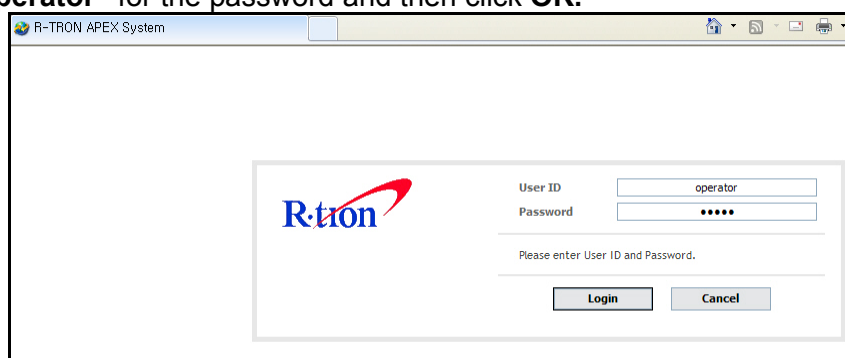
5.3. GUI Login

For APEX1930 operation access to Web GUI and Log in.

Step 1 Open your Web browser and type **http://192.168.0.1** into the URL address box. Then press the Enter key.



Step 2 Confirm a User ID and type the password into the password box. Type **“operator”** for the password and then click **OK**.



Step 3 The pop-up message for the login success will appear. Click **OK**.



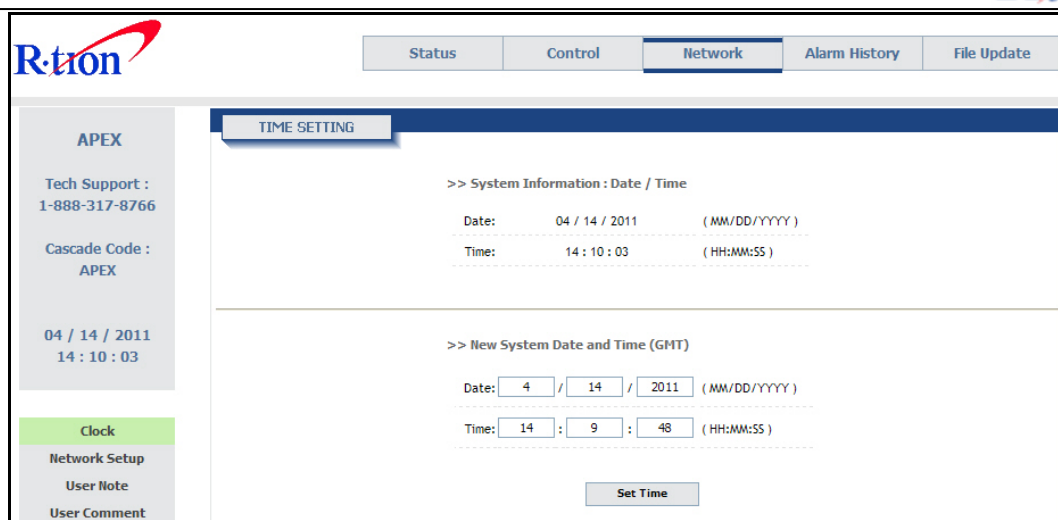
Step 4 When the login process is complete, the initial screen will appear.

5.4. GUI Network Setup

When you click Network you can set up time system, Ethernet, and time setting.

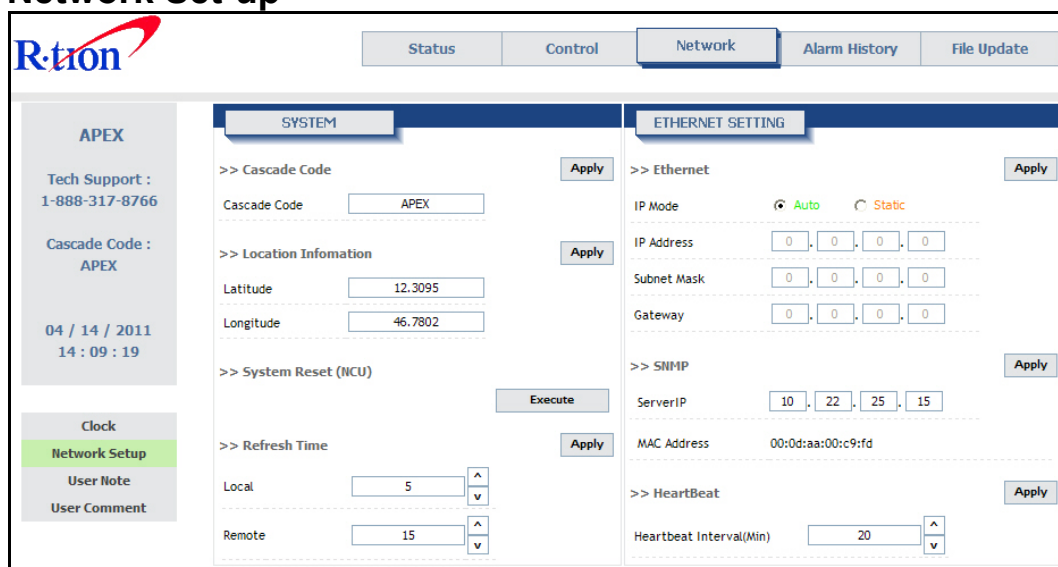
5.4.1. Time Setting

The time will automatically set to your PC time when you click the set time



In the above page, you can set device time and update time-related information.

5.4.2. Network Set-up



<Network Set-ups>

- **SYSTEM**
 - **Cascade Code:** Type the pre-assigned cascade code. Otherwise, you cannot access the system setup.
 - **Location Information:** Enter the latitude and longitude. You can input values either in Decimal Degrees or Degrees-Minutes-Seconds.
[Example]
(‘N/S’ | ‘E/W’) ddd.dddddd: (Latitude: N 39.006967 Longitude: W 94.532306)
 - **Refresh Time:** Set each refresh time for connecting to Local port and Remote port.
- **ETHERNET SETTING**
 - **Ethernet IP Mode/IP Address:** Enables you to set a connection mode for the network connected to the APEX1930 remote LAN port. When you “select” Auto, the device automatically assigns the IP address. When you select “Static”, it is possible to set an IP address of your choosing.
 - **SNMP:** In order to send Heartbeat and alarm related information to a remote monitoring server, you can set a server IP address. The factory default IP address is 10.22.25.15.
 - **Heartbeat Interval:** Sets the time to transmit the Heartbeat to the NMC Server.