ARS1120

WLAN Dual SerialBridge™

User's Manual

<u>Version 1.4</u>

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This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference.
(2) This device will accept any interference received, including interference that may cause undesired operation.

FCC Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a class B 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 to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user need to correct the interference at his area. If the equipment causes interference to radio or television reception, try to correct the interference by using one or more of the following measures:

• Plug the equipment into an outlet that is on a different circuit from the television or radio.
• Change the direction of the television or radio antenna until the interference disappears.
• Move the equipment to one side or the other of the television or radio.
• Move the equipment farther away from the television or radio.

To assure continued compliance, any changes or modifications not expressly approved by manufacturer could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement

This device and its antennas must operate with a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End users must be provided with specific operating instructions for satisfying RF exposure compliance.

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Installation and use of this Wireless LAN device must be in strict accordance with the instructions included in the user documentation provided with the product. Any changes or modifications (including the antennas) made to this device that are not expressly approved by manufacturer may void the user's authority to operate the equipment. The manufacturer is not responsible for any radio or television interference caused by unauthorized modification of this device, or the substitution or attachment of connecting cables and equipment other than manufacturer specified. It is the responsibility of the user to correct any interference caused by such unauthorized modification, substitution or attachment. Manufacturer and its authorized resellers or distributors will assume no liability for any damage or violation of government regulations arising from failing to comply with these guidelines.

Limited Warranty

This product is warranted by manufacturer to be free from defects in material and workmanship for one (1) year from the date of purchase unless otherwise stated.

During this period if this product is found to be defective in material or workmanship, manufacturer or one of its authorized service facilities will at its option either repair or replace this product without charge, subject to the following conditions, limitations and exclusions:

1. This warranty extends to the original consumer purchaser only and is not assignable or transferable.
2. This warranty shall not apply to any product which has been subjected to misuse, abuse, abnormal use, negligence, alteration or accident, or has had its serial number altered or removed.
3. This warranty does not apply to any defects or damage directly or indirectly caused by or resulting from the use of unauthorized replacement parts and/or service performed by unauthorized personnel.
4. This warranty does not apply to the software driver that accompanies this product.

This warranty is made expressly in lieu of all other warranties, expressed or implied, including but not limited to any implied warranty of merchantability of fitness for a particular purpose, and all other obligations on the part of Manufacturer provided, however, that if the disclaimer of implied warranties is ineffective under applicable law, the duration of any implied warranties arising by operation of law shall be limited to one (1) year from the date of purchase or such longer period as may be required by applicable law.

Manufacturer hereby disclaims any and all liabilities for consequential and incidental damages arising out of or in connection with any breach of this warranty or any other claim with respect to this product, including but not limited to claims of negligence, strict liability in tort or breach of contract.

Table of Content

1. Introduction

The ARS1120 WLAN Dual SerialBridge™ easily brings a wireless connection to any serial device in a simple and secure manner. The ARS1120 enables remote accessibility for services and support to any legacy serial devices and eliminates cable interference and ground loops. In addition to expanding beyond cabling limitations, it combines the benefits of data network with proven asynchronous connectivity to deliver high performance serial connections to wireless LANs. Its external antenna design also allows the use of third party antenna for extended range and performance.

The ARS1120 has a broad range of networking functions utilizing TCP/IP to provide serial tunneling. It is easy to set up using a secure web browser. Its flash-upgradeable firmware provides future upgradeability. The ARS1120 Site Survey function allows users to browse the available active Access Points facilitating easy network connection. It also supports full mobility and seamless roaming from cell to cell.

The Ident-and-Connect™ auto discovery utility allows the user easily find all the available ARS1120 in the network and can access any specific ARS1120. The SerialComm™ Virtual COM utility will treat the ARS1120 serial ports as the COM ports of the Windows based PC/NB running the SerialComm™ Virtual COM utility. The ComSR utility provides the diagnostic function that allows user to do the loop back test on ARS1120.

ComSR is a diagnostic program for Aboundi Dual SerialBridge™ (ARS1120, ARS1200, ARS1300). It provides the loop back testing function for user to test the SerialBridge™ units. From PC running ComSR and SerialComm™ utility, user can send/receive data via two virtual COM ports connected to SerialBridge™ unit's two serial ports.

The ARS1120 supports full and half-duplex transmission, software and hardware flow control, and has programmable baud rates for application optimization. Its enhanced security features support 64 bit and 128 bit WEP (Wired Equivalent Privacy) encryption.

Overall, the ARS1120 will enable wireless connections for most serial applications including retail point-of-sales, remote metering and display, industrial and building automation, security and access control and general data acquisition applications.

1.1 Features

- Easily connect all types of serial devices via IEEE 802.11b WLAN
- Dual serial ports, each can be RS232, RS422 or RS485 which is DIP switch selectable
- Serial ports can be set up individually via easy-to-use web browser with password protection
- External antenna connector supports third-party products for extended range/performance
- Programmable baud rate (from 110bps to 230,400bps)
- Full-duplex (serial data in/data out)
- Hardware RTS/CTS flow control
- Software flow control (XON/XOF, None)
- Supports variant of protocols: TCP, IP, ICMP, HTTP, TFTP, ARP, DHCP Client, SNMP (get)
- Ident-and-Connect™ auto discovery utility allows available ARS1120 in the network to be automatically discovered and connected
- Includes SerialComm™ Virtual COM function
- ComSR utility provides the loop back test to diagnose ARS1120 device.
- Supports watch dog timer
- Supports loop back test utility
- Supports watch dog timer
- Firmware upgrade via WLAN
- Wired Equivalent Privacy (WEP) security feature supports 64 and 128-bit encryption
- Unique site survey function lets users browse for all available active Access Point connections
- Supports both "Ad-Hoc" and infrastructure topologies
- Supports full mobility and seamless roaming from cell to cell
- Full compliment of status LEDs and activity indicators for easy installation, monitoring and diagnostics
- User friendly LED status graphic display for monitoring status remotely
- Extended operational temperature range
- Optional industrial DIN Rail mounting hardware accessory, DB9 to terminal strip or RJ-45 termination adaptor

1.2 Applications

The following describes 4 application examples for ARS1120:

Application 1 – Peer to Peer (Ad-Hoc Mode)
Application 1 is a dedicated application environment. Both the Host PC and serial device use the ARS1120 device to communicate with each other (refer to Figure 1-1).

Figure 1-1 Peer to Peer (Ad-Hoc Mode)

Application 2 – ARS1120 to PC WLAN (Ad-Hoc Mode)
Application 2 uses the ARS1120 in the serial device side and the Host PC side will be equipped with WLAN card.
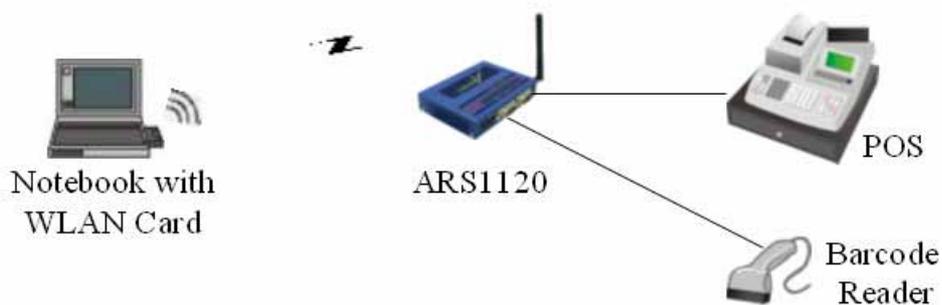
Figure 1-2 ARS1120 to PC WLAN (Ad-Hoc Mode)

Application 3 – ARS1120 to Access Point (Infrastructure Mode)

Application 3 uses the ARS1120 in the serial device side (for example, Programmable Logic Controller, PLC) and the Host PC side is connected to the AP via LAN as shown below.
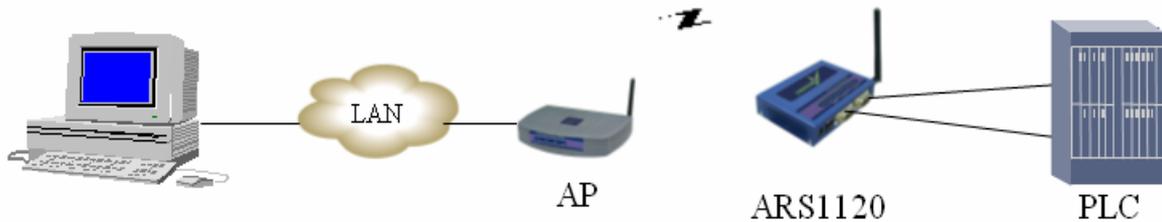
Figure 1-3 ARS1120 to Access Point (Infrastructure Mode)

Application 4 – ARS1120 over the Internet (Infrastructure Mode)

Application 4 is used for far end remote communication via the Internet.
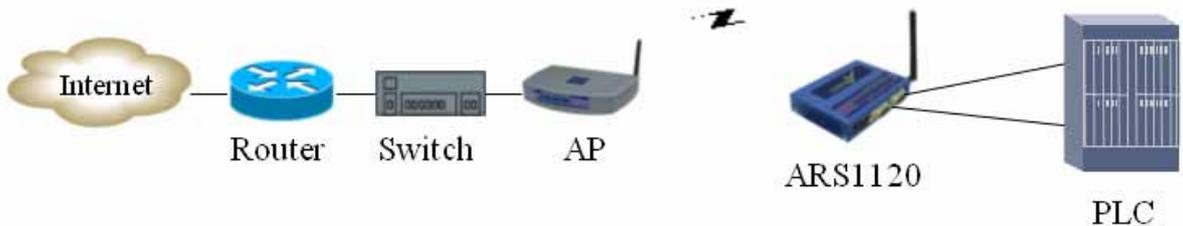
Figure 1-4 ARS1120 over the Internet (Infrastructure Mode)

2. Installation

Please follow the steps described in Section 2.1 through 2.9 to install your ARS1120 including hardware and utilities.

2.1 Product Kit

Before starting installation, please make sure the ARS1120 package includes the following four items:

1) ARS1120 device with one antenna.
2) CD-ROM (containing SerialComm™ Utility, ComSR Utility and User's Manual).
3) Power adapter.
4) Quick Installation Guide

If anything from the above items is missing, please contact your vendor.

2.2 System Minimum Requirements

For ARS1120 Application 3 and 4 (Figure 1-3, Figure 1-4), your system should meet the following minimum requirements to use ARS1120 as the serial data transport platform.

1) A serial Device
2) A WLAN Access Point (AP)
3) A Host PC/server connected to the AP via LAN.

2.3 ARS1120 and AP Location

Please choose a proper location for your AP. In general, the best location to place the AP is at the center of all the WLAN stations, including ARS1120, within the line of sight. Better performance can be obtained by locate the elevation of the AP device above obstacles. For AP installation/configuration, please refer to your AP user manual.

2.4 Serial Port Operation Mode Setting

ARS1120 supports dual serial ports. Each port can be a console, RS232, RS422 or RS485 port selected by the DIP switch, refer to Figure 2-1.

Figure 2-1 ARS1120 Rear Panel

There is a DIP switch and serial port ping assignment table attached at the bottom of ARS1120. Set the serial port type based on your need, refer to Figure 2-2.

Note: The default DIP switch is set port 1 to console and port 2 to RS232. After the initial settings, remember to set the DIP switch to meet your need.

Note: After changing the DIP switch, you need to reboot the device to make the change valid. To reboot the device, you can do it via web browser or by command (console port or Telnet). Unplug and then re-plug the power can also reboot the device.

Figure 2-2 DIP Switch and Serial Port Pin Assignment Table

For example,

- To set port 1 as the console port: set DIP switch 3 and 4 to OFF position (i.e. up), refer to Figure 2-1 and Figure 2-2. Port 1 LED will be all OFF.
- To set port 2 as the RS232 port: set DIP switch 1 to OFF position (i.e. up) and DIP switch 2 to ON position (i.e. down). Port 2 RS232 LED will be all ON.

2.5 LED Indicator Label

Figure 2-3 shows the ARS1120 LED indicator label.
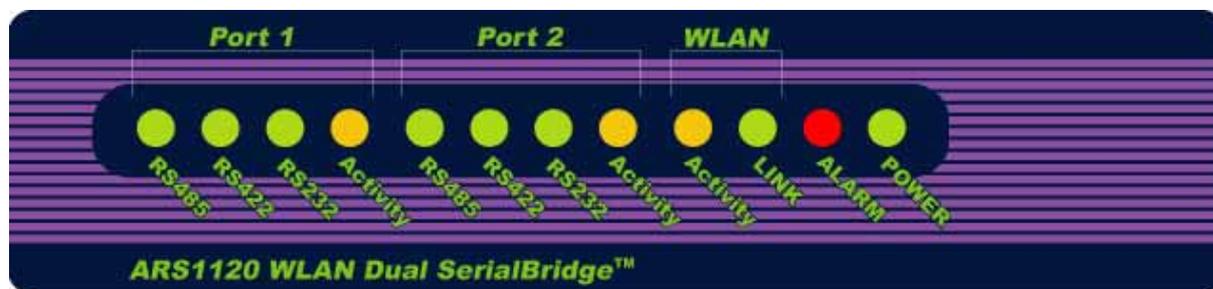
Figure 2-3 LED Indicator Label

The function for each LED is described as follow:

Power LED: ON, green, when power adaptor is plugged into ARS1120

Alarm LED: When power is applied to ARS1120, it will do self test. During this period, the Alarm LED will be ON, red. After passing the self test, it will be OFF. When you reboot the device, the Alarm LED will also be ON during the self test period, and then it will be OFF.

Link LED: ON, green, when ARS1120 is linked with AP (infrastructure mode) or with another WLAN station (Ad-Hoc mode)
OFF when ARS1120 is not linked with any WLAN devices

Activity LED: Blinking, yellow, when there is data transferring to/from ARS1120

RS232 LED: ON, green, when the corresponding DIP switch is set to RS232

RS422 LED: ON, green, when the corresponding DIP switch is set to RS422

RS485 LED: ON, green, when the corresponding DIP switch is set to RS485

For console port, all RS232, RS422 and RS485 LED will be OFF,

2.6 Plug in RS232 Cable

Connect PC/NB to the ARS1120 serial port by using an NULL cross cable with DB9 female connector. This PC/NB will be used to configure ARS1120 via command mode. A NULL cross cable will cross pins 2 & 3, 7 & 8, and 4 & 6. ARS1120 can be configured either by web browser or by command mode.

2.7 Plug in Power Cable

Plug the power cord of power adapter into the socket marked with "DC IN" on the rear panel of ARS1120, and plug the power adapter into an A/C power outlet. When completed, the green power LED on the top panel should light up.

Warning: Use only power adapter supplied with the ARS1120; otherwise, the ARS1120 may be damaged.

2.8 Install SerialComm Utility

Please follow the steps below to install SerialComm™ utility into the PC/NB. This utility support several functions: Virtual Com, Ident-and-Connect™ auto discovery, directly connect with discovered IP devices, LED status graphic display and Ping IP connectivity.

    1) Insert the supplied CD-ROM in the CD-ROM driver.

    2) Execute the file **Setup.exe** in the CD-ROM.

2.9 Initial Settings

For setting up your ARS1120 at the first time, the first thing you should do is to configure the IP address, SSID and WEP settings. The PC/NB, AP and ARS1120 should be within at the same IP subnet. AP and ARS1120 should have same SSID and WEP settings.

The default IP address, SSID and WEP of the ARS1120 is set to:

- IP address: **192.168.1.200**
- SSID: **SerialBridge**
- WEP: **Disable**

Select one of the following methods for your ARS1120 initial setting.

2.9.1 Change PC and AP Settings

Connect your PC/NB directly with an AP's LAN port (or via LAN connection).
Configure AP with the following settings:

IP Address: **192.168.1.xxx** where "xxx" is a value other than "200".

Mask: **255.255.255.0**

SSID: **SerialBridge**

WEP: **Disable**

Operation Mode: **AP (Infrastructure mode)**

Change your PC/NB IP address to have IP address 192.168.1.yyy where "yyy" is the value other than "200".

Now, the ARS1120 can be configured via web browser or telnet by enter ARS1120 IP address: **192.168.1.200** (which is the ARS1120 default IP address).

2.9.2 Change ARS1120 Settings

Your PC/NB needs to be connected with ARS1120 serial port. Follow the steps below to configure ARS1120:

- Set ARS1120 serial port to be the console port as described in section 2.4. The **permanent**, default settings for console port are:

  Baud Rate: **2,400**   Data Length: **8**   Parity: **None**

  Stop Bit: **1**   Flow Control: **None**

- Follow the steps described in section 4.1 and 4.2 to set the PC/NB COM port and open Microsoft HyperTerminal.

- Use the commands described in section 4.3 and 4.4 to change ARS1120 IP address. ARS1120 IP address should have same IP subnet as your PC/NB and AP have.

  The commands are: **IP <IP_Address>**

  MASK <IP_Address>

  GW <IP_Address>

- Use the commands described in section 4.3 and 4.4 to change ARS1120 WLAN Operation Mode, Channel, SSID and WEP settings. They also should be the same as your AP has. The commands are:

  MODE <[B]SS|[A]d-Hoc>   **Note**: "B" for infrastructure and "A" for Ad-Hoc mode

  SSID <SSID>

  CHAN <1-11>   **Note**: Only needed for Ad-Hoc mode.

  WEP <0|64|128>   **Note**: When "0" is set, WK and WKID is not needed.

  WK <0|64|128> <1-4> <Key in Hex>

  WKID <1-4>

3. Web Browser Configuration

This section provides directions for ARS1120 web browser configuration: Network Settings, Serial Settings, WLAN Settings, Site Survey, Restore Default, Firmware Upgrade, Password Setting and Reboot the System.

3.1 Home Page

The **WLAN Dual SerialBridge** home page will be displayed when the ARS1120 IP address is correctly entered into the web browser, refer to Figure 3-1. It also shows the firmware version.
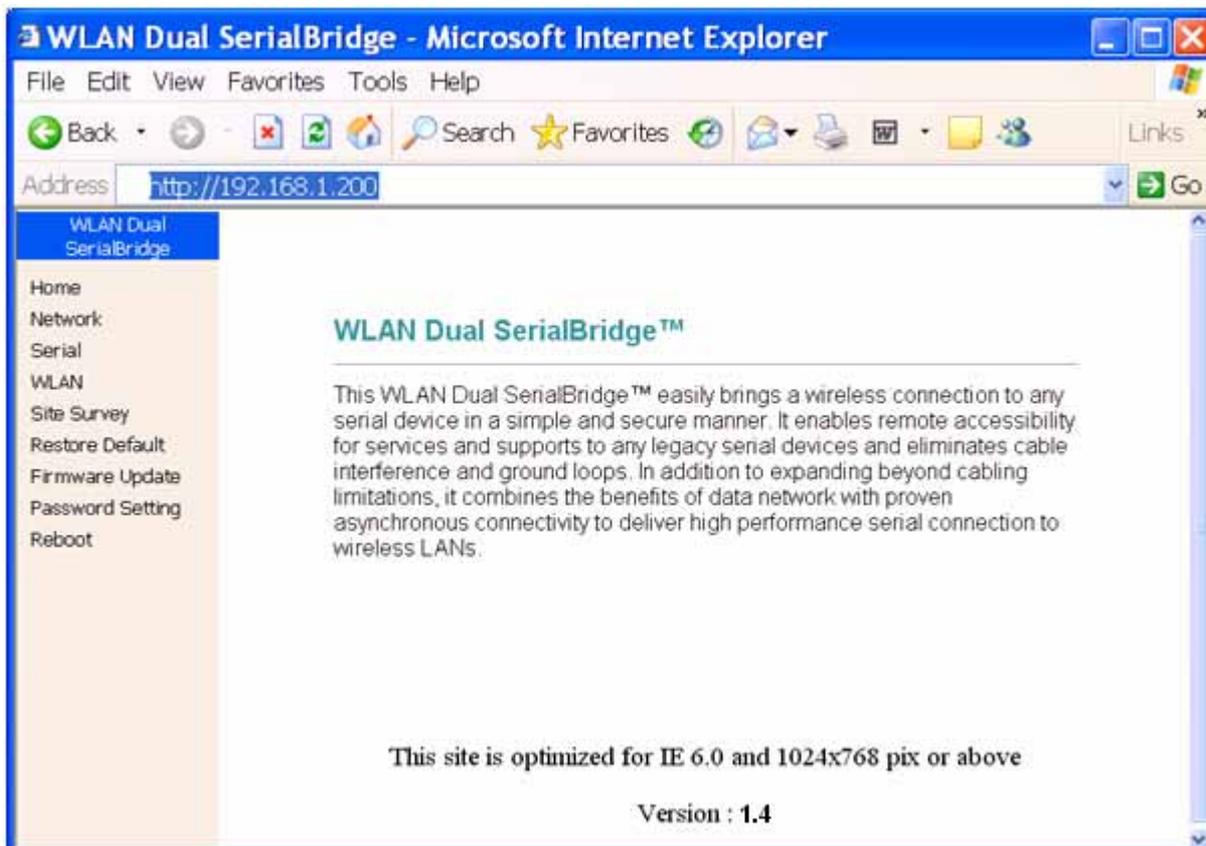
Figure 3-1 Web Configuration Home Page

3.2 Network Settings

At the left frame of the **WLAN Dual SerialBridge** web page, select **Network** to change the IP related settings and device description information. Refer to Figure 3-2.
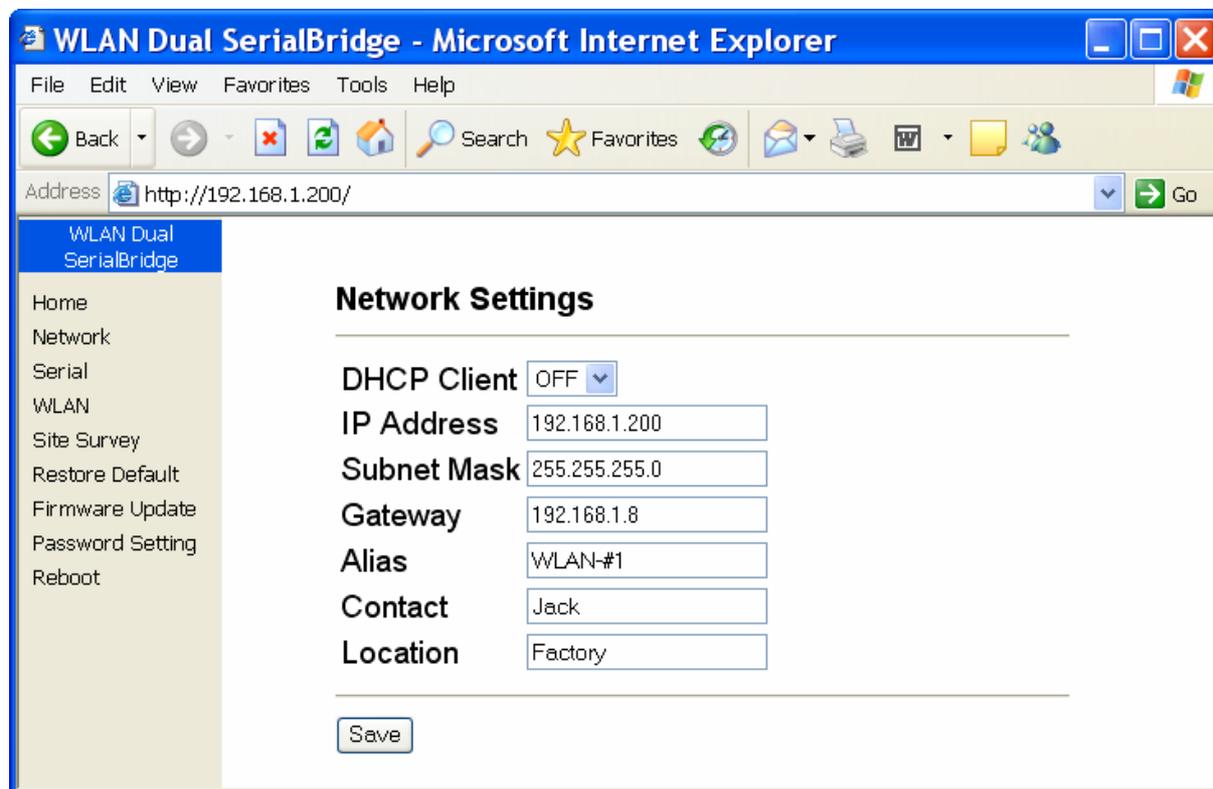
Figure 3-2 Network Settings

ARS1120, AP and Gateway must have the same IP subnet. When the ARS1120 needs to connect to a Host PC that is in another subnet, then you need to specify the gateway IP address. If ARS1120 and Host PC are at the same subnet, then just leave Gateway IP address as it is.

The ARS1120 web browser configuration also provides device description information: **Alias**, **Contact**, and **Location**. Enter the information that meets your need. They are used to identify specific ARS1120 among several ARS1120 devices in same IP subnet, also refer to section 5.3.

3.3 Serial Port Settings

At the left frame of the **WLAN Dual SerialBridge** web page, select **Serial** to change the serial port related settings, refer to Figure 3-3.
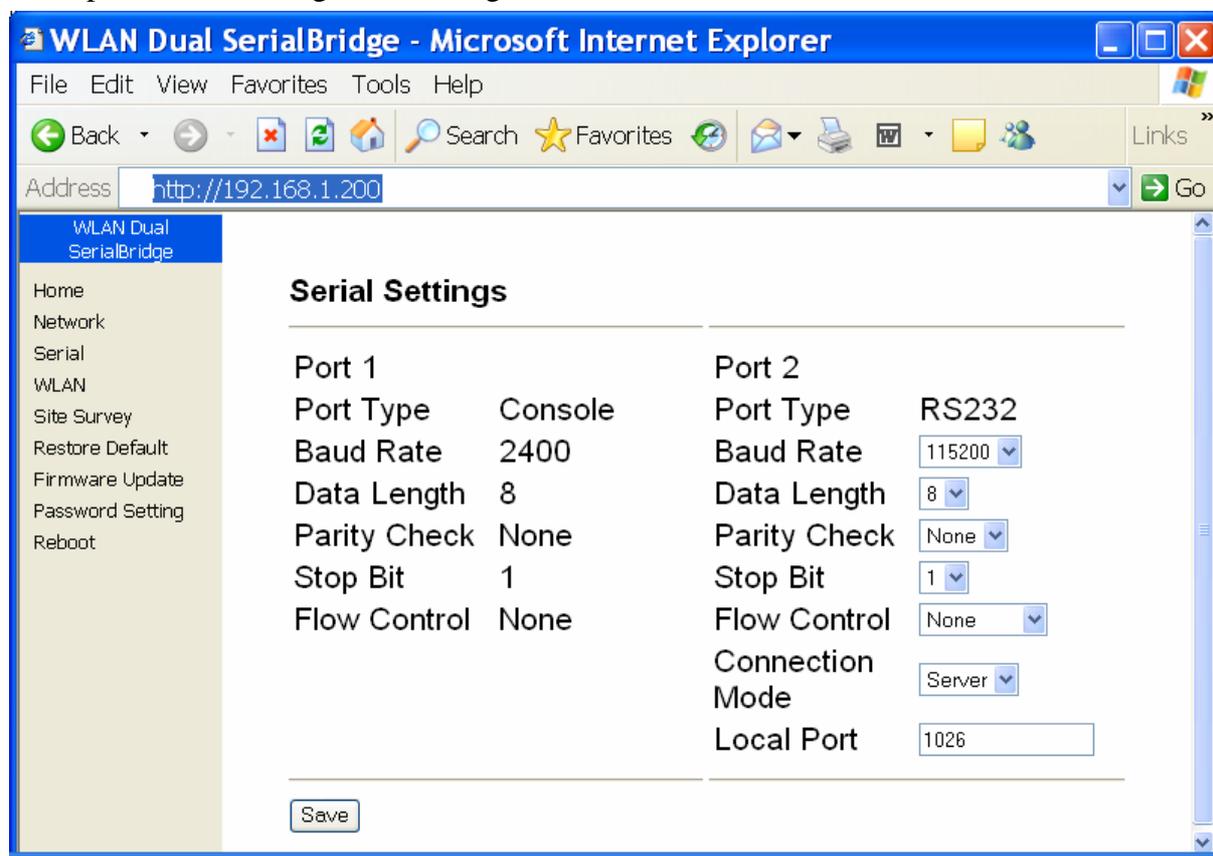
Figure 3-3 Serial Settings

Depend on the serial port operation mode setting, the ARS1120 web browser configuration will provide different display for user to enter the serial port parameter. Figure 3-3 shows that port 1 is a console port while port 2 is a RS232 port.

When the **Connection Mode** is set to **Server**, the **Remote Port** (TCP port) and **Remote IP** (IP address) filed will not show up, instead the **Local Port** (TCP port) will show up.
Note: Local and Remote port number must be between 1024 and 65535 due to TCP port number 0-1023 are reserved for well known applications.

3.4 WLAN Setting

At the left frame of the **WLAN Dual SerialBridge** web page, select **WLAN** to change the
WLAN related settings, refer to Figure 3-4.
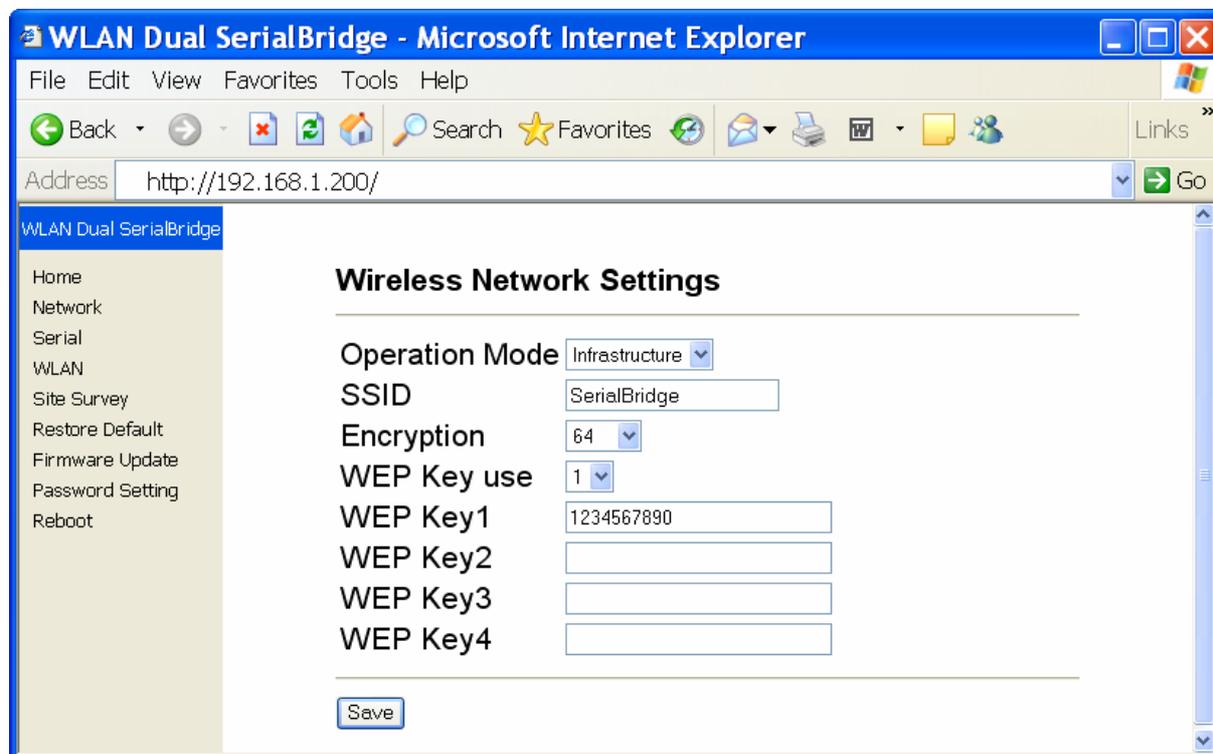
Figure 3-4 WLAN Settings

ARS1120 and AP must have the same SSID and WEP settings. When the **Operation Mode** is
set to **Infrastructure**, ARS1120 will follow the channel used by the AP. So, **Channel** is not
displayed. When **Encryption** is OFF, then other WEP related fields are not displayed.
When **Encryption** is set to **64 or 128**, then the related WEP Key settings must be set to the
same values as those set in AP.

3.5 Site Survey

At the left frame of the **WLAN Dual SerialBridge** web page, select **Site Survey** to find the available AP, refer to Figure 3-5.

<u>Note</u>: Wait for few seconds to allow ARS1120 to scan available AP.
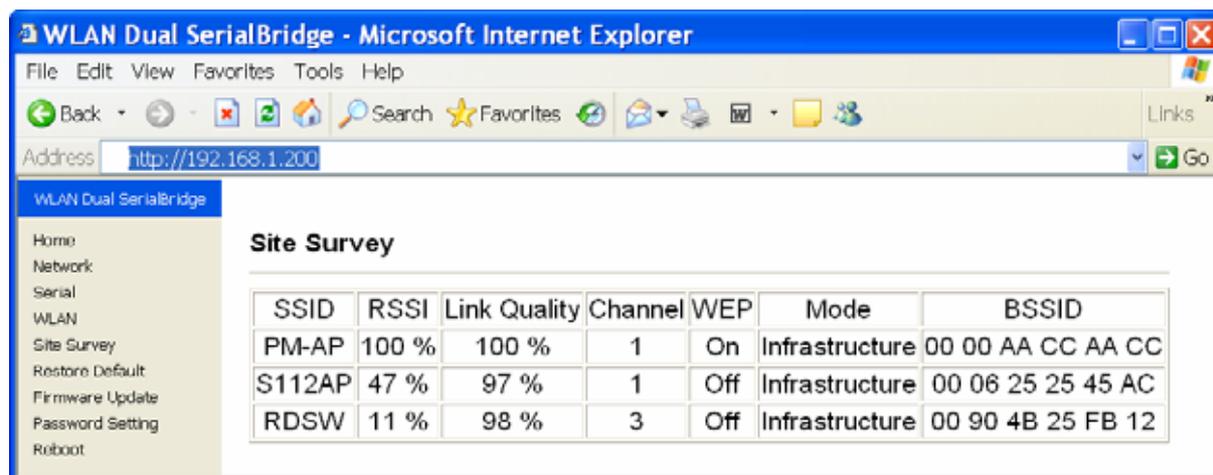
Figure 3-5 Site Survey

It allows users to browse the available active Access Points to which ARS1120 can connect (as long as the AP SSID has not been "hidden" by the AP configuration.)
After few seconds, it will show the available AP's SSID, Received Signal Strength Index (RSSI), Link Quality, Channel, WEP, Mode and BSSID. Those values are not saved in the ARS1120 memory due to varying RSSI and Link Quality values. To review the most current values, click the **Site Survey** at the left frame again.

3.6 Restore to Default

At the left frame of the **WLAN Dual SerialBridge** web page, select **Restore Default** to
change all the ARS1120 settings to the factory default, refer to Figure 3-6.
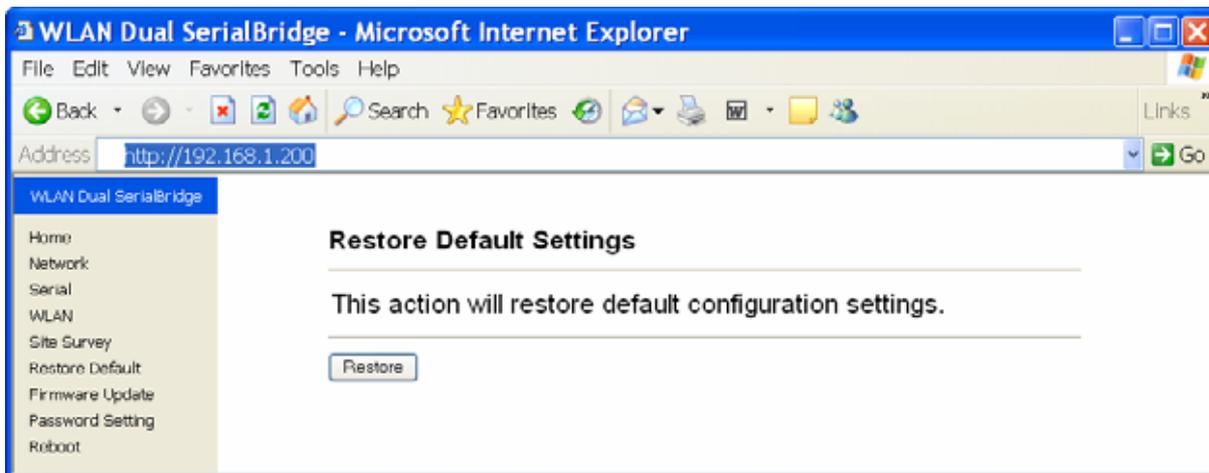
Figure 3-6 Restore Default Settings

Warning: When you restore the device, the configuration settings will be reset to the factory
default. Make sure you have written down the settings for record.

3.7 Firmware Upgrade

At the left frame of the **WLAN Dual SerialBridge** web page, select **Firmware Upgrade** to upgrade ARS1120 firmware, refer to Figure 3-7.
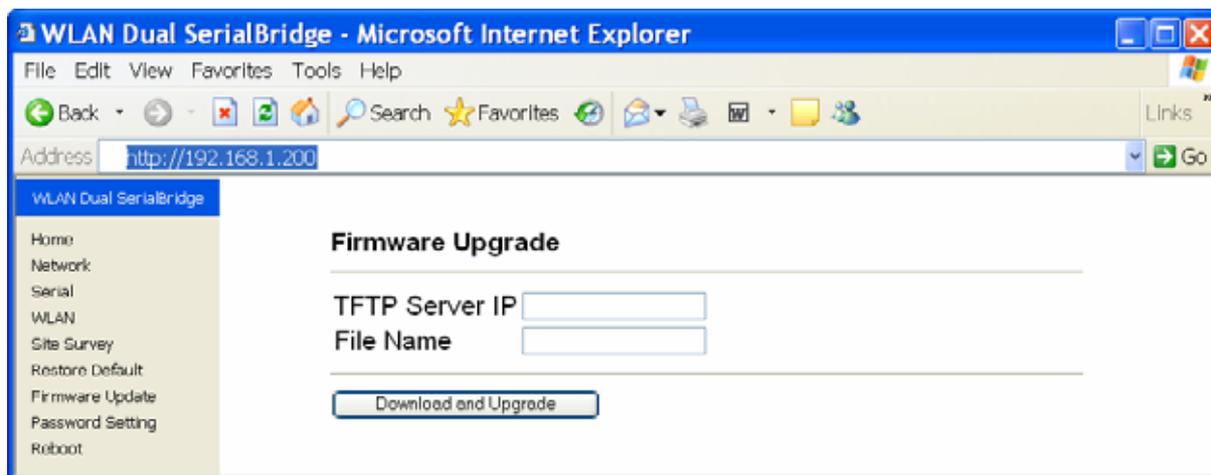
Figure 3-7 Firmware Upgrade

As an ongoing development, newly released features may be available. To download the new firmware, the TFTP server must support TFTP protocol. Enter the TFTP server IP address and file name, and then click **Download and Upgrade** button to upgrade firmware.

<u>**Warning**</u>: **Do not cut the power while download the new firmware. The period for loading the new firmware will depend on the IP network traffic load.**
<u>Note</u>:   When the firmware upgrade is completed, you need to reboot the device to make the change valid and then refresh the web browser; otherwise, you might get the old file from the web browser temporary Internet files.

3.8 Password Setting

At the left frame of the **WLAN Dual SerialBridge** web page, select **Password Setting** to set the user name and password for ARS1120, refer to Figure 3-8.
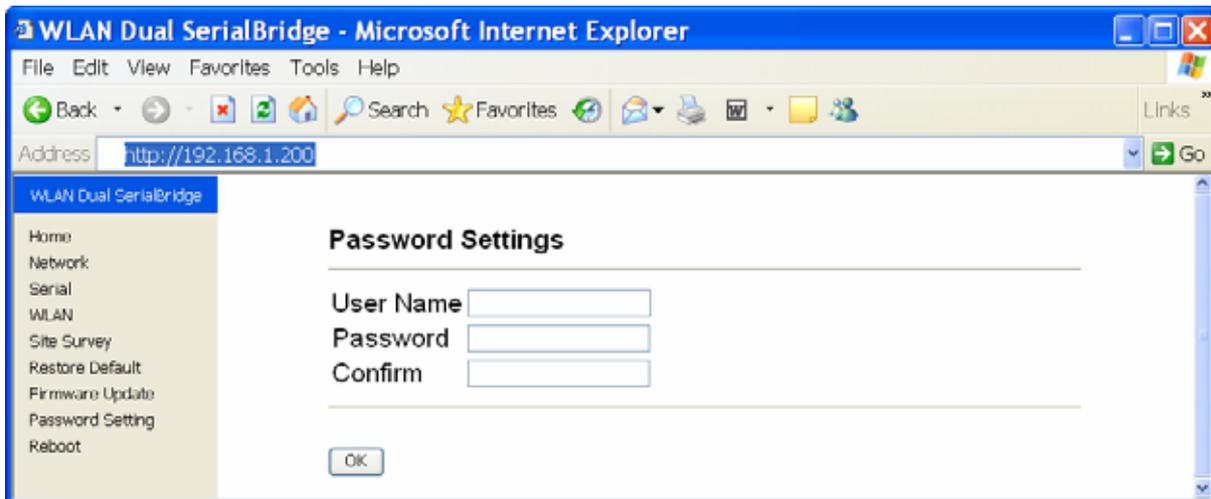
Figure 3-8 Password Settings

ARS1120 provides web browser configuration security feature through the support of the password protection function. The default username and password are:

      User Name: **admin**
      Password: **admin**

At the initial setting, it is recommended to change the user name and password.

3.9 Reboot

At the left frame of the **WLAN Dual SerialBridge** web page, select **Reboot** to reboot ARS1120, refer to Figure 3-9
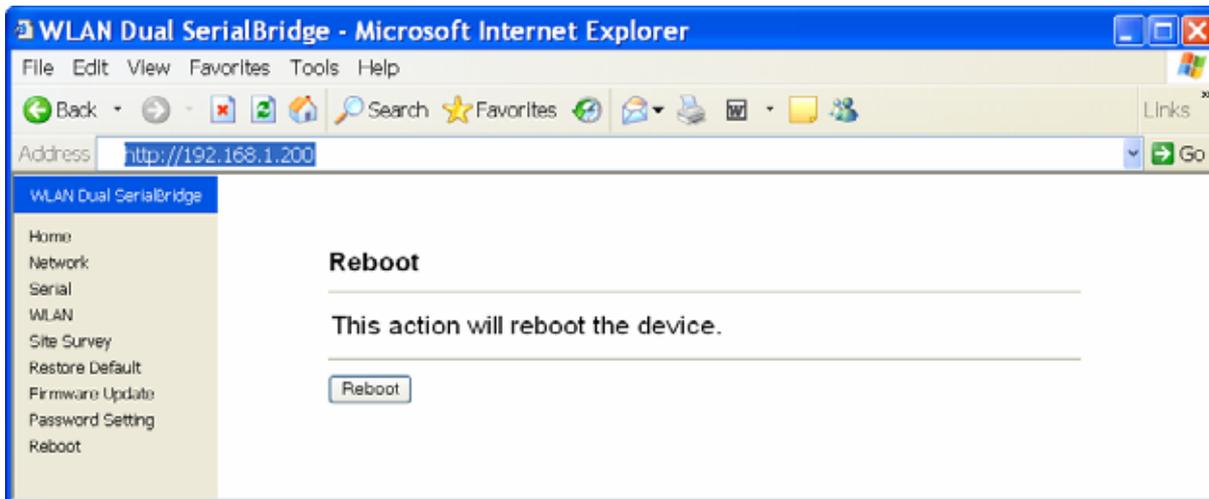
Figure 3-9 Reboot

For any change on the settings, ARS1120 need to be rebooted in order to make the change valid.

Note: When the reboot is completed, you must refresh the browser, otherwise your web browser might use the old temporary Internet file. In addition to refresh the web browser, Figure 3-10 and Figure 3-11 also shows the methods to delete the temporary Internet files.
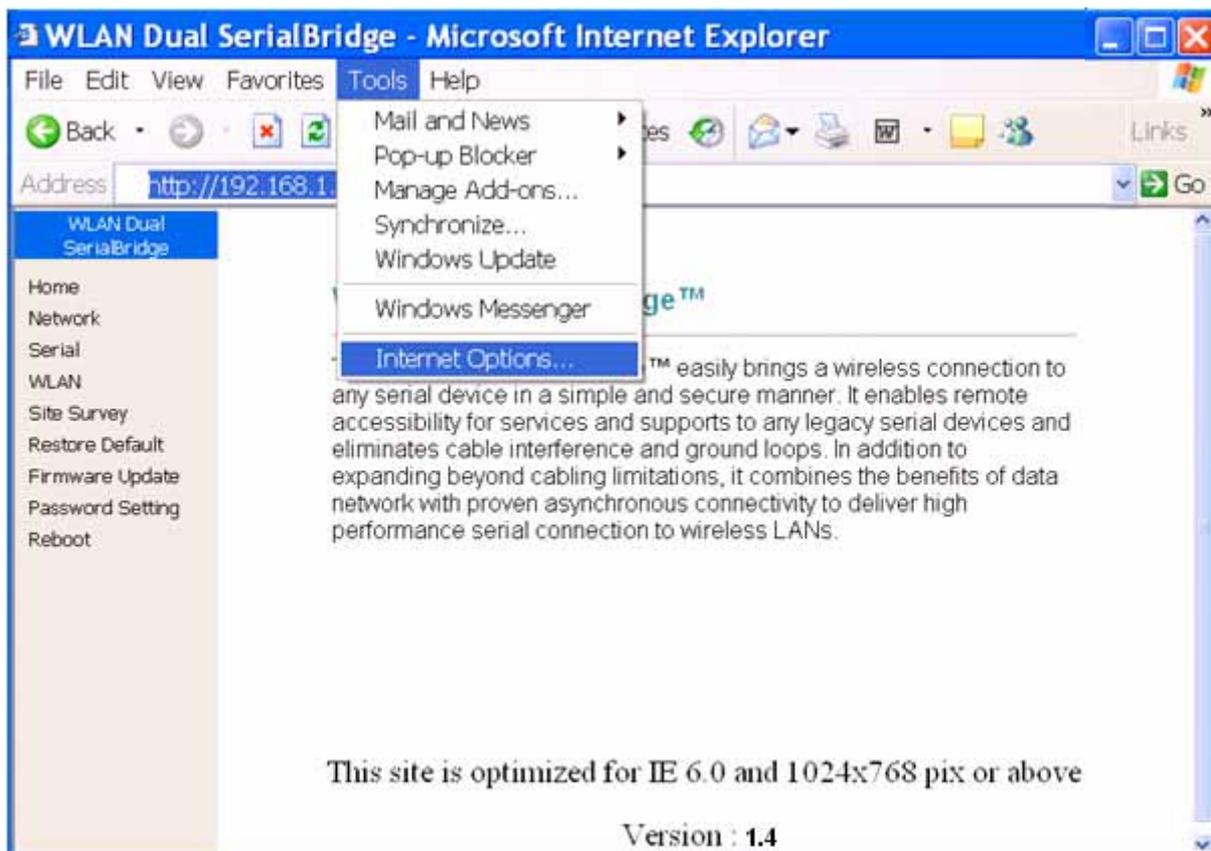
Figure 3-10 Select Internet Options
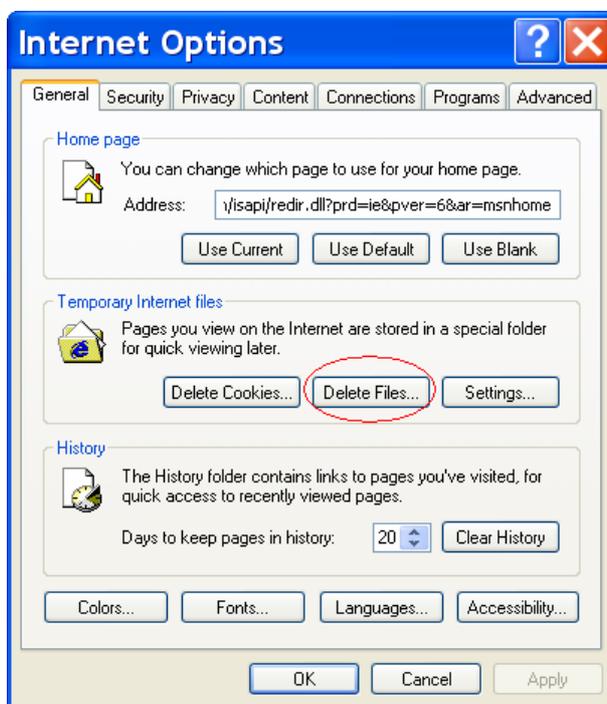
Figure 3-11 Delete Temporary Internet Files

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4. Command Mode Configuration

ARS1120 can be configured by command mode from HyperTerminal via console port or by command mode via Telnet.

Note: HyperTerminal is a Microsoft Windows™ program usually accessible from **Start**, **Programs**, **Accessories**, **Communications**, **and HyperTerminal.**

Refer to section 2.4 to set ARS1120 serial port as the console port.

4.1 Console Port Default Settings

When ARS1120 serial port is set to console mode, the console port default settings are:

Baud rate: **2,400**
Data length (bits): **8**
Parity: **None**
Stop bits: **1**
Flow control: **None**

Note: These default values are permanent and can not be changed.

4.2 HyperTerminal Settings

From Windows, click **Start**, **Programs**, **Accessories**, **Communications**, and **HyperTerminal** to open the HyperTerminal and assign a name, e.g. ARS1120 as shown in Figure 4-1.

Figure 4-1 Open HyperTerminal

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Select the COM port used in your PC/NB, and then click **Configure** button for setting COM port parameters, refer to Figure 4-2.

Set the PC/NB COM port parameters to be the same as ARS1120 console port default settings, refer to Figure 4-3.
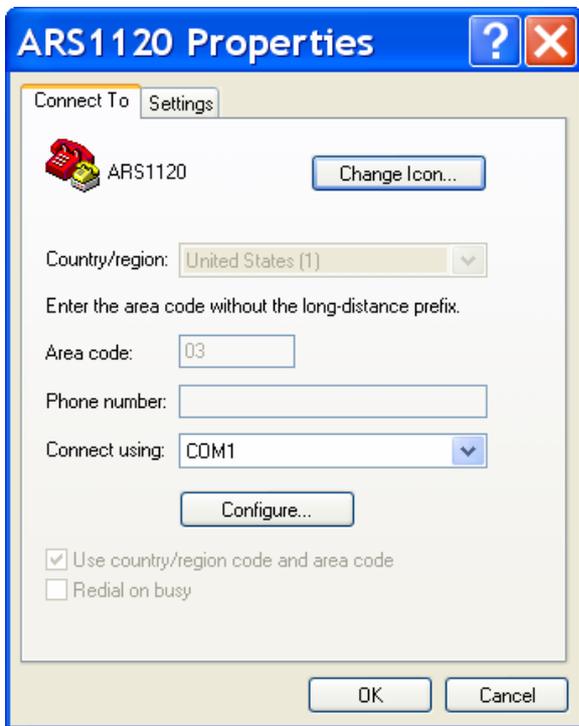
Figure 4-2 PC/NB COM Port Selection
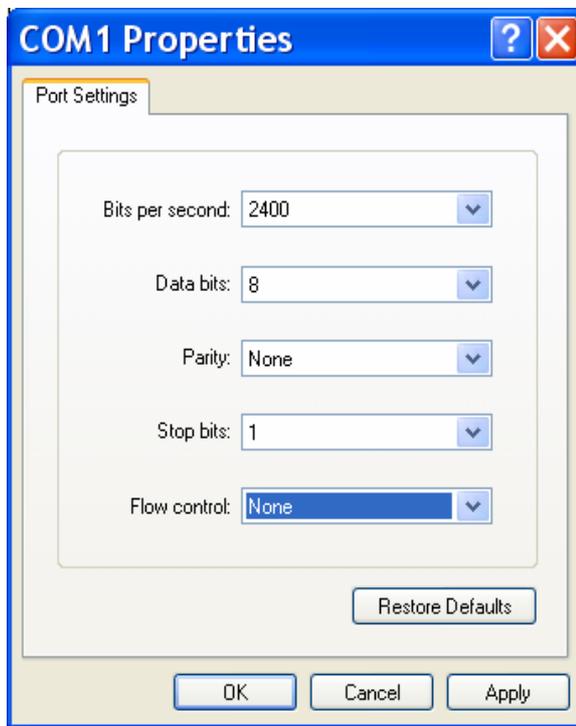
Figure 4-3 PC/NB COM Port Settings

When the PC/NB COM parameters are set complete, click **OK** button, then the following **ARS1120 – HyperTerminal** window will be displayed. Press the **Enter** key from the PC/NB keyboard. After entering correct Username and Password, HyperTerminal will prompt ">" symbol and is ready to accept command, refer to Figure 4-4.
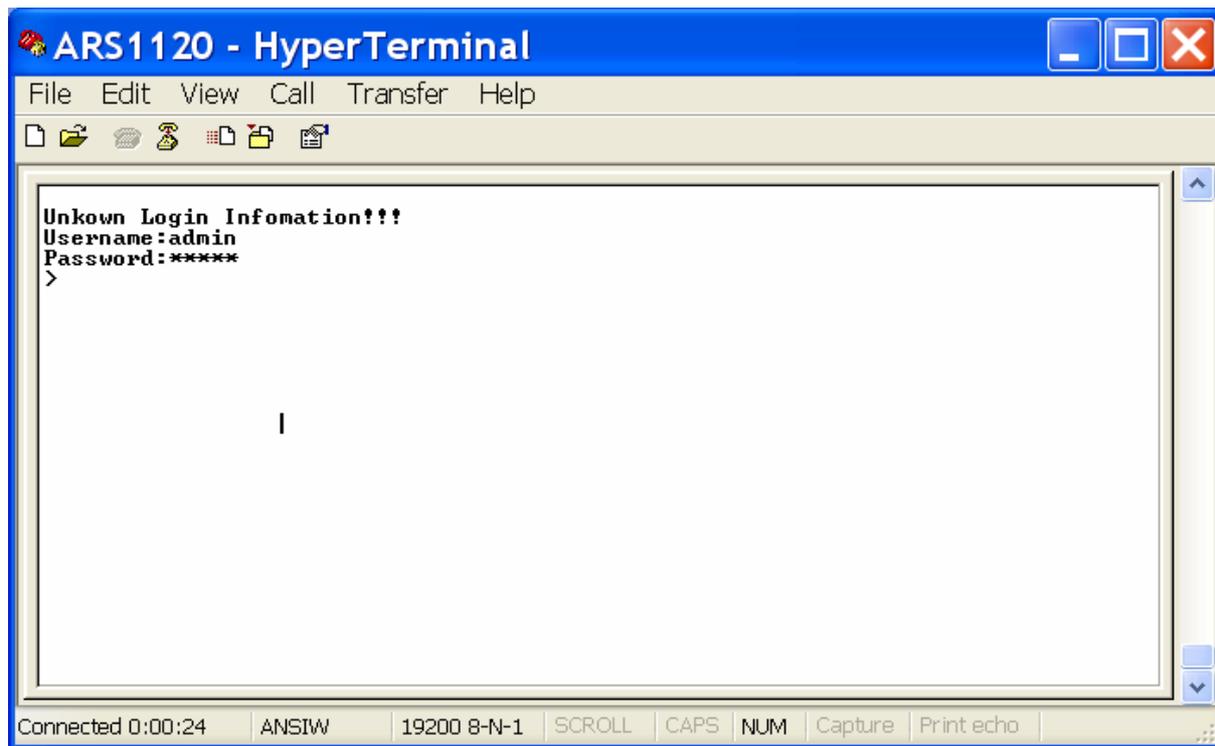
Figure 4-4 Ready to Accept Command

4.3 Command Format

The command format is:

COMMAND <parameter_1> <parameter_2>

The delimiter among command and parameters is a space. The number of parameter depends on the need of command.

Note: After using **DEFAULT** command, you need to enter the **SAVE** command in order to save the default value into the flash memory and then enter **REBOOT** to make the change valid.

Note: When a command is accepted, ARS1120 will respond "**OK**". If ARS1120 does not respond "OK", please refer to the command sets in Table 1 to verify the entered command is correct or not.

Note: When the commands are all entered complete, enter **SAVE** to store the change into ARS1120 flash memory and then enter **REBOOT** to make the change valid.

4.4 Command Sets

The following table shows the available command sets which provide same function as web browser configuration described in section 3.

Note: The command is upper/ lower case independent.

Table 1 Command Sets

Administration	
VERSION	Show firmware version
HELP	List all commands
?	Same command as HELP
DEFAULT	Restore to default
UPG <TFTP Server IP> <File Name>	Upgrade firmware through TFTP
PWD <Username> <Password>	Set username and password
CLPWD	Clear username and password
HB <0|1>	Heart beat **0**: Off **1**: On
PING <IP>	Send ICMP echo request packet 4 times
PING2 <IP> <Interval>	Setup background periodic ping <IP> address for every <interval> seconds
EXIT	Logout
REBOOT	Reboot System
SAVE	Save configuration to flash

WLAN Settings	
MODE <[B]SS|[A]d-Hoc>	Set WLAN mode **B** : Infrastructure **A** : Ad-Hoc
SSID <SSID>	Set WLAN SSID
CHAN <1-11>	Set RF channel
RATE <1|2|5.5|11>	Set Tx rate **1**: 1Mbps **2**: 2Mbps **5**: 5.5Mbps **11**: 11Mbps
WEP <0|64|128>	WEP encryption **0**: OFF **64**: 64bit **128**: 128bit

WK <0|64|128> <1-4> <Key in Hex>	Set encryption type, WEP Key# used and then followed by encryption Key For **64-bit** encryption, enter a **10** hexadecimal characters encryption key. For **128-bit** encryption, enter a **26** hexadecimal characters encryption key.
WKID <1-4>	Selects one of four key sets to be used for encryption.
SS	Site Survey

Serial Settings	
BAUD <COM1|COM2> <1-13>	Select serial port (**1** or **2**) and set baud rate **1**: 110 **2**: 150 **3**: 300 **4**: 600 **5**: 1200 **6**: 2400 **7**: 4800 **8**: 9600 **9**: 19200 **10**: 38400 **11**: 57600 **12**: 115200 **13**: 230400
DL <COM1|COM2> <5|6|7|8>	Select serial port (**1**, **2**) and set data length (**5, 6, 7, 8**)
PC <COM1|COM2> <0|1|2|3|4>	Select serial port (**1**, **2**) and set parity check **0**: None **1**: Odd **2**: Even **3**: Mark **4**: Space
SB <COM1|COM2> <1|2>	Select serial port (**1**, **2**) and set stop bit (**1**, **2**)
FC <COM1|COM2> <0|1|2>	Select serial port (**1**, **2**) and set flow control **0**: None **1**: XON/XOFF **2**: Hardware
LPORT <COM1|COM2> <Local Port>	Select serial port (**1**, **2**) and set local TCP port number (1024 ~ 65535)
RPORT <COM1|COM2> <Remote Port>	Select serial port (**1**, **2**) and set remote TCP Port number (1024 ~ 65535)
RIP <COM1|COM2> <Remote IP Address>	Select serial port (**1**, **2**) and set remote device IP address
RMODE <COM1|COM2> <1|2>	Select serial port (**1**, **2**) and set connection mode **1**: Client **2**: Server

Network Settings	
IP <IP address>	Set IP address
MASK <IP address>	Set IP Mask
GW <IP address>	Set Gateway IP address
DHCP <1|0>	Set DHCP client ON (**1**) or OFF (**0**)

System Device Information	
ALIAS <Alias Name>	Set device alias name
CONT <Contact Information>	Set device contact information
LOCT <Location Information>	Set device location information

4.5 Telnet

ARS1120 can also be configured by command mode via Telnet. From your PC/NB Windows, select **Start**, **Run**, and then enter "**telnet 192.168.1.200**", as shown in Figure 4-5.
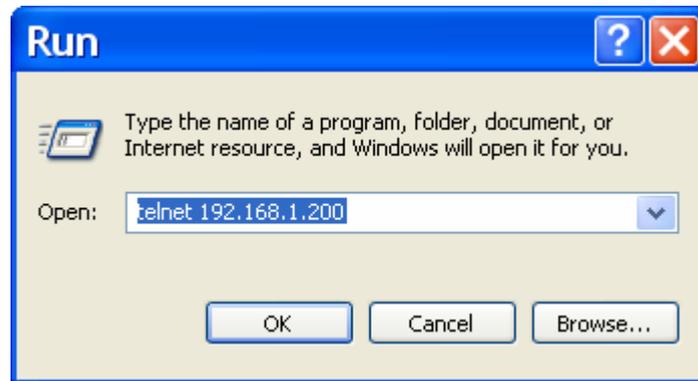
Figure 4-5 Open Telnet Connection

After the Telnet connection is established, enter the username and password, then Telnet will respond the ">" prompt symbol as shown in Figure 4-6. Follow the command format and command sets in section 4.3 and section 4.4 to configure ARS1120.

Figure 4-6 Command Setting via Telnet

5. SerialComm™ Utility

SerialComm™ utility provides several useful functions:

- Virtual Com function will treat the Aboundi Dual SerialBridge units (ARS1120, /ARS1200/ARS1300) serial ports as the COM ports of the Windows based PC/NB running the SerialComm™ Virtual Com function.
- Ident-and-Connect™ auto discovery function lets user find all the available SerialBridge units in the network.
- Direct connect with the discovered IP device by clicking target device IP address.
- LED status graphic display helps user to monitor SerialBridge unit status remotely.
- Ping IP connectivity function will check the IP connection status between PC/NB and the specified IP device.

SerialComm™ is provided as a service with service name SerialCommSvc. When Virtual Com parameters are set up correctly, the Virtual Com ports will be automatically created by SerialComSvc service every time when you reboot your PC/NB. There is no need to start or stop SerialCommSvc service during normal operation. If you have to stop and restart SerialCommSvc service, please see **Stop SerialComm Service** section and **Start SerialComm Service** section in this chapter.

Install SerialComm

Follow the steps described in section 2.8 to install the SerialComm™ utility. After the SerialComm™ utility is installed correctly, an icon [icon] can be found at the Windows tool bar.

Uninstall SerialComm

To uninstall SerialComm™ utility from your PC/NB Windows, click **Start**, select **Programs**, **SerialComm** and then click **Uninstall SerialComm**, refer to Figure 5-1.
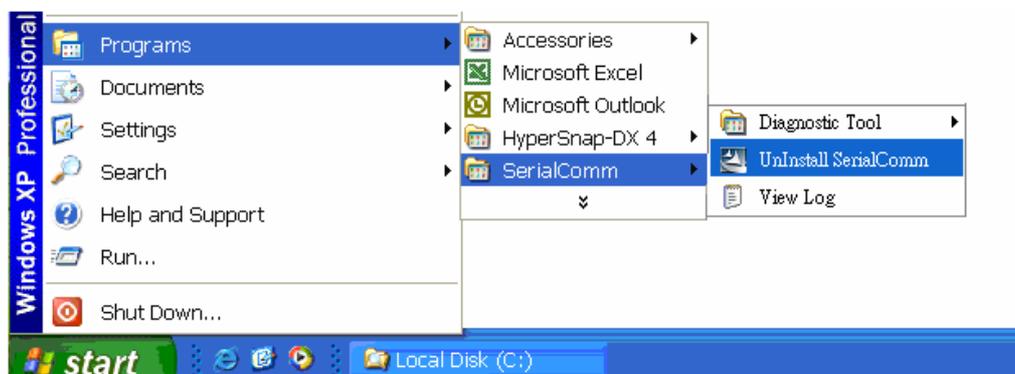
Figure 5-1 Uninstall SerialComm™

Open SerialComm Window

At the Windows tool bar, double click the SerialComm™ utility icon to open the **SerialComm** window for configuration ARS1120.
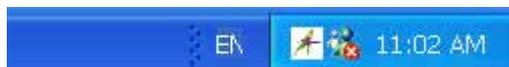
Stop SerialCommSvc Service

At the Windows tool bar, select **Start, Settings, Control Panel, Administrative Tool, Service**, the following window will be displayed. Select **SerialCommSvc** and then click ■ button.
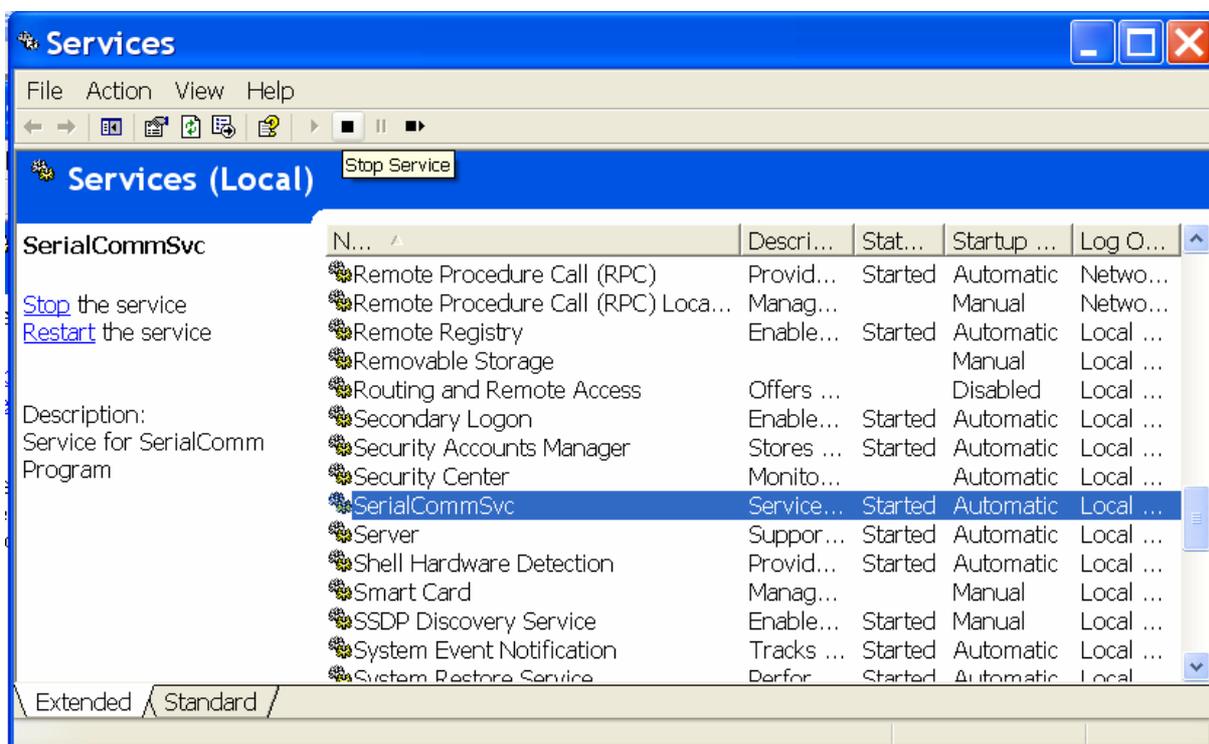
Figure 5-2 Stop SerialCommSvc Service

Start SerialCommSvc Service

At the Windows tool bar, select **Start, Settings, Control Panel, Administrative Tool, Service,** the following window will be displayed. Select **SerialCommSvc** and then click

▶ button.
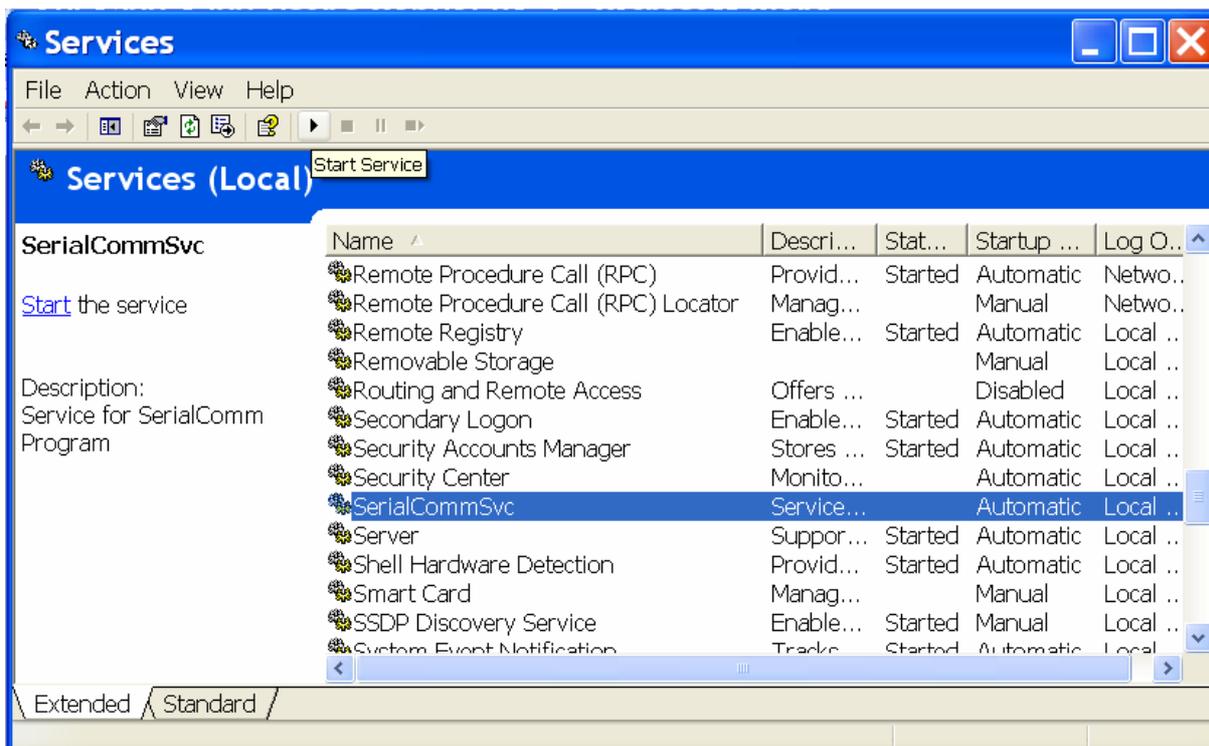
Figure 5-3 Start SerialCommSvc Service

5.1 Define Virtual Com

At the upper frame of the **SerialComm** window, select **Setting** tap window to configure the Virtual Com. Figure 5-4 will be displayed and shows the existing Virtual Com settings in the **Virtual Com List**.
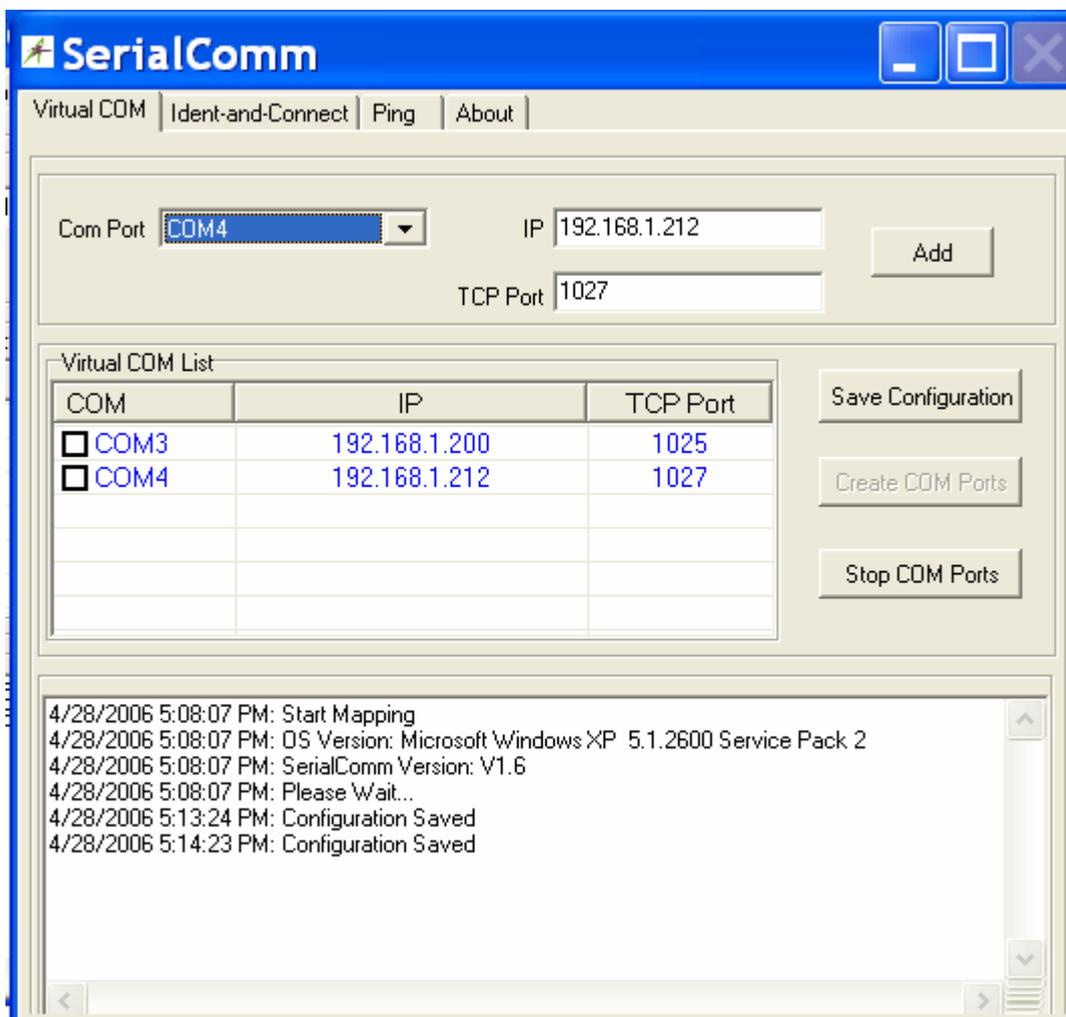
Figure 5-4 Virtual Com Settings

Com Port: Enter the Com port number that will be used as the Virtual Com for the PC/NB.

IP: Enter the IP address of the remote ARS1120 for the Com port to be mapped to.

TCP Port: Enter **Local Port** number of the remote ARS1120 into this field. TCP port number must be between 1024 and 65535 due to TCP port number 0-1023 are reserved for well known applications.

Add: When data is filled, click **Add** button to add this Virtual Com port into the **Virtual Com List**.

Save Configuration: Click **Save Configuration** button to save the settings into the PC/NB disk file.

Create COM Port: From the **Virtual COM List** select the virtual COM port then click this button for mapping this COM port to the corresponding IP/TCP address.

Stop COM Port: At the **Virtual COM List** select the virtual COM port then click this button for removing the COM port <-> IP/TCP Port mapping.

As shown in Figure 5-5, at the bottom of **SerialComm** window, there is log area to show all activity. The log file can also be opened from Windows, click **Start**, select **Programs**, **SerialComm** and then click **View Log** (refer to Figure 5-1). For example,

At 5:41:39PM, there is a save configuration activity.

At 5:41:59PM, the COM3 is mapped to 192.168.1.200:1025 (IP:TCP) successfully.

At 5:42:07PM, all COM ports mapping is stop complete.
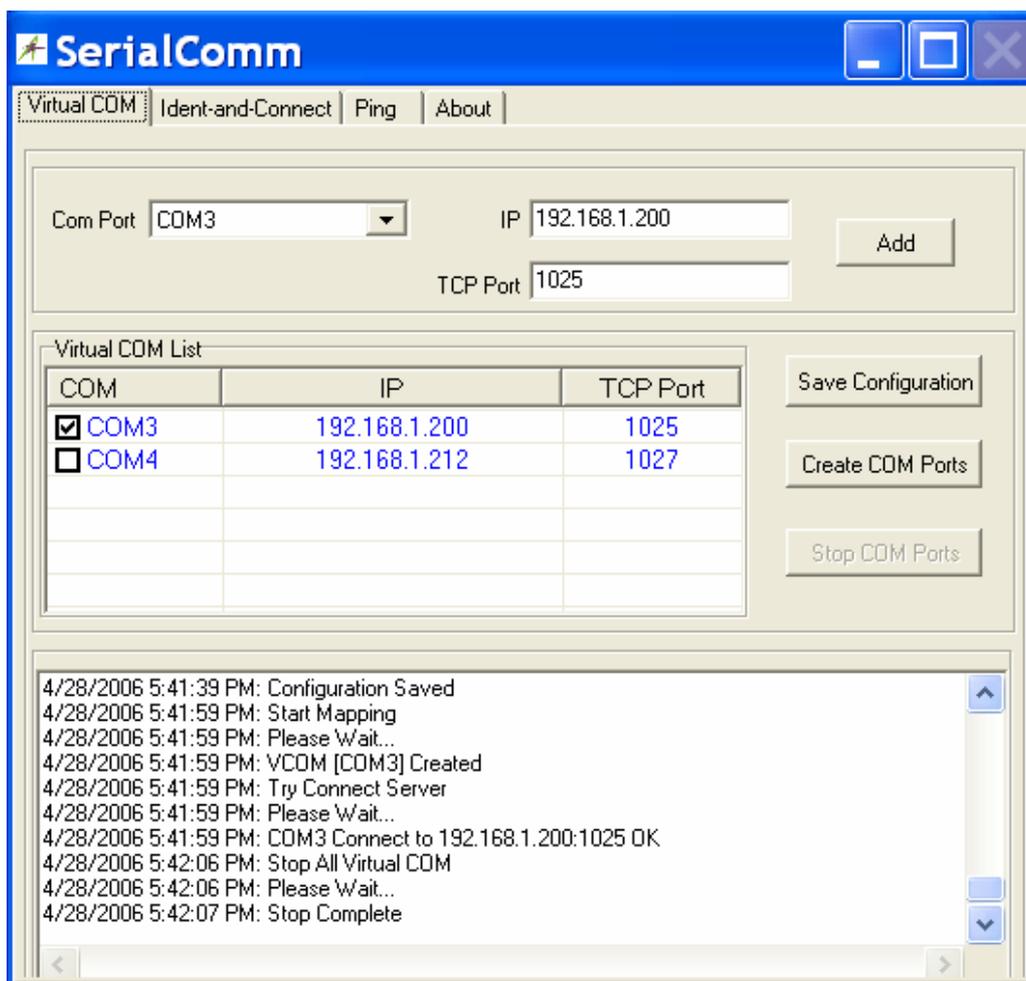
Figure 5-5 Log Area

Note: If the **Save Configuration** button is not clicked then the updated data will not be saved into the PC disk file.

Note: The connection mode of the remote ARS1120 should be set to **Server**.

Add to Virtual Com List

Figure 5-6 shows an example to define COM5 mapping to the ARS1120 with IP address 192.168.1.200 and TCP port number 1026. After clicking **Add** button, this COM port data will be added at the last line of the **Virtual Com List**. Click **Save Configuration** button to save the settings into the PC/NB disk file.
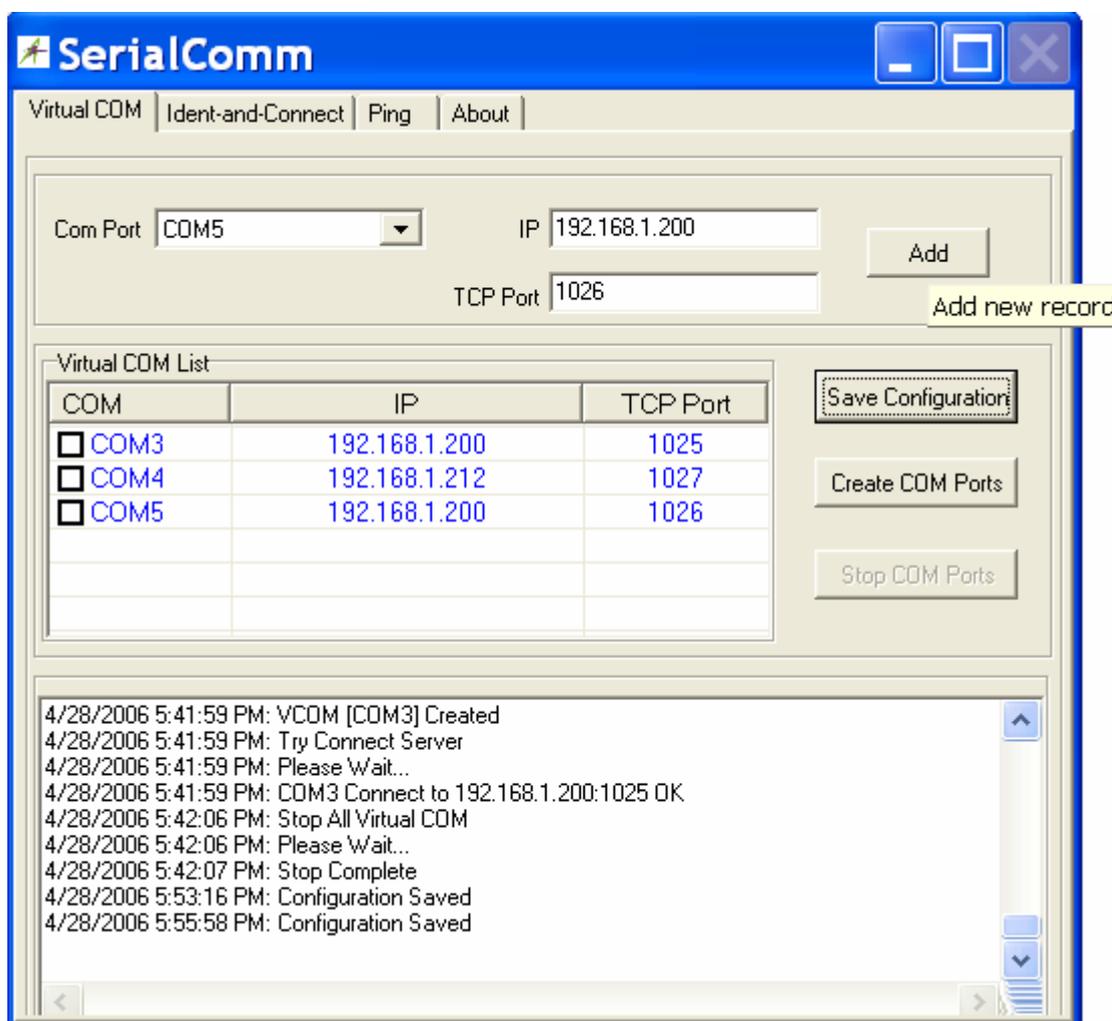
Figure 5-6 Add to Virtual Com List

Clear from Virtual Com List

From the **Virtual Com List**, select the COM port number by right clicking the row of the COM port to be deleted. For example, in Figure 5-7 the COM5 is selected, and then click **Clear** to delete COM5 from the **Virtual Com List**.
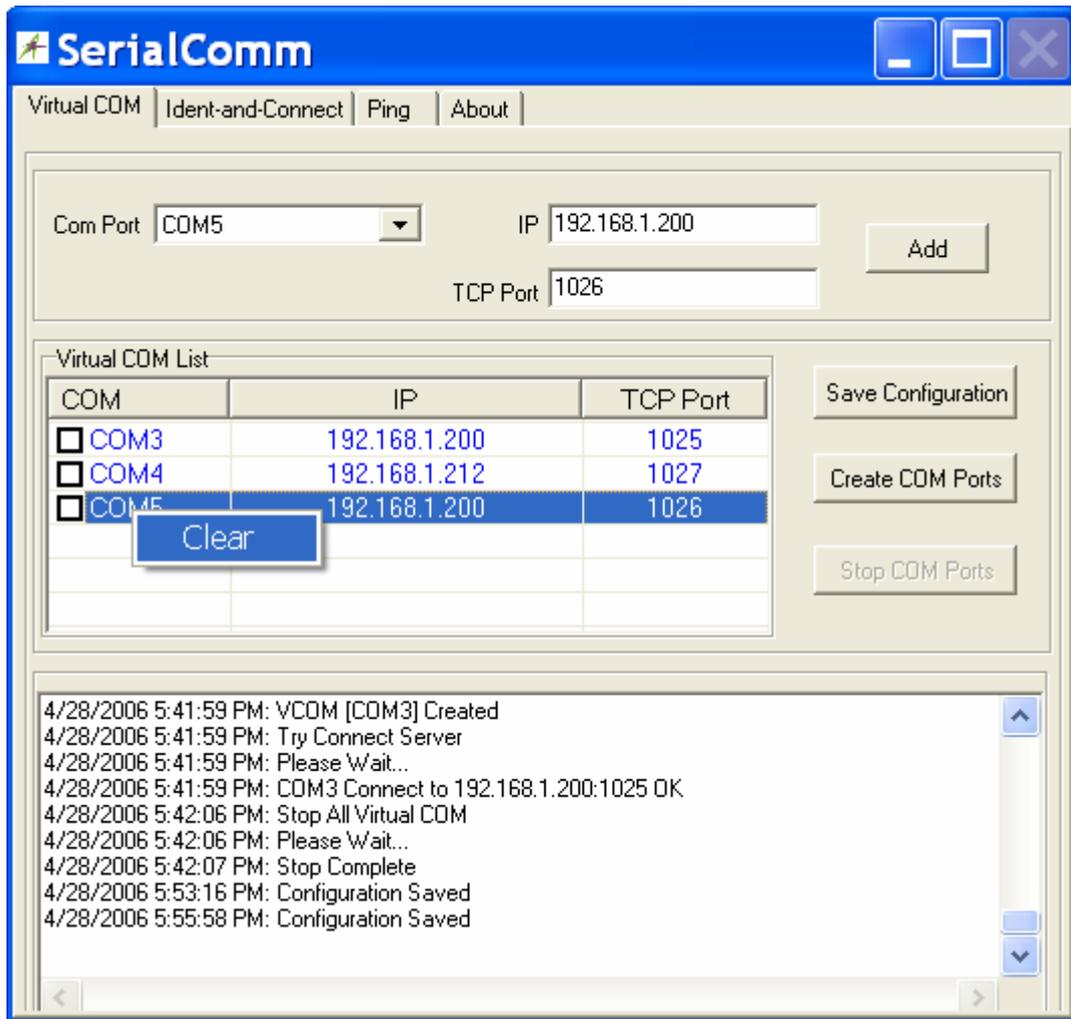
Figure 5-7 Clear from Virtual Com List

5.2 Create and Stop Virtual Com

To create and stop the Virtual Com, you must select which COM port will be activated first.

Select COM port

From the **Virtual Com List**, select the COM port number by clicking the check box under the COM column. For example, in Figure 5-8 COM 5 is selected.
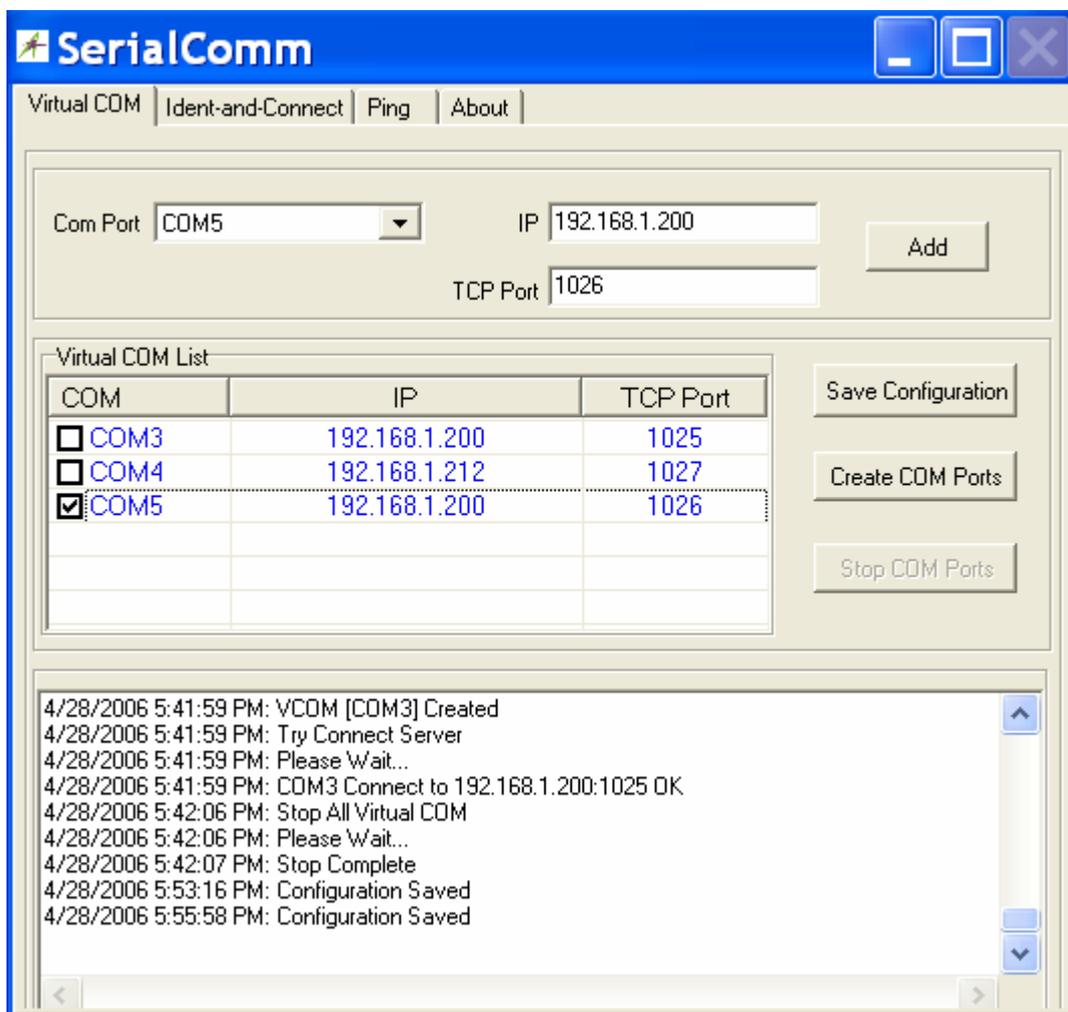
Figure 5-8 Select COM port

Create/Stop Virtual COM

At the right of the **Virtual COM List**, click the **Create COM Ports** or **Stop COM Ports** button to crate the virtual COM port or stop it (refer to Figure 5-9).
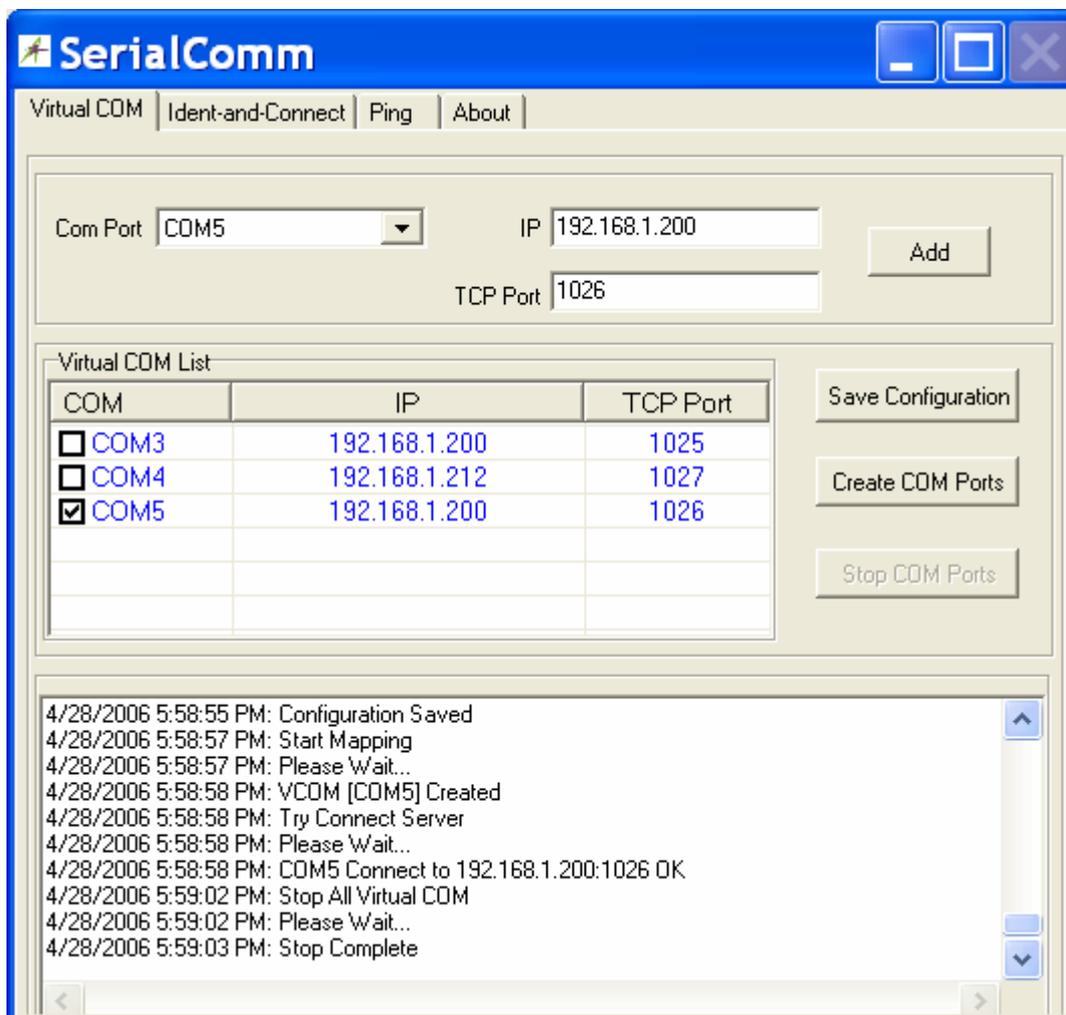
Figure 5-9 Crate/Stop Virtual COM

When the Virtual COM connection is created correctly, the SerialComm™ log area will display the messages "COMx **Connect to** x.x.x.x : yyyy **OK**", For example, in Figure 5-9, at 5:58:58PM, in the log area, there is a message "**COM5 Connect to 192.168.1.200:1026 OK**" showing the COM <-> IP:TCP mapping is successfully.

When the Virtual COM connection is stopped correctly, the SerialComm™ log area will display the message "**Stop Complete**", refer to Figure 5-9, message at 5:59:03PM.

Note: When there will be any configuration change and then reboot the ARS1120 device, the Virtual COM port should be stopped first.

5.3 Ident-and-Connect ™

At the upper frame of the **SerialComm** window, select **Ident-and-Connect** tap window. Figure 5-10 will be displayed. There are two methods allow user to search the available SerialBridge units (ARS1120, ARS1200 or ARS1300) in the network.

Subnet Broadcast Auto Discovery will search all the available SerialBridge units within the same IP subnet as PC/NB has, refer to Figure 5-10.
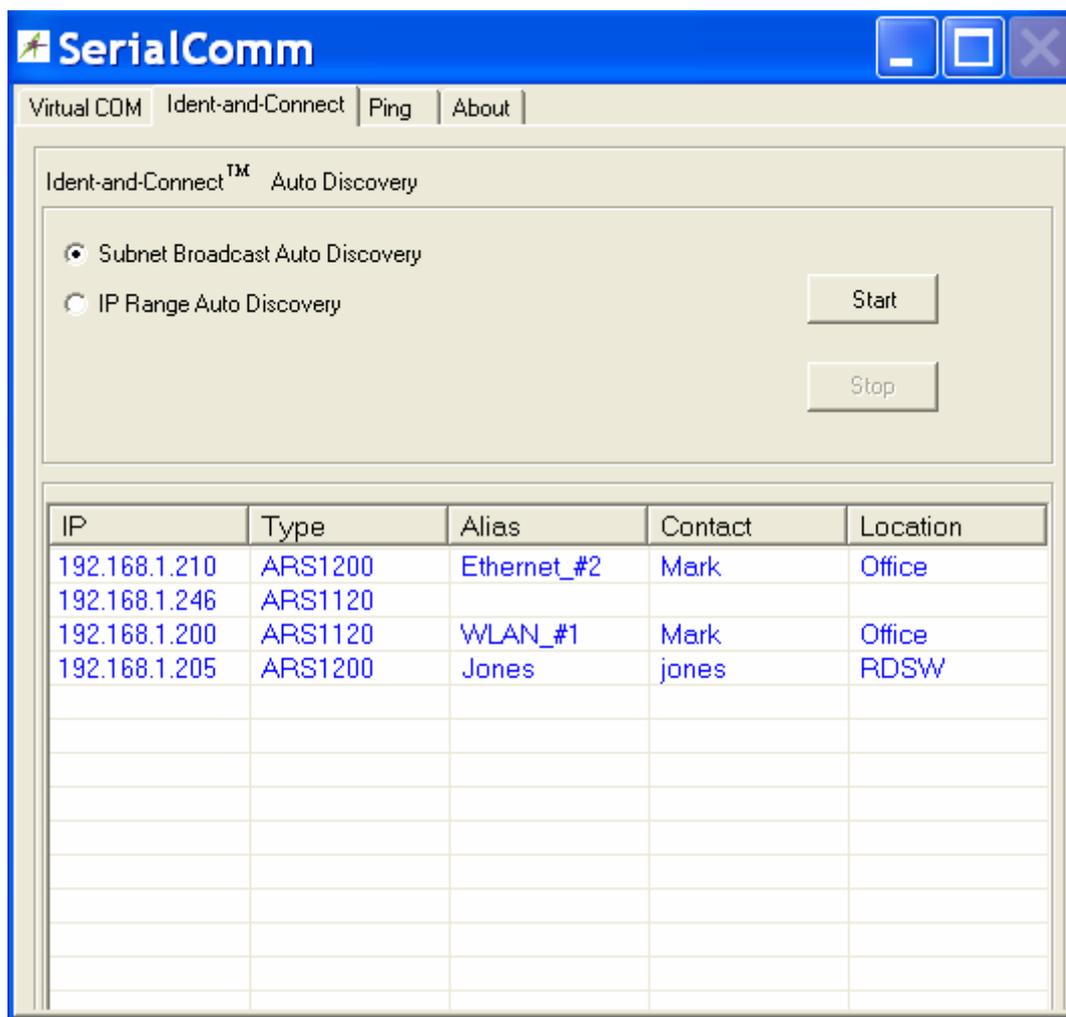
Figure 5-10 Subnet Broadcast Auto Discovery

Two buttons, **Start** and **Stop**, are available for user to start the search or stop the search. It will take few seconds for searching the available SerialBridge units. If the target SerialBridge unit is found, you can use the **Stop** button to stop the search, or wait until the utility finish the search.

The Ident-and-Connect™ auto discovery function also provides the device description information: **Alias, Contact and Location** which can be used to identify a device, especially there are many SerialBridge™ family in the same location, e.g. office, factory, warehouse, etc. Those device description information are entered from, for example, ARS1120 Network Settings window, refer to section 3.2.

IP Range Auto Discovery allows user to specify any class C IP range for searching available SerialBridge™ units (ARS1120, ARS1200 or ARS1300) in that IP range, refer to Figure 5-11. The class C IP range is not necessary to be the same IP subnet as the PC/NB has. IP Range Auto Discovery supports maximum an IP class C address range, for example, from 192.168.123.100 to 192.168.123.200. **Note: Depend on the network traffic and configuration, it might take few minutes for the search.**

Figure 5-11 IP Range Auto Discovery

5.4 Direct Connect with Discovered IP Device

Ident-and-Connect™ auto discovery function also provide the capability for user to connect the PC with the target SerialBridge unit by right clicking the target device IP address and then select **Connect**. Figure 5-12 shows an example to connect device with IP address 192.168.1.200 which is an ARS1120 device and located at office. By clicking **Connect**, ARS1120 web browser configuration windows will be displayed, refer to section 3.
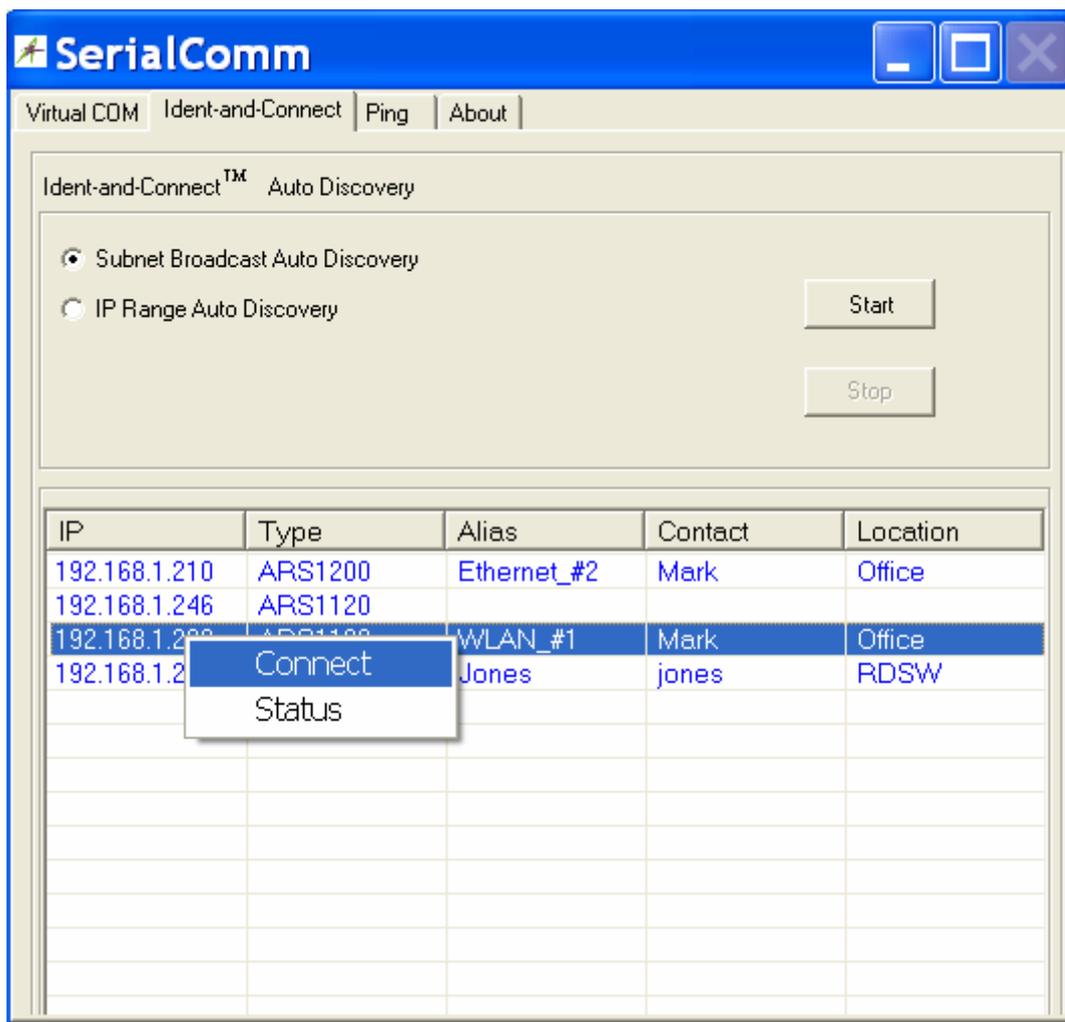
Figure 5-12 Connect with Discovered IP Device

If the ARS1120 web browser configuration window does not show up, refer to section 5.6 to check the IP connection.

5.5 LED Status Graphic Display

ARS1120 LED Status Graphic Display function provides the capability to remotely monitor ARS1120 device status. Right clicking the target IP device's IP address, and then click **Status**, refer Figure 5-13 and Figure 5-14.

Figure 5-13 Select LED Status Graphic Display
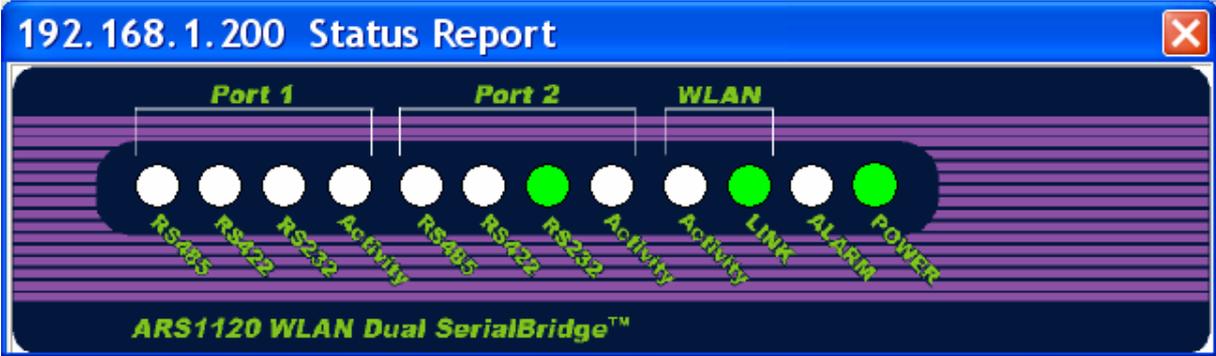
Figure 5-14 LED Status Graphic Display

Figure 5-14 shows an example for ARS1120. The Power is ON, Ethernet link is ON. Port 2 is set to RS232 port while Port 1 is set to console port (all LED is OFF).

5.6 Ping IP Connectivity

The Ping IP connectivity function provides an easy way to check the IP connection with the specific IP device. At the upper frame of the **SerialComm** window, select the **Ping** tap window, and then click the **Ping** button. The **Ping** function will continue to ping the specified IP device. To stop the **Ping** function, click the **Stop** button, refer to Figure 5-15.
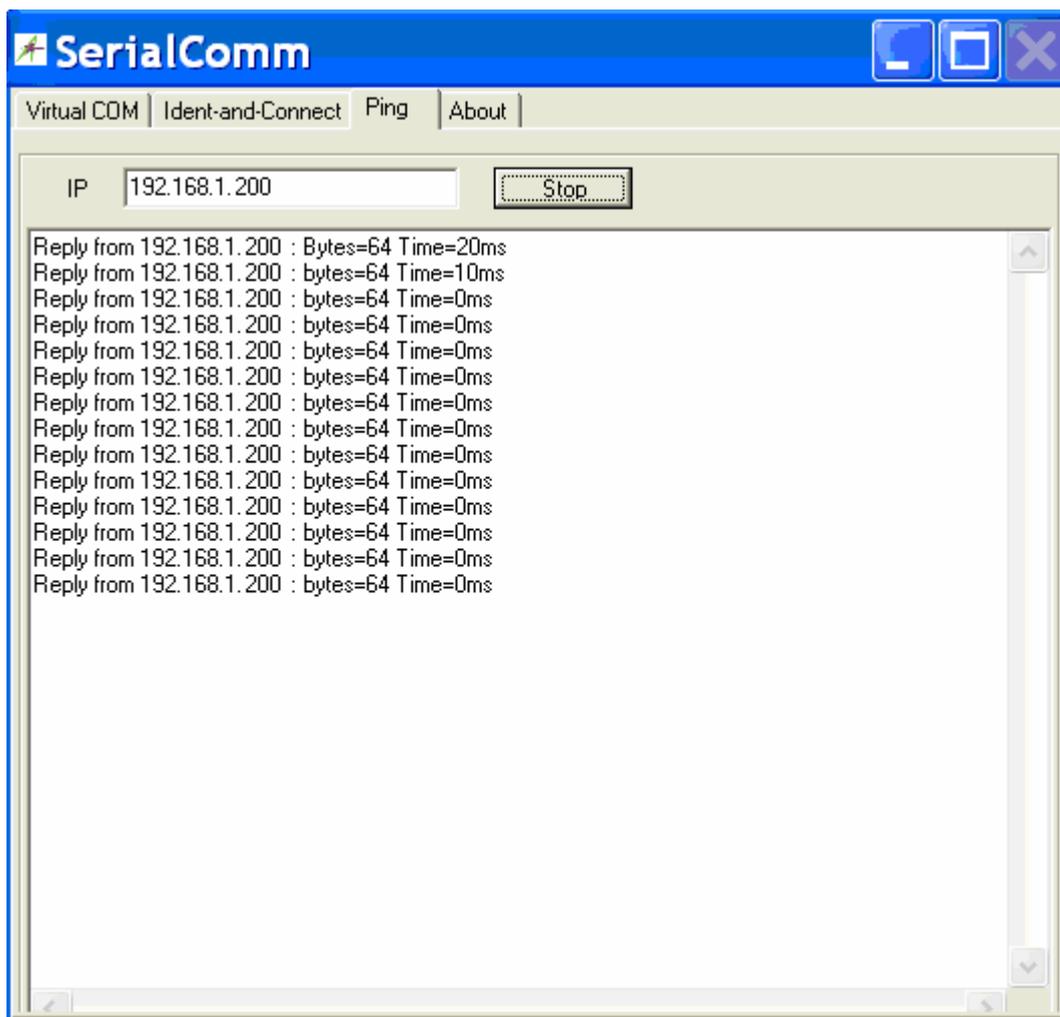
Figure 5-15 Ping IP Connectivity

5.7 Utility Version

At the upper frame of the **SerialComm** window, select the **About** tap window to check the SerialComm utility version if necessary.

6. Diagnostics – ComSR Utility

Aboundi Dual SerialBridge units (ARS1120/ARS1200/ARS1300) can be diagnosed by the ComSR utility which provides the loop back test to allow user to send and receive data/file from the PC/NB virtual COM via the remote SerialBridge two serial ports. The two serial ports will be connected by a null modem serial cable. In order to do the loop back test successfully, please make sure that:

• Both serial ports of a SerialBridge unit should be set up as server ports.
• Two virtual Com ports should be set up by using SerialComm, and they should start/connect successfully to the server ports of the SerialBridge unit.
• A null modem serial cable should be used to connect the two physical serial ports of the SerialBridge unit.
• Only text format is supported. Most ASCII control codes are not supported in this version.

Note: The included Test_Text_File.txt can be used as the text file for testing sending/receiving file via the loop back path.

6.1 Install ComSR Utility

Please follow the steps below to install ComSR utility into the PC/NB.

1) Insert the supplied CD-ROM in the CD-ROM driver.

2) Read the Readme.txt file under **Diagnostic Tool** folder first.

3) Execute the file **Setup.exe** under **Diagnostic Tool** folder in the CD-ROM.

After the installation is completed, an icon will be generated as shown in Figure 6-1
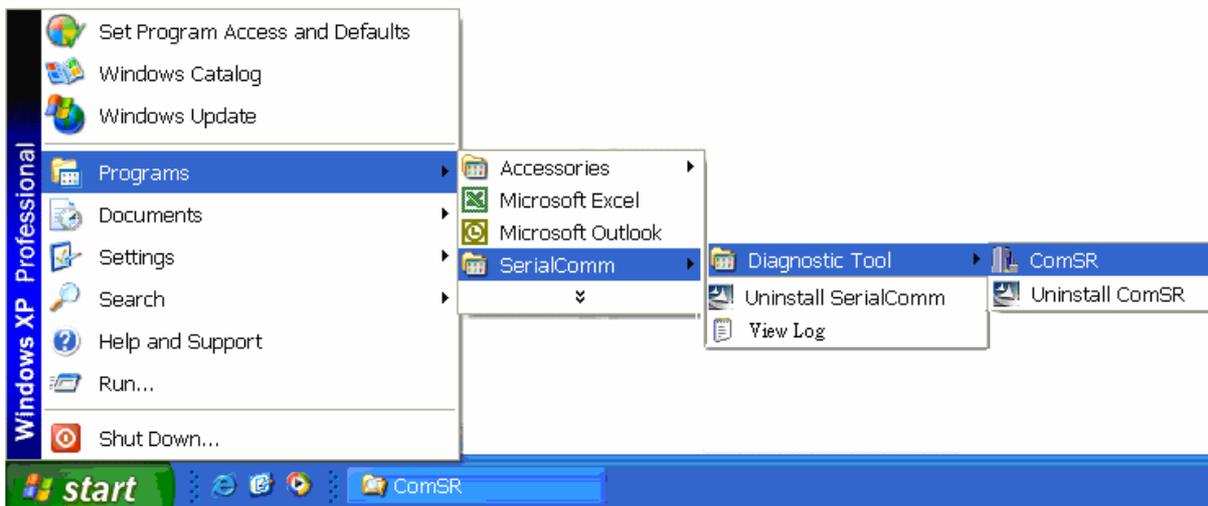
Figure 6-1 ComSR Icon

6.2 Open ComSR utility

To open ComSR utility, from your PC/NB Windows, click **Start**, select **Programs**, **SerialComm, Diagnostic Tool** and then click **ComSR**, the ComSR window will be displayed as shown in Figure 6-2.
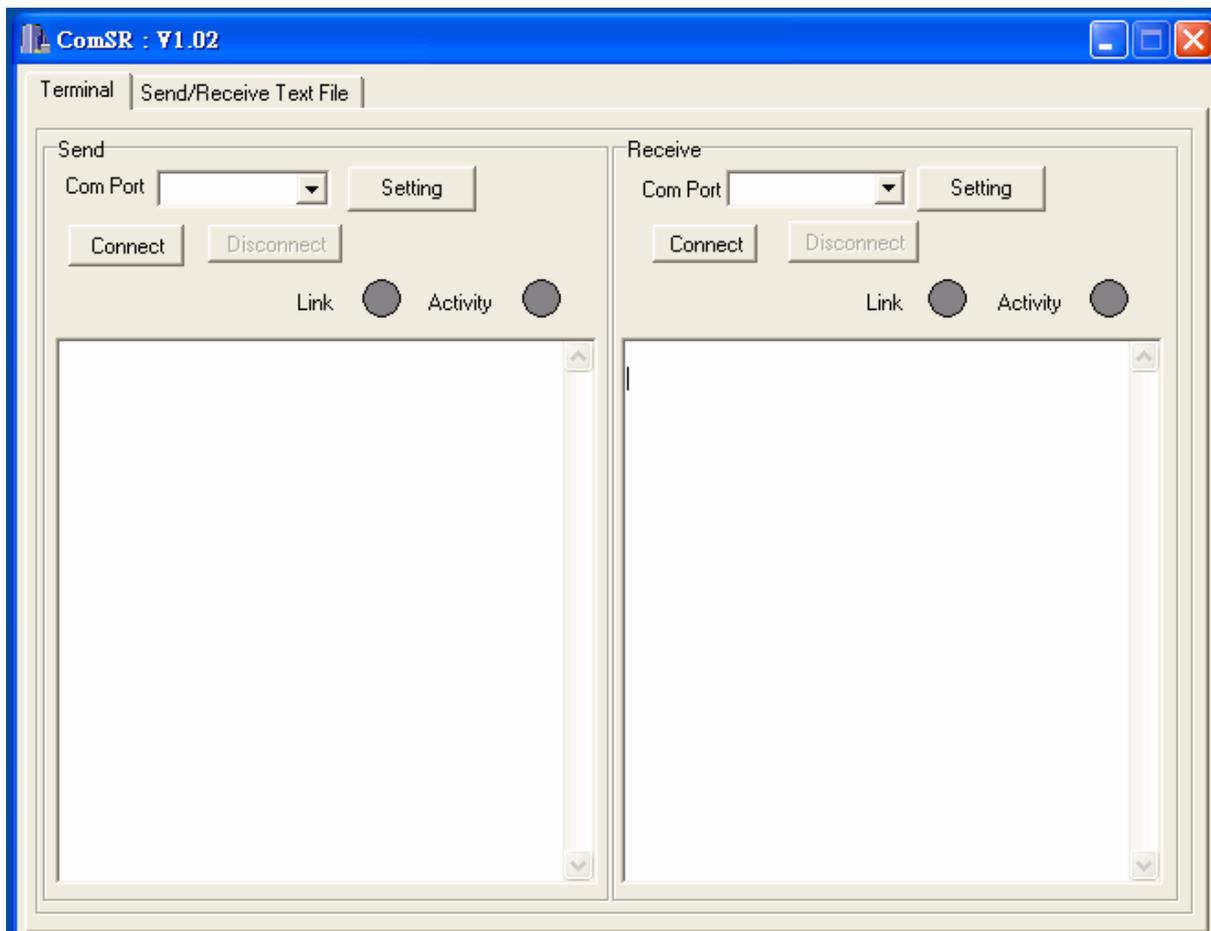
Figure 6-2 ComSR Window

ComSR provide two methods for loop testing:

Terminal: ComSR is simulated as a simple terminal and allow the characters typed in one side to be shown up at the other side.

Send/Receive Text File: The text file sent in sending side will be displayed in the receiving side. The **Test_Text_File.txt** in the CD-ROM can be used for this file transfer testing.

Note: Only "Enter" and "Line Feed" ASCII control codes are supported.
   Make sure the enter character or character in the text file does not include other ASCII control code.

55

6.3 Select COM port

Assume COM5 and COM6 have been set up via the SerialComm, refer to section 5.1and section 5.2 for detail on the virtual COM definition and activation.

As shown in Figure 6-3, all available COM ports can be found in the pull down window. Select the virtual COM port, which has been setup by the SerialComm, for both **Send** side and **Receive** side.
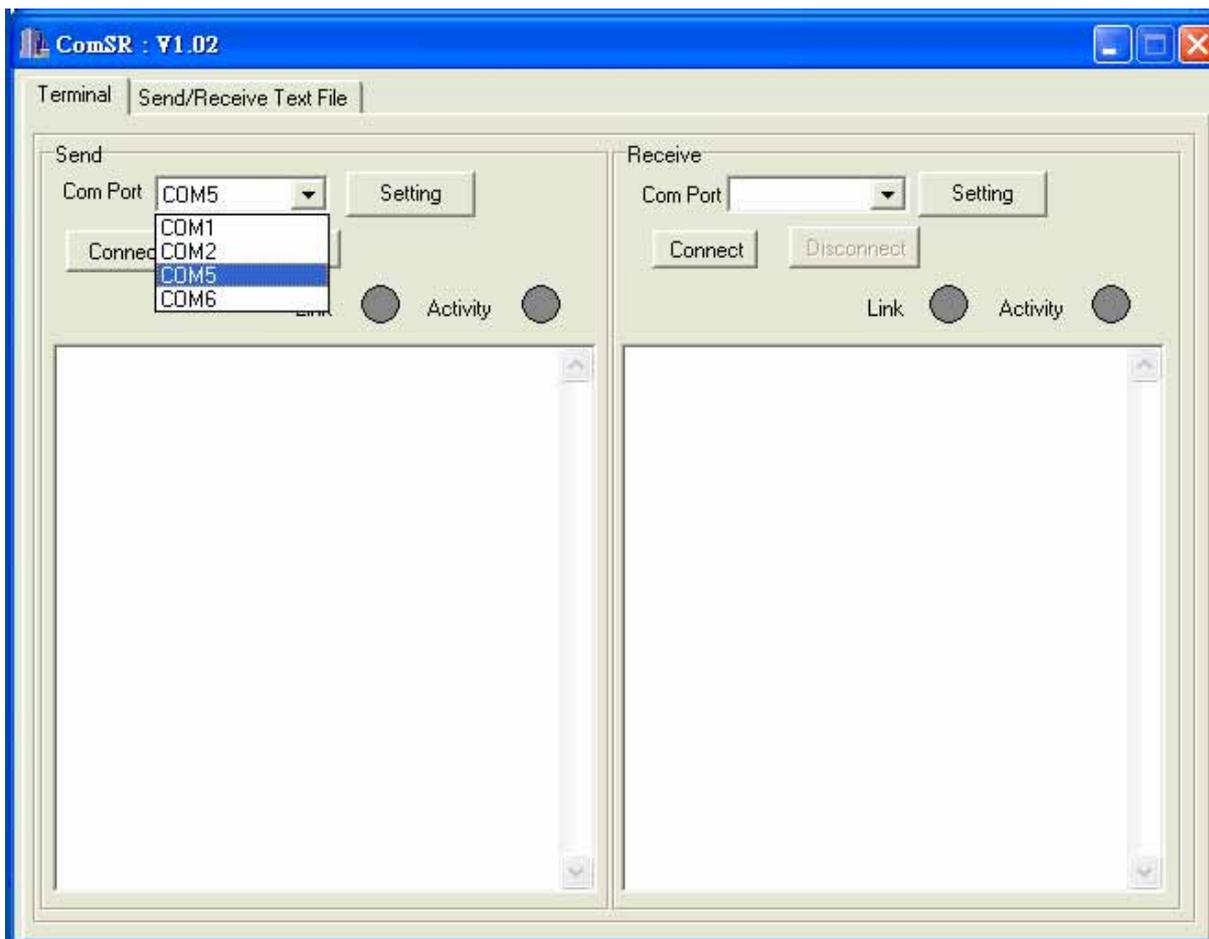
Figure 6-3 Select Virtual COM

6.4 COM Port Settings

ComSR supports both physical COM ports and virtual COM ports.

If the PC/NB physical COM ports are selected, then on the **Send** (and/or **Receive**) side, click
the **Setting** button to set the **Com Port Setting** parameters as same values as the
physical COM ports settings of your PC/NB.

If ARS1120 virtual COM ports are selected, then it is no matter what the **Com Port Setting** is,
the ComSR can still work. This is due to the virtual COM is implemented by IP network
redirector.
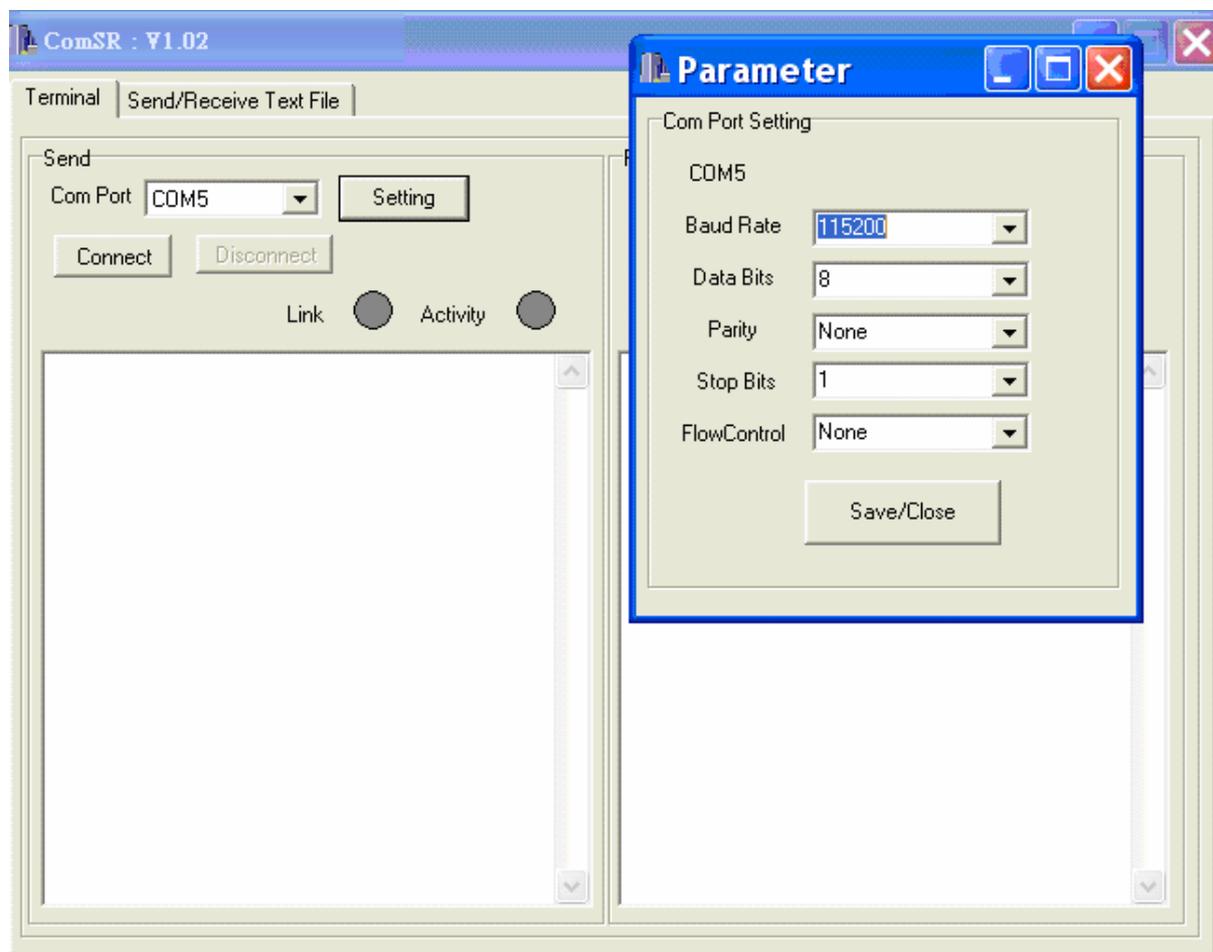
Figure 6-4 Com Port Settings

6.5 Simple Terminal Simulator

From the **Terminal** tap window, click the **Connect** button on both **Send** and **Receive** sides. If the connection is established correctly, the **Link** LED will be ON (green). The ComSR will be acted as if a simple terminal simulator. Any character typed in on one side will be displayed on the other side; and, the **Activity** LED will be flashing (yellow), refer to Figure 6-5 and Figure 6-6.
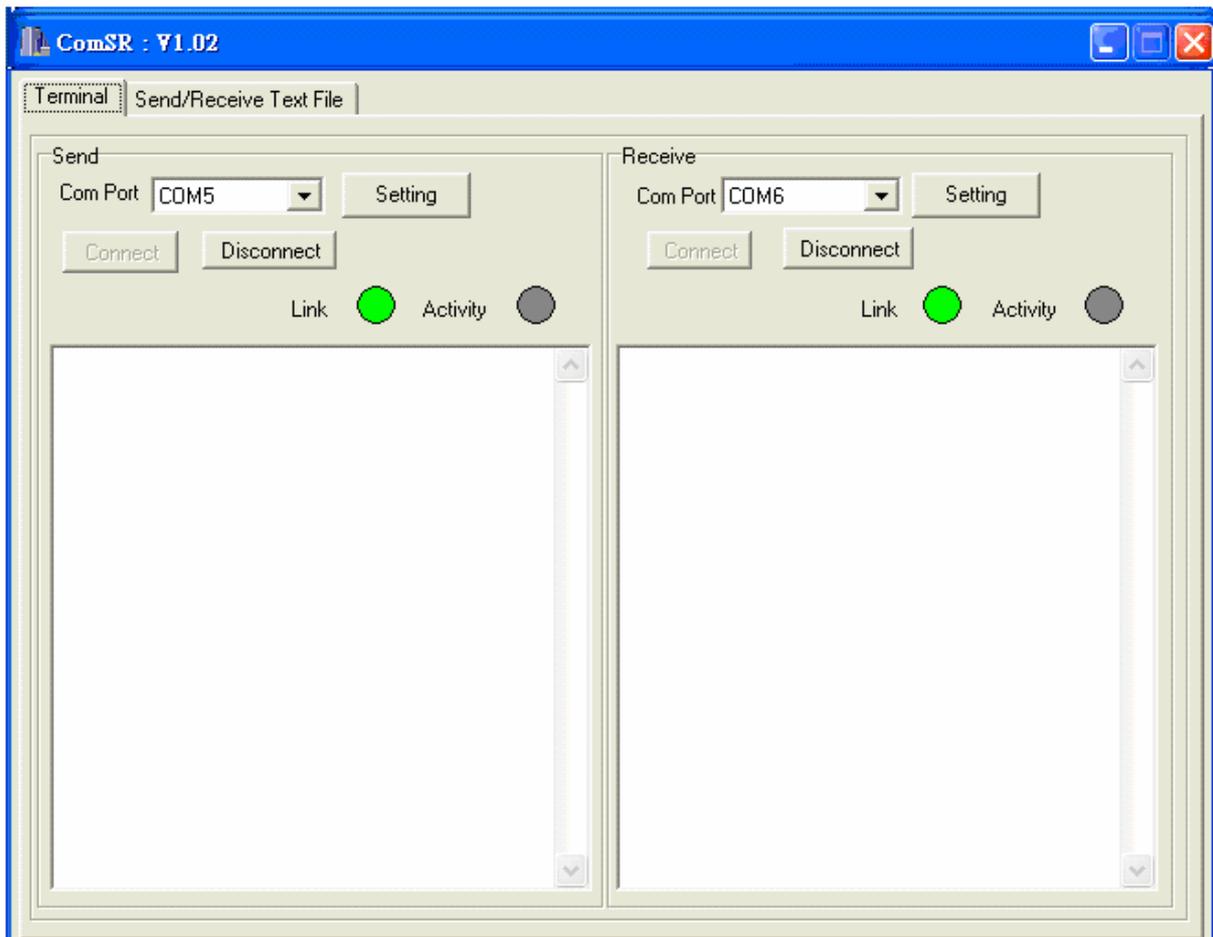
Figure 6-5 Connect Com Port
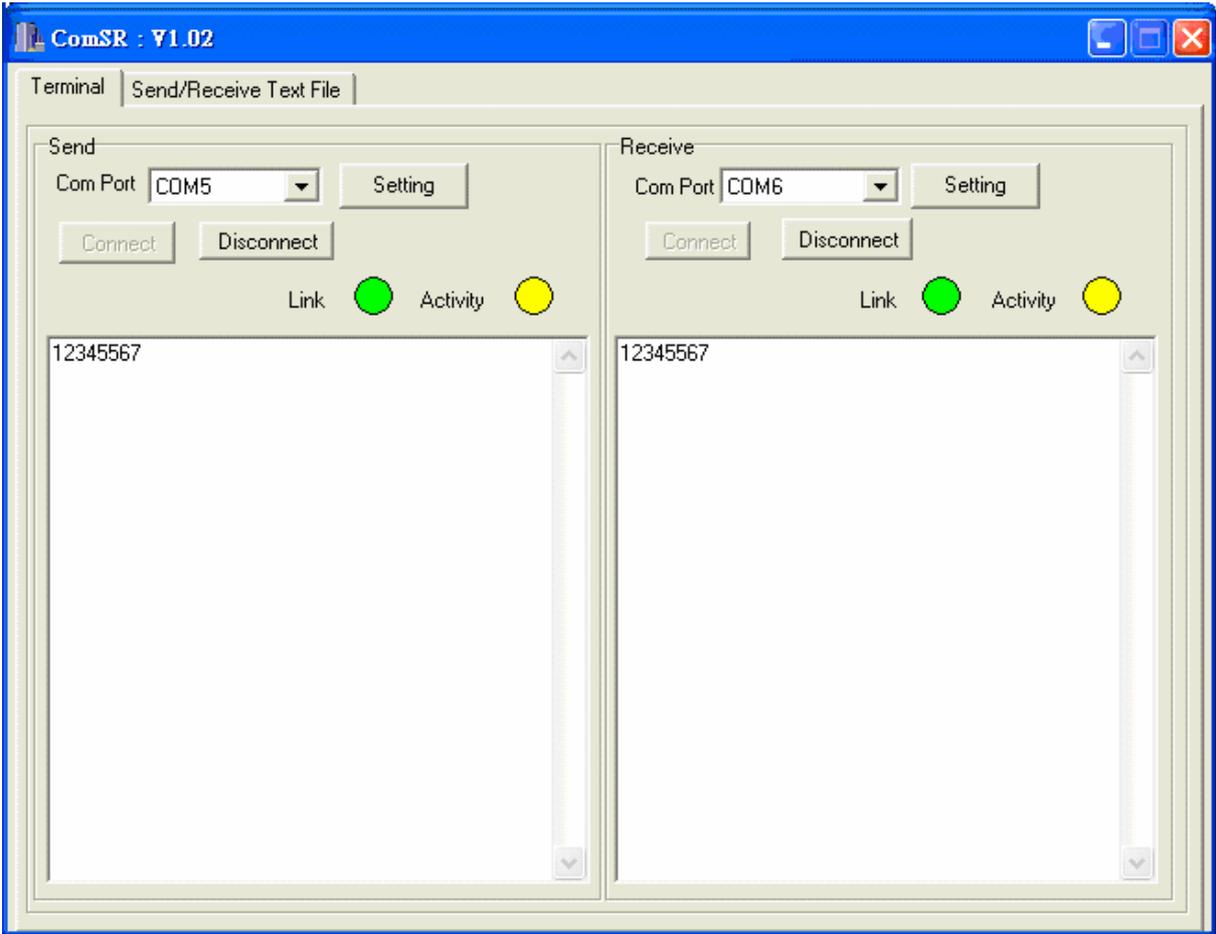
Figure 6-6 Simple Terminal Simulator

6.6 Send/Receive Text File

From the **Send/Receive Text File** tap window, follow the similar procedures to select and setup the COM port for both **Send** and **Receive** sides, refer to Figure 6-7.

Note 1: If the COM ports have been setup in Terminal tap windows and have not been disconnected then it not necessary to setup again.
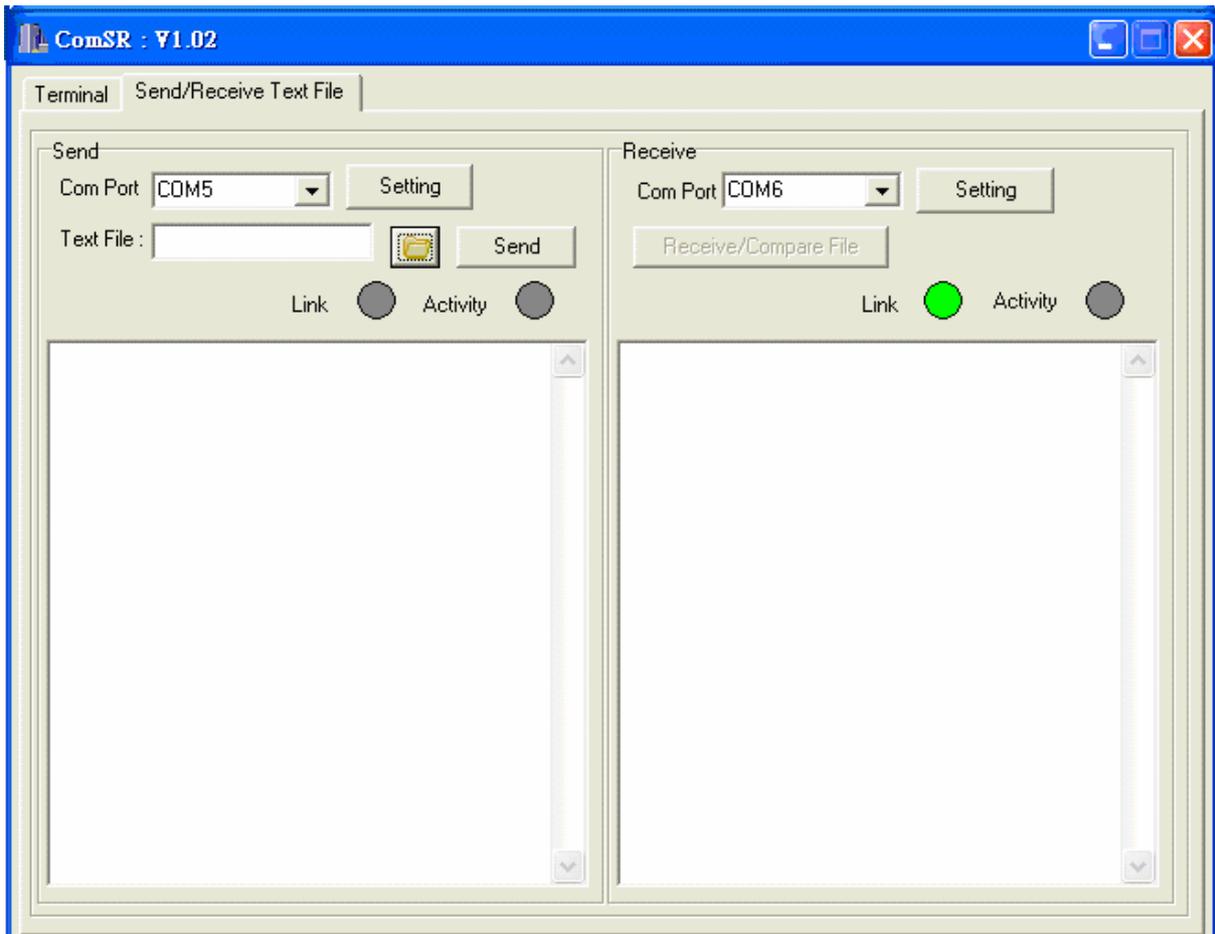
Figure 6-7 Select Com Ports

Follow the steps below to transfer text file for loop back testing:

• At the **Receive** side, click **Receive/Compare File** button first.
• From the **Send** side click [folder icon] button to browse the text file to be sent and then click the **Send** button.

The text file will be sent from the **Send** side and will be loop back to the **Receive** side via the remote ARS1120 two serial ports connected by one null modem serial cable. The content of the text file will be displayed at both sides. At the **Receive** side, the file will also be checked. A comparison result will be shown at the **Receive** side, refer to Figure 6-8.
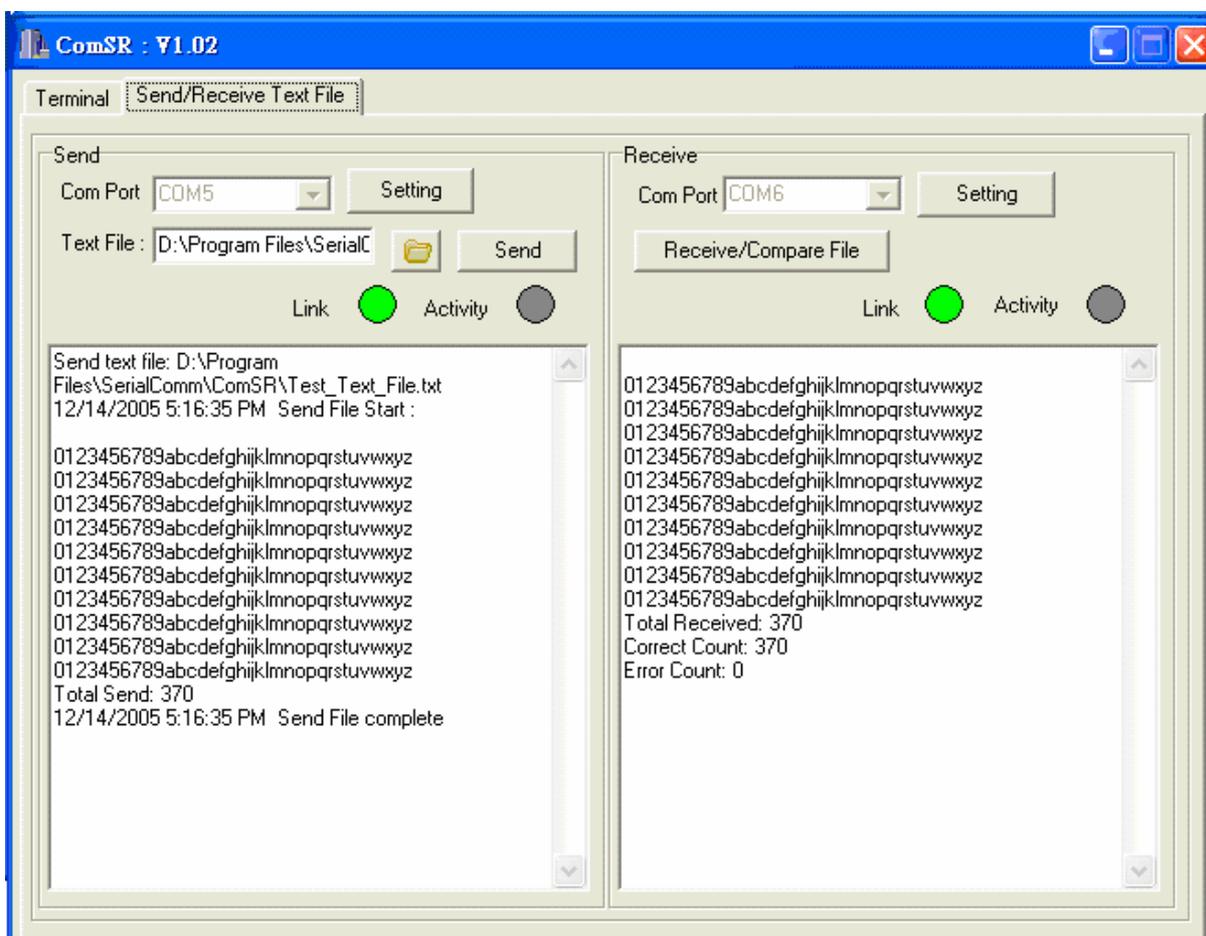
Figure 6-8 Send and Receive Text File

If the transmission path has no error, then the comparison result will show **Error Count: 0**.

7. Specifications

- **Serial**
  - Baud Rate Options: 230400, 115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200, 600, 300, 150, 110 bps
  - Data Length Options: 5, 6, 7, 8 Bits
  - Parity Options: Even, Odd, None, Mask, Space
  - Stop Bit Options: 1 (default), 2 Bits
  - Handshake Flow Control:
    Hardware Flow Control (RTS/CTS)
    Software Flow Control (XON/XOF, None)
  - Two Male DB9 RS232 Connectors
  - Serial UART Buffer: 4096 Bytes Input, 4096 Bytes Output

- **WLAN Radio**
  - Protocol Type: 802.11b Standard Compliant
  - Operating Range
    Open Environment: 1000 ft./300m
    Office Environment: 100-330 ft./30-100m
  - Security: WEP 64 and 128 Bit Encryption
  - Site Survey Function

- **Radio Characteristics**
  - Spread Spectrum Technology: Direct Sequence Spread Spectrum (DSSS)
  - RF Range: 2.4 – 2.4835 GHz
  - Data Rate: 11 / 5.5 / 2 / 1 Mbps
  - Modulation: DBPSK for 1 Mbps, DQPSK for 2 Mbps, CCK for 5.5 / 11 Mbps
  - Operation Channels: US - 11, Canada - 11, Europe - 13, France - 4, Spain - 2
  - RF Power Output (Typical): +13 dBm
  - Receive Sensitivity (Typical @BER10E-5): - 82 dBm

- **Power**
  - Voltage Power Source Range: 12 to 28Vdc/Vac
  - Current: 350mA Typical @ +12Vdc

- **Software**
  - No Driver Required
  - Utility: Ident-and-Connect™ Auto Discovery and Virtual COM Software Run

on Windows 95/98/Me/NT/2000/XP

- **Mechanical**
  - Antenna Connector: RSMA
  - DIP Switch for Serial Port Type Selection
  - LED: Power, Alarm, Link, Activity, RS232, RS422, RS485
  - Dimensions: 4.6" x 3.5" x 0.9" (without antenna)

    11.7 x 8.8 x 2.3 cm (without antenna)
  - Weight: 11.1 oz./315 grams (without antenna)

- **Environment**
  - Temperature:

    Operating: -20 to +55°C / -4 to +131°F

    Storage: -40 to +85°C / -40 to +185°F
  - Relative Humidity: 95% (non-condensing)

- **EMC Certifications**
  - U.S.A.: FCC Part 15 Subpart B, Class B

    Part 15 Subpart C
  - CE: ETSI EN 300 328, ETSI EN 301 489-1/17

    EN 300 826, EN 50385, EN 55022

    EN 60950, EN61000

8. Default Settings

The following subsections show the default settings for ARS1120.

8.1 Network
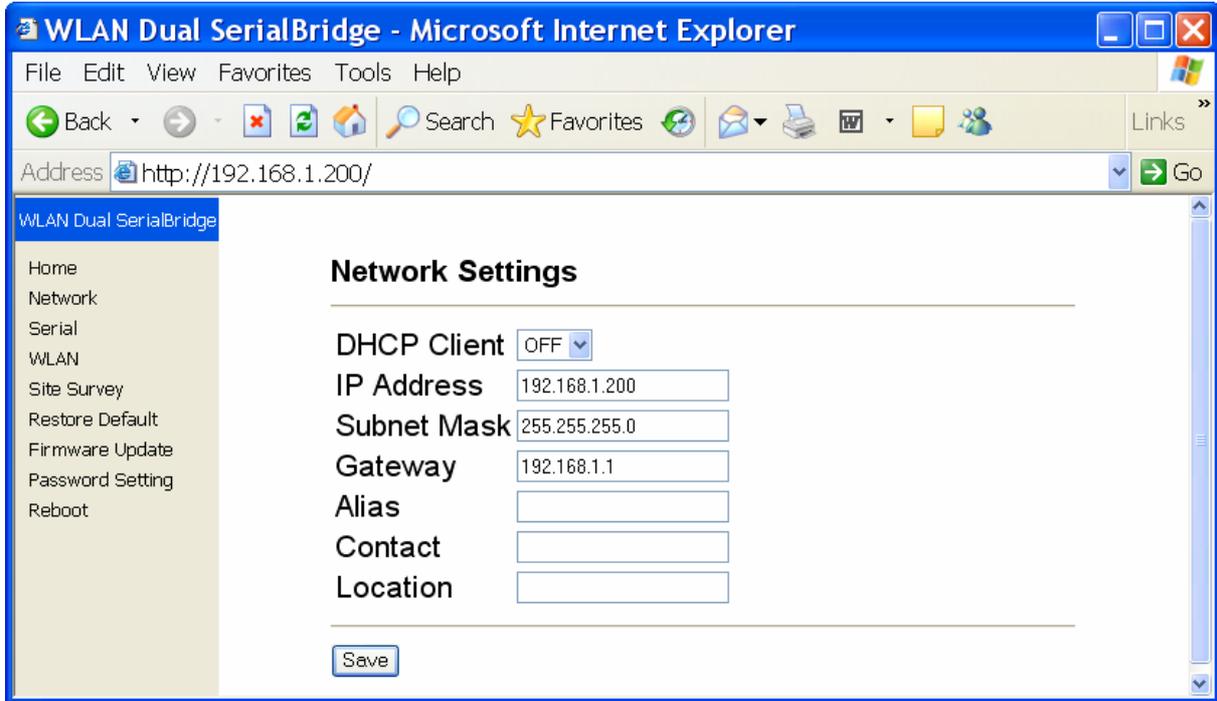
Figure 8-1 Network Default Settings

8.2 WLAN

Figure 8-2 WLAN Default Settings

8.3 Serial Port

When any serial port is set to console port, it has the following default settings:

> Baud Rate: **2,400**
> Data Length: **8**
> Parity: **None**
> Stop Bit: **1**
> Flow Control: **None**

The console port parameter can not be changed.

The RS232/RS422/RS485 ports have the following default settings:

> Baud Rate: **115,200**
> Data Length: **8**
> Parity: **None**
> Stop Bit: **1**
> Flow Control: **None**

9. Glossary

802.11

802.11 refer to a family of specifications defined by the IEEE for wireless LAN technology. 802.11 specify an over-the-air interface between a wireless client and a base station or between two wireless clients. There are several specifications in the 802.11 family:

- **802.11** -- applies to wireless LANs and provides 1 or 2 Mbps transmission in the 2.4 GHz band using either Frequency Hopping Spread Spectrum (FHSS) or Direct Sequence Spread Spectrum (DSSS).
- **802.11a** -- an extension to 802.11 that applies to wireless LANs and provides up to 54 Mbps in the 5GHz band. 802.11a uses an Orthogonal Frequency Division multiplexing (OFDM) encoding scheme rather than FHSS or DSSS.
- **802.11b** --An extension of the IEEE 802.11 standards for wireless LAN and provides 11 Mbps transmission with a fallback to 5.5, 2 and 1 Mbps, an operating frequency of 2.4GHz. Devices meet 802.11b requirements can interoperate with each other even manufactured by different companies.
- **802.11g** -- An extension of the IEEE 802.11 standards for wireless LAN and provides 54Mbps using OFDM modulation, an operating frequency of 2.4GHz, backward compatibility with 802.11b devices.

Access Point

Any entity that acts as a communication hub for the associated wireless stations to connect with the wired LAN via the wireless medium

Ad-Hoc Network

A network composed solely of stations within mutual communication range of each other via the wireless medium (WM) and operate on a peer-to-peer bass. An Ad-Hoc network is typically created in a spontaneous manner. The principal distinguishing characteristic of an Ad Hoc network is its limited temporal and spatial extent. The term Ad-Hoc is often used as slang to refer to an independent basic service set (IBSS).

Basic Service Set (BSS)

A set of 802.11-compliant stations that operate as a fully connected wireless network An Access Point is associated with several wireless stations.

Baud Rate

The number of pulses of a signal that occur in one second

Thus, baud rate is the speed the digital signal pulses travel.

Bit Rate

The transmission rate of binary symbols (.0. and .1.)

Bit rate is equal to the total number of bits transmitted in one second.

DHCP (Dynamic Host Configuration Protocol)

A protocol that automatically assigns the dynamic IP addresses to devices on a network. With dynamic addressing, a device can have a different IP address every time it connects to the network and simplifies network administration because the software keeps track of IP addresses rather than requiring an administrator to manage the task. When a device newly added into the network, a dynamic IP address will be assigned to that device. Many ISPs use dynamic IP addressing for dial-up users.

DNS

Domain Name Server is a server that translates domain names into IP addresses. A domain name is alphabetic and is meaningful for human to remember and use. However, the Internet routing is based on IP address. So, when you enter a domain name, the DNS server will translate the domain name into the corresponding IP address. For example, the domain name www.example.com might be translated to 198.152.212.140

DSSS (Direct-Sequence Spread Spectrum)

DSSS is a transmission technology used in WLAN transmissions to increases the signal's resistance to interference. At the sending station, the data signal is combined with a higher data rate bit sequence to generate the DSSS signal. At the intended receiving station, the DSSS signal is recognized as valid signal, however, for an unintended station, the DSSS signal appears as low power wideband noise and is rejected (ignored).

The bit sequence is a redundant bit pattern for each bit that is transmitted. If one or more bits in the pattern are damaged during transmission, the original data can be recovered due to the redundancy of the transmission.

Dynamic IP Address

In a TCP/IP network, the client station is automatically assigned an IP address by a DHCP server. The network devices, such as servers and printers, are usually assigned with static

(fixed) IP addresses.

ESS (Extended Service Set)

A set of more than two or more BSSs (multiple APs) forming a single network

IEEE (Institute of Electrical and Electronics Engineers)

IEEE is best known for developing standards for the computer and electronics industry

CTS (Clear To Send)

An RS-232 signal sent from the receiving station to the transmitting station to indicate it is ready to accept data.

Default Gateway

The default gateway is a router used to forward all traffic that is not addressed to a station within the local subnet. The traffic will be forwarded to a destination outside of the subnet of the transmitting device.

ESS (Extended Service Set)

More than one BSS can be configured as an Extended Service Set. An ESS is basically a roaming domain.

Identification (BSSID)

A six-byte address that distinguishes a particular access point from others
Also know as a network ID

Infrastructure

An infrastructure network is a group of computers or other devices, each with a wireless adapter, connected as an 802.11 wireless LAN. In infrastructure mode, the wireless devices communicate with each other and to a wired network by first going through an Access Point.

IP Address

IP address is an identifier for a computer or device on a TCP/IP network. Networks use the TCP/IP protocol to route the messages based on the destination devices' IP address. IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be 0 to 255. For example, 192.168.1.224 could be an IP address.
Within an isolated network, the IP addresses can be assigned at random as long as each one is

unique. However, to connect a private network to the Internet, it will require a registered IP addresses to avoid duplicates.

ISP (Internet Service Provider)

ISP is a company that provides service for the individuals or companies to access the Internet. It also provides other related services such as web site and virtual hosting.

LAN (Local Area Network)

LAN is a group of computers or devices that share a common communications media and typically share the resources (e.g. server, printer) within a small area (e.g. office).

MAC Address (Media Access Control)

MAC address is a unique hardware number used to identify each node in a network.

OFDM (Orthogonal Frequency Division Multiplexing)

Technology used in WLAN and provides better performance (higher data rates and more reliable) than previous technology DSSS. OFDM works by splitting the radio signal into multiple smaller sub-signals that are then transmitted simultaneously at different frequencies to the receiver, i.e. OFDM divides one high-speed data stream into a number of lower speed data streams, which are then transmitted in parallel. Each lower speed stream is used to modulate a sub-carrier. OFDM is also used for other applications, including power line networking.

Roaming

A function that allows one to travel with a mobile end system (wireless LAN mobile station, for example) through the territory of a domain (an ESS, for example) while continuously connecting to the infrastructure

SSID (Service Set Identifier)

SSID is an identification name used by a group of wireless devices to make connections to each other. In order for wireless devices to communicate with each other, they must all be set to the same radio channel and must use the same SSID. Even if they are set to the same radio channel, they cannot communicate unless the SSID is the same.

Static IP Address

A permanent IP address that is assigned to a node in a TCP/IP network

Subnet Mask

An IP address has two components: network address and host address. Part of the host address can be used to identify a particular subnet. The system administrator can further divide the host address into two or more subnets. A mask is used to determine what subnetwork an IP address belongs to. The subnet mask is the network address plus the bits reserved for identifying the sub-network. By convention, the bits for the network address are all set to 1 due to it will work the same if the bits were set exactly as in the network address. It's called a mask because it can be used to identify the subnet to which an IP address belongs by performing a bitwise AND operation on the mask and the IP address.

TCP (Transmission Control Protocol)

A protocol used along with the IP (Internet Protocol) to send data in message units between network devices over a LAN or WAN. IP takes care of handling the data routing and TCP takes care of tracking the individual units of data (called packets) that a message is divided into for efficient delivery over the network. TCP is a connection oriented protocol due to it requires the receiver to return an acknowledgment of receipting the packet to the sender.

TCP/IP (Transmission Control Protocol/Internet Protocol)

TCP/IP is a suite of communications protocols used to connect hosts on the Internet. It uses several protocols, the two major protocols are TCP and IP.

UDP (User Datagram Protocol)

A protocol used along with the IP (Internet Protocol) to send data in message units (datagram) between network devices over a LAN or WAN. IP takes care of handling the data routing and UDP takes care of tracking the individual units of data (called packets) that a message is divided into for efficient delivery over the network. UDP is a connectionless protocol due to it does not require the receiver to return an acknowledgment of receipting the packet to the sender (as opposed to TCP). UDP connection is not a reliable connection. It is used primarily for broadcasting messages over a network.

Wired Equivalent Privacy (WEP)

The optional cryptographic confidentiality algorithm specified by IEEE 802.11 used to provide data confidentiality that is subjectively equivalent to the confidentiality of a wired

local area network (LAN) medium that does not employ cryptographic techniques to enhance privacy.

WLAN (Wireless Local Area Network)

A group of computers and associated devices that use radio frequency to communicate with each other