Creating a Hot Spot using Windows XPe
Featuring ICOP's eBox III

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1   The Basic Concept – a PC as a Wireless Access Point

We constantly look for unique techniques and ideas for Windows XP Embedded. One area that we have not explored specifically is wireless capabilities. As more systems are remotely connected via wireless, a flexible access point would be ideal to link the systems together. This requires a system best suited for application, and the eBox III and IV series offer the right size, performance, and price. The wireless add-on module for the eBox series combined with the internal wired Ethernet support opens up wireless bridging opportunities.

New wireless technologies seem to come out every year. We have 802.11 a, b, g, and now n. Every time one of these new technologies reaches the market, new hardware such as access points and wireless adapters have to be purchased to take full advantage of the new technology. Creating a wireless access point using a PC make some sense since a PC offers the most flexible hardware platform. With Windows XP Embedded, you can build a wireless access point (WAP) using off the shelf software and device drivers. Any upgrades in technology can be added to the system since the system is a PC running the Windows operating system.

You could also add support for local data storage where data and multimedia files can be shared as a network storage device. You can also add support to manage the system remotely by adding a few networking features:

- Web Server
- FTP Server
- Remote Desktop Server
- Telnet Server
- SSH

Fig 1.1 eBox III with Wireless Networking Module

The eBox-3853 shown in Fig 1.1 has two wired 10/100Base-T Ethernet ports and wireless 802.11b/g support. You can easily create a wireless router. With the USB ports, you could add an 802.11n module configured for full speed mode to have a wireless access point that support the latest wireless technologies.

2   Setup XP Embedded Image

Taking advantage of the SJJ's TcDK's platform macro component for the eBox III (http://www.sjjmicro.com/TcDK.html), a custom image can be built that supports everything needed to create an ad hoc access point.

1. Open Target Designer
2. Add the ICOP_eBox III 38XX Series (SJJ EMS) platform macro component that comes with SJJ's TcDK.
3. Add the following components:

- Accessories/System Tools
- Add Hardware Control Panel
- Add/Remove Programs Control Panel
- Administration Support Tools
- CMD - Windows Command Processor
- Computer Browser Service
- Computer Name User Interface
- Control Panel Applet for "Wireless Setup Wizard" and "Home Networking Wizard"
- Date/Time Control Panel
- Device Manager
- Disk Management Services
- Display Control Panel
- Keyboard & Mouse Control Panel
- Internet Connection Wizard
- Map Network Drives/Network Places Wizard
- Netshell
- Network Provisioning Service

- Network Setup Wizard Down Level Setup
- Network Setup Wizard
- Primitive: Browselc
- Primitive: Browseui
- Primitive: Wzcsvc
- Runtime Quick Start Helper Macro
- Standard Start Menu Shortcuts
- System Control Panel
- TCP/IP Networking with File Sharing and Client For MS Networks
- TCP/IP Utilities
- Users Control Panel
- Windows Firewall/Internet Connection Sharing (ICS)
- Windows Firewall Control Panel
- Windows Installer Service
- Windows XP Visual Style
- Wireless Zero Configuration

You could use Component Designer to create a macro component that has dependencies on all of these components. The components are a mix of control panel applets and networking support functionality and tools. The Windows Installer Service was added to support installation of new device drivers or applications.

4. Optional components to include would be for remote management services such as:

- Terminal Services
- Telnet Server
- Terminal Server Remote Desktop

5. Add the USB Boot 2.0 component if you are going to boot from USB flash disk.
6. Run dependency check
7. Build the image
8. Deploy the image to the target and let the image run through FBA.

3   Configure Ad Hoc Network

Once the system has completed FBA, the following steps can be used to setup the ad hoc access point. First the Wireless gets configured with an ad hoc network connection and then a wired connection provides access to the Internet for all users to access the system.

1. Open **Control Panel**
2. Open the **Network Connections** control panel**.**
3. Right click on the wireless adapter and choose **Properties** from the context menu.
4. Click on Wireless Networks Tab and make sure that "Use Windows to configure my wireless network settings" is checked. The default is checked.
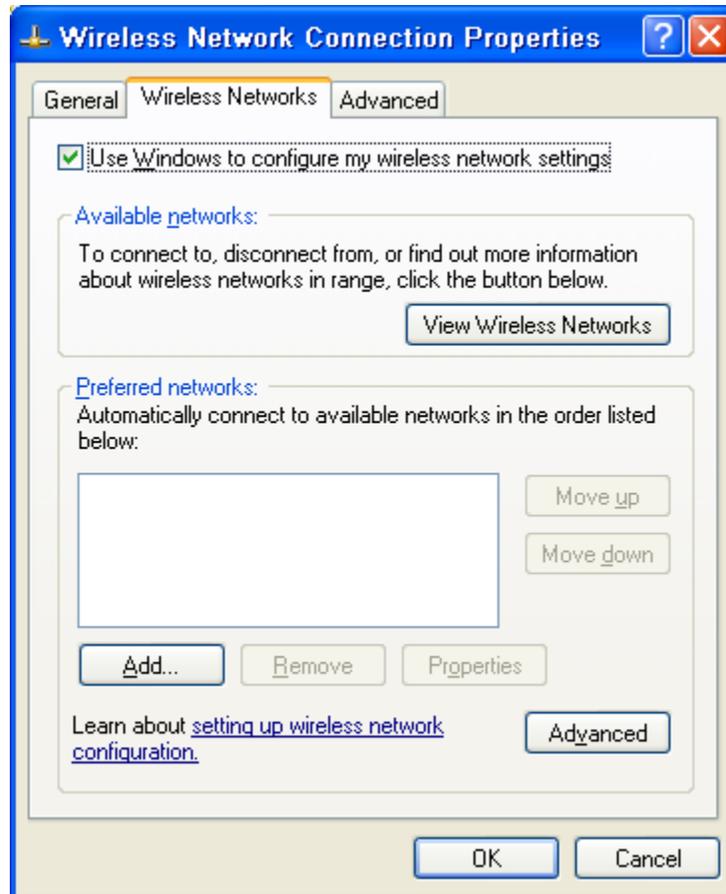
Fig 3.1 Wireless Properties

5. Click on **Advanced** button
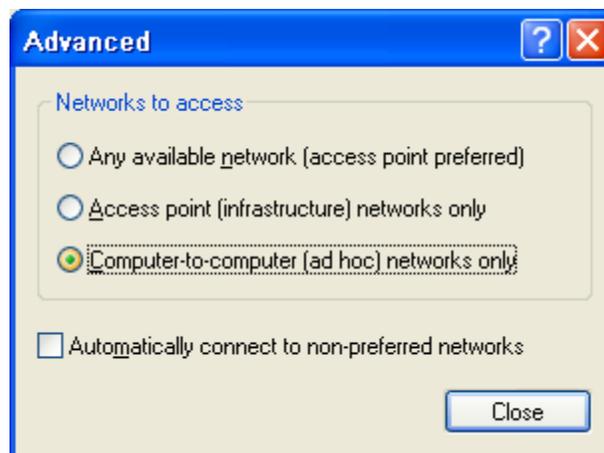6. Select "Computer-to-computer (ad hoc) networks only"

Fig 3.2 Set Ad Hoc Access

7. Under preferred networks click **Add**
8. Add hot spot name or SSID
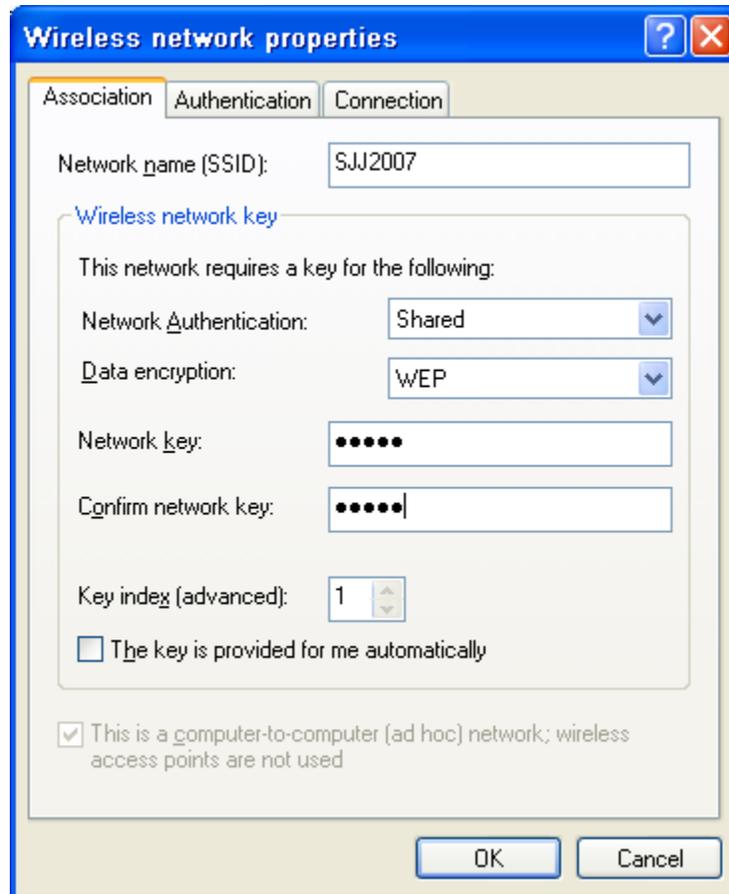9. Set Network Authentication to **Shared**.
10. Set Data Encryption: **WEP**

Fig 3.3 Create the Ad Hoc Network Name and Network Key

11. **Uncheck** the option "The key is provided for me automatically"
12. Create a network key and confirm - make sure you follow password rules
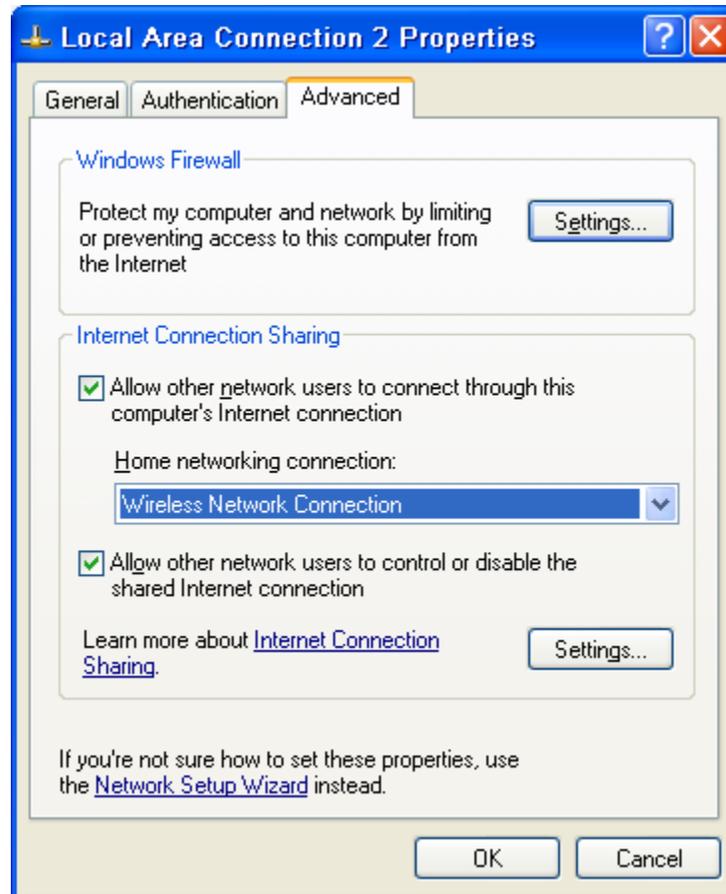13. Click **OK** and you should see hot spot listed.

Fig 3.4 Enable Internet Connection Sharing in a Wired Connection

14. Right click on a wired connection and select properties.
15. Select Advanced tab
16. Set the ICS to check the box to "Enable others to connect through this internet connection".
17. Set Home networking connection to **Wireless Network Connection**

On another PC with wireless connectivity, you should now be able to connect to the ad hoc access point to access the Internet. You will need the wireless network key to complete the connection.

4   Conclusion: A Different Wireless Access Point Idea

The same steps in section 3 can be applied to any Windows XP Pro system, but once a system is open to share the Internet any one can access the local files if things are not locked down. With XP Embedded, you can take additional steps to create custom security policies, custom firewall settings, unique splash screens, and custom shells to lockout users from certain files, folders, and system settings. Also, you can run XP Embedded headless without a video, keyboard, or mouse, and have it automatically reply to system messages. With XP Embedded, there is more flexibility and control that can be applied to an OS image running WAP.

There have been attempts to create software that makes a PC a WAP device. These applications have come and gone over the years. If you find any, please let us know, and we will update this documentation. By enabling an ad hoc implementation in XP Embedded, you can support future communication technologies.

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