



# **3** Installing Applications

There are multiple ways to get an application to your 700 Series Color Mobile Computer; just as there are multiple ways to package the application for delivery.

## Packaging an Application

Use any of the following methods to package an application for installation:

- For very simple applications, the application itself might be the only file that needs to be delivered.
- It could be a directory structure that contains the application, supporting files like ActiveX controls, DLLs, images, sound files, and data files.
- Via a CAB file.

Consider either of the following when choosing a location into which to store your application:

- In the basic 700 Series Computer, there are no built-in storage options other than the Object Store. The Object Store is RAM that looks like a disk. Anything copied here will be deleted when a cold-boot is performed on the 700 Series Computer.
- If the optional SecureDigital or CompactFlash storage card is in the system, then consider this card the primary location for placing an application's install files. The following folders represent either card:
  - The SecureDigital storage card creates the “\SDMMC Disk” folder.
  - The CompactFlash storage card creates the “\Storage Card” folder.
- Files copied to either of these locations will be safe when a cold-boot is performed on a 700 Series Computer - *providing the AutoRun system is installed onto the storage card*. You can find this system on the Recovery CD. Copying a CAB file to the “\CABFILES” folder on one of these cards will automatically extract that CAB file on every cold boot to ensure that your system is properly set up. See page 82 for more details on how this works.

## Installing Applications

Consider any of the following options to get the package to the preferred location on your 700 Series Computer.

- Microsoft ActiveSync
- FTP Server (*page 78*)
- Application Manager in Unit Manager (*page 78*)
- SecureDigital or CompactFlash storage card (*page 78*)

## Using Microsoft ActiveSync



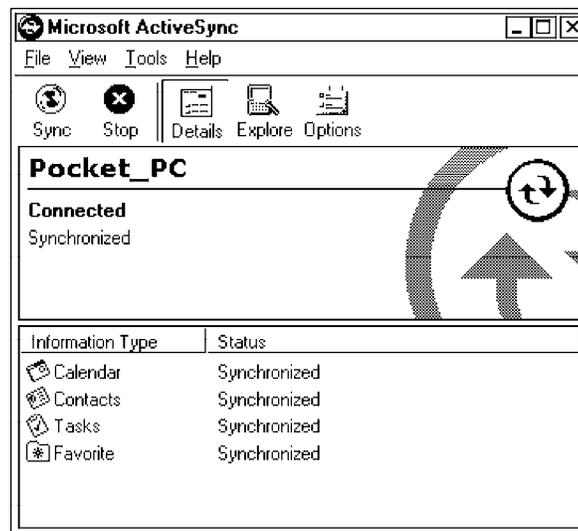
**Note:** These instructions assume that the 700 Color Management Tools portion of the *700 Series Color Software Tools CD* was installed onto your desktop.

The Microsoft ActiveSync tool is located on the 700C Companion CD, which contains Microsoft products, such as Outlook and ActiveSync. See Chapter 2, “*Pocket PC 2002*,” for information about this tool as provided by Microsoft Corporation.

This can be a serial, USB, Ethernet, InfraRed, or 802.11b ActiveSync connection. Files can then be copied using File Explorer on a PC or a laptop computer. This option is usually only good when updating a few 700 Series Computers.

These instructions assume that Microsoft ActiveSync had been installed onto your desktop computer and is up and running. If not, go to Chapter 2, “*Pocket PC 2002*,” for an URL from which you can download the latest application.

- 1 Connect your 700 Series Computer to your desktop computer via an ActiveSync cable or IrDA.
- 2 Wait for a “Connected” message to appear in the Microsoft ActiveSync application to signal a connection to the 700 Series Computer. If necessary, select **File** → **Get Connected** to initiate a connection.



- 3 Click **Explore** to access the Mobile Device directory on your 700 Series Computer.

- 4 From your desktop, select **Start** → **Windows Explorer**, then browse the applicable path for any of the system files needed for your 700 Series Computer (*listed with their paths*). Select to highlight the appropriate file, right-click the file for a pop-up menu, then select **Copy**.
  - Base operating system files:  
“C:\Intermec\Intermec 700 Color Mgmt Tools\Drive Images”
  - CAB files:  
“C:\Intermec\Intermec 700 Color Mgmt Tools\Cab Files”
- 5 Within the Mobile Device directory, go to the directory where you want the files located on the 700 Series Computer, do a right-click for a pop-up menu, then select **Paste**.
- 6 When all of the files are pasted, perform a warm-boot on the 700 Series Computer. When the computer reboots, wait for the LED on the top left of your keypad to stop blinking. Tap **Start** → **Programs** → **File Explorer** to locate the newly copied executable files, then tap these files to activate their utilities.

## Using the FTP Server

The 700 Series Computer has a built-in FTP Server that connects to a network via Ethernet or 802.11b. This “ftp”s to the IP address of the 700 Series Computer and places files. The benefit of using FTP is that a script can be created that will automate the process of copying files to the 700 Series Computer. This option is good for when a large number of 700 Series Computers need to be updated. See Chapter 7, “*Programming*,” for more information.

## Using the Application Manager in Unit Manager

This requires the 700 Series Computer to connect to the network via Ethernet or 802.11b. The process is still manual so it would take longer than the FTP method but it would still be a better option than ActiveSync where many 700 Series Computers need to be updated. The Unit Manager applications are available on the *700 Series Color Unit Manager CD-ROM*. For more information, consult your Intermec sales representative.

## Using a Storage Card

The following steps pertain to installing an application using a storage card.

### Copying to a CompactFlash Card

Follow the steps below to install your application on the device using a CompactFlash storage card:

- 1 Suspend the 700 Series Color Mobile Computer and remove its CompactFlash drive, which holds a SanDisk CompactFlash storage card.
- 2 Using a CompactFlash Adapter card, place the CompactFlash Drive in your desktop PC card drive.

- 3 Create a subdirectory on the PCMCIA CompactFlash drive in which to store your application.
- 4 Add the autorun system to the storage card using the CEImager application. See the *Software Tools User's Manual* for information about CEImager.
- 5 Copy your application, data files, and all required DLLs and drivers to the subdirectory created on the CompactFlash drive.
- 6 Add your application to the AUTOUSER.DAT file on the “\Storage Card\2577” directory that contains the following statement, where *your directory* is the directory on the CompactFlash storage card where the application was installed, and *yourapp.exe* is the name of your application. Finish the “RUN=” statement with a carriage return line-feed combination. There may be multiple run statements in the file.  

```
RUN=\<your di rectory>\<yourapp. exe>
```
- 7 Remove the CompactFlash drive from your desktop computer and reinstall it into the 700 Series Computer.
- 8 Warm-boot the 700 Series Computer to add these files to the CompactFlash storage card.

If the AUTOUSER.DAT file is found and the “RUN=” statement is correct, then the task manager will launch and execute your program on start-up.

### Copying to a SecureDigital Storage Card

Do the same steps as for the CompactFlash storage Card, except replace the “\Storage Card\2577” directory with the “\SDMMC Disk\2577” directory.

## Updating the System Software

You can use the Recovery CD to reinstall or update the operating system software on the 700 Series Color Computer. For more information, contact your Intermec sales representative.

## Application Migration



**Note:** These instructions assume that the 700 Color Management Tools portion of the 700C Software Tools CD was installed onto your desktop and that a storage card has been added to the base configuration of the 700 Color Computer.

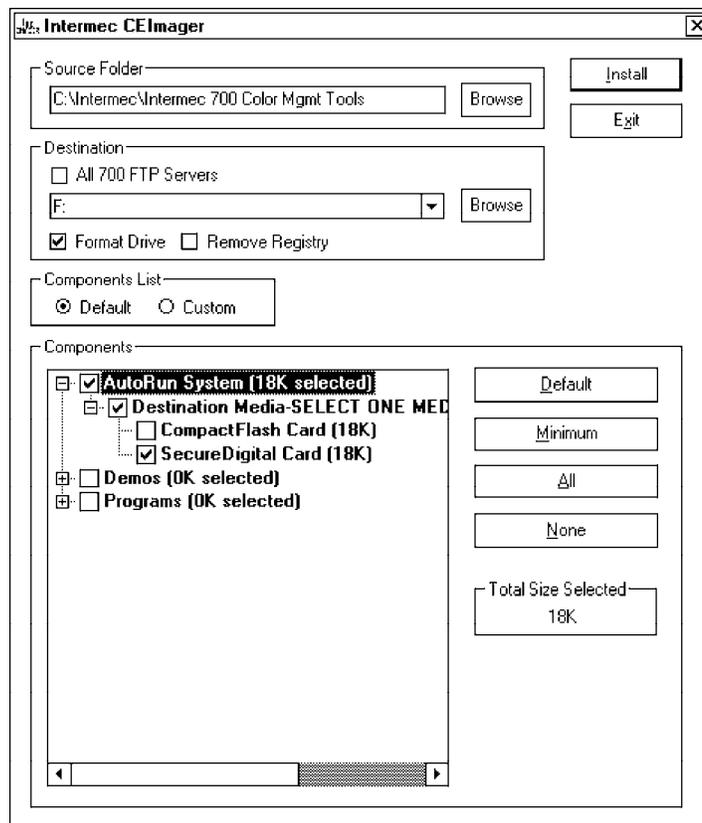
The following steps are required to ensure that the following will happen on a cold-boot:

- CAB files can be restored,
- applications will automatically start,
- and the registry will be restored.

Do the following for the cold-boot procedure:



- 1 From your desktop, double-click the **Intermec CE Imager** desktop icon to access the Intermec CEImager application. If this icon is not on your desktop, then double-click the CEIMAGER.EXE executable from the “C:\Intermec\Intermec 700 Color Mgmt Tools\Tools\CEImager” folder.
- 2 Click **Default** under **Components List** to activate the components.
- 3 Click (+) to expand the **AutoRun System** component, click (+) to expand the **Destination Media** option, then select *either* the **Compact-Flash Card** option or the **SecureDigital Card** option. *Do not select both storage cards, as the AutoRun files copied will work for one storage card, but not work on the other storage card.*

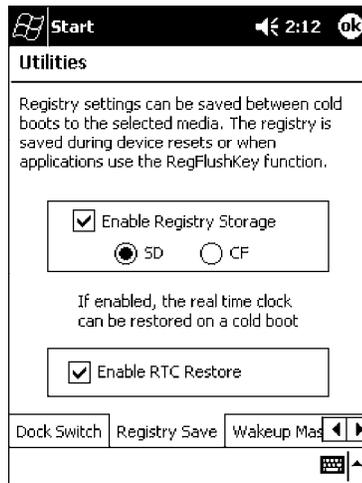


- 4 Click **Install** to install the AUTORUN files onto the storage card.
- 5 Create a “\Cabfiles” folder on the storage card. Copy any CAB files that are to be extracted on every startup into this folder.
- 6 In the “\2577” directory, add your custom AUTOUSER.DAT file. See the *Recovery Help* for more information on how to set up an AUTOUSER.DAT file.
- 7 If you are using the RegFlushKey() API, the application must use a special API to make sure the registry is written to the appropriate card; or you can use the **Utilities** control panel applet, as follows:



#### Utilities

- a From the 700 Series Computer, tap **Start** → **Settings** → the **System** tab → the **Utilities** icon → the **Registry Save** tab.
- b Tap **Enable Registry Storage**, then tap either of the following:
  - **SD**  
To write the registry to the SecureDigital storage card.
  - **CF**  
To write the registry to the CompactFlash storage card.
- c Tap **ok** to save your entry and exit the **Utilities** control panel applet.



**Note:** If you are using a SecureDigital storage card, you must change any disk access from “Storage Card” to “SDMMC Disk.”

- 8 Remove the storage card from the desktop PC and install the card into the 700 Series Color Computer.
- 9 Perform a cold-boot on the 700 Series Color Computer. Files will automatically install from the storage card upon reboot. Any calls to the RegFlushKey() API will automatically write the registry to the appropriate location.

When converting a 700 Series Monochrome Computer application to run on the 700 Series Color Computer, most APIs should work without changes. Below are a few exceptions:

- The 700 Series Monochrome Computer used the “\Storage Card” folder for nonvolatile storage. You may need to change the application to store data in a volatile location or onto the “SDMMC Disk” if a SecureDigital storage card is present in the system.
- If the application uses the RegFlushKey() API, it must first verify that the proper media is available in the system and call the special API mentioned in Step 7 on the previous page.
- If the application will be using the 700 Color switchable dock, use the API to set the proper port on the dock before communications.
- Some WAN radio options have changed. Review the WAN radio section to determine if any changes will be required in your application.
- The arrow and tab keys are swapped from the way they were on the 700 Series Monochrome Computers. Keyboard remapping is available on the 700 Series Color Computer if these keys need to be changed. See page 79 for more details.
- No special SDK is needed to compile applications for the Xscale processor. Targeting the SA1110 processor will create applications that run on the 700 Series Color Computer.

## Cabinet File Installation

CAB files (*short for cabinet files*) are like .ZIP files, plus they register DLLs, create shortcuts, modify registry entries, and run custom set up programs. Tap a CAB file to extract that file or place the CAB file on one of the approved storage devices in the “\Cab Files” folder, then perform a warmboot on the 700 Series Computer. There are two methods available to extract a CAB file:

- Tap a CAB file to extract it. When using this method, the CAB file is automatically deleted when the extraction process is successful, *unless* the CAB file is set with the read-only attribute.
- Use the AUTOCAB method where all files are extracted when a coldboot is performed on the 700 Series Computer. This AutoCab application is on the Recovery CD, see its “*Recovery Help*” for more information.



# 4 Network Support

The 700 Series Color Mobile Computer can integrate up to three radios in a single unit, and will automatically install the appropriate software for radio use when the unit is powered on. The Intermec CORE application defaults to the most recently used module. If a module has not yet been used or set, CORE will default to the first module as listed alphabetically.

The following communication options on the 700 Series Computer provide wired and wireless connectivity:

- **Onboard wired Ethernet** (*standard*)
- **Wireless Local Area Network (LAN)**  
This 802.11b radio option provides up to 11 Mb/sec throughput.
- **Wireless Wide Area Network (WAN)**  
Includes support for GSM/GPRS and CDMA/1xRTT radios.
- **Wireless Printing**  
This allows for cable-free communications with peripheral devices, such as printers, over a ten-meter range. This compatibility is provided via a Bluetooth qualified module by Socket Communications.

## CORE

The Intermec Common Object Resource Environment (CORE) application provides a framework for various modules that let you configure and manage your Intermec products. These modules are software plug-ins that can be configuration tools, such as the 802.11b radio configuration module, or they can provide information on your environment, such as a battery life module.



CORE is built into the operating system of every 700 Series Computer. On the 700 Series Computer, tap **Start** → **Programs** → the **Intermec CORE** icon to access this application.

CORE modules are collections of specific information. This information is usually related to a particular radio technology, but not always. Each module can display general and detailed information. Tap the **General** and **Details** tabs near the bottom to switch between general and detailed information. Note that not all modules will have detailed information.

To learn more about this application, see its online help. Tap **Start** → **Help** from the menu to see the CORE online help.



**Note:** Once CORE is running, you can return to it by tapping its icon from the System Tray via the Today screen. Tap **Start** → **Today** → the **Intermec CORE** three-ring icon (*circled in the following illustration*).



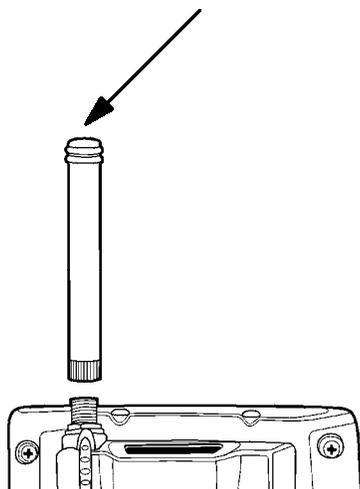
## Network Adapters

Your 700 Series Computer can have up to three radios installed. The default network adapter or radio is dependent on what card is inserted in your 700 Computer. Below are the the network adapters that exist as of this publication. See the Developer's Support web site for the latest information on network adapters for your unit.

- Ethernet Communications (*LAN9000*) - page 86.
- 802.11b Radios (*802.11b Wireless LAN driver*) - page 87.
- WWAN (*Wireless WAN*) - page 110.
- Wireless Printing (*PAN*) - page 120.

Note that the tip of the antenna attached to your 700 Series Computer is color-coded to identify its radio type. Refer to the following to determine your radio type:

- **Green**  
802.11b diversity
- **Red**  
CDMA/GPRS US/Canada
- **Blue**  
GPRS International

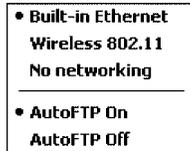


## Ethernet Communications

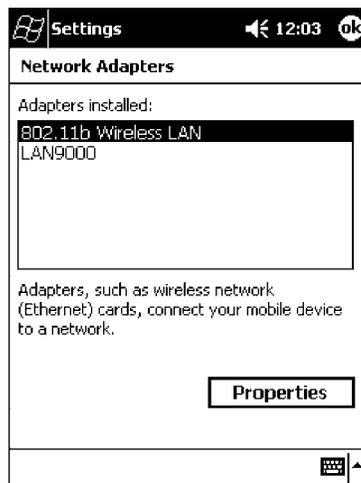
Follow the steps below to start Ethernet communications on the 700 Series Computer. If your system does not contain an 802.11b radio, then **Ethernet networking using DHCP** will be selected as the default.



When “Built-in Ethernet” is selected from the NDISTRY pop-up menu, then the antenna shown to the left will appear in the System Tray. When “No networking” is selected, then this icon will appear with a red “X” above it.



From the 700 Series Computer, tap **Start** → **Settings** → the **Connections** tab → **Network Adapters** to access the network connections for this unit. Make the changes necessary for your network, then tap **ok** when finished.



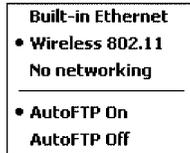
**Note:** “LAN9000” is for Ethernet and ”802.11b Wireless LAN” is for 802.11b radios.

## 802.11b Communications

The 700 Series Computer can integrate the 802.11b radio module along with either the GSM/GPRS or the CDMA/1xRTT radio and the Wireless Printing option. The 802.11b radio module accommodates any Wireless LAN (WLAN) requirements, such as using WLAN access points for cross-docking or load-planning applications.



When “Wireless 802.11” is selected via the NDISTRY pop-up menu, then the antenna shown to the left will appear in the System Tray.

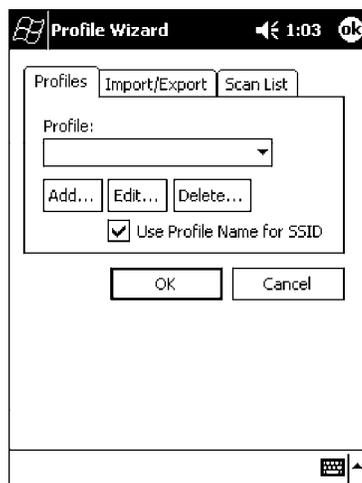


To start 802.11b communications on the 700 Series Computer, tap **Start** → **Settings** → the **System** tab → the **Wireless Network** icon to access the Profile Wizard for the 802.11b radio module. The Profile Wizard defaults to the Profiles page.

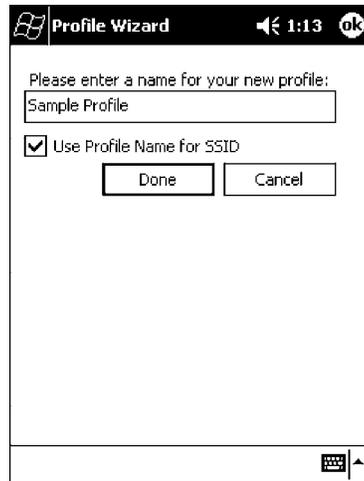
### Profiles

Use the Profiles page to add, edit, or delete multiple networking environments for this 802.11b radio. To add a profile from this screen, enter up to 32 alphanumeric characters in the **Profile** field, then tap **Add**. See “*Basic*” on page 89 and “*Security*” on page 90 for more information.

Leave **Use Profile Name for SSID** checked for the SSID (or Network Name) to use this profile name. If this is cleared (check mark removed), the SSID will default to using the factory-assigned “INTERMEC” network name.



- **To add a profile:**  
Tap **Add**, enter up to 32 alphanumeric characters to name this profile if you have not already entered a description in the Profiles page, configure the basic and security information for this profile, then click **Done** to configure its basic and security information.
- Leave **Use Profile Name for SSID** checked for the SSID to use this assigned profile name. If this is cleared (check mark removed), the SSID will default to using the factory-assigned “INTERMEC” network name. Go to the next page to continue.

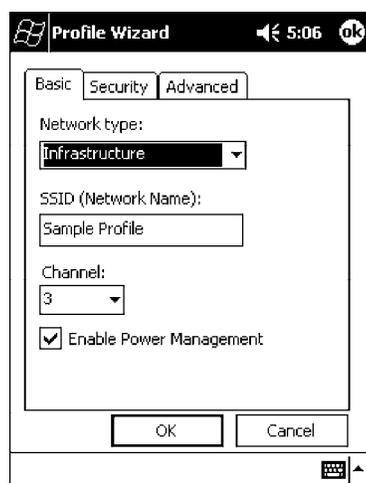


- **To edit a profile:**  
Select an existing profile from the **Profile** drop-down list, tap **Edit**, make the changes needed for this profile (starting in the next paragraph), then tap **OK** to return to the Profiles page.
- **To delete a profile:**  
Select a profile from the **Profile** drop-down list, tap **Delete**, then tap **Yes** to remove the selected profile.

## Basic

Use the Basic page to set the network type and radio channel for this profile. Click **OK** to return to the Profiles page.

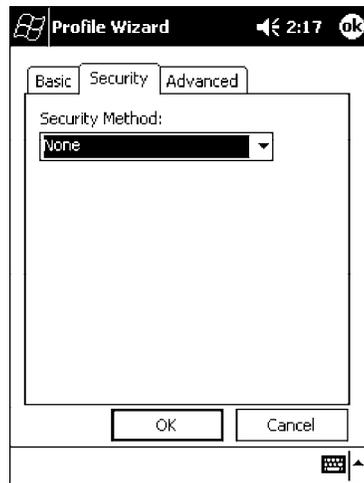
- **Network type:**  
Tap the drop-down list to select either Infrastructure or Ad-hoc.
- **SSID (Network Name):**  
This assumes the profile name when **Use Profile Name for SSID** is checked on the previous screen, *unless another name is entered in this field*. If you want to connect to the next available network or are not familiar with the network name, enter “ANY” in this field. Consult your LAN administrator for network names.
- **Channel:**  
If “Ad-hoc” were selected as the network type, then this is enabled. Tap the drop-down list to select a channel, from 1-15, through which to handle connections (*default is 3*).
- **Enable Power Management:**  
Check this box to conserve battery power (*default*), or clear this box to disable this feature.



## Security

Use the Security page to set this profile as read-only or to enable WEP (Wired Equivalent Privacy) encryption. Click **OK** to return to the Profiles page. The following securities are available from the **Security Method** drop-down list. *Note that the last three methods are available if you have purchased the security package. Contact your Intermec Representative for more information.*

- 802.11 WEP Encryption (*next page*)
- 802.1x TLS (*page 92*)
- 802.1x TTLS (*page 93*)
- LEAP (*page 93*)



**802.11 WEP Encryption:**

WEP keys are only needed if they are expected by your clients. There are two types available: 64-bit (5-character strings, 12345) (*default*) and 128-bit (13-character strings, 1234567890123). These can be entered as either ASCII (12345) or Hex (0x3132333435).

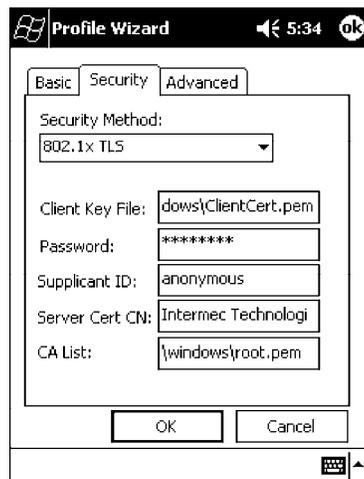
To enter WEP keys, select “802.11 WEP Encryption” from the **Security Method** drop-down list. Select a data transmission key from the **Data TX Key** drop-down list near the bottom of this screen, then enter the encryption key for that data transmission in the appropriate **Key #** field.

The screenshot shows the 'Profile Wizard' dialog box with the 'Security' tab selected. The 'Security Method' dropdown is set to '802.11 WEP Encryption'. Below this, there are four text input fields labeled 'Key 1:', 'Key 2:', 'Key 3:', and 'Key 4:'. At the bottom of the main area, the 'Data TX Key' dropdown is set to 'Key 1'. The dialog has 'OK' and 'Cancel' buttons at the bottom, and a '2:18' timer and 'ok' button in the top right corner.

**802.1x TLS** (*Transport Layer Security*):

TLS is a protocol that ensures privacy between communicating applications and their users on the Internet. To use this protocol, select “802.1x TLS” from the **Security Method** drop-down list, then enter the following:

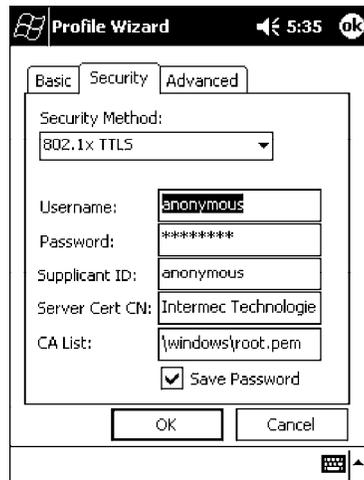
- **Client Key File:**  
Enter the file location where the certificate for your identity is stored.
- **Password:**  
Enter the password for the certificate in this field.
- **Supplicant ID:**  
Enter the user ID associated with this certificate.
- **Server Cert CN** (*Certificate Common Name*):  
Enter the common name of your authentication server.
- **CA List** (*Certificate Authority*):  
Enter the file location, or path, of the server certificates.



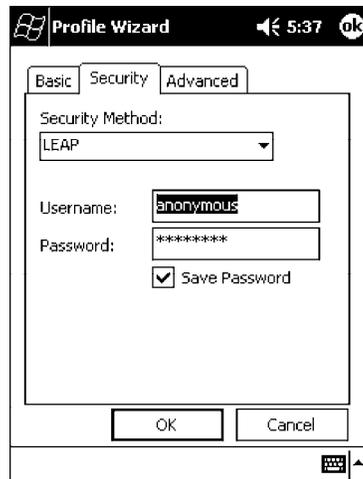
**802.1x TTLS (EAP-Tunneled TLS):**

To use this protocol, select “802.1x TTLS” from the Security Method drop-down list, then enter the following:

- **Username:**  
Enter your user name for this security protocol.
- **Password:**  
Enter your password for this security protocol.
- **Supplicant ID:**  
Enter “anonymous” unless your administrator indicates otherwise.
- **Server Cert CN (Certificate Common Name):**  
Enter the common name of your authentication server.
- **CA List:**  
Enter the file location, or path, of the server certificates.

**LEAP (Cisco Wireless EAP (Extensible Authentication Protocol)):**

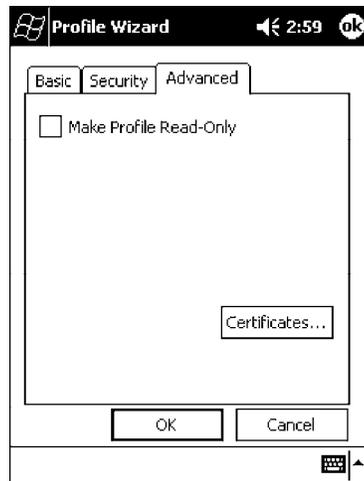
Enter your unique user name and password to use this protocol.



## Advanced

Use this page to secure the configuration for this profile or to make all fields read-only.

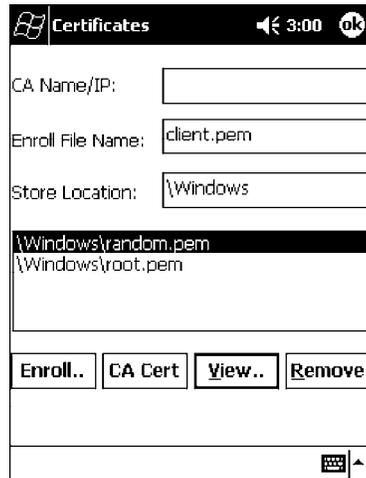
- **Make Profile Read-Only:**  
Check this box, then enter and reenter a password to “lock” or render “read-only” all configurations for this profile. To reverse this step, clear the check box, then enter the password assigned with the “read-only” status.
- **Certificates:**  
If “802.1x TLS,” “802.1x TTLS,” or “LEAP” were enabled via the **Security** tab, then this button will appear. Tap this button to configure the available certificates. See “*Certificates*” on the next page for more information.



## Certificates

Use this page to view, modify, or remove certificates assigned to your particular security method. *Note that you can also access this page by tapping **Start** → **certificates** from the **Today** screen.*

- **CA Name/IP:**  
Enter a valid CA name or IP address assigned to the certificate in question. This allows you to enroll the certificate or to browse for its latest information.
- **Enroll File Name:**  
Enter the file name of the certificate to be enrolled.
- **Store Location:**  
Enter the path where the certificate is to be stored within your 700 Series Computer.
- **Enroll:**  
Tap this to assign the file entered in **Enroll File Name** to the location specified in **Store Location**.
- **CA Vert:**  
Tap this to view the contents of the certificate via the Internet Explorer.
- **View:**  
Tap this to view information about the certificate, such as to whom this certificate was issued, who issued the certificate, and the span of time the certificate is valid.
- **Remove:**  
Select a file from the list, then tap this button to delete that file.

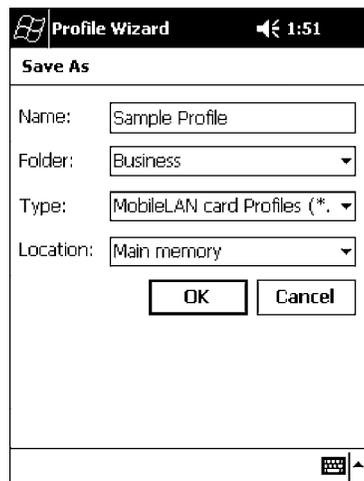


## Import/Export

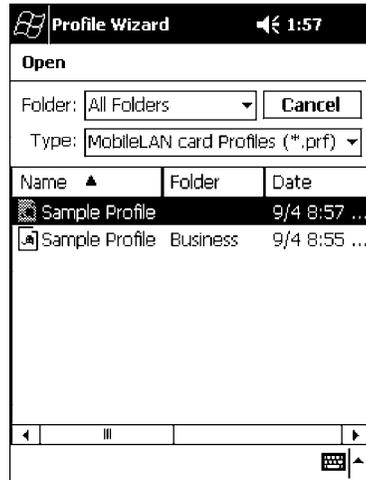
Use this page to send a profile or to retrieve a profile to or from another location within your 700 Series Computer.



- **To export a profile:**  
Select to highlight a profile, then tap **Export**. Select from the drop-down lists, the folder, type of files, and location within the folder where the profile is to go, tap **OK** to export the profile, tap **ok** to close the confirmation screen, then tap **OK** again to exit the Profile Wizard.



- **To import a profile:**  
Tap **Import** to access the Open screen, from the drop-down lists, select a folder and file type, then tap a profile from the list provided. Tap **ok** to close the confirmation screen, then tap **OK** again to exit the Profile Wizard.



### Scan List

Use this Scan List page to monitor network connections, and if lost, to attempt to reestablish connections with these networks.

### Selected Profile

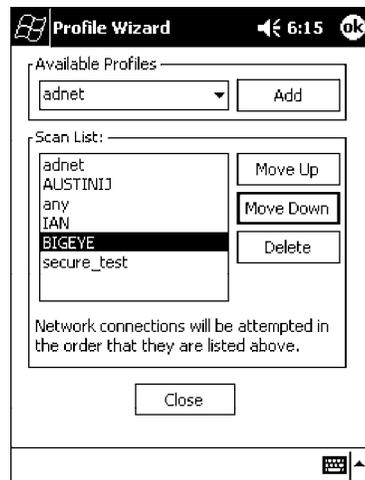
Select this option to use the profile defined in the Profiles page, then tap **OK** to exit the Profile Wizard. When connections are lost, attempts will be made to connect to the specified profile.



## Scan List

Use this option to select a number of profiles with which to establish connections. When connections are lost, attempts will be made to contact each of the profiles listed, in the order they appear in the list.

- 1 Tap this option, then tap **Edit Scan List**.
- 2 Select profiles from the **Available Profiles** drop-down list, then tap **Add** to include each selection in the Scan List.
- 3 To arrange the hierarchy of profiles, tap to select a profile, then tap either **Move Up** or **Move Down** to move each profile. To remove a profile from the list, tap to select that profile, then tap **Delete**.
- 4 Click either **ok** or **Close** to return to the Scan List page, then click **OK** to exit the Profile Wizard.



## Network Selection APIs

The Network Selection APIs allow the user to change network adapter configuration programmatically. Both drivers support the same IOCTL function numbers for loading and unloading the drivers.

Loading and unloading of the 802.11b driver is performed by the FWV1: device in the system by performing DeviceIOControl() calls to the driver.

Loading and unloading of the driver for the built-in Ethernet adapter is performed by the SYI1: device in the system by performing DeviceIOControl() calls to the driver.

- For loading an NDIS driver associated with an adapter, the IOCTL is IOCTL\_LOAD\_NDIS\_MINIPORT.
- For unloading NDIS drivers associated with an adapter the IOCTL is IOCTL\_UNLOAD\_NDIS\_MINIPORT.

```

#include <winioctl.h>
#include "sysio.h"
void DoLoad(int nDevice) {
    LPTSTR devs[] = { _T("SYI1:"), _T("FWV1:") };
    HANDLE hLoaderDev;
    DWORD bytesReturned;
    hLoaderDev = CreateFile(devs[nDevice], GENERIC_READ|GENERIC_WRITE, 0,
        NULL, OPEN_EXISTING, 0, NULL);
    if (hLoaderDev != INVALID_HANDLE_VALUE) {
        if (!DeviceIoControl(hLoaderDev, IOCTL_LOAD_NDIS_MINIPORT, NULL, -1, NULL, 0,
            &bytesReturned, NULL)){
            MessageBox(NULL, TEXT("SYSIO IoControl Failed"), TEXT("Network
                loader"), MB_ICONHAND);
            if (hLoaderDev!=INVALID_HANDLE_VALUE) CloseHandle(hLoaderDev);
            hLoaderDev = INVALID_HANDLE_VALUE; // bad handle
        }else {
            CloseHandle(hLoaderDev);
        }
    }
}

void DoUnload(int nDevice) {
    LPTSTR devs[] = { _T("SYI1:"), _T("FWV1:") };
    HANDLE hLoaderDev;
    DWORD bytesReturned;
    hLoaderDev = CreateFile(devs[nDevice], GENERIC_READ|GENERIC_WRITE, 0,
        NULL, OPEN_EXISTING, 0, NULL);
    if (hLoaderDev != INVALID_HANDLE_VALUE) {
        if (!DeviceIoControl(hLoaderDev, IOCTL_UNLOAD_NDIS_MINIPORT, NULL, -1, NULL, 0,
            &bytesReturned, NULL)){
            MessageBox(NULL, TEXT("SYSIO IoControl Failed"), TEXT("Network
                loader"), MB_ICONHAND);
            if (hLoaderDev!=INVALID_HANDLE_VALUE) CloseHandle(hLoaderDev);
            hLoaderDev = INVALID_HANDLE_VALUE; // bad handle
        }else {
            CloseHandle(hLoaderDev);
        }
    }
}
}

```

The API provided by Intermec Technologies exposes a limited set of routines that allows a programmer to access and affect the 802.11b network interface card from within their application. The routines provided will also read/write values to the CE registry that pertain to the 802.11b radio driver. By using the provided functions, a programmer can alter the 802.11b parameters of Network Name (SSID), WEP Keys, Infrastructure Modes, Radio Channel, and Power Management Modes. A programmer can also retrieve network connect status and signal strength indication from the RF network card.

The API is contained within the 80211API.DLL file that should be present in any load that has the 802.11b networking installed.

- **NETWLAN.DLL**  
This file is the 802.11b driver. It will be present in all 700 CE loads that use the 802.11b network interface card.
- **80211API.DLL**  
This file is an Intermec authored file that provides the programmer with a set of API calls to configure or monitor status of the 802.11b network.
- **MOD80211.DLL**  
The CORE module for the 802.11b NIC. It provides the 802.11b status information displayed when the CORE application is running.
- **80211CONF.EXE**  
This is the “Control Panel” for configuring the 802.11b network parameters. Note that it is an EXE file and is actually called by CPL802.CPL (see below). It is also called by the CORE application when the “Configuration” button is pressed.
- **CPL802.CPL**  
A control panel application that does nothing but call 80211CONF.EXE.
- **80211SCAN.EXE**  
Internally manages the Scan List activity.

The 80211API.DLL supports an unlimited number of radio configuration profiles. These profiles are the same as those set by the **Wireless Network** control panel applet that runs on the Windows CE unit. You can configure different 802.11b profiles and switch between them using the 802.11 API. See the `ConfigureProfile()` function on page 106 for more information.

## Function Summary

Below are functions available for the 700 Series Color Computer when enabled with the 802.11b radio module.

### RadioConnect()

Connects to the available radio. Use this function if you plan on using a lot of API calls that talk directly to the radio.

**Syntax:** `UINT RadioConnect( );`

**Parameters:** None.

**Returns:** `ERROR_SUCCESS` when successful, otherwise `ERR_CONNECT_FAILED`.

### RadioDisconnect()

Cleans up the connection from the `RadioConnect()` function after an application closes.

**Syntax:** `UINT RadioDisconnect( );`

**Parameters:** None.

**Returns:** `ERROR_SUCCESS` when successful, otherwise `ERR_CONNECT_FAILED`.

### GetMac()

Gets the radio MAC address.

**Syntax:** `UINT GetMac( TCHAR * );`

**Parameters:** Pointer to a character array, which is populated with MAC addresses.

**Returns:** `ERROR_SUCCESS` when successful, `ERR_QUERY_FAILED` when the query failed, or `ERR_CONNECT_FAILED` if a connection with the radio failed.

### GetBSSID()

Gets the associated access point name, the BSSID.

**Syntax:** `UINT GetBSSID( TCHAR * );`

**Parameters:** Pointer to a character array, which is populated with the current BSSID.

**Returns:** `ERROR_SUCCESS` when successful, `ERR_QUERY_FAILED` when the query failed, or `ERR_CONNECT_FAILED` if a connection with the radio failed.

### GetSSID()

Gets the current SSID (network name).

**Syntax:** `UINT GetSSID( TCHAR * );`

**Parameters:** Pointer to a character array, which is populated with the current SSID.

**Returns:** `ERROR_SUCCESS` when successful, `ERR_QUERY_FAILED` when the query failed, or `ERR_CONNECT_FAILED` if a connection with the radio failed.

### GetLinkSpeed()

Retrieves the current link speed of the radio connection.

**Syntax:** `UINT GetLinkSpeed( int & );`

**Parameters:**  References an integer.

**Returns:** ERROR\_SUCCESS when successful,  
ERR\_QUERY\_FAILED when the query failed, or  
ERR\_CONNECT\_FAILED if a connection with the radio failed.

### GetNetworkType()

Retrieves the network type.

**Syntax:** `UINT GetNetworkType( ULONG & );`

**Parameters:**  References a ULONG value, populated with one of the following:  
NDIS\_NET\_TYPE\_FH Frequency Hopping Radio  
NDIS\_NET\_TYPE\_DS Direct Sequence Radio  
NDIS\_NET\_TYPE\_UNDEFINED  
Unknown or information not available.

**Returns:** ERROR\_SUCCESS when successful,  
ERR\_QUERY\_FAILED when the query failed, or  
ERR\_CONNECT\_FAILED if a connection with the radio failed.

### GetTXPower()

Gets the current TX power of the radio in milliwatts.

**Syntax:** `UINT GetTXPower( ULONG & );`

**Parameters:**  References a ULONG value, populated with one of the following in milliwatts (mW):

NDIS_POWER_LEVEL_63	63 mW.
NDIS_POWER_LEVEL_30	30 mW.
NDIS_POWER_LEVEL_15	15 mW.
NDIS_POWER_LEVEL_5	5 mW.
NDIS_POWER_LEVEL_1	1 mW.
NDIS_POWER_LEVEL_UNKNOWN	

Unknown Value or Error.

**Returns:** ERROR\_SUCCESS when successful,  
ERR\_QUERY\_FAILED when the query failed, or  
ERR\_CONNECT\_FAILED if a connection with the radio failed.

**GetNetworkMode()**

Retrieves the network mode.

**Syntax:** `UINT GetNetworkMode( ULONG & );`

**Parameters:** *☞* References a ULONG value, populated with one of the following:

<code>NDIS_NET_MODE_IBSS</code>	802.11 Ad-Hoc Mode.
<code>NDIS_NET_MODE_ESS</code>	802.11 Infrastructure Mode.
<code>NDIS_NET_MODE_UNKNOWN</code>	Unknown Value or Error.
<code>NDIS_NET_AUTO_UNKNOWN</code>	Automatic Selection. <i>Use of this option is not recommended.</i>

**Returns:** `ERROR_SUCCESS` when successful,  
`ERR_QUERY_FAILED` when the query failed, or  
`ERR_CONNECT_FAILED` if a connection with the radio failed.

**SetNetworkMode()**

Sets the radio and updates the CE registry.

**Syntax:** `UINT SetNetworkMode( ULONG & );`

**Parameters:** *☞* References a ULONG value, populated with one of the values defined in `GetNetworkMode()`.

**Returns:** `ERROR_SUCCESS` when successful,  
`ERR_QUERY_FAILED` when the query failed, or  
`ERR_CONNECT_FAILED` if a connection with the radio failed.

**AddWep()**

Adds a WEP key to the radio configuration.

**Syntax:** `UINT AddWep( ULONG 1, BOOL 2, TCHAR * 3 );`

**Parameters:** *ULONG* Pointer that identifies what key to be set.  
*BOOL* Specifies whether the key being set is the default TX key.  
*TCHAR* Pointer that specifies the key data either in hex (string lengths of 10 or 26) or ASCII (string lengths of 5 or 13).

**Returns:** `ERROR_SUCCESS` when successful,  
`ERR_QUERY_FAILED` when the query failed, or  
`ERR_CONNECT_FAILED` if a connection with the radio failed.

**GetRSSI()**

Sets the current RSSI (Received Signal Strength Indication).

**Syntax:** `UINT GetRSSI( ULONG & );`

**Parameters:** *☞* References a ULONG value.

**Returns:** `ERROR_SUCCESS` when successful,  
`ERR_QUERY_FAILED` when the query failed, or  
`ERR_CONNECT_FAILED` if a connection with the radio failed.

### GetAssociationStatus()

Gets the current connection, or association status.

**Syntax:** `UINT GetAssociationStatus( ULONG & );`

**Parameters:**  References a ULONG value, a current connection status as follows:  
NDIS\_RADIO\_ASSOCIATED Radio is associated w/access point.  
NDIS\_RADIO\_SCANNING Radio is scanning for network.

**Returns:** ERROR\_SUCCESS when successful,  
ERR\_QUERY\_FAILED when the query failed, or  
ERR\_CONNECT\_FAILED if a connection with the radio failed.

### GetWepStatus()

Gets the current WEP status.

**Syntax:** `UINT GetWepStatus( ULONG & );`

**Parameters:**  References a ULONG status value which include the following:  
NDIS\_RADIO\_WEP\_ENABLED WEP is currently enabled.  
NDIS\_RADIO\_WEP\_DISABLED WEP is currently disabled.  
NDIS\_RADIO\_WEP\_ABSENT WEP key is absent.  
NDIS\_RADIO\_WEP\_NOT\_SUPPORTED  
WEP is not supported.

**Returns:** ERROR\_SUCCESS when successful,  
ERR\_QUERY\_FAILED when the query failed, or  
ERR\_CONNECT\_FAILED if a connection with the radio failed.

### GetAuthenticationMode()

Gets the current authentication mode.

**Syntax:** `UINT GetAuthenticationMode( ULONG & );`

**Parameters:**  References a ULONG value which include the following current authentication mode:  
NDIS\_RADIO\_AUTH\_MODE\_OPEN Open System is in use.  
NDIS\_RADIO\_AUTH\_MODE\_SHARED Shared Key is in use.  
NDIS\_RADIO\_AUTH\_MODE\_AUTO Automatic Detection.  
NDIS\_RADIO\_AUTH\_MODE\_ERROR Unknown value/Error.

**Returns:** ERROR\_SUCCESS when successful,  
ERR\_QUERY\_FAILED when the query failed, or  
ERR\_CONNECT\_FAILED if a connection with the radio failed.

### SetAuthenticationMode()

Sets the radio authentication mode with a value defined in the GetAuthenticationMode() function.

**Syntax:** `UINT SetAuthenticationMode( ULONG );`

**Parameters:** Passes in a ULONG set to one of the values as defined in GetAuthenticationMode().

**Returns:** ERROR\_SUCCESS when successful,  
ERR\_QUERY\_FAILED when the query failed, or  
ERR\_CONNECT\_FAILED if a connection with the radio failed.

**SetChannel()**

Sets the radio channel, ranging from 1 to 14.

**Syntax:** `UINT SetChannel( USHORT );`

**Parameters:** USHORT set to a desired channel (1-14).

**Returns:** ERROR\_SUCCESS when successful,  
ERR\_QUERY\_FAILED when the query failed, or  
ERR\_CONNECT\_FAILED if a connection with the radio failed.

**EnableWep()**

Enables or disables WEP encryption.

**Syntax:** `UINT EnableWep( BOOL );`

**Parameters:** Set to TRUE (0) to enable WEP encryption or FALSE (1) to disabled WEP encryption.

**Returns:** ERROR\_SUCCESS when successful,  
ERR\_QUERY\_FAILED when the query failed, or  
ERR\_CONNECT\_FAILED if a connection with the radio failed.

**GetPowerMode()**

Gets the current power management mode of the radio.

**Syntax:** `UINT GetPowerMode( ULONG & );`

**Parameters:**  References a ULONG value which include the following current radio power management mode:

**NDIS\_RADIO\_POWER\_MODE\_CAM**

Continuous Access Mode (*uses most power*).

**NDIS\_RADIO\_POWER\_MODE\_MAX**

Maximum Power Savings.

**NDIS\_RADIO\_POWER\_MODE\_PSP**

Power Saving Mode, best balance of power and performance.

**NDIS\_RADIO\_POWER\_UNKNOWN**

Unknown mode reported or error.

**Returns:** ERROR\_SUCCESS when successful,  
ERR\_QUERY\_FAILED when the query failed, or  
ERR\_CONNECT\_FAILED if a connection with the radio failed.

**SetSSID()**

Passes the desired SSID (network name).

**Syntax:** `UINT SetSSID( TCHAR * );`

**Parameters:** Pointer to a character array that contains the desired SSID.

**Returns:** ERROR\_SUCCESS when successful,  
ERR\_QUERY\_FAILED when the query failed, or  
ERR\_CONNECT\_FAILED if a connection with the radio failed.

### **isOrinoco()**

Confirms whether the present radio is an ORiNOCO radio.

**Syntax:** `UINT isOrinoco( );`

**Parameters:** None.

**Returns:** TRUE when an ORiNOCO radio.  
FALSE when other than an ORiNOCO radio.

### **EncryptWepKeyForRegistry()**

Encrypts a key for registry storage. Requires TCHAR pointers for a destination and a source.

**Syntax:** `UINT EncryptWepKeyForRegistry( TCHAR * szDest, TCHAR * szSource );`

**Parameters:** *szDest* String for the destination.  
*szSource* String for the source.

**Returns:** ERROR\_SUCCESS when successful,  
ERR\_QUERY\_FAILED when the query failed, or  
ERR\_CONNECT\_FAILED if a connection with the radio failed.

### **SetRTSThreshold()**

Sets the radio RTS (Request To Send) threshold.

**Syntax:** `UINT SetRTSThreshold( USHORT & );`

**Parameters:**  References a USHORT value.

**Returns:** None.

### **GetRTSThreshold()**

Gets the radio RTS threshold.

**Syntax:** `UINT GetRTSThreshold( USHORT & );`

**Parameters:**  References a USHORT value.

**Returns:** None.

### **ConfigureProfile()**

If using the Intermec 802.11b Profile Management system, you can program the API to configure the radio to a specific profile by passing the profile name.

**Syntax:** `UINT ConfigureProfile( TCHAR * );`

**Parameters:** Pointer to a string that contains the name of the profile to be activated.

**Returns:** None.

### StartScanList()

If a scan list is configured, this will start the API looking for a network on that scan list and configuring the radio appropriately. This call can take a long time to process.

**Syntax:** UINT **StartScanList**( );

**Parameters:** None.

**Returns:** None.

### 802.11b Radio CORE Module

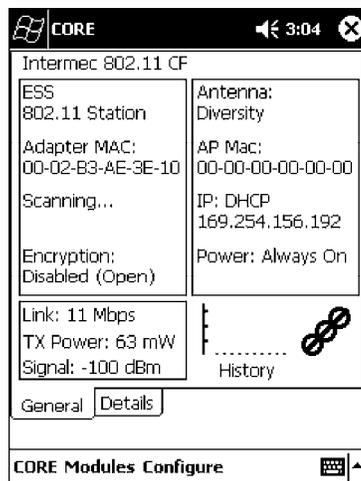
The 802.11b radio CORE module displays helpful information about the 802.11b radio option built into your 700 Series Computer.

Note that you can configure the 802.11b radio module from this CORE application. Select **Configure** → **Configure 802.11 CF** from the bottom menu bar to access the Profile Wizard application. Information about this application starts on page 87.

Select **Modules** → **Intermec 802.11 CF Help** for more information on the contents of this CORE module.

### General

Below are descriptions and meanings for each piece of information provided via the **General** tab, reading from top to bottom starting on the left.



- **ESS 802.11 Station:**  
This identifies the type of network to which you are attached, either an ESS (Embedded Security Subsystem) Station, or Ad-hoc.
- **Adapter MAC:**  
This identifies the MAC address for this 802.11b adapter.
- **Scanning:**  
Status of association. When connected to a network, this changes to “Connected to NET” with NET being the name of the network to which you are connected.

- **Encryption:**  
This indicates whether WEP encryption is “Enabled” or “Disabled (Open).” See page 90 for more information.
- **Link:**  
This indicates the speed at which a connection is made.
- **TX Power:**  
This shows the speed (in milliwatts) at which transmissions are made.
- **Signal:**  
This identifies the radio signal strength (in dBm).
- **Antenna:**  
This identifies the antenna being used with the assigned profile.
- **AP Mac:**  
This identifies the MAC address of the access point to which this 700 Series Computer is connected.
- **IP:**  
This provides the IP address which can be set as either DHCP (Dynamic Host Configuration Protocol) or statically.
- **Power:**  
This indicates the power status of this 700 Series Computer: “Always On” is the default.
- **History:**  
This bar graph displays an active history of this radio module’s quality of connections.
- **Friendly Indicator:**  
If the radio stack is loaded, then all three dots are filled. These dots are left empty if the stack is not loaded. These dots do vary based on the CORE application’s perception of the overall connection quality.



## Details

Below are descriptions and meanings for each piece of information provided via the **Details** tab, reading from top to bottom.



- **Attach-Roam Cnt:**  
This includes the number of new associations made during the current session, including any found roaming.
- **Scanlist:**  
This indicates whether the Scan List option was enabled or disabled. See page 97 for more information.
- **Watchdog Status:**  
This monitors the activity of the Scan List: “Running” or “Stopped.”
- **Supplicant:**  
This monitors the 802.1x security activity on the client: “Running” or “Stopped.”

## WWAN Radio Options

The 700 Series Computer can integrate either the GSM/GPRS or the CDMA/1xRTT radio along with the 802.11b radio and the Wireless Printing option. The WWAN radio option accommodates any Wireless WAN requirements, such as taking the 700 Series Computer off the premises in a delivery vehicle to cover a much larger area.

### GSM/GPRS

The GSM (Global System for Mobile communications) and GPRS (General Packet Radio Service) wireless infrastructure increases voice capacity, enables personalized “user-aware” services, and creates networking efficiencies to help wireless service providers drive reduced operating costs.

- **GSM** is an open, nonproprietary system. One of its great strengths is the international roaming capability. This provides seamless and same-standardized same-number contactability world-wide. GSM satellite roaming has extended service access to areas with unavailable terrestrial coverage.
- **GPRS** is the high-speed data evolution of GSM. GPRS supports Internet Protocol (IP), enabling access to Internet and intranet content and applications from GPRS wireless devices. The anticipated data rate for GPRS is 115 Kbps and throughput rates of 30-60 Kbps have been achieved initially. This high speed capability enables vehicle applications to become real-time and to use the Internet for access to corporate data or information in the form of traffic or navigation.

### CDMA/1xRTT SB555

Code Division Multiple Access (CDMA) is a form of “spread-spectrum,” a family of digital communication techniques used in military applications for years. The core principle of spread-spectrum is the use of noise-like carrier waves, and, as the name implies, bandwidths much wider than that required for simple point-to-point communication at the same data rate.

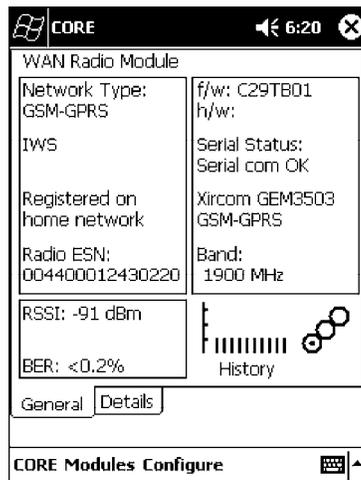
- **1XRTT**, the first phase of CDMA2000, is designed to support up to 144 KB per second packet data transmission and to double the voice capacity of current generation CDMA networks.
- **SB555 Embedded Module**, from Sierra Wireless, provides complete wireless functionality and integrates easily into the most compact and slender mobile applications with its small flexible design. The SB555 offers maximum coverage and access to entire CDMA networks.

## WAN Radio CORE Module

The WAN radio CORE module displays helpful information about either the GSM/GPRS radio or the CDMA/1xRTT radio option built into your 700 Series Computer. *The following illustrations are for a GSM/GPRS GEM350X radio.*

### General

Below are descriptions and meanings for each piece of information provided via the **General** tab, reading from top to bottom starting on the left. *The information applies to both the GSM/GPRS and the CDMA/1xRTT radio modules unless otherwise indicated.*



- **Network Type:**  
This is the network type which would list either “GSM-GPRS” or “CDMA-1XRTT.” *Scatternets are not supported.*
- **IWS (GSM/GPRS) or Sprint PCS Network (CDMA/1xRTT):**  
This lists the name of the wireless network provider, such as T-Mobile, Voicestream, AT&T Wireless, etc. “IWS” is short for the Iowa Wireless Service carrier.
- **Registered on home network:**  
If the WAN radio module has registered with a service provider network, then one of the following will appear:
  - *Registered on home network:*  
The radio module is registered on its “home” network.
  - *Registered on roamed network:*  
The radio module is registered on another service provider’s network.
  - *Radio Not Registered:*  
There is no network within range of this radio module.
- **Radio ESN:**  
This displays the Electronic Serial Number (ESN) assigned to this radio module or lists “Unavailable” if a number cannot be read from the radio.

- **RSSI:**  
This displays the Received Signal Strength Indicator (RSSI) frequency or lists “Unavailable” if there is no signal or the signal cannot be retrieved from the radio module.
- **BER (*GSM/GPRS GEM 350X, CDMA/1xRTT*):**  
This shows the Bit Error Rate (BER), the percentage of bits with errors divided by the total number of bits transmitted, received, or processed over a given period of time.
- **f/w:**  
This identifies the firmware version, if available.
- **h/w:**  
This identifies the hardware version, if available.
- **Serial Status:**  
This indicates whether serial communications passed (“Serial com OK”) or failed (“Serial com FAIL”) in its last transaction. A status of “Serial com FAIL” typically indicates that the 700 Series Computer is unable to establish communication with the radio module installed within.
- **Xircom GEM3503 (*GSM/GPRS*), Siemens MC45 (*GSM/GPRS*), or Sierra Wireless SB555 (*CDMA/1xRTT*):**  
This identifies the product name for this radio module.
- **Band (*GSM/GPRS*) or Channel (*CDMA/1xRTT*):**  
This identifies the bandwidth or channel available for this radio module, if any.
- **History:**  
This bar graph displays an active history of this radio module’s quality of connections.
- **Friendly Indicator:**  
Usually indicates the signal strength for this radio module. Three filled dots indicate a high quality or strong signal. Three empty dots indicate that the signal is out of range or there is no signal detected.



## Details

Below are descriptions and meanings for each piece of information provided via the **Details** tab, reading from top to bottom. Most of this is similar to what is shown under the **General** tab. *The information applies to both the GSM/GPRS and the CDMA/1xRTT radio modules unless otherwise indicated.*



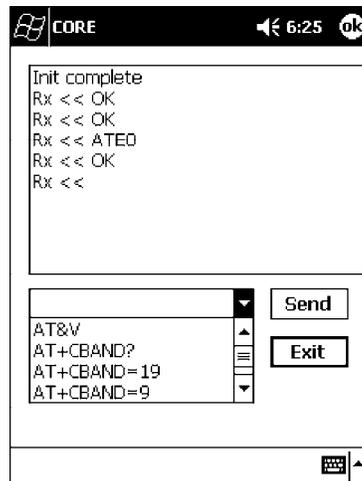
- Serial Status:**  
 This indicates whether serial communications passed (“PASS”) or failed (“FAIL”) in its last transaction. A status of “FAIL” typically indicates that the 700 Series Computer is unable to establish communication with the radio module installed within.
- Manufacturer:**  
 This lists the name of the manufacturer that developed this radio module, such as “Xircom, an Intel Corporation,” “Siemens,” or “Sierra Wireless.”
- Model:**  
 This identifies the product name for this radio module, such as “SB555,” “GEM350X,” or “MC45.”
- IMEI # (GSM/GPRS):**  
 This is the IMEI (International Mobile station Equipment Identity) serial number of the GSM/GPRS radio module.
- RSSI:**  
 This displays the RSSI frequency or lists “Unavailable” if there is no signal or the signal cannot be retrieved from the radio module.
- Operator:**  
 This lists the name of the service providing the network support.
- SIM Status (GSM/GPRS MC45):**  
 Identifies whether a Subscriber Identity Module (SIM) card is installed in this 700 Series Computer.

- **Band (CDMA/1xRTT):**  
This identifies the frequency bands used by this radio module.
- **IMSI # (GSM/GPRS):**  
This shows the IMSI (International Mobile Subscriber Identity) number assigned to the SIM card installed in this 700 Series Computer.
- **Radio Temp (CDMA/1xRTT):**  
This identifies the temperature of the radio module, or lists “Unavailable degrees” if there is no information or the temperature cannot be measured.
- **Firmware Rev:**  
This identifies the firmware version, if available.
- **Firmware Date (GSM/GPRS):**  
This provides the last date when this firmware was updated, if available.

### Terminal Application

Tap **Terminal App** from the **Details** page to send standard AT commands. Information about these AT commands are available under “*AT Command Interface*” on page 115.

Select an AT command from the drop-down list, then tap **Send**. The results of each test appears in the text box. Tap **Exit** or **ok** to close this screen and return to the **Details** page.





**Note:** You will need the Adobe Acrobat Reader application to view a PDF document. Go to “<http://www.adobe.com/prodindex/acrobat/readstep.html>” to install or download the latest Adobe Acrobat Reader according to Adobe’s instructions.

### **Command Set for Sierra Wireless SB555**

Use the AT command interface from Sierra Wireless to program the CDMA/1xRTT SB555 radio module. Documentation for this interface is available via the following URL. Click the “General AT command reference” link for a PDF document, which is 680 KB in size. *Note that this URL is subject to change.*

[http://www.sierrawireless.com/ProductsOrdering/embedded\\_docs.html](http://www.sierrawireless.com/ProductsOrdering/embedded_docs.html)

### **Command Set for Xircom/Intel GEM350X**

Use the GEM350X AT command list from Intel Corporation to program the GPRS/GSM GEM350X radio module. The “*GEM350X Programmer’s Reference*” is available either from Intermec Technologies or from Intel Corporation. Contact either your Intermec representative or the Intel Corporation support personnel at the following URL for more information. *Note that this URL is subject to change.*

<http://support.intel.com/sites/support/index.htm?iid=intelhome1+support&>

### **Command Set for Siemens MC45**

Use the MC45 AT command interface from Siemens AG to program the GPRS/GSM MC45 radio module. The “*MC45 Siemens Cellular Engine AT Command Set*” is available either from Intermec Technologies or from Siemens AG. Contact either your Intermec representative or the Siemens AG support personnel at the following URL for more information. *Note that this URL is subject to change.*

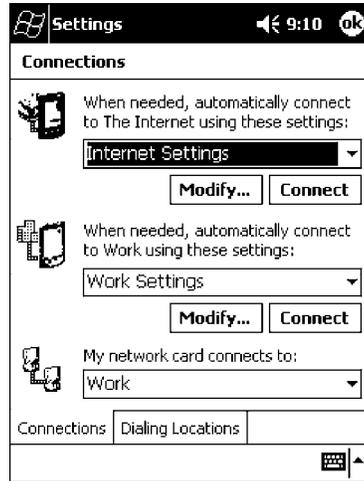
[http://www.siemens-mobile.com/btob/CDA/presentation/ap\\_btob\\_cda\\_presentation\\_fromtdoor/0,2950,12,FF.html](http://www.siemens-mobile.com/btob/CDA/presentation/ap_btob_cda_presentation_fromtdoor/0,2950,12,FF.html)

### Testing the AT Commands

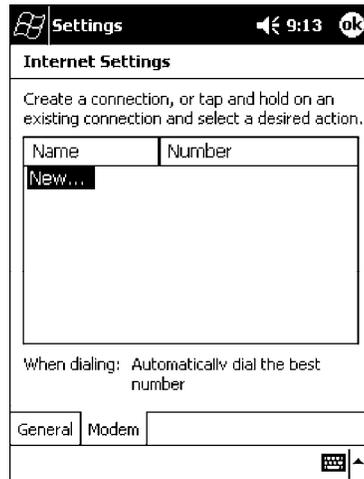
These commands can be sent to either WAN radio by setting up a dial-up networking connection to COM4. Do the following to initiate this connection and test these commands to your radio:



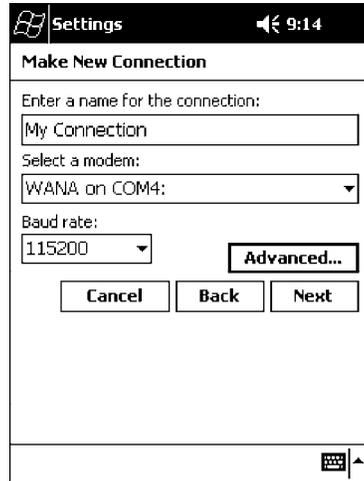
- 1 From the 700 Series Computer, select **Start** → **Settings** → the **Connections** tab → the **Connections** icon.
- 2 Tap **Modify** beneath the **Internet Settings** drop-down list.



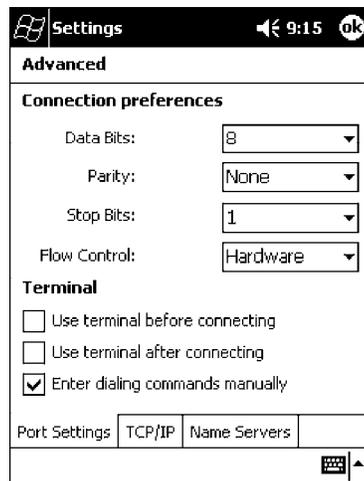
- 3 Tap **New..** to make a new connection.



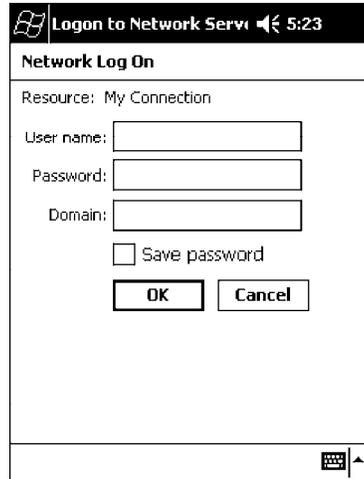
- 4 Enter a name for the connection, select “WAN on COM4” from the **Select a modem** drop-down list, and select “115200” from the **Baud rate** drop-down list. Tap **Advanced** to continue.



- 5 On the **Port Settings** tab, check **Enter dialing commands manually**, then tap **ok**, **Next**, then **Finish** to return to the Internet Settings screen with your new connection.



- 6 Press and hold the new connection for a pop-up menu, then tap **Connect** to initiate the connection. Wait for about ten seconds for the Network Log On screen, then tap **OK**. *Note: You do not need to enter any information within the Network Log On screen.*



- 7 Use either the onscreen keyboard, or press the keys to type any of the AT commands provided by Sierra Wireless. Press or tap **Enter** to send each command. The results of each command sent will print onscreen - see the sample illustration below. *Note that each “AT” command must start with either the “at” or “at+” characters.*
- To see what you typed onscreen, type “ate1” to initiate the AT Echo command, then press **Enter**.

## Wireless Printing

The 700 Series Computer can integrate the Wireless Printing option (*which is equipped with a Bluetooth qualified module by Socket Communications*) along with either the GSM/GPRS or the CDMA/1xRTT radio and the 802.11b radio. This option uses the network to print information stored on the 700 Series Computer.

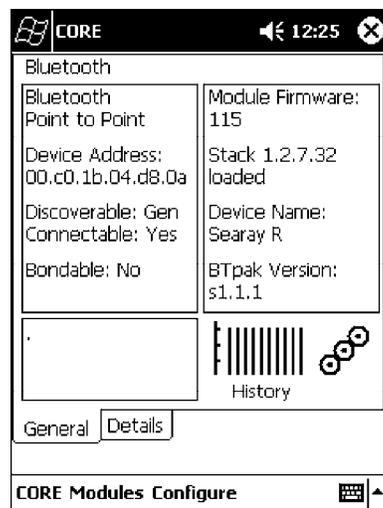
“Bluetooth” is the name given to a technology standard using short-range radio links, intended to replace the cables connecting portable and fixed electronic devices. The standard defines a uniform structure for a wide range of devices to communicate with each other, with minimal user effort. Its key features are robustness, low complexity, low power, and low cost. The technology also offers wireless access to LANs, the mobile phone network, and the internet for a host of home appliances and portable hand-held interfaces.

### Documentation

Information about additional “Bluetooth” software, including the Bluetooth Device Manager and the BTctrl program, can be found within the Wireless Printing SDK. This is located on the 700C Software Tools CD, via the directory off the root of the toolkit called “*Wireless Printing SDK*.” It also can be found in the *Wireless Printing Development Guide*, also on the 700C Tools CD.

### Bluealps CORE Module

The Bluealps CORE module displays helpful information about this Wireless Printing option within your 700 Series Computer. Below are descriptions and meanings for each piece of information provided via the **General** tab, reading from top to bottom starting on the left.



- **Bluetooth Point to Point:**  
This is the network type. “Point to Point” is the type of connection supported as of this publication. *Scatternets are not supported.* The only supported application is wireless printing to Intermec wireless printers, such as the 781T Belt-Mount Printer.
- **Device Address:**  
This provides the network address, which in this case, will be replaced by the device address of the Bluetooth compatible module within your 700 Series Computer. *Note that this address is universally unique.*
- **Discoverable:**  
The following is displayed depending on whether the 700 Series Computer is configured to be discoverable:
  - “Gen” Generally discoverable
  - “Lim” Limited discovery
  - “No” Not discoverable
- **Connectable:**  
This defines whether the 700 Series Computer is able to accept other devices with Bluetooth compatible modules connecting to it. “Yes” if the connection is doable, “No” if not.
- **Bondable:**  
This defines the security element of the 700 Series Computer, which is the bondable setting. If the unit is bondable, then “Yes” is displayed, otherwise “No” is displayed.
- **Module Firmware:**  
This reflects the firmware (hardware) version of the 700 Series Computer. When the CORE module first installs onto the unit, the firmware level is unknown, thus “...reading” is displayed. Once the firmware level is read from the unit, then a three-digit decimal is displayed.
- **Stack [Stack Version] [loaded/not loaded]:**  
*[Stack Version]* displays the Bluetooth stack version, which appears in the “1.2.3.4” format. If the stack is loaded, then “loaded” is displayed after the stack version, otherwise “not loaded” is displayed.
- **Device Name:**  
This displays the device name as assigned to the Bluetooth compatible module by the end-user. If the configured name is longer than the space allowed, it will be truncated.
- **BTpak Version:**  
This displays the driver version of additional Bluetooth components within the 700 Series Computer and is usually presented in the “1.2.3” format. The version may also contain a letter at either end.
- **History:**  
This bar graph displays an active history of this wireless printer driver’s quality of connections.
- **Friendly Indicator:**  
If the Bluetooth stack is loaded, then all three dots are filled. These dots are left empty if the stack is not loaded. These dots do vary based on the CORE application’s perception of the overall connection quality.



## AutoIP/DHCP

Automatic Private IP Addressing (AutoIP) is enabled by default in Pocket PC 2002. To remain compatible with other Pocket PC devices, this setting needs to be enabled. You can configure the registry settings in the following to set the required AutoIP/DHCP behavior:

- For Ethernet: HKEY\_LOCAL\_MACHINE\Comm\LAN9001\TcpIp
- For 802.11b: HKEY\_LOCAL\_MACHINE\Comm\NETWLAN1\TcpIp

Other registry keys that can modify the behavior of AutoIP are as follows. You can find the appropriate settings and behavior of each of these keys in Microsoft Help.

- AutoInterval
- AutoMask
- AutoSubnet
- AutoIP
- AutoSeed

When a TCP/IP client cannot find a DHCP server, it generates an AutoIP address from the 169.254.xxx.xxx block. The client then tries to check for a DHCP server every 300 seconds (5 minutes) and if a DHCP server is found, the client drops the AutoIP address and uses the address from the DHCP server.

In the MSDN Windows CE documentation, see “*Automatic Client Configuration*” for more information on AutoIP.

To disable AutoIP, set the AutoCfg registry entry to “0.” If a DHCP server cannot be found, instead of using AutoIP, the system will display the “Unable to obtain a server assigned IP address” message.



**Note:** If AutoIP is defined using CAB files, the EnableDHCP registry key must also be defined and set to “1” before the system will attempt to obtain a DHCP address.

To extend the number of attempts that a DHCP client makes to get a DHCP address, use the DhcpRetryDialogue and DhcpMaxRetry registry settings.

Change the AutoInterval registry key value to make the client retry more often to obtain a DHCP address.

## SNMP Configuration

Simple Network Management Protocol (SNMP) was developed in the late 1980s to provide a general-purpose internetworking management protocol. Its primary goal was to be simple so nothing would stand in the way of its ubiquitous deployment. To this end, it has been very successful as it is currently deployed in almost every major internetworking product on the market. However, like many achieved goals, the primary strength can also become a weakness.

### The Focus was “Simple”

An extreme example of simplicity versus power can be realized by comparing SNMP against the Common Management Information Protocol (CMIP), the ISO entry to the standard management protocol world. CMIP has a very rich set of primitives and a core set of data elements. However, to implement CMIP, a subset of the protocol must be selected. Then, to achieve interoperability, this subset must be agreed upon with other implementors. As SNMP was specified completely and with no options, one implemented what was there and interoperability was assured. Returning to simplicity, SNMP was built simply for a number of reasons other than time to market: robustness in the face of network failure, low overhead in the devices running the protocol; and ease of debugging the protocol itself (*the last thing you want to debug is the management protocol that is supposed to be helping you debug your network*). Thus, the SNMP limited itself to the User Datagram Protocol (UDP). This gave the implementor the ability and responsibility to manage lost packets and perform any necessary retransmissions. As network debugging in the face of changing routes will certainly mean losing packets, retaining this control from the transport service (*layer 4*) was considered essential. Since a network management protocol will run continuously, it is mandatory that it consume as minimal a network resource as possible. UDP allows the necessary control over packet transmissions, packet size and content (*packetization*). It is a natural choice.

### Using SNMP

SNMP has three control primitives that initiate data flow from the requester (*get, get-next, and set*). There are two control primitives the responder uses to reply. One is used in response to the requester's direct query (*get-response*) and the other is an asynchronous response to obtain the requester's attention (*trap*). All five of these primitives are carried by UDP and are thus limited in size by the amount of data that can fit into a single UDP packet. The relatively small message size was a goal of the design but for some reasonable set of network management functions, it imposes a limitation.

Often in network management, it is necessary to obtain bulk information without knowing at first what is in that bulk. In one case, there is a set of problems having to do with packets not going where they are supposed to, due to device misconfiguration that prevents proper protocol operation where one needs to view the entire set of data.

## Retrieval of Management Information

SNMP has the get-next primitive which permits the viewing of data without requiring prior knowledge. If you know what you are looking for, the get primitive will return it. When you want an entire table of information, the get-next primitive will obtain it. However, unless employed with care, the get-next primitive can be extremely resource-intensive in real time, network bandwidth, and the agent's CPU time. The simplest use of the get-next primitive is to start at the beginning of a table, await the response and then issue another get-next with the name returned. As an example, say you wanted the next-hop address, next-hop interface, and route-type from a routing table containing 1000 entries. Using the simplest form of get-next, this would require  $2 \times 3 \times 1000$  or 6000 packets (*get-next and get-response packets, columns, and rows*). A straight-forward optimization would be to request the three columns in a single packet. This puts the number of packets at  $2 \times 1000$  or 2000 packets. In real time, it is the product of the round trip by the number of request. In agent CPU time, this is still 6000 lookups in the routing table for both cases.

## An Early Approach to Getting More than One Item at a Time

The ability to retrieve only one piece or object at a time has been a problem for SNMP. This is particularly an issue with the use of this protocol in wireless environments where the wireless datapipe is small and overhead due to network management it is considered overhead. One approach creates multiple get-next requests running concurrently. A second algorithm, reduces the packet count by combining the multiple concurrent get-nests into a single packet. Neither approach has been implemented which makes network management in wireless environment, though essential to the success of the operation, tenuous. The issue has been resolved in SNMP V2 protocol where a get-bulk primitive has been defined.

## Conclusion

Software development moves forward by evolving the unknown into the known and wireless environments are moving from vertical only application to wide spread implementation. At the time of the SNMP inception, it was not possible to conceive of a reliable transport based network management protocol. Today's problems require more sophisticated data to analyze a problem. This puts the burden back on the protocol to send and receive data quickly and efficiently. Work continues in subcommittees to improve SNMP and resolve the issues that are developing with new applications and new network architectures.

## SNMP Configuration on the 700 Series Computer

In short, SNMP is an application-layer protocol that facilitates the exchange of management information between network devices. The 700 Series Computer is such an SNMP-enabled device. Use SNMP to control and configure the 700 Series Computer anywhere on an SNMP-enabled network.

The 700 Series Computer supports four proprietary Management Information Bases (MIBs) and Intermec Technologies provides SNMP support for MIB-II through seven read-only MIB-II (RFC1213-MIB) Object Identifiers (OIDs).



**Note:** You can only query these seven OIDs through an SNMP management station, these are not available in the Unit Manager applications.

### Management Information Base

The Management Information Base is a database that contains information about the elements to be managed. The information identifies the management element and specifies its type and access mode (Read-Only, Read-Write). MIBs are written in ASN.1 (Abstract Syntax Notation.1) - a machine independent data definition language. *Note: Elements to be managed are represented by objects. The MIB is a structured collection of such objects.*

You will find the following MIB files either on the 700C Tools CD or on the web via <http://www.intermec.com>:

- **INTERMEC.MIB**  
Defines the root of the Intermec MIB tree.
- **ITCADC.MIB**  
Defines objects for Automated Data Collection (ADC), such as bar code symbologies.
- **ITCSNMP.MIB**  
Defines objects for Intermec SNMP parameters and security methods, such as an SNMP security IP address.
- **ITCTERMINAL.MIB**  
Defines objects for 700 Series parameters, such as key clicks.

## Object Identifiers

Each object has a unique identifier called an OID. OIDs consist of a sequence of integer values represented in dot notation. Objects are stored in a tree structure. OIDs are assigned based on the position of the object in the tree. Seven MIB OIDs are shown in the following table.

### Example

The internet OID = 1.3.6.1.

### MIB Object Identifiers

MIB-II Item	OID	Group or Table	Description
ifNumber	1.3.6.1.2.1.2.1.0	Interfaces Group	Indicates the number of adapters present in the system. For the 700 Series Computer, if one adapter is present in the system, then <i>ifNumber</i> = 1 and <i>ifIndex</i> = 1.
ifIndex	1.3.6.1.2.1.2.2.1.1.ifIndex	Interfaces Table (ifTable)	A unique value for each interface. The value ranges between 1 and the value of <i>ifNumber</i> .
ifDescr	1.3.6.1.2.1.2.2.1.2.ifIndex	Interfaces Table (ifTable)	A textual string containing information about the interface.
ifType	1.3.6.1.2.1.2.2.1.3.ifIndex	Interfaces Table (ifTable)	An integer containing information about the type of the interface. It is equal to 1 for Other.
ipAdEntAddr	1.3.6.1.2.1.4.20.1.1.IpAddress	IP address Table (ipAddrTable)	The IP address to which this entry's addressing information pertains ( <i>same as 700 IP address</i> ), where IP Address is the valid non-zero IP address of the 700 Series Computer.
ipAdEntIfIndex	1.3.6.1.2.1.4.20.1.2.IpAddress	IP address Table (ipAddrTable)	The index value that uniquely identifies the interface to which this entry is applicable ( <i>same as ifIndex</i> ).
ipAdEntNetMask	1.3.6.1.2.1.4.20.1.3.IpAddress	IP address Table (ipAddrTable)	The subnet mask associated with the IP address of this entry ( <i>same as Subnet Mask</i> ).

## Configuring with SNMP

The community string allows an SNMP manager to manage the 700 Series Computer with a specified privilege level. The default read-only community string is “public” and “private” is the default read/write community string. See the specific configuration parameter to find its OID. To configure the 700 Series Computers using SNMP:

- 1 Configure 700 Series Computers for RF or Ethernet communications.
- 2 Determine the OID (Object Identifier) for the parameter to be changed. The Intermec base OID is 1.3.6.1.4.1.1963.
- 3 Use your SNMP management station to get and set variables that are defined in the Intermec MIBs. You can set the traps, identification, or security configuration parameters for SNMP. See *Appendix A, “Control Panel Applets,”* to learn more about these parameters.