Intermec

Installation Instructions

EasyLAN Wireless Interface Kit

(for EasyCoder PF2i, PF4i, PF4i Compact Industrial, and PM4i)

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Contents

Introduction

This Installation Instructions booklet describes how to install an EasyLAN Wireless network interface in an EasyCoder PF2i, PF4i, PF4i Compact Industrial, or PM4i printer and how to connect it to a LAN, WAN, Intranet, or Internet network via a wireless connection.

The installation instructions describes how to physically install the interface board in a printer and how to set up the IP address, netmask, default router, and name server. The instructions end when you have the printer's home page up and running. From there, please refer to the Intermec EasyLAN User's Guide on the attached CD-ROM.

This interface kit must only be physically installed by an authorized service technician. The device is country/region specific and must be ordered for the correct country/region. Use of this device in other region than shown on the device home page/test label may violate applicable law.

Printer Firmware

The printer must either be fitted with Intermec Fingerprint v8.10 (or later) or IPL v2.10 (or later). In Intermec Fingerprint, the network port is addressed as device "net1:" (communication channel #5).

Installation Kit

The EasyLAN Interface Kit contains:

- One EasyLAN adapter board complete with radio module fitted
- Rear plate (for EasyCoder PF2/4i-series printers only)
- RJ-45 plug (for EasyCoder PM4i only)
- One light guide
- One hexagonal threaded spacer
- One antenna extension cable
- One antenna
- One cable clip
- One cable tie
- One CD-ROM with software and manuals
- This Installation Instruction booklet

The only tools required for the installation are #T10 and #T20 Torx screwdrivers and a small wrench.

Important 802MIG2 Information

For Users in the United States and Canada

This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that can cause undesired operation.

Federal Communications Commission Compliance

This equipment is intended for operation in a commercial environment, in compliance with the requirements for a Class B digital device, pursuant to Part 15 of the FCC Rules, and it must not be used in a residential environment. It generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instruction manual, it may cause interference to radio communications. If this equipment causes interference, the user will be required to correct the interference at the user's own expense.

Operation Warning: The user shall stay at least 20 cm (8 in) away from the antenna of this device, when the device is in use in access points and other hosts, where higher gain antennas may be used.

Installation Warning: To comply with the FCC's RF exposure requirements and minimize health hazards:

Host devices with higher gain antennas such as access points must be installed in such a way that the user will be at least 20 cm (8 in) away from the antenna, when the device is in use.

The installers should not forget that the burden of maintaining this distance is on the installer and not the user. the antennas should be installed in a manner that will comply with this requirement.

Changes or modifications not expressly approved by Intermec could void the user's authority to operate this equipment.

Note: To maintain compliance with FCC Rules, the input/output (I/O) cables that interconnect between the device and any peripheral must be as specified by Intermec.

Industry Canada Compliance

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

This device requires a radio license, unless it is used totally inside a building. (The user must obtain this license.)

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Cet appareil exige une license radio à moins d'être entièrement installé dans un bâtiment. (L'utilisateur doit obtenir cette license.)

For Users Outside of the United States and Canada

The Intermec product you purchased contains a Mode 802MIG2 transceiver module. This module transmits and receives data using a 2.4 GHz Direct Sequence Spread Spectrum system.

Please check the Intermec Web site for additional documentation at www.intermec.com.

Hereby, Intermec Technologies Corporation declares that this Model 802MIG2 is in compliance with the essential requirements and other relevant provisions of R&TTE Directive (1995/5/EC). This product has been assessed to the following standards:

- ETSI EN 300 328-2 v1.2.1 (2001-12)
- ETSI EN 301 489-17 v1.1.1 (2001-09)
- EN 60950:1992 (incl. Amdt. 1-4,11)

The original Declaration of Conformity is available on the Intermec Technologies Corporation Web site at www.intermec.com.

This product transmits electromagnetic waves at 2.4 GHz frequency range. It has been tested and found compliant with U.S. (OET Guide 65) and Canadian (RSS 102) RF exposure regulations. There are no regulations covering this product type in the European Union at this time.

The transmitter module's output power is 11.6 mW. The product using this module are intended for business and industrial environments. They should not be used in residential environments and by children.

CE 0981 ⓘ This product is marked with this logo and uses radio frequency bands that are not harmonized throughout the European Union.

The following table indicates the areas of intended use of the equipment and any known restrictions.

Country of Intended Use	Yes	No	License Required	Restrictions	Details
Austria	X				
Belgium	X				
Denmark	X				
Finland	X				
France	X			X	2454 to 2483 MHz bands must not be used outdoors on this device.
Germany	X				
Greece	X				
Ireland	X				
Italy	X				
Luxembourg	X				
The Netherlands	X				
Portugal	X				
Spain	X				
Sweden	X				
United Kingdom	X				
Other non-EU:					
Iceland	X				
Liectenstein	X				
Norway	X				
Slovenia	X				
Switzerland	X				

Additional EMI/RFI Compliance

This device meets the Class B limit requirements of CISPR 22.

Pour les utilisateurs en dehors du Canada et des Etat-unis

Le produit Intermec que vous avez acheté contient un module émetteur-récepteur de modèle 802MIG2. Ce module peut transmettre et recevoir des données à l'aide d'un système d'étalement du spectre en séquence directe de 2,4 GHz.

Pour obtenir toute documentation upplémentaire, veuillez consulter le site Web d'Intermec, à l'adresse www.intermec.com.

Par la présente, Intermec Technologies Corporation déclare que ce modèle 802MIG2 est conforme aux exigences de base et autres exigences pertinentes de la Directive R&TTE (1999/5/EC). Ce produit a été évalué par rapport aux normes suivantes :

- ETSI EN 300 328-2 v1.2.1 (2001-12)
- ETSI EN 301 489-17 v1.1.1 (2001-09)
- EN 60950:1992 (comprenant l'amendement 1-4, 11)

La Déclaration de conformité originale est disponible sur le site Web d'Intermec Technologies Corporation, à l'adresse www.intermec.com.

Ce produit émet des ondes électromagnétiques à une plage de fréquences de 2,4 GHz. Il a été évalué et reconnu conforme aux règlements concernant l'exposition à la radiofréquence des États-Unis (OET Guide 65) et du Canada (RSS 102). Il n'y a actuellement aucun règlement couvrant ce type de produit pour l'Union européenne.

La puissance de sortie du module émetteur-récepteur est de 11.6mW. Les produits utilisant ce module sont destinés à des environnements commerciaux et industriels. Ils ne doivent pas être utilisés dans des environnements résidentiels et par des enfants.

CE 0981 ⓘ Ce produit est marqué de ce logo et il utilise des bandes de fréquence radio qui ne sont pas harmonisées sur le territoire de la Communauté européenne.

Le tableau suivant répertorie les zones d'utilisation prévues pour l'équipement et les restrictions connues.

Pays d'utilisation prévu	Oui	Non	License Requise	Restrictions	Détails
France	X			X	Lorsque ce produit est utilisé à l'extérieur, il est alors limité à une valeur variant entre les parties 2400 et 2454 MHz.

Conformité additionelle à la norme EMI/RFI

Cet appareil respecte les limites imposées pour la Classe B par le CISPR 22.

Für Benutzer außerhalb von Kanada und den Vereinigten Staaten

Das Intermec-Produkt, das Sie gekauft haben, enthält ein Sende-Empfangs-Modul, Modell 802MIG2. Dieses Modul sendet und empfängt Daten mit Hilfe eines 2,4-GHz-Direktsequenz-Spreizspektrumsystems.

Dieses Produkt übermittelt elektromagnetische Wellen in einem Frequenzbereich von 2,4 GHz. Es wurde getestet und in Übereinstimmung mit U.S. (OET Anleitung 65) und kanadischen (RSS 102) RF-Bestrahlungsvorschriften befunden. Zur Zeit gibt es in der EU keine Richtlinien, die diesen Produkttyp abdecken.

Weitere Hinweise erhalten Sie auf der Intermec-Website unter www.intermec.com.

Hiermit erklärt Intermec Technologies Corporation, dass das Modell 802MIG2 mit den wesentlichen Anforderungen und anderen sachdienlichen Vorschriften der R&TTE-Richtlinie (1999/5/EC) übereinstimmt. Dieses Produkt wurde gemäß der folgenden Normen bewertet:

- ETSI EN 300 328-2 v1.2.1 (2001-12)
- ETSI EN 301 489-17 v1.1.1 (2001-09)
- EN 60950:1992 (einschl. Amdt. 1-4, 11)

Die Originalkonformitätserklärung steht auf der Website der Intermec Technologies Corporation unter www.intermec.com zur Verfügung.

Die Ausgangsleistung des Sende-Empfangs-Moduls beträgt 11.6mW. Die Produkte, die dieses Modul verwenden, sind für geschäftliche und industrielle Umgebungen gedacht. Sie sollten nicht in Wohngegenden und in der Nähe von Kindern verwendet werden.

CE 0981 ⓘ Das Produkt ist mit diesem Markenzeichen versehen und verwendet Radiofrequenzbreiten, die in der Europäischen Gemeinschaft nicht überall aufeinander abgestimmt sind.

Zusätzliche Elektromagnetische Störung-Übereinstimmung

Dieses Gerät entspricht den Grenzbestimmungen der Klasse B von CISPR 22.

Per gli utenti al di fuori del Canada o degli Stati Uniti

Il prodotto Intermec che avete acquistato contiene un modulo transceiver Modello 802MIG2. Il transceiver trasmette e riceve i dati tramite un sistema a 2,4 GHz che utilizza la tecnologia DSSS (sequenza diretta, spettro esteso).

Per altre informazioni, consultate il sito Web Intermec all'indirizzo www.intermec.com.

Con la presente Intermec Technologies Corporation dichiara che questo Modello 802MIG2 è conforme ai requisiti essenziali e alle altre clausole importanti della direttiva R&TTE (1999/5/EC).

Questo prodotto è stato valutato in base ai seguenti standard:

- ETSI EN 300 328-2 v1.2.1 (2001-12)
- ETSI EN 301 489-17 v1.1.1 (2001-09)
- EN 60950:1992 (incluso Amdt. 1-4, 11)

La dichiarazione di conformità originale è disponibile presso il sito Web di Intermec Technologies Corporation a www.intermec.com.

Questo prodotto trasmette onde elettromagnetiche con una frequenza intorno ai 2,4 GHz. Dai collaudi ai quali è stato sottoposto è risultato conforme alle norme statunitensi (OET Guide 65) e a quelle canadesi (RSS 102) relative all'esposizione alle radiofrequenze. Attualmente non esistono norme relative a questo prodotto nell'Unione Europea.

La potenza di uscita del modulo trasmittente è di 11.6mW. I prodotti che utilizzano questo modulo sono destinati ad ambienti industriali e commerciali e non debbono essere utilizzati in ambienti residenziali e dai bambini.

CE 0981 ⓘ Questo prodotto reca questo marchio ed utilizza bande di radiofrequnza che non sono armonizzate nell'ambito della Comunità Europea.

Ulteriore conformità con EMI/RFI

Questo dispositivo è conforme ai limiti stabiliti in CISPR 22 per la Classe B.

Para Usuarios Fuera de Canada o de los Estados Unidos

Este producto de Intermec contiene un módulo transceptor Modelo 802MIG2. Dicho módulo transmite y recibe datos por medio de un sistema de espectro ensanchado en secuencia directa de 2,4 GHz.

Para obtener documentación adicional, visite el sitio web de Intermec: www.intermec.com.

Por la presente, Intermec Technologies Corporation declara que el Modelo 802MIG2 cumple con los requisitos esenciales de acuerdo con la directiva (1999/5/EC) de R&TTE. Este producto ha sido evaluado de acuerdo con los siguientes estándares o normas:

- ETSI EN 300 328-2 v1.2.1 (2001-12)
- ETSI EN 301 489-17 v1.1.1 (2001-09)
- EN 60950:1992 (incl. Enmienda 1-4, 11)

La Declaración de Conformidad original está disponible en el sitio web de Intermec Technologies Corporation: www.intermec.com.

Este producto transmite ondas electromagnéticas de radio en la gama de frecuencias de 2,4 GHz. Ha sido probado y se ha determinado que cumple con las reglamentaciones de los EE.UU. (OET Guide 65) y del Canadá (RSS 102), referentes a la exposición de RF. En este momento, no existen reglamentaciones que abarquen este producto en la UE.

La potencia de salida del módulo transmisor es de 11.6mW. Los productos que usan este módulo están destinados para uso en ambientes comerciales e industriales. No deben ser usados en ambientes residenciales o en la proximidad de niños.

CE 0981 ⓘ Este producto está marcado con este logotipo y usa bandas de frecuencia de radio que no han sido armonizadas a lo largo de la Unión Europea.

Conformidad adicional con EMI/RFI

Este dispositivo cumple con los límites requeridos para la Clase B de CISPR 22.

Para Usuários Fora do Canadá ou dos Estados Unidos

O produto Intermec que você comprou contém um módulo transceptor Modelo 802MIG2. Este módulo transmite e recebe dados usando um sistema DSSS (Espectro de Difusão de Sequência Direta) de 2,4 GHz.

Consulte também o site da Intermec na web, no endereço www.intermec.com, para documentação complementar.

Por este documento, a Intermec Technologies Corporation declara que o Modelo 802MIG2 atende aos requisitos essenciais e outras condições relevantes da Diretiva R&TTE (1999/5/EC). Esse produto foi avaliado em relação aos seguintes padrões:

- ETSI EN 300 328-2 v1.2.1 (2001-12)
- ETSI EN 301 489-17 v1.1.1 (2001-09)
- EN 60950:1992 (incluída Amdt. 1-4, 11)

A Declaração de Conformidade original está disponível no site da web da Intermec Technologies Corporation no endereço www.intermec.com.

Este produto transmite ondas eletromagnéticas na faixa de freqüência de 2,4 GHz. Ele foi testado e aprovado quanto à sua conformidade com os regulamentos de exposição à RF dos EUA (OET Guide 65) e do Canadá (RSS 102). Não existem regulamentos cobrindo esse tipo de produto atualmente na UE.

A potência de saída do módulo transmissor é de 11.6mW. Os produtos que usam este módulo são destinados aos ambientes comerciais e industriais. Eles não devem ser utilizados em ambientes residenciais e por crianças.

CE 0981 ⓘ Este produto é identificado por esta logomarca e utiliza bandas de freqüência de rádio que não estão harmonizadas na Comunidade Européia.

Conformidades EMI/RFI Adicionais

Este produto atende aos requisitos de limite Classe B do CISPR 22.

1 Physical Installation

This chapter describes how to physically install the EasyLAN interface kit in a PF2/4i- or PM4i-series printer.

The installation described in this chapter must only be performed by an authorized service technician. Intermec assumes no responsibility for personal injury or damage to the equipment if the installation in performed by an unauthorized person.

Take precautions against electrostatic discharges, for example by wearing grounded bracelets.

Note: When the EasyLAN Wireless interface is factory-installed in a printer, the antenna is packed separately in the box and must be fitted to its connector on the printer's rear plate as illustrated at the end of this chapter.

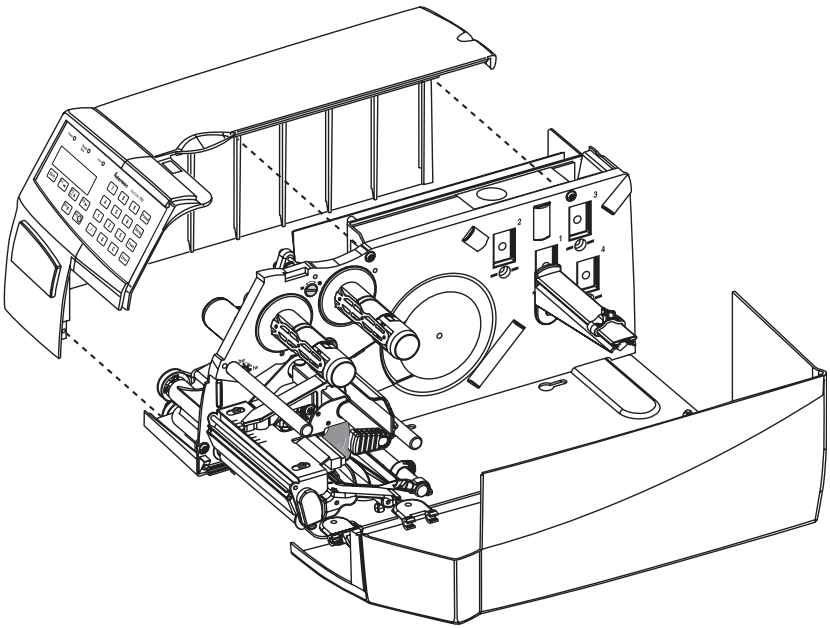
- Switch off the printer and disconnect the power cord.
- Disconnect all communication cables.
- Remove the front/left-hand cover as follows.

Warning

The electronic compartment contains wires and components with dangerous voltage (up to 380V). Make sure that the printer is switched off and the power cord is disconnected before the left-hand cover is removed.

EasyCoder PF2/4i printers

- Open the right-hand door.
- Using a #T20 Torx screwdriver, remove the three screws and lift the cover up so it disengages the bottom plate.

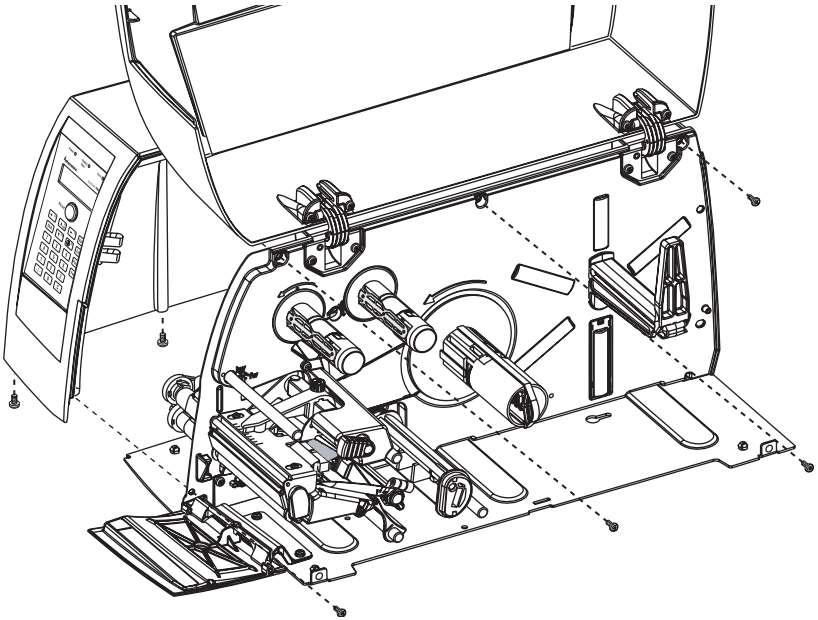


- Swing out the rear part of the cover so you can disconnect the console cable from the CPU board.
- Put the cover aside on a soft cloth or similar to avoid scratches.

- Remove any optional interface board or blind cover plate fitted on the rear plate.
- Remove any present EasyLAN Ethernet interface installed in the printer including cables etc.
- Remove the present rear plate like this:
  - Loosen but do not remove the two #T20 Torx screws that hold the rear plate and the #T20 Torx screw that holds the rear bottom corner of the CPU board.
  - Carefully manipulate the rear plate out of the groove in the chassis. Allow the CPU board to flex a little to be able to get the connectors out of their slots.
- Install the rear plate included in the kit in reverse order and tighten all three screws.
- Reinstall any optional interface board or blind cover plate previously removed.
- Continued on page 5.

EasyCoder PM4i printers

- Using a #T20 Torx screwdriver, loosen the four screws that holds the cover along the lower left edge of the bottom plate.
- Remove the four screws that hold the cover to the center section.
- Pull out the cover so you can disconnect the console cable from the CPU board.
- Put the cover aside on a soft cloth or similar to avoid scratches.

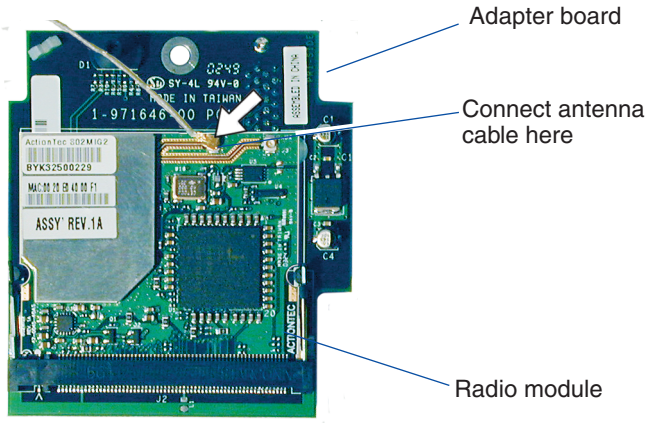


- Remove any present EasyLAN Ethernet interface including cables etc. Fit the RJ-45 plug included in the kit into the square hole left by the RJ-45 Ethernet connector.

- Remove the antenna plug, which is snap-locked into the rear plate.

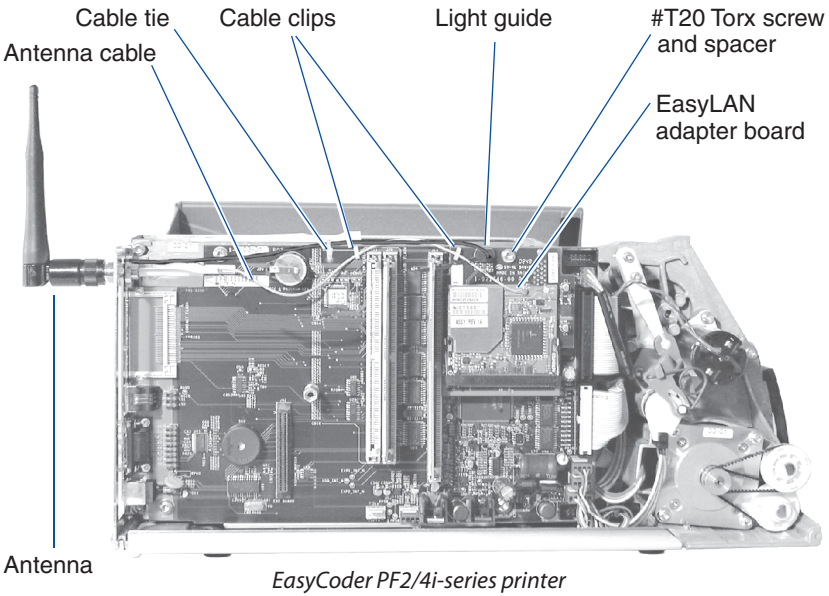
All Models

- Connect the antenna cable to the radio module, which is factory-fitted on the EasyLAN adapter board, as illustrated below. Support the upper edge of the radio module with a finger while connecting the cable.

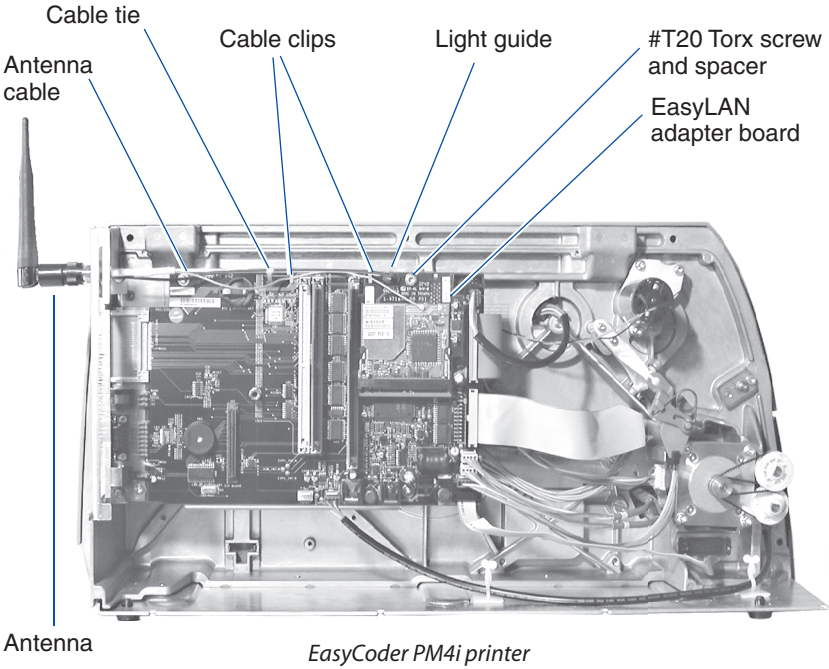


- Remove the #T20 Torx screw that holds the upper/front part of the CPU board to the power supply unit and replace it with the hexagonal spacer included in the kit. Keep the screw.
- Connect the EasyLAN adapter board to the PCI connector (J84) on the CPU board so the hole in the board becomes aligned with the spacer and secure the board with the #T20 Torx screw.
- Route the antenna cable over the SIMMs on the CPU board towards the rear plate and secure it using the cable clips included in the kit. One clip is factory-fitted on the EasyLAN adapter board and the other should be fitted in the small hole at the top of the CPU board immediately to the rear of the memory SIMM sockets.
- From the inside of the electronics compartment, insert the antenna connector through the round hole in the rear plate and lock it with the washer and nut on the outside.
- Fit the antenna to the connector of the antenna cable and bend the hinge so the antenna points straight up.

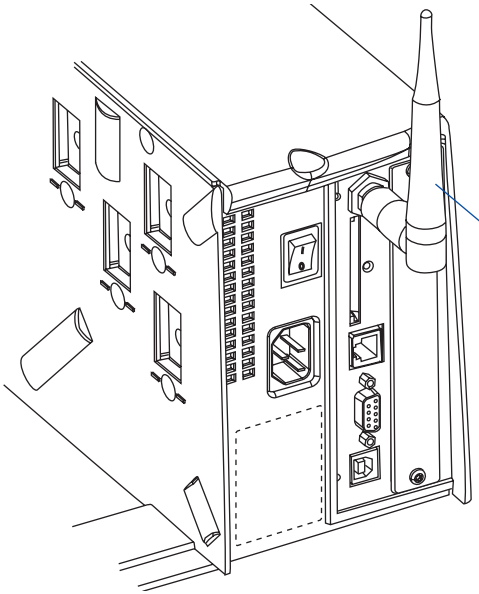
- From the outside, insert the thin end of the light guide through the small hole next to the antenna on the rear plate. Press the clear plastic "lamp" in place. Connect the other end to the black plastic socket (D1) at the top of the EasyLAN adapter board. Secure it with the cable tie through the hole at the upper edge of the CPU board.
- Put back the front/left-hand cover. Route the cable from the display unit above the ribbon motor. Connect the cable to connector J50 at the upper front corner of the CPU board.
- Connect the power cord and switch on the power.
- Enter the Setup Mode and print the test label "Hardware Info" in Fingerprint or "HW" in IPL to see if the printer detects the EasyLAN Wireless interface board. For information on how to enter the Setup Mode and print test labels, refer to the User's Guide for the printer in question.
- Set up the network parameters. There are several methods:
  - Connect the printer and a PC and run the EasyLAN Network Setup wizard, which can be found on the attched CD-ROM. Requires a PC running Windows 98 or later.
  - Insert a CompactFlash Card containing a configuration file in the printer and start it up. Configuration Compact Flash cards can be created using the EasyLAN Network Setup wizard on the attached CD-ROM.
  - Fingerprint:
    Establish an RS-232 communication with the printer and set it up using Fingerprint setup strings or setup files. IP address, netmask, default router, and name server can also be set using the printer's built-in keyboard. See Chapter 3. Only requirement on the PC side is a terminal program that can transmit and receive ASCII characters on an RS-232 line.
  - IPL:
    Establish an RS-232 communication with the printer and set it up using IPL commands. Only requirement on the PC side is a terminal program that can transmit and receive ASCII characters on an RS-232 line. Select the method of obtaining IP address, netmask, default router, and name server automatically from the server using the printer's built-in keyboard. This requires a server that supports DHCP and/or BOOTP. See Chapter 4.



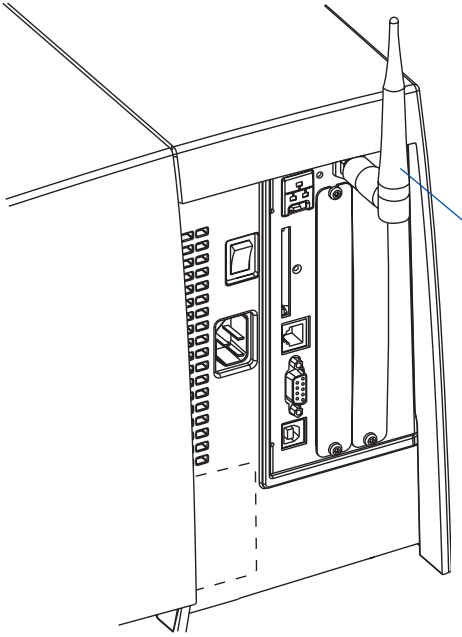
EasyCoder PF2/4i-series printer



EasyCoder PM4i printer



EasyCoder PF2/4i-series printer, rear view



EasyCoder PM4i printer, rear view

2 Setup (General)

This chapter explains how to connect the printer to a PC via the printer's serial communication port.

It also gives a brief introduction to the Intermec EasyLAN Network Setup wizard, which provides screen that guides the user step-by-step through the setup procedure.

It also gives useful information on default user and password.

Establish Serial Communication

To set up wireless communication, you need to establish a serial communication with a PC using a cable. This applies both to set up using the EasyLAN Network Setup wizard and to set up using Fingerprint or IPL commands.

- Connect a common RS-232 cable between a serial port, for example COM1, on the PC and the RS-232 port on the printer.
- Start a terminal program, for example Microsoft Hyper Terminal.
- Set up the printer and the terminal for the communication parameters and type of handshake.
- Press the <i> key on the printer's keyboard to check that the printer uses either auto or an RS-232 serial channel as I/O channel.
- Check that the communication is working.

Also refer to the printer's *User's Guide* and the *Intermec Fingerprint v8.xx, Programmer's Reference Manual* or the *IPL Programmming v2.10, Reference Manual*.

EasyLAN Network Setup wizard

This is a convenient and free PC-based tool for setting up the printer for wireless as well as wired network communication. Both the wizard and its User's Guide is included on the CD-ROM in the EasyLAN Wireless Interface Kit.

User and Password

By default, the user is **`admin`** and the password is **`pass`**. Initially, this user and password gives unrestricted access to all setup parameters, except Region. Changing the Region requires a special password, which only as distributed to authorized personnel.

Use of the EasyLAN Wireless network interface with an incorrect REGION setting may be in violation of applicable laws.

3 Setup in Fingerprint

This chapter explains how to set up the wireless network communication in printers running Intermec Fingerprint v8.10 (or later). The only requirement on the PC side is a terminal program that can transmit and receive ASCII characters on an RS-232 line. Thus, this method is recommended when you do not have the opportunity to run the Intermec EasyLAN Network Setup wizard, for example because you use some other operating system than Windows.

For information on how to set up the network communication in printer's running IPL, refer to Chapter 4.

Setting Up Wireless Communication

General

Once a wired serial communication is established, you can use Fingerprint setup strings or setup files to set up the necessary EasyLAN wireless parameters. All settings are saved in files on the printer flash memory. If a factory defaulting upgrade is performed, all settings described in this section are set to their (factory) default values.

The default allowed user is "**admin**". All settings are restricted to read-only for all users except the allowed user, who can change all settings. If unauthorized access is attempted, error 1076 (Operation not permitted) will occur. Settings beginning with a period "." character are read-protected from non-authorized users. Some settings are not possible to read even by the allowed user, for instance WEP keys, which return the same string regardless of the actual key.

Display Current User

To display who the current user is in Fingerprint, the "whoami" command is used.

Syntax:

RUN"whoami"

Note: This command is case-sensitive.

The command echoes the current user to the standard out channel.

Example:

```
RUN"whoami"
user

Ok
```

Changing User

To change the current user in Fingerprint, the “su”-command is used.

Syntax:

RUN"su [-p <password>] <user>"

su requests the password for <user>, and switches to that user after checking the password file.

Valid <user> names are **admin** and **user**.

Everyone can become user even if user’s password is set.

No password is requested if the current user already is the one to switch to.

The option is as follows:

-p password	Don’t query for a password; use the one supplied at the command line.

Note: Everything is case sensitive (user name, su command, passwords).

Examples:

To become “admin”.

```
RUN"su admin"
Password:[enter password (default: pass)]

Ok
```

Or:

```
RUN"su -p pass admin": RUN"whoami"
admin
```

To switch back to user:

```
RUN"su user"
```

Changing Passwords

To change the password for a user in Fingerprint, the “passwd”-command is used.

Syntax:

RUN"passwd [<user>]"

passwd changes the user’s password. First, the user is prompted for the current password (if it exists). If the current password is correctly typed, a new password is requested. The new password must be entered twice to avoid typing errors. The new password s total length must be less than 128 characters. Numbers, upper-case letters and metacharacters are encouraged. Valid user names are **admin** and **user**.

You can also use this command:

RUN"passwd <user> '<oldpasswd>' '<newpasswd>' '<newpasswd>'

Examples:

To change password for the current user (user, without password):

```
RUN"passwd"
Changing local password for user.
New password:[enter new password]
Retype new password:[enter new password]
```

To change password for ’admin’:

```
RUN"passwd admin"
Changing local password for admin.
Old password:[enter current password]
New password:[enter new password]
Retype new password:[enter new password]
```

Note: You do not have to change to the user whose password is changed.

Active

While setting up the printer’s network settings, it is preferable that the changes do not take effect until all the changes have been made. All settings are saved to non-volatile memory immediately after the command has been given, but they are not committed to the NIC/driver until these “current” settings have been “activated.”

A reboot will cause the current settings to be used. The alternative to rebooting the printer is the "ACTIVE" setting. Setting this to anything other than a "0" will cause the current settings to be activated. Reading the ACTIVE setting will indicate whether the current settings are being used or not. 0 indicates that the current settings are not active (changes have been made since startup or last non-zero setting of ACTIVE). 1 indicates that the settings are being used. ACTIVE cannot be set to 0 explicitly (but is implicitly set to 0 by changing another setting). Any changes made on the web page(s) will be activated when the user submits the form (given that the settings are correctly entered).

In Fingerprint, there is presently only one section with an "ACTIVE" setting, "wlan" (regarding wireless LAN settings). An ACTIVE setting is only valid for the setup section in which it belongs.

`SETUP "wlan","ACTIVE","1"` activates the current settings in the "wlan" section (forcing a re-association).

SETUP GET/WRITE for "ACTIVE" will get 1 if the current settings are in use, 0 if a setting has been changed.

SSID

The SSID (Service Set Identifier) is 0-32 characters used to differentiate wireless LANs that overlap in frequency and physical coverage area. An empty SSID string signifies that the printer will associate with any network. By default SSID is “INTERMEC”.

Non-alphanumeric octets are entered by “%HH” (a percent sign and two hexadecimal digits (0-9, a-f, A-F) representing the value of the character). Example: “12%2034” is equivalent to “12 34”. The percent sign is represented by “%25”. The SSID is possible to change by allowed users and on the printer’s web page.

```
SETUP "wlan","SSID","qwerty"
```

Sets SSID to “qwerty”.

SETUP GET/WRITE report the SSID.

The SSID is shown on the network test label and on the printer’s home page.

WEP

WEP (Wired Equivalent Privacy) uses a secret (40 or 104 bits long) together with a 24-bit “IV” (Initialization Vector) to form a key used to encrypt the data sent over radio.

The printer can have up to 4 WEP 64 and/or WEP 128 keys. There is a key selection setting for selecting which key that will be used when transmitting. Its value is 0-4 (0 signifying that WEP is disabled; 1-4 selecting one of the configured keys). It is possible to select an un-configured key (this disables WEP). By default, WEP is disabled, and no keys are configured.

WEP keys are entered either in a hexadecimal notation or in an alphanumerical notation. A string starting with “0x” (a zero followed by a lower-case x) followed by 10 or 26 characters is interpreted as a WEP key in hex-notation; anything else is interpreted as a WEP key in alphanumerical notation. If a key is set to the empty string it is said to be un-configured. If the wireless data is WEP encrypted, it is possible to change the WEP keys on the printer’s home page.

Examples:

`SETUP "wlan","WEP1","0x1138170147"`
Sets key #1 (WEP 64, hexadecimal)

`SETUP "wlan","WEP2","abcde"`
Sets key #2 (WEP 64, alphanumerical)

`SETUP "wlan","WEP3","0x123456789abcdef0123456789a"`
Sets key #3, (WEP 128, hexadecimal)

`SETUP "wlan","WEP4","abcdefghijklm"`
Sets key #4 (WEP 128, alphanumerical)

`SETUP "wlan","WEP2",""`
Removes key #2

`SETUP "wlan",".WEP_KEY","0"`
Disables WEP

`SETUP "wlan",".WEP_KEY","1"`
Selects WEP key #1 for use in transmission (0-4 accepted)

SETUP WRITE/GET for WEP1-4 return empty string if that key is not configured, "****" otherwise.

It is not possible for any user to read the WEP key(s).

WEP Enabled/Disabled is shown on the network test label. WEP is deemed disabled if no key has been selected, or if the selected key is unconfigured.

Reading Wireless Connection Variables

The following wireless connection variables can be read using SETUP GET instructions:

- Active channel[1,3]
- MAC address of the access point[1]
- Signal strength[1,3]
- Speed[1]
- Region[2]

[1]/. The information is also given on the network test label and on the web page.

[2]/. The current region is also presented on the web page.

[3]/. Active channel and signal strength is shown in the printer's display window when the <i> key is pressed.

Active Channel

802.11b/g operates on a number of different channels, corresponding to different frequencies. The printer scans for a suitable access point and channel. The selected channel can be read from the printer. The read-only setup-variable "CHANNEL" can assume values from 0 up to 14 depending on the region setting. 0 signifies that an association has not yet been made, 1-14 is the currently selected channel.

```
SETUP GET "wlan","CHANNEL",A$
```
gets the current channel in A$.

Access Point Information

The printer associates with an access point. The read-only setup-variable "AP_MAC" will assume the MAC address of the access point which the printer is currently associated with. If no association has been performed, the value of "AP_MAC" is "00:00:00:00:00:00".

```
SETUP GET "wlan","AP_MAC",A$
```
gets the MAC address of the associated access point in A$.

Signal Strength

An important tool when working out problems with wireless LANs is a signal strength meter. The printer monitors the received signal strength, and makes it available to the user. The read-only setup variable "SIGNAL" assumes the value of the current received signal strength. The value may vary from 0 (no signal) to 100 (maximum strength).

```
SETUP GET "wlan","SIGNAL",A$
```
gets signal strength in A$.

Speed

Depending on different (radio) network parameters—such as distribution of access points, frequencies, number of clients, etc.—the network card may select a lower speed than the maximum for better overall performance. The selected speed (rounded down to whole Mbps) can be read from the printer. The read-only setup-variable "SPEED" can assume values from 0 up to 54 (Mbps).

```
SETUP GET "wlan","SPEED",A$
```

Gets the speed in A$.

Region (a.k.a. Regulatory Domain)

Some countries and regulatory authorities only allow the use of a subset of the 14 channels specified in the 802.11b/g standard. To make the product world configurable the setup variable ".REGION" is used.

The region can only be set by personnel authorized by Intermec. If the wrong region/domain is set, please contact your Intermec representative immediately. Continued use of the EasyLAN Wireless network interface with an incorrect REGION setting may be in violation of applicable laws.

The region setting will not be reset to default, even if a factory defaulting upgrade is performed.

The following regulatory domains are implemented:

Value	Countries	Allowed channels
FCC (or USA)	U.S.A	1-11 (default)
IC (or Canada)	Canada	1-11
ETSI (or EU)	EU countries[1] + Iceland, Liechtenstein, Norway, and Switzerland	1-13

[1]/. Certain restrictions apply to outdoor use in France.

```
SETUP GET "wlan",".REGION",A$
```
Gets the active region in A$.

Reading Wireless Connection Setup

All settings can be returned to the host via a specified serial communication port, usually "uart1:", using the Fingerprint instruction SETUP WRITE "wlan".

Example:

```
SETUP WRITE "wlan","uart1:”
```

yields for example:

```
SSID qwerty
WEP1 ****
WEP2 ****
WEP3
WEP4
.WEP_KEY 0
.REGION USA (FCC)
# CHANNEL 11
# AP_MAC 00:10:40:25:ee:a9
# SIGNAL 49
# SPEED 11
ACTIVE 1
```

Setting Up Network Parameters

In this document, the use of setup strings or setup files are described. Network parameters could also be set via the printer's built-in keyboard as described in the User's Guide.

New Line

Set the New Line parameter using a setup string or setup file:

```
SETUP"NET-COM,NET1,NEW LINE,CR/LF"
SETUP"NET-COM,NET1,NEW LINE,LF"
SETUP"NET-COM,NET1,NEW LINE,CR"
```

Default is CR/LF.

IP Selection Method

There are four methods for setting the IP address. DHCP, BOOTP, and DHCP+BOOTP let the server assign a **temporary** IP address to the printer. Which method to choose depends on the server. DHCP, BOOTP, and DHCP+BOOTP also sets the netmask, default router, and name server automatically. If the server neither supports DHCP nor BOOTP, or if you want to set a **permanent** IP address manually, use the MANUAL option. In this case, you will also have to set the netmask, default router, and name server manually via the printer's keyboard.

Always consult the network administrator before assigning a permanent IP address to avoid having more than one device with the same IP address in the network.

Set the IP selection method parameter using a setup string or setup file (by default only allowed for **admin**[1]):

```
SETUP"NETWORK,IP SELECTION,DHCP+BOOTP"          (default)
SETUP"NETWORK,IP SELECTION,MANUAL"
SETUP"NETWORK,IP SELECTION,DHCP"
SETUP"NETWORK,IP SELECTION,BOOTP"
```

[1]/. However, anybody can change the IP selection method from the printer's keyboard using the Setup Mode.

IP Address

If you have selected MANUAL as manual selection method, you can assign a permanent IP Address to the printer:

```
SETUP"NETWORK,IP ADDRESS,nnn.nnn.nnn.nnn"
```

Netmask

If you have selected MANUAL as manual selection method, you can specify a netmask for the printer:

```
SETUP"NETWORK,NETMASK,nnn.nnn.nnn.nnn"
```

Default Router

If you have selected MANUAL as manual selection method, you can specify a default router for the printer:

```
SETUP"NETWORK,DEFAULT ROUTER,nnn.nnn.nnn.nnn"
```

Name Server

If you have selected MANUAL as manual selection method, you can specify a name server for the printer:

```
SETUP"NETWORK,NAME-SERVER,nnn.nnn.nnn.nnn"
```

Finishing the Setup

You can now disconnect the printer from the PC and test the wireless communication as described in Chapter 4, assuming that there is a working wireless LAN and the printer is inside the coverage area of an access point.

4 Setup in IPL

This chapter explains how to set up the wireless network communication in printers running IPL v2.10 (or later). The only requirement on the PC side is a terminal program that can transmit and receive ASCII characters on an RS-232 line. Thus, this method is recommended when you do not have the opportunity to run the Intermec EasyLAN Network Setup wizard, for example because you use some other operating system than Windows.

For information on how to set up the network communication in printer's running Fingerprint, refer to Chapter 3.

Setting Up Wireless Communication

General

Once a wired serial communication is established, you can use IPL commands to set up the necessary EasyLAN wireless parameters. All settings are saved in files on the printer flash memory. If a factory defaulting upgrade is performed, all settings described in this section are set to their (factory) default values.

The default allowed user is "**admin**". All settings are restricted to read-only for all users except the allowed user, who can change all settings. Settings beginning with a period "." character are read-protected from non-authorized users. Some settings are not possible to read even by the allowed user, for instance WEP keys, which return the same string regardless of the actual key.

Display Current User

To display who the current user is in IPL, the "whoami" command is used.

```
<STX><SI>.x,whoami<ETX>
```

Changing User

To change the current user in IPL, the "xu"-command is used.

```
<STX><ESC>xu,user,password<ETX>
```

xu switches to the specified user after checking the password against the password file.

Valid user names are **admin** and **user**.

Everyone can become **user** even if user's password is set.

Example:

```
<STX><SI>xu,admin,pass<ETX>
```

changes the current user to "admin" provided that the admin's password is "pass."

Changing Passwords

To change the password for a user in IPL, the "passwd"-command is used.

<STX><SI>xp,user,oldpass,newpass,retyped<ETX>

Passwd changes the user's password. If the current password (**oldpass**) is correctly typed, the password will be changed to **newpass**. The new password must be entered twice to avoid typing errors. The new password's total length must be less than 128 characters. Numbers, uppercase letters, and metacharacters are encouraged. Comma signs (,) are not allowed. Valid user names are **admin** and **user**.

Example:

<STX><SI>xp,admin,pass,?pw,?pw<ETX>

Active

While setting up the printer's network settings, it is preferable that the changes do not take effect until all the changes have been made. All settings are saved to non-volatile memory immediately after the command has been given, but they are not committed to the NIC/driver until these "current" settings have been "activated."

A reboot will cause the current settings to be used. The alternative to rebooting the printer is the "ACTIVE" setting. Setting this to anything other than a "0" will cause the current settings to be activated. Reading the ACTIVE setting will indicate whether the current settings are being used or not. 0 indicates that the current settings are not active (changes have been made since startup or last non-zero setting of ACTIVE). 1 indicates that the settings are being used. ACTIVE cannot be set to 0 explicitly (but is implicitly set to 0 by changing another setting). Any changes made on the web page(s) will be activated when the user submits the form (given that the settings are correctly entered).

Unlike Fingerprint, IPL has no distinction between setup sections.

<STX><SI>ws,ACTIVE,1<ETX>
Sets ACTIVE to 1

<STX><SI>wt,ACTIVE<ETX>
Transmits ACTIVE status

SSID

The SSID (Service Set Identifier) is 0-32 characters used to differentiate wireless LANs that overlap in frequency and physical coverage area. An empty SSID string signifies that the printer will associate with any network. By default SSID is "INTERMEC".

Non-alphanumeric octets are entered by "%HH" (a percent sign and two hexadecimal digits (0-9, a-f, A-F) representing the value of the character). Example: "12%2034" is equivalent to "12 34". The percent sign is represented by "%25'. The SSID is possible to change by allowed users on the printer's web page.

<STX><SI>ws,SSID,qwerty<ETX>
Sets SSID to "qwerty".

<STX><SI>wt,SSID<ETX>
Transmits current SSID.

The SSID is shown on the network test label and on the printer's home page.

WEP

WEP (Wired Equivalent Privacy) uses a secret (40 or 104 bits long) together with a 24-bit "IV" (Initialization Vector) to form a key used to encrypt the data sent over radio.

The printer can have up to 4 WEP 64 and/or WEP 128 keys. There is a key selection setting to select which key that will be used when transmitting. Its value will be 0-4 (0 signifying that WEP is disabled; 1-4 selecting one of the configured keys). It is possible to select an un-configured key (this disables WEP). By default, WEP is disabled, and no keys will be configured.

WEP keys are entered either in a hexadecimal notation or in an alphanumerical notation. A string starting with "0x" (a zero followed by a lower-case x) followed by 10 or 26 characters is interpreted as a WEP key in hex-notation; anything else is interpreted as a WEP key in alphanumerical notation. If a key is set to the empty string it is said to be un-configured. If the wireless data is WEP encrypted, it is possible to change the WEP keys on the printer's home page.

Examples:

<STX><SI>ws,WEP1,0x1138170147<ETX>
Sets key #1 (WEP 64, hexadecimal)

<STX><SI>ws,WEP2,abcde<ETX>
Sets key #2 (WEP 64, alphanumerical)

<STX><SI>ws,WEP3,0x123456789abcdef0123456789a<ETX>
Sets key #3 (WEP 128, hexadecimal)

<STX><SI>ws,WEP4,abcdefghijklm<ETX>
Sets key #4 (WEP 128, alphanumerical)

<STX><SI>ws,WEP2,<ETX>
Removes key #2

<STX><SI>ws,.WEP_KEY,0<ETX>
Disables WEP

<STX><SI>ws,.WEP_KEY,1<ETX>
Select WEP key 1 for use in transmission (0-4 accepted).

<STX><SI>wt,WEP1<ETX>
Transmits WEP key #1 (empty string if that key is not configured, "****" otherwise). WEP2-4 transmits key #2-4.

<STX><SI>wt,.WEP_KEY<ETX>
Transmits selected WEP key: 0 when disabled, 1-4 when enabled. Only allowed users may see this.

It is not possible for any user to read the WEP key(s).

WEP Enabled/Disabled is shown on the network test label. WEP is deemed disabled if no key has been selected, or if the selected key is unconfigured.

Reading Wireless Connection Variables

The following wireless connection variables can be read using IPL commands:

- Active channel[1,3]
- MAC address of the access point[1]
- Signal strength[1,3]
- Speed[1]
- Region[2]

[1]/. The information is also given on the network test label and on the web page.

[2]/. The current region is also presented on the web page.

[3]/. Active channel and signal strength is shown in the printer's display window when the <i> key is pressed.

Active Channel

802.11b/g operates on a number of different channels, corresponding to different frequencies. The printer scans for a suitable access point and channel. The selected channel can be read from the printer. The read-only setup-variable "CHANNEL" can assume values from 0 up to 14 depending on the region setting. 0 signifies that an association has not yet been made, 1-14 is the currently selected channel.

<STX><SI>wt,CHANNEL<ETX>
transmits current channel.

Access Point Information

The printer associates with an access point. The read-only setup-variable "AP_MAC" will assume the MAC address of the access point which the printer is currently associated with. If no association has been performed, the value of "AP_MAC" is "00:00:00:00:00:00".

<STX><SI>wt,AP_MAC<ETX>
Transmits the MAC address of the associated access point.

Signal Strength

An important tool when working out problems with wireless LANs is a signal strength meter. The printer monitors the received signal strength, and makes it available to the user. The read-only setup variable "SIGNAL" assumes the value of the current received signal strength. The value may vary from 0 (no signal) to 100 (maximum strength).

<STX><SI>wt,SIGNAL<ETX>
Transmits signal strength.

Speed

Depending on different (radio) network parameters—such as distribution of access points, frequencies, number of clients, etc.—the network card may select a lower speed than the maximum for better overall performance. The selected speed (rounded down to whole Mbps) can be read from the printer. The read-only setup-variable "SPEED" can assume values from 0 up to 54 (Mbps).

<STX><SI>wt,SPEED<ETX>

Transmits network speed.

Region (a.k.a. Regulatory Domain)

Some countries and regulatory authorities only allow the use of a subset of the 14 channels specified in the 802.11b/g standard. To make the product world configurable the setup variable ".REGION" is used.

The region can only be set by personnel authorized by Intermec. If the wrong region/domain is set, please contact your Intermec representative immediately. Continued use of the EasyLAN Wireless network interface with an incorrect REGION setting may be in violation of applicable laws.

The region setting will not be reset to default, even if a factory defaulting upgrade is performed.

The following regulatory domains are implemented:

Value	Countries	Allowed channels
FCC (or USA)	U.S.A	1-11 (default)
IC (or Canada)	Canada	1-11
ETSI (or EU)	EU countries[1] + Iceland, Liechtenstein, Norway, and Switzerland	1-13

[1]/. Certain restrictions apply to outdoor use in France.

<STX><SI>wt,.REGION<ETX>
Transmits the active region.

Finishing the Wireless Setup

You can now disconnect the printer from the PC. Still it remains to assign IP address, netmask, default router, and name server. This can either be done via the printer's display and keyboard (provided the server support DHCP or BOOTP). If not, you must rely on wireless communication and use the ARPn'PING method, which require that there is a working wireless LAN and the printer is inside the coverage area of an access point.

Setting Up Network Parameters

You can now disconnect the printer from the PC. Still it remains to assign IP address, netmask, default router, and name server. This can either be done via the printer's display and keyboard (provided the server support either DHCP or BOOTP (or both). If not, you must rely on wireless communication and use the ARPn'PING method, which require that there is a working wireless LAN and the printer is inside the coverage area of an access point.

IP Selection Method

There are four methods for setting the IP address. DHCP, BOOTP, and DHCP+BOOTP let the server assign a **temporary** IP address to the printer. Which method to choose depends on the server. DHCP, BOOTP, and DHCP+BOOTP also sets the netmask, default router, and name server automatically. If the server neither supports DHCP nor BOOTP, you will have to use the ARP'n'PING method. The MANUAL option is presently not supported by IPL.

Always consult the network administrator before assigning a permanent IP address to avoid having more than one device with the same IP address in the network.

- Press the **Setup** key on the printer's built-in keyboard. This message appears in the display window:

```
SETUP:
SER-COM
```

- Repeatedly press the → key until the following message appears:

```
SETUP:
NETWORK
```

- Press the ↓ key. The display shows:

```
NETWORK:
IP SELECTION
```

- Press the ↓ key. The display shows by default:

```
IP SELECTION:
DHCP+BOOTP
```

- Here, you can select the method for assigning the IP address for the printer as discussed above. There are four options; DHCP+BOOTP, MANUAL, DHCP, and BOOTP. Do **not** select the MANUAL option, but use the ARP'n'PING method described later instead!
- Use the ← or → keys to browse the stack of options. When the desired option is displayed, press the **Enter** key.

Reading the IP Address

- After having selected the method for assigning the IP address, the display shows:

```
NETWORK:
IP ADDRESS
```

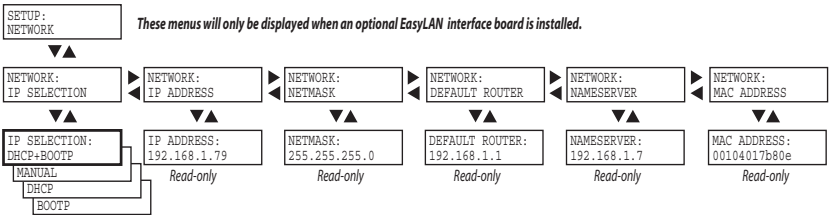
- If you have chosen either DHCP+BOOTP, DHCP, or BOOTP, press the ↓ key and you can read the temporary IP address automatically assigned by the server, for example:

```
IP ADDRESS:
192.168.1.79
```

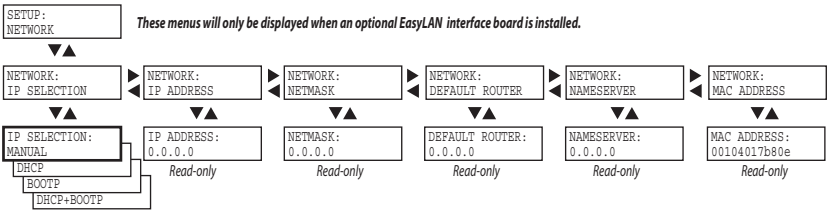
- After having read the IP address, press the **Enter** key to go on to Netmask parameter or press the **Setup** key to exit the Setup Mode.

Reading the Netmask, Default Router, and Name Server

- These parameters work in the same way as reading the IP address. In case of DHCP, BOOTP, or DHCP+BOOTP, these parameters are set automatically by the server. In case of the ARP'n'PING method, you will have to set these parameters via the printer's home page once the network communication has been established. Refer to the diagram on the next page.



Example of the network setup when an automatic IP selection method is used.



Example of the network setup when the manual IP selection method is used or when the network does not have an DHCP or BOOTP server.

Using ARP'n'PING to set an IP Address (Windows)

The ARP'n'PING method is intended for networks that do not have an DHCP or BOOTP server.

You must have a free IP address, which will be permanently assigned to the printer. However, it could be changed later from the printer's home page once the communication is established.

You must also have the printer's MAC address. You can get the MAC address from the Setup Mode as shown above or from the serial number label on the EasyLAN board.

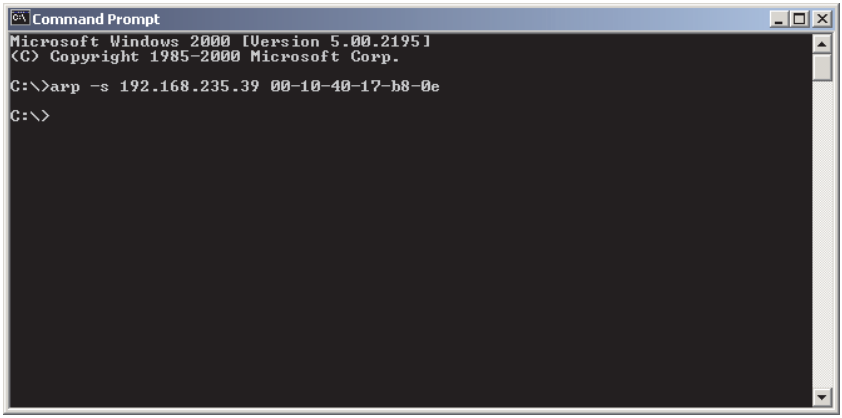
If the printer is started with DHCP and/or BOOTP, the printer will try to find an IP address five times before it considers it a failure. This takes about 2 minutes during which you cannot start using the ARP'n'PING method.

The following instructions apply to Windows 2000, but similar methods can be used on other operating systems, both in Windows and in Unix. In Windows, the groups of digits in the MAC address are separated by hyphens (-), and in Unix by colons (:).

On the task bar of the host, click the **Start** button, click **Accessories**, and then click the **Command Prompt**. In the Command Prompt, type:

arp -s <desired IP address><printer MAC-address>

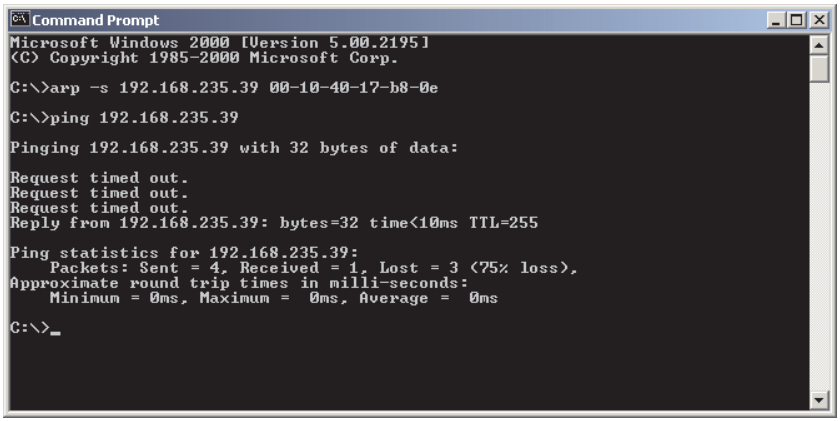
Example:



While still using the Command Prompt, use ping to make the printer set the IP address by typing:

ping <IP address>

Example:



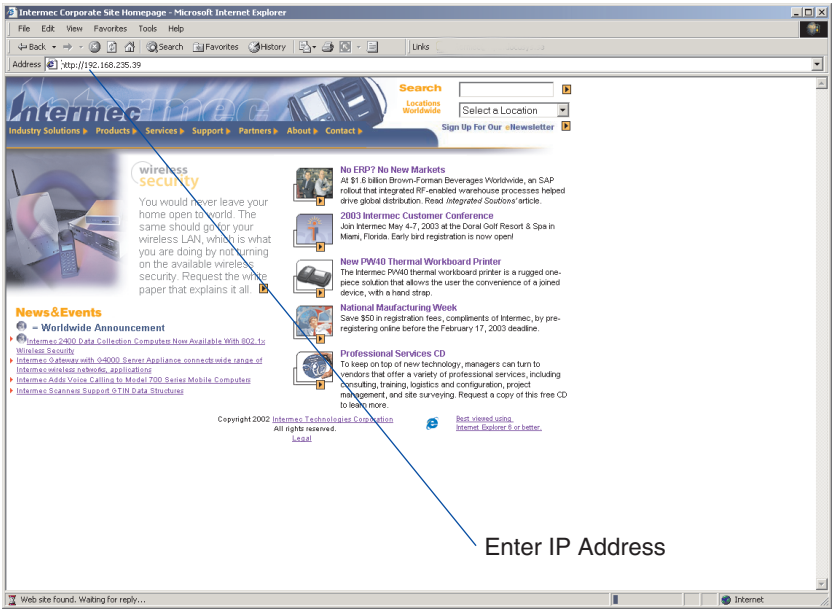
Exit the Command Prompt.

5 Accessing the Printer's Home Page

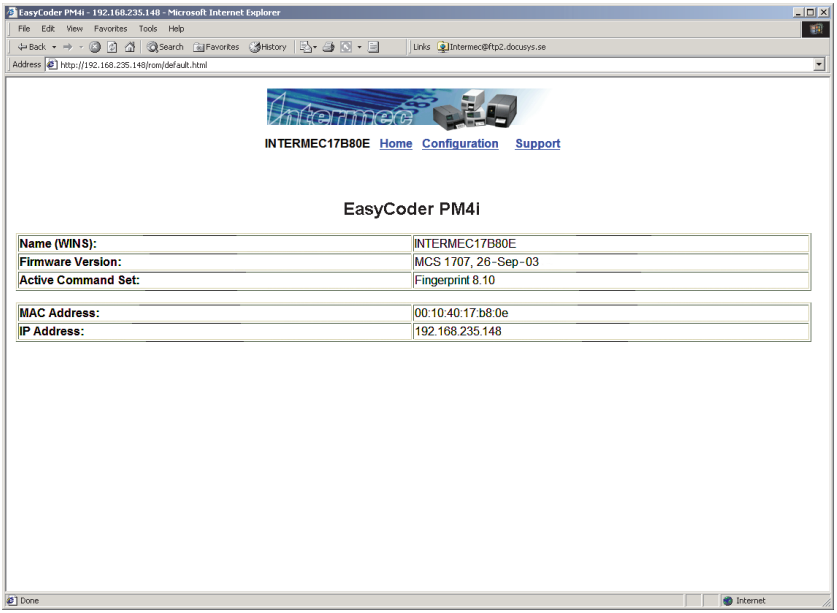
This chapter describes how to access the printer's home page in order to ascertain that the network communication works properly.

Using the Web Browser

Start your favorite web browser (in this example Microsoft Internet Explorer) and enter the printer's IP address in the Address field, for example *http://192.168.235.39*



The printer's home page will appear:



From the printer's home page, you can perform a large number of tasks, including changing or setting the IP address, netmask, default router, and name server and changing some of the wireless communication parameters. Please refer to the EasyLAN User's Guide that comes in PDF format on the CD-ROM included with the EasyLAN Wireless interface kit.

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EasyLAN Wireless Interface Kit Installation Instructions

1-960610-00