



# **Fax over IP**

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## **Administrator's Guide**

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## Overview

*Fax over IP (FoIP)* sends and receives faxes through an Internet connection, eliminating the need for costly modems, analog phone lines, and analog telephone adapters (ATA). In a typical Voice over IP (VoIP) installation, the ATA detects an incoming fax signal and converts the analog tones into the T.38 protocol packets read by an IP network. The Lexmark FoIP application uses fax data that is already formatted into the T.38 standard protocol, enabling a multifunction printer (MFP) to send this data directly to an IP private branch exchange (PBX) through a single network connection. Combining the real-time T.38 protocol with either SIP or H.323 (the most common VoIP protocols) provides fast and reliable FoIP performance within a VoIP environment.

With Fax over IP, faxing documents works just like a regular analog fax due to the seamless integration within Lexmark's fax system architecture. Any differences in fax functionality are designed to be transparent to the user and system, ensuring that fax data will be handled and processed in the same manner regardless of its source. This includes sending and receiving faxes, or fax forwarding to FTP, LDSS, File Share, and eSF apps. The only exception is that the familiar fax sounds are not heard through an internal speaker because T.3n8 transmits only network packets that do not contain analog audio information.

## Configuring and using the application

Fax over IP does not have any direct configuration or user settings. Updating the device firmware to the required level and installing the application license will automatically enable required printer firmware settings that can be configured to send and receive faxes using FoIP. These settings will depend on how the IP PBX is set up and configured. After configuring the printer's firmware settings, you will not notice any difference in how documents are faxed and processed except that you can begin sending and receiving faxes through a single network connection, eliminating the need for costly modems, analog phone lines, and ATAs.

To update the device firmware, see "Updating firmware" on page 13.

# Configuring the fax settings

## Setting the fax mode

- 1 Access the application configuration settings from the Embedded Web Server (EWS).
- 2 Click **Settings** or **Configuration**, and then click **Fax Settings**.
- 3 From the Fax Mode drop-list menu, select **Analog/T.38**.

**Note:** The default Fax Mode options are **Analog Fax** and **Fax Server**. After the Fax over IP application and license are installed, the Analog Fax option changes to **Analog/T.38**.

- 4 Click **Submit**.

## Selecting the fax transport

- 1 Access the application configuration settings from the Embedded Web Server (EWS).
- 2 Click **Settings** or **Configuration**, and then click **Fax Settings > Analog/T.38 Fax Setup**.

**Note:** This option appears only after you have installed the Fax over IP application and license.

- 3 Under Fax Settings, select **T.38** from the Fax Transport drop-down menu.
- 4 Click **Submit**.

## Additional fax settings

### VoIP settings

- 1 Access the application configuration settings from the Embedded Web Server (EWS).
- 2 Click **Settings** or **Configuration**, and then click **Fax Settings > Analog/T.38 Fax Setup**.
- 3 Under VoIP Settings, use the following criteria:

- **VoIP Protocol**—From the drop-down menu, select one of the following:
  - **SIP**
  - **H.323**
  - **SIP and H.323**

**Note:** If **SIP and H.323** is selected, outgoing calls will use SIP as the default unless a SIP Dial Out Digit is specified.

- **Trace Level**—Enter a number to set the VoIP debug level. Higher numbers gather more debug information than lower numbers. The debug information is stored on the fax data partition. The accepted range is 0–7.
- **STUN Server**—Type a server location that will traverse the firewall.
- **Force Fax Mode**—Select this box to help ensure that the VoIP gateway automatically switches from analog to T.38 at the beginning of a fax call.

## SIP settings

- 1 Access the application configuration settings from the Embedded Web Server (EWS).
- 2 Click **Settings** or **Configuration**, and then click **Fax Settings > Analog/T.38 Fax Setup**.
- 3 Under SIP Settings, use the following criteria where applicable:
  - **Proxy**—Type the IP address or name of the system that will convert a phone number to an IP address when sending a fax. For example, `111.111.111.111` or `lab-uc520.lpdev.prtdev.domain`.

**Note:** SIP Proxy is the only required setting in some environments. Other settings will depend on the IP PBX configuration requirements.
  - **Registrar**—Type the name or IP address of the system that registers SIP clients.

**Note:** A substitution variable can be used in place of a name or IP address. For a list of allowed substitution variables, see “Substitution variables for VoIP, SIP, and H.323 settings” on page 8.
  - **User**—Type the name of the SIP user.
  - **Password**—Type the SIP password used to register with the SIP Registrar.
  - **Contact**—Type the SIP contact name.
  - **Realm**—Type the realm name used to register with the Address of Record (AOR). If omitted, then the proxy name is used as the default.
  - **Auth ID**—Type the name used as the user name when registering. If omitted, then the User field is used as the default.
  - **Outbound Proxy**—Type a name to direct all SIP communication through this system.
  - **Disable Incoming Calls**—Select this box to ignore all incoming SIP calls.
  - **SIP Dial Out Digit**—From the drop-down menu, select a number to set a prefix digit. Any call that begins with this prefix digit is placed as a SIP call. The accepted range is 0–9.

**Notes:**

  - The prefix digit is removed before the call is made.
  - The VoIP Protocol must be set to **SIP and H.323**.- **SIP Registration Status**—This shows the response from the registrar to the registration request. The first line should be `200 OK`, indicating that the SIP request was accepted, or `100 Trying`, indicating that a request is being processed. Any other text in the first line means that a problem occurred. The second line contains the address of record (AOR). The third line is the registration timestamp.

## H.323 settings

- 1 Access the application configuration settings from the Embedded Web Server (EWS).
- 2 Click **Settings** or **Configuration**, and then click **Fax Settings > Analog/T.38 Fax Setup**.
- 3 Under H.323 Settings, use the following criteria:
  - **Gateway**—Type the name of the H.323 gateway.
  - **Gatekeeper**—Type the name of the H.323 gatekeeper.
  - **User**—Type the name used to register with the gateway.
  - **Password**—Type the password used to register with the gateway.
  - **Enable Fast Start**—Select this box to enable the fast start procedure.
  - **Disable H.245 Tunneling**—Select this box to disable H.245 tunneling.

- **Disable Gatekeeper Discovery**—Select this box to disable gatekeeper discovery.
- **Disable Incoming Calls**—Select this box to ignore all incoming H.323 calls.
- **H.323 Dial Out Digit**—From the drop-down menu, select a number to set a prefix digit. Any call that begins with this prefix digit is placed as a H.323 call. The accepted range is 0–9.

**Notes:**

- The prefix digit is removed before the call is made.
- The VoIP Protocol must be set to **SIP and H.323**.

## T.38 settings

- 1 Access the application configuration settings from the Embedded Web Server (EWS).
- 2 Click **Settings** or **Configuration**, and then click **Fax Settings > Analog/T.38 Fax Setup**.
- 3 Under T.38 Settings, use the following criteria:
  - **Indicator Redundancy**—Enter the number of times a fax indicator is repeated (CNG, ANS, etc.).
  - **Low Speed Redundancy**—Enter the number of times a low speed data transmission is repeated (300bps FSK signaling).
  - **High Speed Redundancy**—Enter the number of times high speed data is repeated (image data).
  - **UDPTL Keep Alive Interval**—Enter the number of milliseconds for the Keep Alive Interval. The accepted range is from 1 to 10000 milliseconds. The number 0 will disable this function.

**Note:** The first three settings help to increase the reliability of transmitted data, but also require increased bandwidth.

## Supporting information

### UCF identification settings

UCF ID	Corresponding data
mfp.fax.mode	Fax mode settings: 0 = Analog/T.38 or 2 = Fax Server
mfp.fax.voipSettings.faxTransport	VoIP settings: 0 = Analog or 1 = T.38
mfp.fax.voipSettings.voipProtocol	VoIP settings: 1 = SIP, 2 = H.323, 3 = SIP and H.323
mfp.fax.voipSettings.traceLevel	VoIP settings: 0–7
mfp.fax.voipSettings.stunServer	VoIP settings: STUN server name or path
mfp.fax.voipSettings.forceFaxMode	VoIP settings: true or false
mfp.fax.sipSettings.proxy	SIP settings: proxy
mfp.fax.sipSettings.outboundProxy	SIP settings: outbound proxy
mfp.fax.sipSettings.registrar	SIP settings: registrar
mfp.fax.sipSettings.user	SIP settings: user name
mfp.fax.sipSettings.password	SIP settings: password

UCF ID	Corresponding data
mfp.fax.sipSettings.contact	SIP settings: contact
mfp.fax.sipSettings.realm	SIP settings: realm
mfp.fax.sipSettings.authID	SIP settings: authorization ID
mfp.fax.sipSettings.disableIncomingCalls	SIP settings: true or false
mfp.fax.sipSettings.sipDialOutDigit	H.323 settings: -1 = none or 0–9
mfp.fax.h323Settings.gateway	H.323 settings: gateway
mfp.fax.h323Settings.enableFastStart	H.323 settings: true or false
mfp.fax.h323Settings.disableH245Tunneling	H.323 settings: true or false
mfp.fax.h323Settings.gatekeeper	H.323 settings: gatekeeper
mfp.fax.h323Settings.user	H.323 settings: user name
mfp.fax.h323Settings.password	H.323 settings: password
mfp.fax.h323Settings.disableGatekeeperDiscovery	H.323 settings: true or false
mfp.fax.h323Settings.disableIncomingCalls	H.323 settings: true or false
mfp.fax.h323Settings.h323DialOutDigit	H.323 settings: -1 = none or 0–9
mfp.fax.t38Settings.indicatorRedundancy	T.38 settings: 0 – 5
mfp.fax.t38Settings.lowSpeedRedundancy	T.38 settings: 0 – 5
mfp.fax.t38Settings.highSpeedRedundancy	T.38 settings: 0 – 5
mfp.fax.t38Settings.udptlKeepAliveInterval	T.38 settings: 0 = disabled or 1–10000

## Substitution variables for VoIP, SIP, and H.323 settings

You can use the following substitution variables where appropriate.

Variable	Corresponding data
\${IPAddr}	IP address of the MFP
\${SIPUser}	User field in the SIP settings
\${SIPProxy}	Proxy field in the SIP settings
\${SIPRegistrar}	Registrar field in the SIP settings
\${H323Gateway}	Gateway field in the H.323 settings
\${H323Gatekeeper}	Gatekeeper field in the H.323 settings
\${StationNumber}	Station Number field in the Fax settings
\${StationName}	Station Name field in the Fax settings

### Notes:

- Multiple indirection is acceptable as long as you avoid setting a substitution loop. For example, you can set SIP Auth ID to the variable **\${SIPUser}** and set SIP User to the variable **\${StationName}**. You should not set a variable equal to itself, such as setting SIP User to the variable **\${SIPUser}**. In this example, the string “**\${SIPUser}**” will be used as the value for the SIP User field.



- Substitution variables can be used in a field. For example, setting the SIP Password field to the variable pas\${SIPUser} results in a password string of “pas” + the SIP User value. So a SIP User value of “1234” sets the password to “pas1234.” A useful technique is to set the SIP Contact field to **\${SIPUser}@\${IPAddr}**.
- Use the original substitution variables \${StationName} and \${StationNumber} on MFPs that show “Fax Name” and “Fax Number” instead of “Station Name” and “Station Number.”

# Troubleshooting

## Fax over IP troubleshooting

### An application error has occurred

Try one or more of the following:

#### CHECK THE SYSTEM LOG

- 1 Obtain the printer IP address:
  - From the printer home screen
  - From the TCP/IP section in the Network/Ports menu
  - By printing a network setup page or menu settings page, and then finding the TCP/IP section

**Note:** An IP address appears as four sets of numbers separated by periods, such as 123.123.123.123.

- 2 Open a Web browser, and then type the printer IP address in the address field.  
The Embedded Web Server appears.
- 3 From the navigation menu on the left, click **Settings** or **Configuration**.
- 4 Click **Device Solutions > Solutions (eSF)**, or click **Embedded Solutions**.
- 5 Click **System** tab > **Log**.
- 6 From the Filter menu, select an application status.
- 7 From the application menu, select an application, and then click **Submit**.

#### ADJUST THE SCAN SETTINGS

**Note:** This applies *only* to applications that support scanning.

In the application configuration settings, select a lower scan resolution. You can select **Off** or a lower resolution from the Scan Color drop-down menu.

#### CONTACT YOUR SOLUTIONS PROVIDER

If you still cannot isolate the problem, then contact your solutions provider for additional help.

### License error

Try one or more of the following:

#### MAKE SURE THE APPLICATION IS LICENSED

Applications require a license to run.

For more information on purchasing a license, contact your Lexmark representative.

**MAKE SURE THE LICENSE IS UP-TO-DATE**

Make sure the license for the application has not yet expired. Check the license expiry date using the Embedded Web Server or MarkVision Professional.

# Appendix

## Configuring applications using the Embedded Web Server

### Accessing application configuration settings using the Embedded Web Server

- 1 Obtain the printer IP address:
  - From the printer home screen
  - From the TCP/IP section in the Network/Ports menu
  - By printing a network setup page or menu settings page, and then finding the TCP/IP section

**Note:** An IP address appears as four sets of numbers separated by periods, such as 123.123.123.123.

- 2 Open a Web browser, and then type the printer IP address in the address field.  
The Embedded Web Server appears.
- 3 From the navigation menu on the left, click **Settings** or **Configuration**, and then do one of the following:
  - Click **Apps > Apps Management**.
  - Click **Device Solutions > Solutions (eSF)**.
  - Click **Embedded Solutions**.
- 4 From the list of installed applications, click the application you want to configure, and then click **Configure**.

## Licensing applications

Applications require a valid electronic license to run on select printers.

For more information on purchasing a license for an application, or for any other licensing information, contact your Lexmark representative.

## Exporting and importing configuration files

After configuring an application, you can export your current settings into a file that can then be imported and used to configure that application on one or more additional printers.

### Exporting and importing a configuration using the Embedded Web Server

You can export configuration settings into a text file, and then import it to apply the settings to other printers.

- 1 From the Embedded Web Server, click **Settings** or **Configuration**, and then do one of the following:
  - Click **Apps > Apps Management**.
  - Click **Device Solutions > Solutions (eSF)**.
  - Click **Embedded Solutions**.
- 2 From the list of installed applications, click the name of the application you want to configure.

3 Click **Configure**, and then do one of the following:

- To export a configuration to a file, click **Export**, and then follow the instructions on the computer screen to save the configuration file.

**Note:** If a **JVM Out of Memory** error occurs, then repeat the export process until the configuration file is saved.

- To import a configuration from a file, click **Import**, and then browse to the saved configuration file that was exported from a previously configured printer.

**Notes:**

- Before importing the configuration file, you can choose to preview it first.
- If a timeout occurs and a blank screen appears, then refresh the Web browser, and then click **Apply**.

## Updating firmware

Some applications require a minimum device firmware level to operate correctly.

For more information on updating the device firmware, contact your Lexmark representative.

### Updating the device firmware

Access the application configuration settings from the Embedded Web Server.

- 1 From the Embedded Web Server, click **Settings** or **Configuration**.
- 2 Click **Update Firmware**.
- 3 Browse to locate the required Flash file.
- 4 Click **Submit**.

## Checking which version of the Embedded Solutions Framework is installed on a printer

- 1 Obtain the printer IP address:
  - From the printer home screen
  - From the TCP/IP section in the Network/Ports menu
  - By printing a network setup page or menu settings page, and then finding the TCP/IP section

**Note:** An IP address appears as four sets of numbers separated by periods, such as 123.123.123.123.

- 2 Open a Web browser, and then type the printer IP address in the address field.
- 3 From the Embedded Web Server, click **Reports > Device Settings**.
- 4 Scroll down until you see “Embedded Solutions” (usually found near the bottom).
- 5 In the Embedded Solutions section, note the value next to “Framework =”. This signifies the installed version.

**Note:** To view the complete list of supported printers for each version of the Embedded Web Server, see the *Readme* file.

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## ZXing 1.7

This project consists of contributions from several people, recognized here for convenience, in alphabetical order.

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