



Max Connectivity Overview/PBX Primer

Introduction

This document is meant to explain the basic different Max installation environments. The following pages will give an overview of how the different versions of the Max connect and operate within different infrastructures, PBX and otherwise. There is also a brief overview of basic PBX concepts as they relate to the Max product line. This is not meant to be a comprehensive PBX guide, but simply an overview of how basic PBX concepts relate to the Max product line.

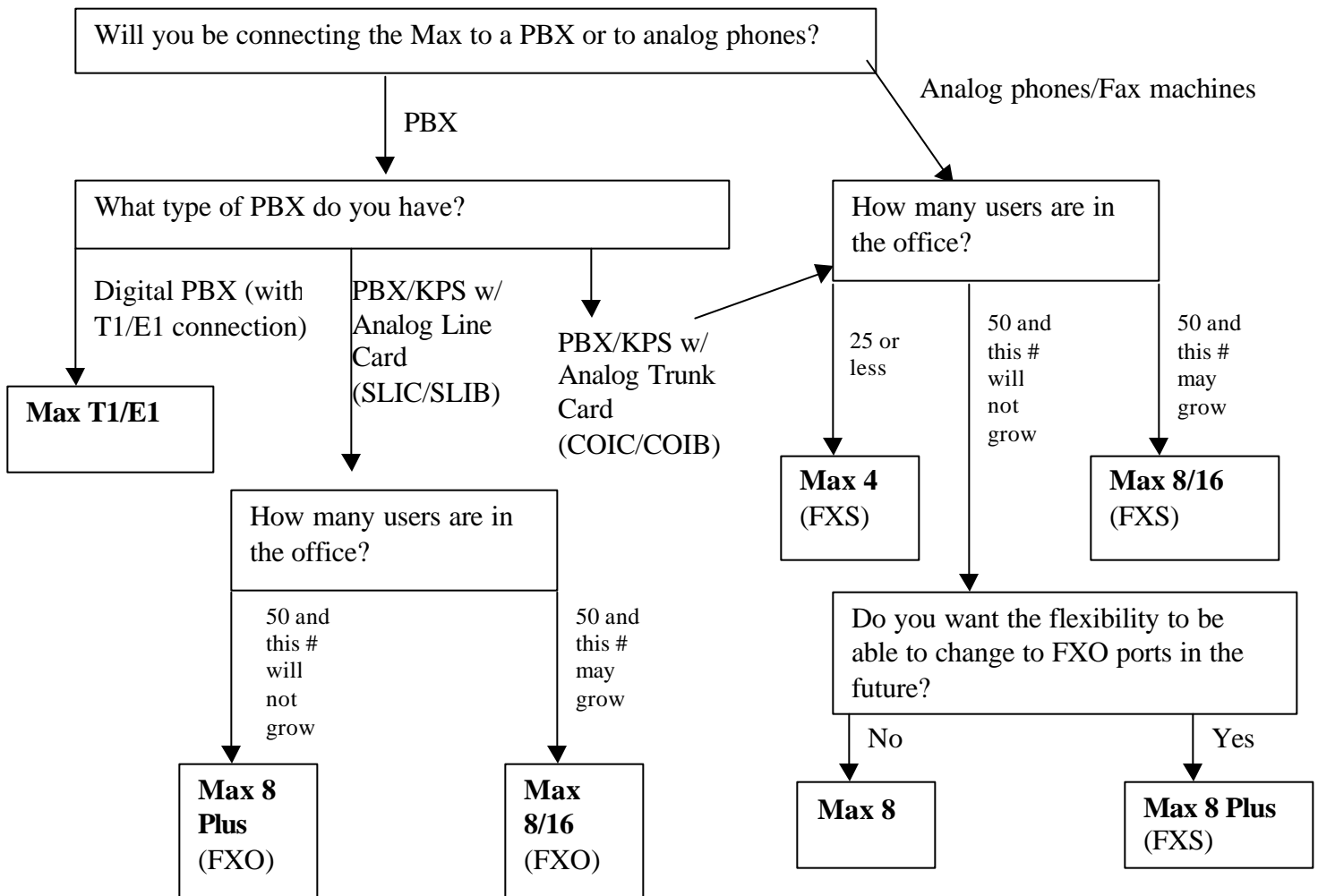
What type of Max unit does my customer need?

To start, you must determine which version of the Max best fits your customer's needs. The following flowchart gives you an idea of the basic issues you need to define:

First, you must qualify that your customer has the appropriate infrastructure to support the Max. They must have:

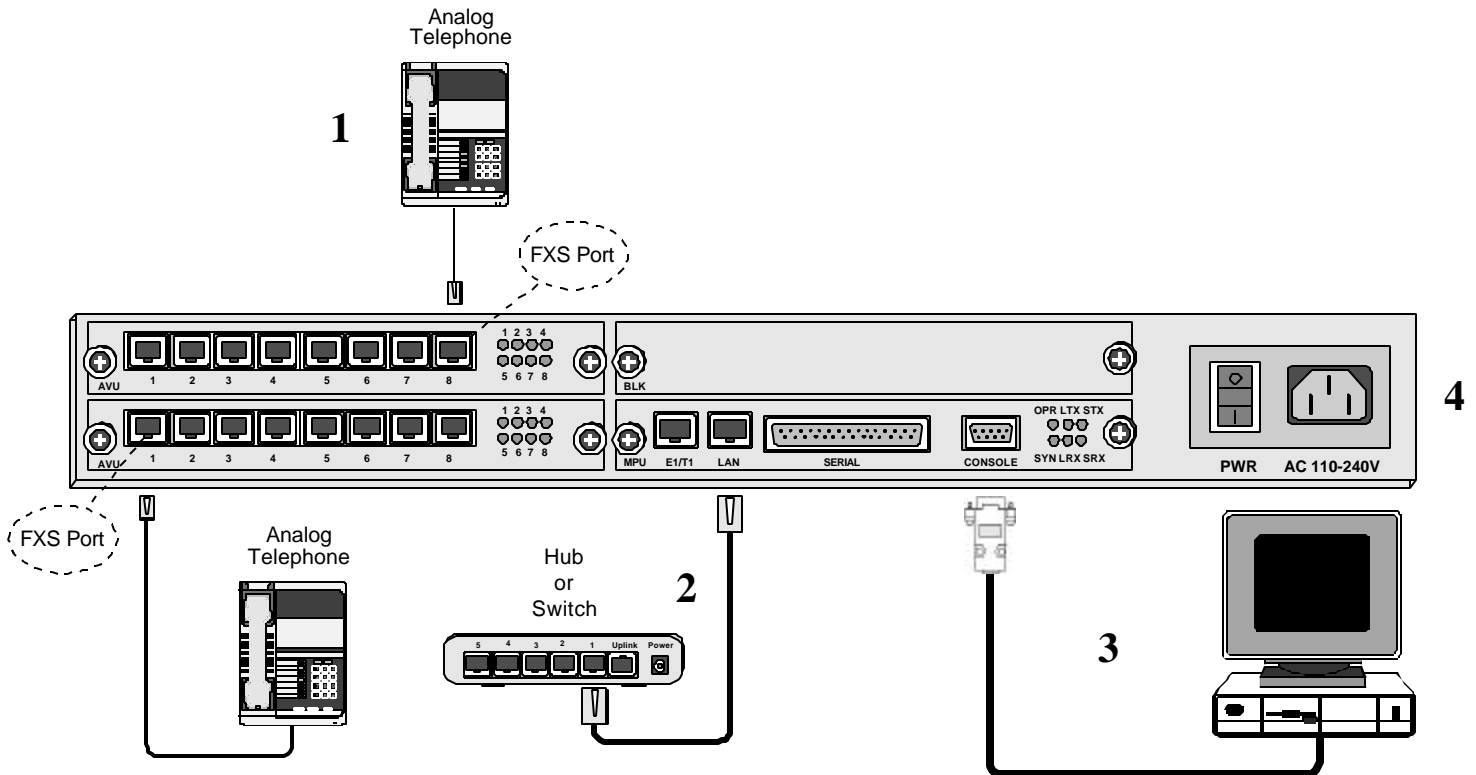
- 1) A network
- 2) At least 17 Kbps throughput per line
- 3) A static or DHCP Internet connection

Then, you need to ask:



Connecting analog phones to the Max (FXS version)

As you can see from the preceding diagram, if your customer plans to connect analog phones or fax machines to the Max, they would need an FXS (Foreign Exchange Station) version. Standard analog phones simply connect to an FXS version of the Max with an RJ-11 cable. The diagram below shows all the connections necessary to operate an FXS version of the Max:



1 Telephone/Fax Connections

Standard analog telephones and fax machines connect to the analog FXS ports with RJ-11 cables.

2 LAN Ethernet Connections

To connect the Max to the LAN, plug the RJ-45 LAN jack from the hub or router into the LAN port on the Max.

3 PC Connection

To initially configure the Max, you can either:

- Connect it to a PC by using a 9-pin RS-232C cable to connect the PC's COM1 serial port to the Max console (pictured above) **OR**
- Use a telephone connected to an FXS port to acquire an IP address. Then, you will need to use a PC for the initial account setup. This PC should be on the same network but does not have to be connected directly to the Max.

4 AC Power Connection

Plug the Max into a power outlet.

Note: When only analog phones are connected, the FXS version of the Max does not support inbound PSTN calling, but you can receive calls (via *72) from other Max units.

Connecting the Max to a PBX

By connecting the Max to a PBX, additional features such as inbound PSTN calling and remote calling can be supported. Basically, an analog PBX would require an FXS or FXO version of the Max. The primary determinant between FXS and FXO is the type of card and available ports present on the PBX. On the other hand, a digital PBX would require the Max T1/E1. To better understand all of the terminology involved, below is a basic PBX overview as it relates to the Max.

PBX basics

As you know, a PBX (Private Branch Exchange) is a phone system that takes a number of telephone lines from the outside world and makes them available throughout an office. For example, we utilize a PBX at Net2Phone, allowing us to make calls within the office and make and receive calls outside the company. Users on a PBX share a certain number of outside lines within the company and have to dial a special number, such as “9”, to access an outside line. Theoretically, not everyone within the company uses an outside line at the same time, so the number of outside lines on the PBX is usually equal to some number less than the number of employees. In this way, utilizing a PBX is more cost effective than connecting an external telephone line to every telephone within an organization. Here are a few key terms you should be familiar with:

- Analog Line Card** An analog line card is a type of card featured on a PBX. The analog line card is used to connect an FXO version of the Max. Another name for an analog line card is a SLIC/SLIB (Subscriber Line Interface Card/Board).
- Analog Trunk Card** An analog trunk card (ATC) is another type of card featured on a PBX. The analog trunk card is used to connect an FXS version of the Max. Another name for an analog trunk card is a COIC/COIB (Central Office Interface Card/Board).
- CO/CO Line/Trunk Line** CO stands for Central Office, typically the location where the phone company stores their telco equipment. CO lines are physically run from this location to a business or home. A CO line is a line with a phone number (i.e. 973-412-4444) that carries calls into and out of a residence or business. In a business environment, these lines are typically connected to a PBX that allows phones connected to the PBX to carry phone calls into and out of the building.
- Extension Lines** Extension lines refer to the individual telephone stations on a PBX that have a separate extension number. An extension line is a line to the PBX, not an actual outside telephone line. Extension lines can be connected to a multiport extension card that is attached to the PBX. When one extension is used to dial another, the PBX acts as a voice router to transport and carry the call to the appropriate extension.

Hunt Group

A hunt group refers to a group of related phones that can be set up to share particular lines. For example, a hunt group can be established when connecting a Max FXO unit to a PBX. When multiple FXO ports on the Max are connected to the PBX, the phones on the PBX can be programmed to share these lines. Users would dial their hunt group code, such as “4000”, to have access to any of the available lines. The PBX accomplishes this by handing off the calls to the next available FXO port on the Max. The user would only receive a busy signal if all of the lines of the hunt group were busy. Or, in this case, the PBX could be programmed to automatically hand the call off to the traditional PSTN phone system.

IVR

IVR (Interactive Voice Response) refers to the voice message options that can greet a Max FXO caller. For example, a Max connected to a PBX extension can be set to greet the caller with a message such as “Welcome to Net2Phone”, can require a password prior to granting access, or be set to simply provide a standard dial-tone once accessed. As mentioned above, only FXO ports provide IVR access. Instructions for customizing the IVR, such as providing personalized voice messages in another language, are included in the user documentation.

Key System

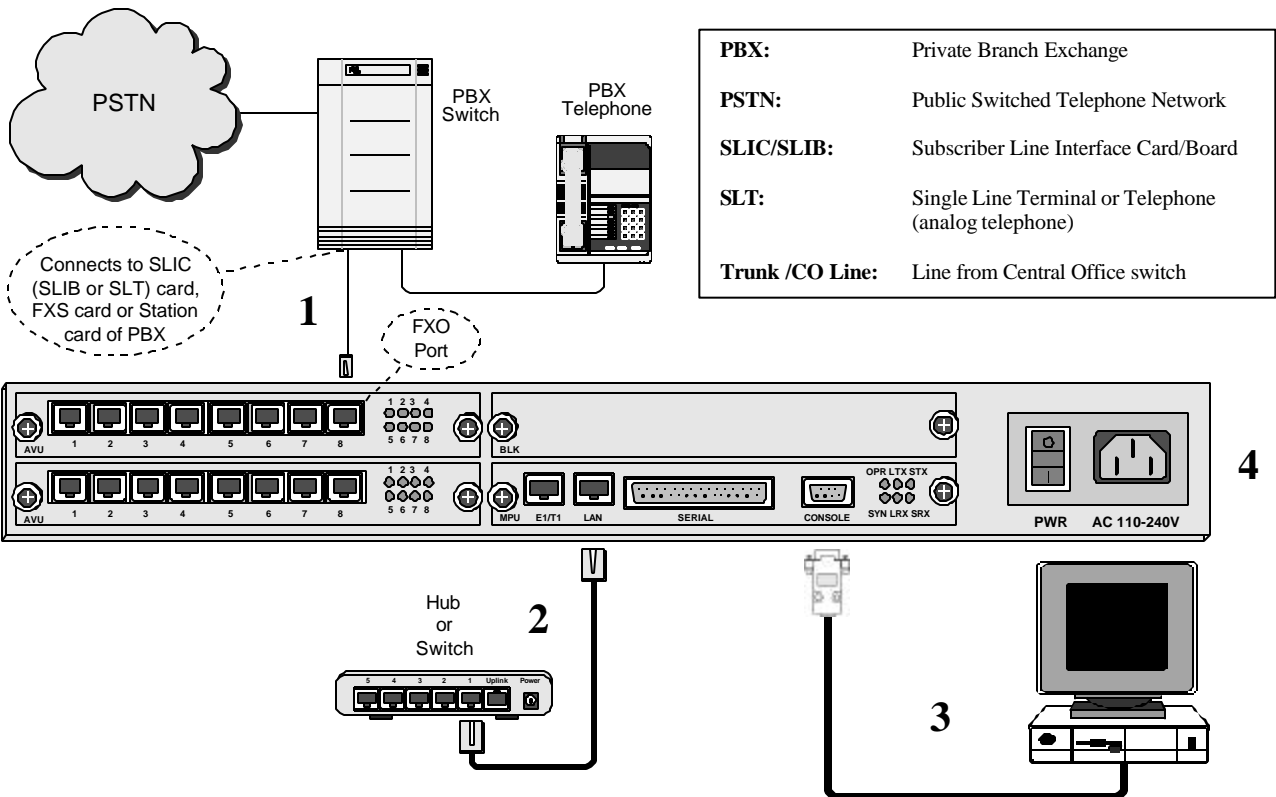
A key system is a telephone system that, for our purposes, is similar to a PBX in most respects. One of the major differences, however, is that each extension on the system has buttons to directly reach an outside line. Users on a key system do not have to dial a special number, such as “9”, to reach an outside line. Key systems are sometimes referred to as a KTS (Key Telephone System) or a KPS (Key Phone System). The Max product line has the same connection requirements for a Key System as a PBX.

RJ-11

RJ-11 refers to the physical connection utilized in standard analog phones. An RJ-11 cord connects an analog phone to a standard, home phone jack.

Analog PBXs (Max FXO solution)

If your customer has an analog PBX with an available analog line card (SLIC/SLIB), the optimal Max solution is an FXO (Foreign Exchange Operator) version. To connect an FXO version of the Max to an analog PBX, simply use RJ-11 cables to connect the analog line card to the FXO ports on the Max. If only one FXO port on the Max is connected to the PBX, all of the users on the PBX will be sharing this one line. If more lines are desired, simply connect multiple FXO ports to the PBX. Then, a hunt group (see definition on previous page) can be established so that the users are sharing multiple lines. The diagram below shows all the connections necessary to operate an FXO version of the Max:



1 PBX Connections

Connect the analog line card to the FXO ports on the Max with RJ-11 cables.

2 LAN Ethernet Connections

To connect the Max to the LAN, plug the RJ-45 LAN jack from the hub or router into the LAN port on the Max.

3 PC Connection

To initially configure the Max, you must connect it to a PC. Use a 9-pin RS-232C cable to connect the PC's COM1 serial port to the Max console. (Note: If there is an FXS port also available on the Max, you can configure it with a phone connected to the Max and a PC on the same network, as described on page 2)

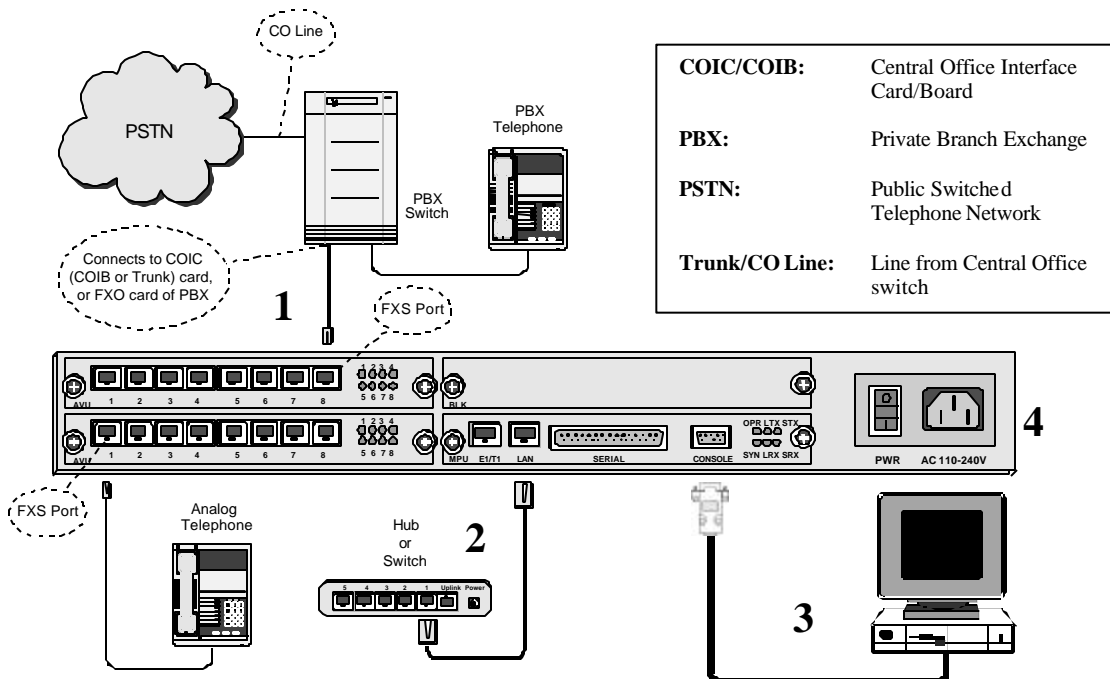
4 AC Power Connection

Plug the Max into a power outlet.

Note: IVR functionality is available with an FXO version of the Max.

Analog PBXs (Max FXS solution)

If your customer has an analog PBX with an available analog trunk card (ATC, COIC/COIB), an FXS (Foreign Exchange Station) version of the Max can be used. To connect an FXS version of the Max to an analog PBX, simply use RJ-11 cables to connect the analog line card to the FXS ports on the Max. If only one FXS port on the Max is connected to the PBX, all of the users on the PBX will be sharing this one line. If more lines are desired, simply connect multiple FXS ports to the PBX. Then, a hunt group (see definition on page 4) can be established so that the users are sharing multiple lines. The diagram below shows all the connections necessary to operate an FXS version of the Max with an analog PBX:



1 PBX Connections

Connect the analog trunk card to the FXS ports on the Max with RJ-11 cables.

2 LAN Ethernet Connections

To connect the Max to the LAN, plug the RJ-45 LAN jack from the hub or router into the LAN port on the Max.

3 PC Connection

To initially configure the Max, you must connect it to a PC. Use a 9-pin RS-232C cable to connect the PC's COM1 serial port to the Max console. (Note: If there is an FXS port also available on the Max, you can configure it with a phone connected to the Max and a PC on the same network, as described on page 2)

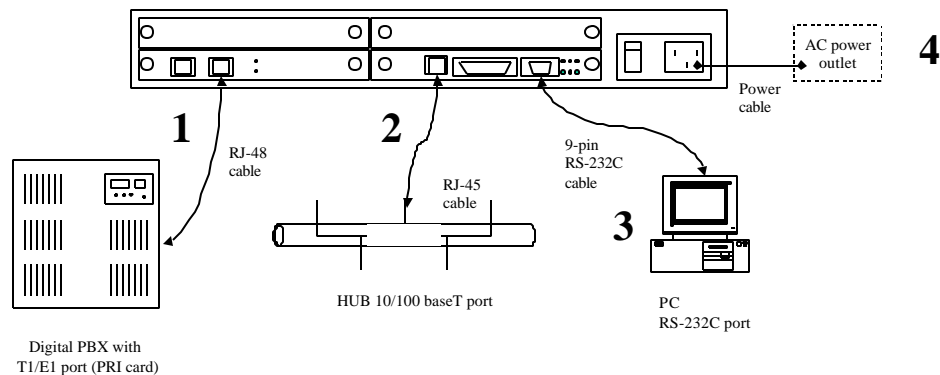
4 AC Power Connection

Plug the Max into a power outlet.

Note: IVR functionality is not available with an FXS version of the Max. If the PBX only has an available analog trunk card and this feature is required, an analog line card must be added and an FXO version of the Max must be used.

Digital PBXs (Max T1/E1 solution)

Most new PBXs are digital. If your customer has a digital PBX, the optimal Max solution is the Max T1/E1. To connect the Max T1/E1 to a digital PBX, simply use an RJ-48 cable to connect the T1/E1 port on the Max to the T1/E1 port on the PBX. With a Max T1/E1, users on the PBX share either 24 (T1 connection) or 30 (E1 connection) virtual lines. For example, if there are 50 phones on the PBX and the Max is connected to an E1, these 50 users will be sharing 30 lines. The diagram below shows the basic connections of a Max T1/E1 in a digital PBX environment:



1 PBX Connections

With an RJ-48 cable, connect the right-side T1/E1 port on the Max to the T1/E1 port on the PBX.

2 LAN Ethernet Connections

To connect the Max to the LAN, plug the RJ-45 LAN jack from the hub or router into the LAN port on the Max.

3 PC Connection

To initially configure the Max, you must connect it to a PC. Use a 9-pin RS-232C cable to connect the PC's COM1 serial port to the Max console.

4 AC Power Connection

Plug the Max into a power outlet.

Note: Certain digital PBXs may feature analog ports in addition to the T1/E1 interface. If this is the case, it is theoretically possible to connect a Max FXO or FXS version to the digital PBX, depending on whether there is an available analog trunk card or analog line card.