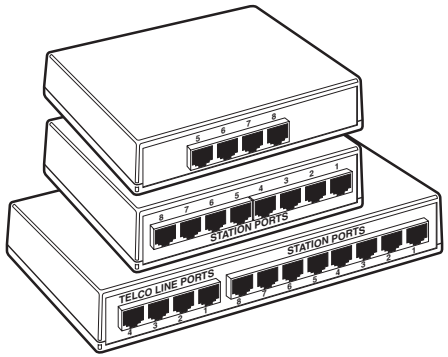
BLACK BOX®
NETWORK SERVICES

APRIL 2001
40423 40424 40425
40426 40428 40429

Telephone Line Managers



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FEDERAL COMMUNICATIONS COMMISSION AND INDUSTRY CANADA RADIO-FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, might cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

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This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

NORMAS OFICIALES MEXICANAS (NOM)
ELECTRICAL SAFETY STATEMENT

INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.

9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:

    A: El cable de poder o el contacto ha sido dañado; u

    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

    C: El aparato ha sido expuesto a la lluvia; o

    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

    E: El aparato ha sido tirado o su cubierta ha sido dañada.

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FEDERAL COMMUNICATIONS COMMISSION
PHONE-NETWORK COMPATIBILITY STATEMENT

1. The Federal Communications Commission (FCC) has established rules which permit this device to be directly connected to the telephone network with standardized jacks. This equipment should not be used on party lines or coin lines.
2. If this device is malfunctioning, it may also be causing harm to the telephone network; this device should be disconnected until the source of the problem can be determined and until the repair has been made. If this is not done, the telephone company may temporarily disconnect service.
3. If you have problems with your telephone equipment after installing this device, disconnect this device from the line to see if it is causing the problem. If it is, contact your supplier or an authorized agent.
4. The telephone company may make changes in its technical operations and procedures. If any such changes affect the compatibility or use of this device, the telephone company is required to give adequate notice of the changes.

5. If the telephone company requests information on what equipment is connected to their lines, inform them of:
   a. The telephone number that this unit is connected to.
   b. The ringer equivalence number.
   c. The USOC jack required: RJ-11C.
   d. The FCC registration number.

   Items (b) and (d) can be found on the unit's FCC label. The ringer equivalence number (REN) is used to determine how many devices can be connected to your telephone line. In most areas, the sum of the RENs of all devices on any one line should not exceed five (5.0). If too many devices are attached, they may not ring properly.
6. In the event of an equipment malfunction, all repairs should be performed by your supplier or an authorized agent. It is the responsibility of users requiring service to report the need for service to the supplier or to an authorized agent.

INDUSTRY CANADA MODEM PHONE-NETWORK COMPATIBILITY STATEMENT

The Industry Canada (IC) label identifies certified equipment. This certification means that the equipment meets certain telecommunications-network protective, operation, and safety requirements. Industry Canada does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single-line individual service may be extended by means of a certified connector assembly (extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility—in this case, Black Box. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION!

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The LOAD NUMBER (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices, subject only to the requirement that the total of the load numbers of all the devices does not exceed 100.

Contents

Contents (continued)

1. Specifications

Compliance — EMI/RFI: FCC Part 15 Subpart J Class A, IC Class/classe A;
Phone-system compatibility: FCC Part 68 (registration number 4E1USA-21459-KX-N)

Ringer Equivalence Number — 0.2 B

Interface — Modular telco (PSTN)

Line Type — 2-wire dialup

Maximum Distance — 40423, 40424: 150 ft. (45.7 m) from Manager to analog phone device

User Controls — 40426: (1) Rear-mounted 4-position ring enable/disable DIP switch for subscriber ports 1 through 4;
40429:
(1) Rear-mounted 4-position ring enable/disable DIP switch for subscriber ports 1 and 2 (DIP-switch positions 3 and 4 are unused);
(7) Internal jumpers for temporary S Module conversion

Indicators — 40423 and 40424: (1) Front-mounted power LED;
40425: (3) Rear-mounted LEDs: (1) Power, (2) Busy [(1) for each telco port];
40426:
(1) Rear-mounted power LED;
(4) Front-mounted busy LEDs [(1) for each telco port];
40428: (1) Rear-mounted power LED;
40429:
(1) Rear-mounted power LED;
(2) Front-mounted busy LEDs [(1) for each telco port]

Connectors — For power: (1) Rear-mounted 2.1-mm jack;
To line:
40423, 40424: (1) Front-mounted RJ-11 (4-pin) female;
40425: (2) Rear-mounted RJ-11 (4-pin) female;
40426: (4) Front-mounted RJ-12 (6-pin) female;
40429: (2) Front-mounted RJ-12 (6-pin) female;
To devices: All RJ-12 (6-pin) female:
40423: (4) front-mounted;
40424: (4) front-mounted, (4) rear-mounted;
All other models: (8) front-mounted;
For expansion (40426, 40428, 40429 only):
(1) Rear-mounted DB25 female

Maximum Altitude — 10,000 ft. (3048 m)

Temperature Tolerance — Operating: 32 to 122˚F (0 to 50˚C);
Storage: –40 to +158˚F (–40 to +70˚C)

Humidity Tolerance — Up to 95% noncondensing

MTBF — 86,000 hours

Power — 40423, 40424: 3 VDC from telco line;
40425, 40426: 9 VDC at less than 100 mA from 110-VAC wallmount transformer;
40428, 40429: 9 VDC at less than 100 mA from Master through expansion cable

Size — 40423, 40424, 40425: 1.25"H x 4"W x 3"D (3.2 x 10.2 x 7.6 cm);
40426, 40428, 40429: 1.5"H x 7"W x 5.25"D (3.8 x 17.8 x 13.3 cm)

Weight — 40423, 40424: 0.3 lb. (0.1 kg);
40425, 40426, 40428, 40429:
Net (chassis only): 1 lb. (0.5 kg);
Shipping (chassis plus power supply): 1.5 lb. (0.7 kg)

2. Introduction

The Telephone Line Manager family of phone-line switches is primarily designed to allow multiple modems to share a lesser number of phone lines. But you can connect other standard analog devices instead of (or in addition to) modems—voice phones, fax machines, PBXs, etc. All of these analog devices will be able to receive inbound calls and place outbound calls in the same way.

Several Telephone Line Manager models are available with different power options and different combinations of "line ports" (connected to telephone lines) and "subscriber ports" (connected to devices):

- The 1-Line Slave models are powered by the phone line. The 1-Line 4-Port Slave (product code 40423) is a 1 x 4 switch (one telco line shared by four devices), while the 1-Line 8-Port Slave (40424) is a 1 x 8 switch (one telco line shared by eight devices).
- The 2- and 4-Line Master models are powered by a 9-VDC external power supply. The 2-Line 8-Port Master (40425) is a 2 x 8 switch (two telco lines shared by eight devices), while the 4-Line 8-Port Master (40426) is a 4 x 8 switch (four telco lines shared by eight devices).

The Slaves can support about 150 ft. (45.7 m) of cable from each of their subscriber ports to the attached device. The Masters can support even greater distances and also provide more signal filtration. For these reasons, the Slaves are normally located near the workgroup they're intended to serve, while Masters are often located in central wiring closets.

Expansion Modules can be stacked on the 4-Line Master and connected to its DB25 expansion port to increase the number of subscriber ports:

- The S Module (40428) provides eight additional subscriber ports for outbound calls only. Up to seven S Modules can be added to a single Master.
- The T Module (40429) provides two additional line ports *as well as* eight additional subscriber ports. T Modules can be stacked to create 6 x 16, 8 x 24, 10 x 32, etc., switching matrixes, with some restrictions.

3. How the Managers Work

The Telephone Line Managers are completely automatic. You won't have to program them or control them with codes or touchtones. And except for the 4-Line Master model and T Expansion Module, you won't even have to configure them—just plug everything in and you're ready to go.

The Managers are primarily used for outbound calls, but they can also handle inbound calls. Unlike other devices that first answer the line and then re-ring the subscribers, the Managers are very fast and inobtrusive. They operate on the fly, and once the connection is established, they're transparent to calls that come through them. The Managers put no additional jitter or noise on the line. They don't cause the voltage on the line to drop by more than 1.5 volts, which keeps even the most sensitive modems happy. It can support any modem data rate that standard phone lines can carry.

3.1 Outbound Calls

Any attached device can bid for an available line by going off hook. If a line is available (not busy), the device will be connected to that line and receive dial tone passed through from the central office. Otherwise, the Manager will prevent the bidding device from interrupting active communication sessions on the Manager's line(s). It will do this by presenting the bidding device with a dead, isolated line with no dial tone, which usually causes devices or the software controlling them to generate a "no dial tone" message for their operators. Devices that have been using a line can free it for other use by simply hanging up.

Slaves and Masters normally handle outbound calls in the same way, except for some extra line prioritization that the 4-Line Master (40426) and T Module (40429) do (see **Section 3.5**). Be aware, though, that if a Master loses AC power, it will maintain any existing telco connection, but it will not be able to maintain line isolation. (That is, it won't be able to prevent other attached devices from interrupting a call in progress.)

Modems and fax machines attached to the Managers should always be set to "wait for dial tone before dialing." This is the normal default setting for this kind of equipment, but modems that have been set differently can be restored using the ATX4 command if the modem recognizes the standard AT command set.

3.2 Inbound Calls

The Telephone Line Managers are more often used to share telco lines for outbound calling, but they can also receive calls.

If the Slave models receive an inbound call, they'll broadcast the call to all of their subscriber ports, and the first device to answer the call will "grab" the line and be exclusively connected. If you have a fax machine connected to one of a Slave's subscriber ports, you might want to disable auto-answering on any modems that are also attached (using the ATS0=0 command if the modem recognizes the standard AT command set), or at least set your modems to answer on more rings than the fax will (send ATS0=4 to have them answer on the fourth ring, for example). If all of the devices attached to a Slave are modems, you might want to designate one of them as the "answering modem" by setting it to auto-answer on an earlier ring than any of the other modems will.

If you're using a 2-Line Master, inbound calls on telco port A are directed to subscriber port 1, while inbound calls on telco port B are directed to subscriber port 2.

Inbound calls received by a 4-Line Master or T Module will be prioritized. See **Section 3.5**.

If there is no device to receive an inbound call, the line will continue to ring until the caller or calling device hangs up.

3.3 Cascading

In addition to attaching Expansion Modules, you can also add subscriber ports to your Telephone Line Manager system by cascading Managers. You can do this by connecting the telco ports of a lower-level Slave or Master Manager to the subscriber ports of main or mid-level "host" Master. This places some restrictions on telco-line access for the lower-level Manager. Refer to Figures 6-5 through 6-8 in **Chapter 6**.

Keep in mind that in a cascade, only Master models can be the hosts (the Managers whose subscriber ports other Managers are attached to). Slaves can't function as hosts.

3.4 Using Managers with ISDN or PBXs

You can also use Telephone Line Managers with ISDN terminal adapters or on either side of a PBX. (The Managers' telco ports can operate on the stepped-down 24V signal provided by most PBXs.) If you place a Manager on the extension side of a PBX, you can further share the PBX's expensive analog boards. If you place a Manager on the telco side of a PBX, you can make the PBX another subscriber device contending for line access and/or answering calls. (This is a common method of bypassing the restrictions that analog PBX boards can place on high-speed modem communication.) Refer to Figure 6-4 in **Chapter 6**.

3.5 Prioritizing Calls (4-Line Master and T Module Only)

The 4-Line Master Manager (40426) routes incoming calls from the telco line to the correspondingly numbered subscriber port. For example, incoming calls on telco line 1 will be routed to subscriber port 1, incoming calls on telco line 2 will be routed to subscriber port 2, and so on.

Outbound calls are prioritized to the lowest-numbered telco port. For example, if there are no inbound or outbound calls already in progress when devices attached to the 4-Line Master start calling out, the first outbound call will be assigned to telco port 1, the second call will be assigned to telco port 2, etc. For this reason, the lower-numbered telco ports will normally be busier than the others. Because the higher-numbered telco ports are more likely to be available for incoming calls, we recommend that you attach devices capable of receiving inbound calls to the 4-Line Master's higher-numbered subscriber ports.

There's one exception to the outbound telco-port assignment-prioritization scheme. If an outbound call is placed from a device attached one of the subscriber ports numbered 1 through 4 that's also "ring enabled" (able to receive inbound calls—see **Section 4.1**), the 4-Line Master's first priority is to try to place the call on the correspondingly numbered telco line. This is done so

that inbound calls on that line are more likely to receive a legitimate busy signal (a busy signal that actually indicates that the device they're trying to reach is unavailable). If that line is busy with another device's call, normal prioritization rules are followed.

For example, if a 4-Line Master has all four telco lines attached to it, and subscriber port 3 is "ring enabled" and has a fax machine attached to it, any outbound transmissions from that fax will be routed through telco port/line 3 if possible.

If the 4-Line Master detects a ring for a device that's ring-enabled, and that device is busy with an outbound call on another line, the line will continue to ring until the caller hangs up. If the caller lets the phone ring until the desired device becomes available, the Master will switch the call to that device.

If the 4-Line Master receives a call on a line that isn't ring-enabled, the Master will answer the call and immediately hang up. This will free up the line more quickly for outbound use.

The T Module operates a bit differently, but the results are the same. If you've ring-enabled its subscriber ports 1 and 2, it will route inbound calls it receives on its own dedicated telco lines to those ports. However, for outbound calls, not all of the devices attached to subscriber ports of stacked T Modules have access to

all of the telco lines in the stack. Instead, the devices have access only to the two telco ports on the same T Module and to ports 3 and 4 on the 4-Line Master, which all of the subscriber ports in the stack share. Devices on T Modules do *not* have access to telco ports on other Modules in the stack, or to telco ports 1 and 2 on the Master. For this reason, you should try to spread your heavy-line-use devices as evenly as possible among the T Modules in a stack; do *not* attach all of your heavy-line-use devices to the same Module.

4. Configuration (4-Line Master and T Module Only)

Most of the Telephone Line Manager models won't require any configuration at all. But there are a couple of settings that you might want to change on the 4-Line Master (40426) and the T Expansion Module (40429).

4.1 Ring Enable/Disable on Subscriber Ports

On the 4-Line Master, whether or not subscriber ports 1 through 4 will accept inbound calls is determined by the setting of the unit's rear-mounted 4-position "ring enable" DIP switch, labeled "RNG." The T Expansion Module has an identical ring enable" DIP switch for its subscriber ports 1 and 2; switch positions 1 and 2 control the corresponding ports and positions 3 and 4 are unused.

For each subscriber port, set the corresponding DIP-switch position to UP to ENABLE that port to accept incoming calls ("ring enabled"), or set it to DOWN to DISABLE that port from accepting calls ("ring disabled"). DOWN/DISABLED is the factory-default setting for all positions.

If the Master or Module detects the ring of an incoming call on a ring-disabled port, it will answer the call and hang up right away to free up the line. Be sure to leave any ports you're not actually using ring-disabled. Also keep in mind that disabling ring to modems installed on the Master or Module can be a useful security feature—modems that can't receive inbound calls are less likely to be used by hackers for electronic attacks on your system.

4.2 Temporary T-to-S Module Conversion

At times—particularly if not all of your site's phone lines are installed yet, or if you are having work done on your site's phone lines or phone system—you might want to temporarily convert your T Expansion Module into an S Module so that the devices attached to its subscriber ports will have access to all four of the telco lines on the 4-Line Master Manager that the T Module is connected to.

To do this, first *make sure* that the T Module is disconnected from all other devices. Then unscrew the screws on the bottom of the Module's case that hold the case together and lift the top of the case off. On the Module's circuit board, you'll see seven internal jumper-post pairs designated JP2 through JP8. There will be a jumper resting on a single post of each of these pairs. For each pair, install the jumper on *both* posts to switch to S-Module behavior. Finally, replace the top of the Module's case and screw it back on.

The T Module will now behave as if it were a regular S Module until you reverse the procedure by moving the jumpers back to covering only a single-post in each pair. Be aware that while it's possible to set a T Module to function as if it were an S Module, it isn't possible to reconfigure an S Module as a T Module.

5. Installation

The Telephone Line Managers models are all installed slightly differently, as described in the following sections.

To connect the Manager to your site's phone system and to your devices, we recommend using straight-through-pinned 2- or 4-wire telephone cable terminated with RJ-11 connectors, such as our 4-wire cable EL04MS-MM.

The telco ports on the Slaves and the 2-Line Master are 4-pin RJ-11 connectors. However, all subscriber ports (the ones labeled "station"), as well as the telco ports on the 4-Line Master and Expansion Modules, are actually 6-pin RJ-12 connectors—you can use 6-wire RJ-12 cables to make connections to these ports if you want. Just remember that the Managers *don't* support dual phone lines, so don't try to run a second line through them on the extra wires of a 4-wire or 6-wire cable.

Whether you use a 2-, 4-, or 6-wire cable, the middle two pins of this cable's RJ-11 or RJ-12 connector should carry the TIP and RING signals. Which pin carries which signal doesn't really matter; the Managers aren't polarity-sensitive, so they can automatically compensate for "rolled" or cross-pinned phone cables if you have to use these. (That being said, it's still a good idea to maintain consistent polarity throughout your installation.)

5.1 Installing a 2-Line Master (40425)

1. Plug the output cord of the 2-Line Master's power supply into the power jack on the back of the Master.
2. Plug the power supply's transformer into a standard, working 110-VAC outlet. The Master's rear-mounted power LED should light.
3. Use phone cable (refer to the guidelines at the start of this chapter) to connect the Master's rear-mounted telco ports to your phone-system wall jacks. If you only need to use one of the Master's two telco ports, you *must* use port A. Port A should also always be used as the primary line for incoming calls.
4. Connect an analog phone device (modem, fax machine, telephone handset, etc.) to one of the Master's front-mounted subscriber ports. Use the device's own phone cable if it came with one; otherwise, use a phone cable that meets the guidelines presented at the start of this chapter.
5. Take the device off hook (for example, by dialing a test number if the device is a modem or fax). Telco port A's busy LED (which is next to the port) should light.

6. If you're using both telco lines, connect another analog device and take it off hook while the first device is still using telco port A. Telco port B's busy LED should light.

If either busy LED fails to light, check the phone cable of any non-working device by plugging the device directly into a phone-system wall jack. If the device doesn't work when it's directly plugged in, the cable is probably defective or incorrectly pinned. If the device functions properly when it's directly plugged in, call Black Box Technical Support.

7. Connect the remainder of your analog devices.

5.2 Installing a 4-Line Master (40426)

1. Plug the output cord of the 4-Line Master's power supply into the power jack on the back of the Master.
2. Plug the power supply's transformer into a standard, working 110-VAC outlet. The Master's rear-mounted power LED should light.
3. Use phone cable (refer to the guidelines at the start of this chapter) to connect the Master's front-mounted telco ports to your phone-system wall jacks. If you don't need to use all of the Master's telco ports, hook up the ports in this order of priority: telco port 1 (primary line) first, then port 2 (secondary line), then port 3, and then port 4.
4. Connect your analog phone devices (modems, fax machines, telephone handsets, etc.) to the Master's front-mounted subscriber ports. Use each device's own phone cable if it came with one; otherwise, use a phone cable that meets the guidelines presented at the start of this chapter.

   Any devices that can accept incoming calls should be connected to subscriber ports 1 through 4, starting with the highest-numbered port available (port 4) and working your way back to port 1. (If you haven't already done so, enable incoming calls by setting the DIP switches for the

incoming-call devices' subscriber ports to "ring enable"; see **Section 4.1**).

5. If you have any Expansion Modules to add to the system, attach them to the Master as described in **Section 5.4**.
6. Take one of the analog devices directly attached to the Master off hook (for example, by dialing a test number if the device is a modem or fax). Telco port 1's busy LED should light.
7. If you're using additional telco lines, take one, two, or three other analog devices off hook simultaneously. The busy LEDs for telco ports 2, 3, and/or 4 should light.

If any of the busy LEDs fail to light, check the phone cable of any non-working device by plugging the device directly into a phone-system wall jack. If the device doesn't work when it's directly plugged in, the cable is probably defective or incorrectly pinned. If the device functions properly when it's directly plugged in, call Black Box Technical Support.

5.3 Installing a Slave (40423 or 40424)

1. Run phone cable (refer to the guidelines at the start of this chapter) from the Slave's telco port to one of your phone-system wall jacks.
2. Connect one of your analog phone devices (modems, fax machines, telephone handsets, etc.) to one of the Slave's subscriber ports using the device's phone cable.
3. Take the device off hook (for example, by dialing a test number if the device is a modem or fax). The Slave's busy LED should light.

   If the LED remains *dark*, check the phone cable of the non-working device by plugging the device directly into a phone-system wall jack. If the device doesn't work when it's directly plugged in, the cable is probably defective or incorrectly pinned. If the device functions properly when it's directly plugged in, call Black Box Technical Support.
4. Connect the remainder of your analog devices, performing the test described in step 3 each time. On the 8-Port Slave, keep in mind that half of the subscriber ports are on the front of the unit and half are on the back.

5.4 Installing an Expansion Module (40428 or 40429)

1. Place the Module close to the Master. You can put Modules on a desktop beside the Master if you want to, but we recommend stacking Modules on top of the Master. (There is no locking system or special stacking arrangement; simply set one Module on top of the Master, then set additional Modules directly on top of the first one as necessary.)
2. Use the included expansion cable to connect the Module to your Manager system as shown in Figure 5-1 on the next page. This cable is a ribbon cable with a DB25 male connector at one end and both a DB25 male and a DB25 female connector at the other end. Attach the DB25 male on the dual-connector end of the cable to the DB25 female expansion port on the back of the Module. Then attach the DB25 male on the other end of the cable to the expansion port on the Master (if this is the first Module in your stack) or to the DB25 female connector on the cable attached to the next Module's expansion port.

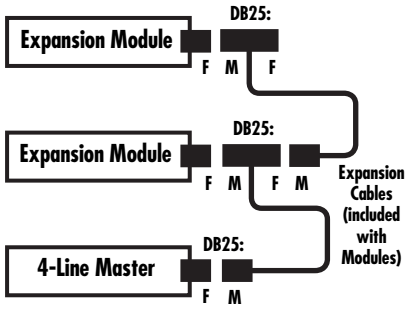

Figure 5-1. Connecting Expansion Modules to your Manager system.

6. Applications

The Telephone Line Managers are very flexible, and there are many ways to make use of them in a phone system. This chapter illustrates some Manager applications.

Figure 6-1 shows a standard application with assorted devices attached to a single Manager. Figure 6-2 shows a PBX and several independent devices sharing a Manager's lines. Figure 6-3 shows a Manager with some lines that function as a PBX extension. Figure 6-4 shows a Manager being used to share a POTS phone line attached to an ISDN terminal adapter.

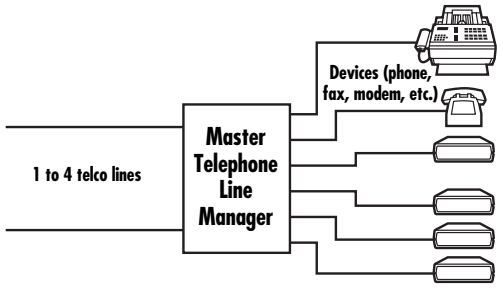

Figure 6-1. Basic line sharing.

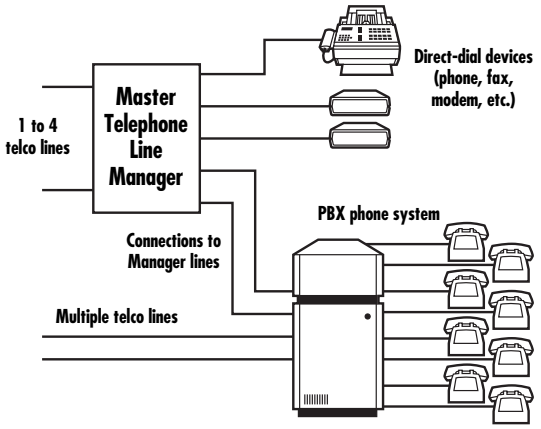

Figure 6-2. Line sharing with a PBX on the device side.

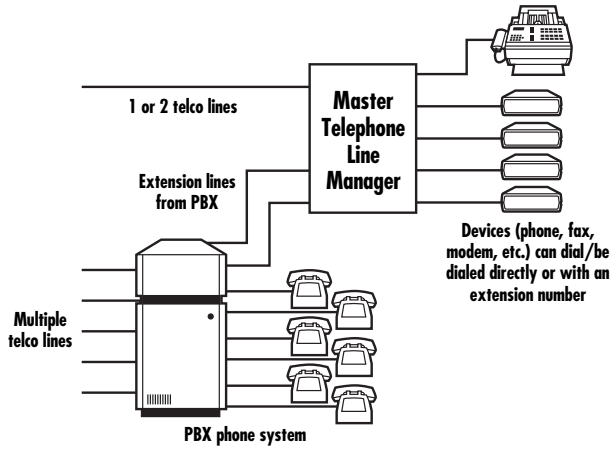

Figure 6-3. Line sharing with a PBX on the line side.

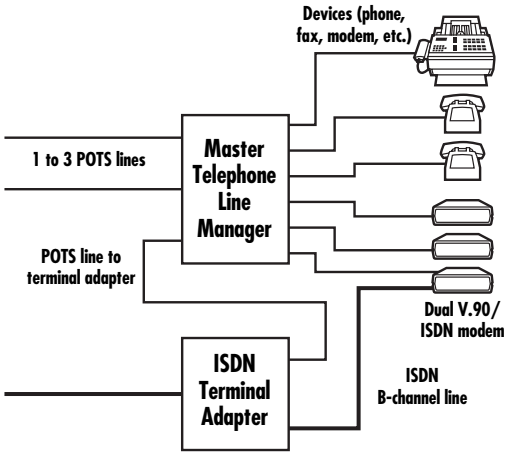

Figure 6-4. Sharing a POTS port on an ISDN terminal adapter.

Figures 6-5 through 6-8 show how the Managers can be used with in-line security devices such as our Lock and Key set (product code 39625), as well as how the Managers can be cascaded. In these figures, the security devices are designated with "S↑" for outbound security and "S↓" for inbound security.

In Figure 6-5, any of the terminals can place a call to a secure host (usually a corporate mainframe or server) or to any nonsecure modems.

In Figure 6-6, any of the terminals can place outbound calls, but any inbound call that doesn't originate from a secure location is refused.

In Figure 6-7, one standalone terminal and one group of terminals are able to access a secure host, using whichever of the two telco lines that might be available; none of the other terminals can reach that host. All of the terminals can dial out to other numbers and/or receive nonsecure inbound calls.

In Figure 6-8, one group of terminals is able to access a secure host, and one terminal is protected from nonsecure inbound calls that might come in on any of the four telco lines. This terminal might be a PC or server with sensitive data. Of course, many or all of these terminals might be interconnected in the same LAN. It isn't a good idea to allow unrestricted inbound-call access to any terminal connected to a LAN.

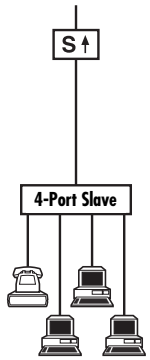

Figure 6-5. Terminals can call a secure host or nonsecure modems.

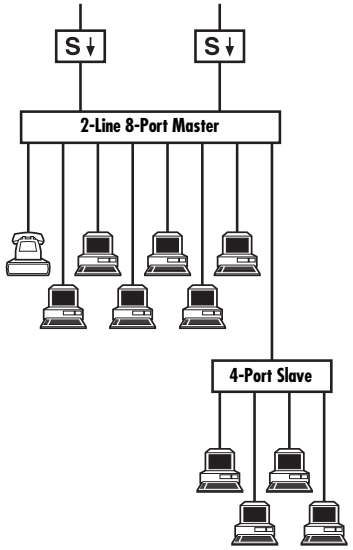

Figure 6-6. Terminals can place outbound calls, but incoming nonsecure calls are refused.

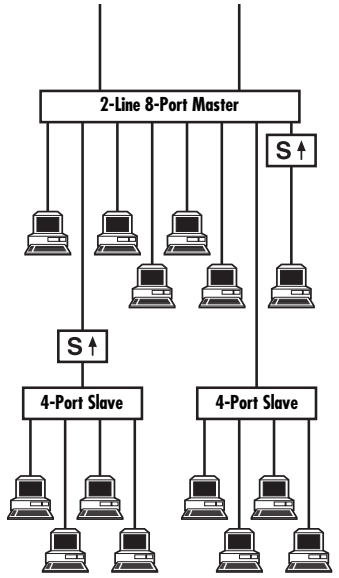

Figure 6-7. One terminal on the Master and all of the terminals on a Slave can call a secure host.

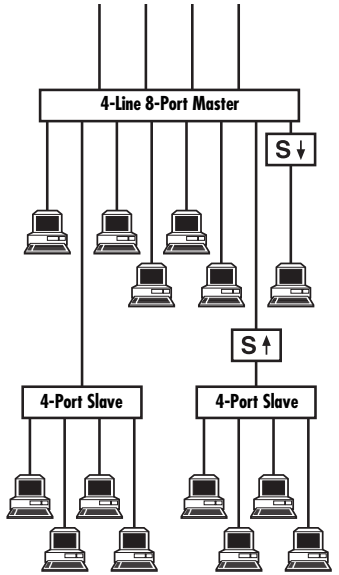

Figure 6-8. One terminal on the Master can receive only secure calls; all terminals on a Slave can call a secure host.

7. Troubleshooting

7.1 Calling Black Box

If your Telephone Line Manager seems to be malfunctioning, *do not attempt to alter or repair it.* It contains no user-serviceable parts. Call Black Box Technical Support at 724-746-5500; the problem might be solvable over the phone.

Before you call, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem;
- when the problem occurs;
- the components involved in the problem;
- any particular application that, when used, appears to create the problem or make it worse; and
- the results of any testing you might have already done.

7.2 Shipping and Packaging

If you need to transport or ship your Telephone Line Manager:

- Package it carefully. We recommend that you use the original container.
- If the shipping is return- or repair-related, include everything you received with the Manager when you pack it. Contact Black Box to get a Return Authorization (RA) number.

NOTES

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