PayLink-IP/Dial Configuration Guide

This document describes the configuration features of the PayLink-IP/Dial. It covers:

1. Hardware connection
2. On-line connection
3. Network settings
4. Advanced network settings
5. Terminal side configuration
6. Host side configuration
7. Protocol configuration
8. Password configuration
9. Glossary
10. Appendix A: Message negotiation
11. Appendix B: Hardware status LEDs

1. Hardware connection

Hardware setup

1. Connect the power supply to the PayLink-IP/Dial and to AC power. The power (red) LED will light to indicate that the unit is receiving power.

2. Connect an Ethernet cross-over cable to the Ethernet RJ-45 jack of the PayLink-IP/Dial. Attach the other end of the crossover network cable to a host PC directly.

Network status is indicated by two LEDs as described in "Appendix B: Hardware status LEDs" on page 29.

3. Open a web browser to the IP address of the PayLink-IP/Dial and configure the device as described in the following pages of this manual.

4. After configuring the PayLink-IP/Dial, attach it to your network and connect a payment terminal to its POTS (RJ-11) port.

Communication status is indicated by two status LEDs as described in "Appendix B: Hardware status LEDs" on page 29.

Dialing

The PayLink-IP/Dial accepts only DTMF tones on its POTS connector (that is, standard dial tones). Payment terminals that employ pulse dialing only cannot be used with the PayLink-IP/Dial.

2. On-line connection

Configuration of the PayLink-IP/Dial begins by entering the IP address of the PayLink-IP/Dial (factory default is 192.168.0.35) into a web browser's location bar (Microsoft Internet Explorer recommended).

An embedded web server in the PayLink-IP/Dial will present the entry screen to the PayLink-IP/Dial configuration options, and show the current settings for the device being addressed:

Figure 1: Opening Screen

Log into the PayLink-IP/Dial by entering the password into the "Enter password:" text entry box and click on the "Configure" button (hitting the Enter key on your keyboard will not work). By default, the PayLink-IP/Dial ships with no password. To configure the PayLink-IP/Dial when no password is set, **do not enter any characters into the password box**; simply click on the "Configure" button.

NOTE: As a security feature, after a user has made three consecutive failed attempts at entering a password, the PayLink-IP/Dial will refuse further password attempts. At this point the PayLink-IP/Dial will continue to operate as currently configured, but will not be available for configuration changes. The password dialog box will also disappear from the opening screen.

To unlock the PayLink-IP/Dial, it must be given the "unlock password" as described in "Password configuration" on page 16.

Once a password has been accepted, the PayLink-IP/Dial will present the following Configuration Menu:

Figure 2: Configuration Menu
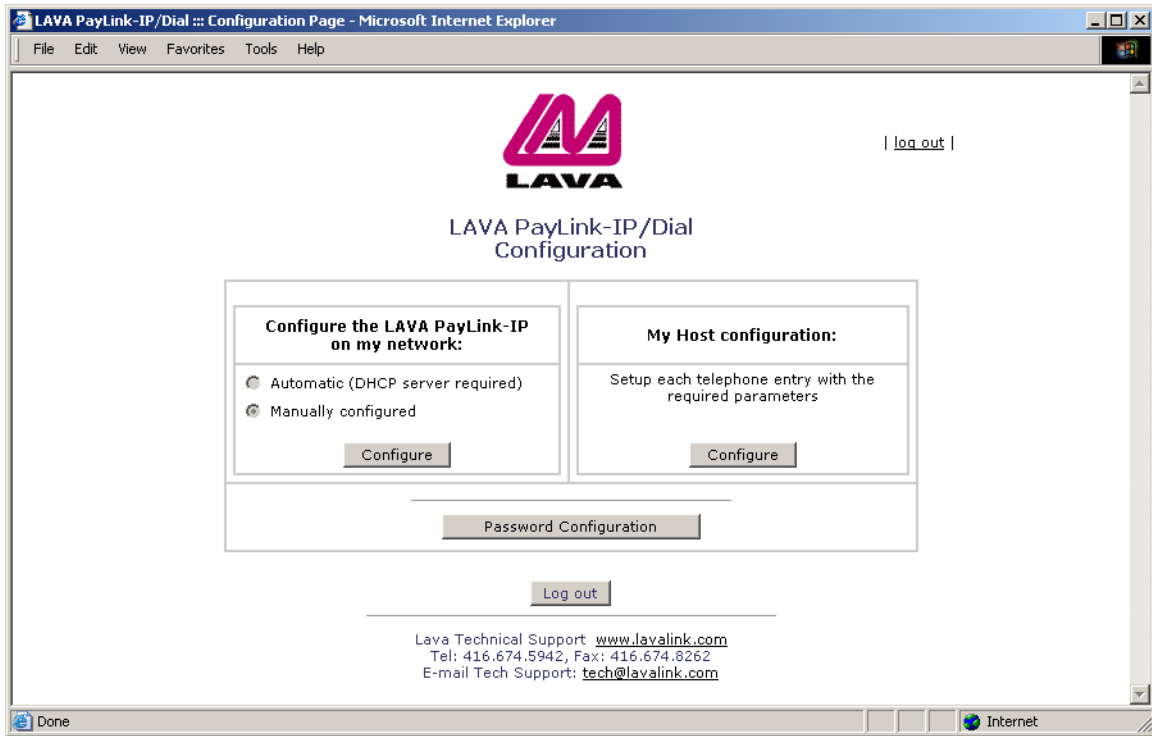
From the Configuration Menu you can open screens to view and modify network settings, payment terminal interface settings, host side interface settings, and passwords for the PayLink-IP/Dial. The radio buttons displayed on this screen indicate the current configuration of the PayLink-IP/Dial; changing these settings is done by clicking the relevant "Configure" button.

3. Network settings

The Network Settings screen allows configuration of the network parameters for the PayLink-IP/Dial:

Figure 3: Network Settings
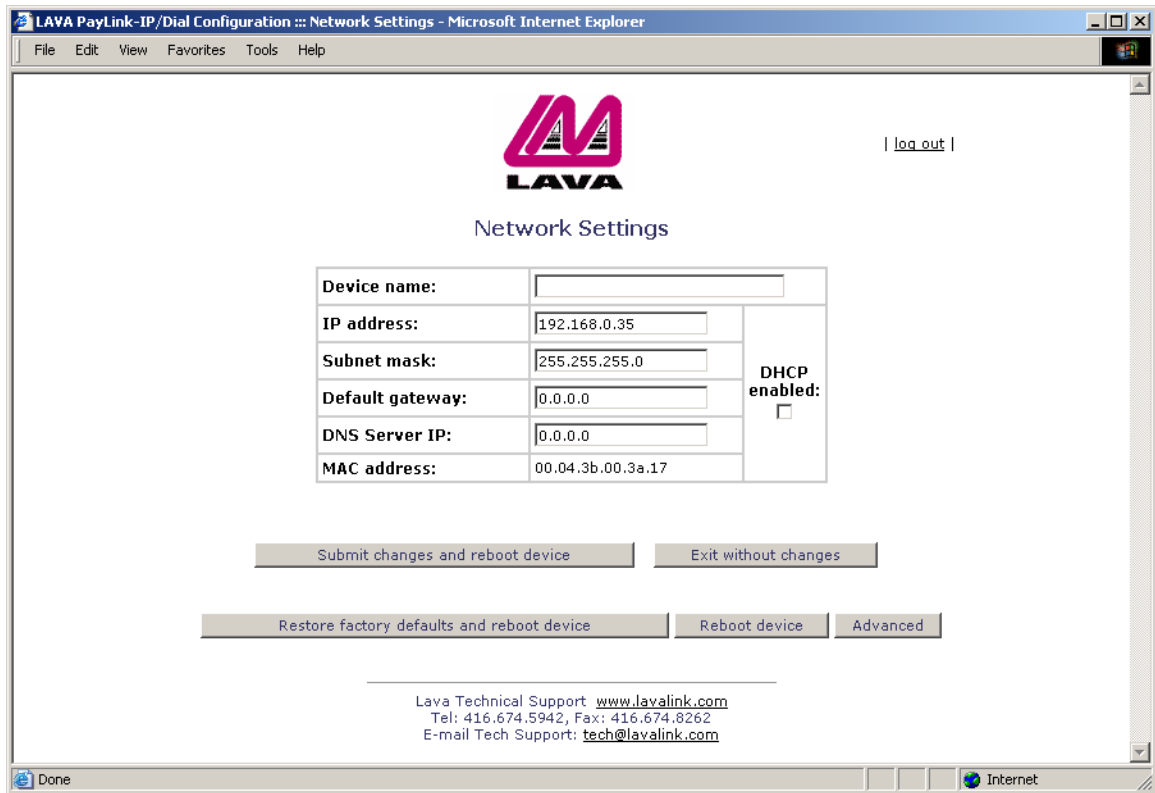
The following network settings are presented:

Device name

Use this field to supply a "friendly" name for the PayLink-IP/Dial device being configured. The friendly name is optional, and can be chosen to provide a conveniently-remembered name for the unit.

IP address

The IP address for the PayLink-IP/Dial will identify the device on the LAN on which it is located. Any conventional IP address can be used. The PayLink-IP/Dial ships with its default IP address as 192.168.0.35; ensure that this IP address is accessible on the LAN onto which the PayLink-IP/Dial is being installed.

NOTE: When DHCP is enabled, any IP address value entered here will be overridden.

Subnet mask

A subnet mask can be configured for the PayLink-IP/Dial in this dialog box; by default the PayLink-IP/Dial is set with a subnet mask of 255.255.255.0.

Note on subnet configuration with the PayLink-IP/Dial. If the PayLink-IP/Dial is on a different subnet from a client station that is attempting to access it, the PayLink-IP/Dial will be visible in an instance of the management application-running on the client station, and its ports can be activated on that client station, but applications running on the client station will not be able to open a serial port on the PayLink-IP/Dial.

For example, if the IP address of the PayLink-IP/Dial is 192.168.0.35 and the IP address of the client station is 192.168.1.1, the two devices are on different subnets (as indicated by the difference between the "0" and the "1" in the third portion of the two IP addresses).

Two solutions exist:

- change the subnet of the either the PayLink-IP/Dial or the client station so that they are both on the same subnet or,

- change the subnet mask of the PayLink-IP/Dial to encompass both subnets. By default, the PayLink-IP/Dial has its subnet mask set to 255.255.255.0. This setting excludes all but the fourth portion of the IP address when assessing IP addresses. In the example above, a subnet mask of 255.255.0.0 will include the PayLink-IP/Dial in both subnets.

Default gateway

Configure the local IP address of the default gateway that the PayLink-IP/Dial will use to communicate with devices outside its network segment.

DNS server IP

If an external DNS server is being used to convert DNS names to IP addresses, the IP address of the DNS server is entered here. By default this field is blank.

DHCP enabled

If installing the PayLink-IP/Dial onto a network where IP addresses are to be assigned by a DHCP server, the "DHCP enabled" checkbox must be set. The PayLink-IP/Dial will act as a DHCP client and obtain its IP address from the DHCP server/s on its LAN.

NOTE: When DHCP is enabled, any IP address value manually configured for the PayLink-IP/Dial will be overridden.

NOTE: If no DNS server is running when DHCP is enabled, connection to the PayLink-IP/Dial will be lost.

MAC address

The MAC address of the PayLink-IP/Dial is shown for reference. This address cannot be changed.

Implementing changes:

After making changes to the network settings, five options exist:

Submit changes and reboot device

This option will register the changes you have entered into the dialog box and reboot the PayLink-IP/Dial, implementing the changes on reboot.

Restore factory defaults and reboot device

This option will restore factory defaults and reboot the PayLink-IP/Dial, implementing the changes on reboot.

Exit without changes

This option will discard changes entered into the dialog box and return you to the "Configuration Menu" screen.

Reboot device

This option will reboot the device with the settings currently implemented, and discard any changes.
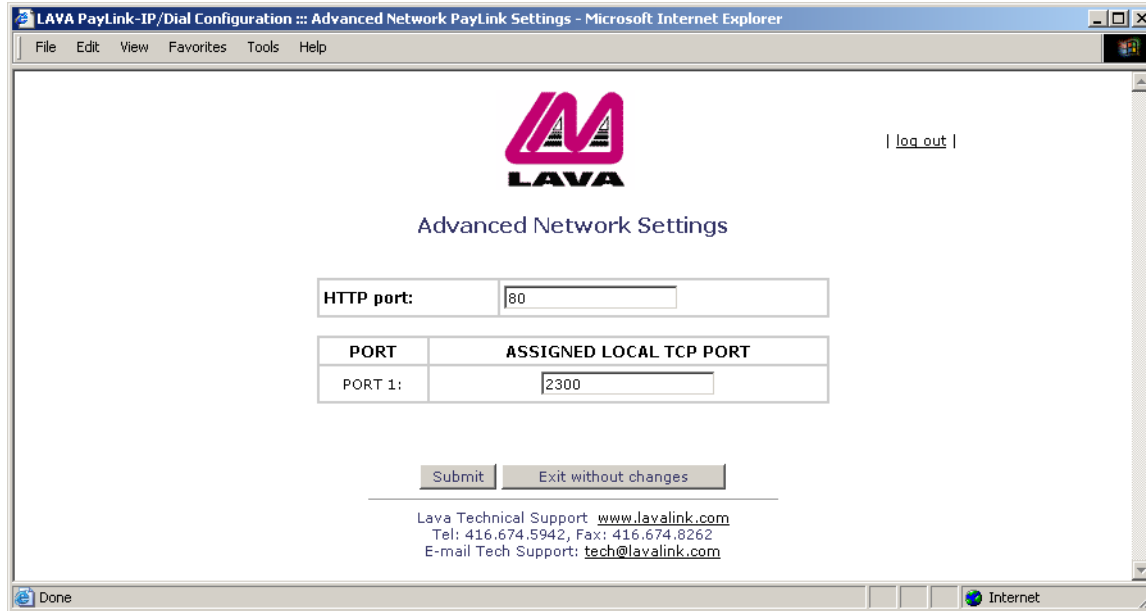
Advanced

This option opens the "Advanced Network Settings" dialog.

4. Advanced network settings

Available from the Network Settings page, the Advanced Network Settings page allows configuration of network port settings for the PayLink-IP/Dial.

Figure 4: Advanced Network Settings

The following advanced network settings can be configured:

HTTP port

By default, the PayLink-IP/Dial communicates on port number 80. A measure of increased security may be obtained by changing this port number to a user-selected TCP port for HTTP communications.

Assigned local TCP port

Use this dialog box to change the TCP port number assigned to the PayLink-IP/Dial. By default the PayLink-IP/Dial assigns TCP port 2300 to the PayLink-IP/Dial; if another device on the network is already using this TCP port number, reassign the PayLink-IP/Dial to another TCP port.

Implementing changes:

After making changes to the advanced network settings, two options exist:

Submit

This selection will register the changes you have entered into the dialog box and reboot the PayLink-IP/Dial, implementing the changes on reboot.

Exit without changes

This selection will discard changes entered into the dialog box and return to the "Network Settings" screen.

5. Host side configuration

If you choose the "My Host configuration" option from the main Configuration Menu, a screen of the following form will appear:

Figure 5: Host side configuration

This screen presents the host configuration settings for contacting payment processors. Settings can be independently configured for a primary host (such as a credit host), a secondary host (such as a debit host), and two additional user-defined hosts (such as charge, gift, or loyalty hosts). For any host that is being used, three parameters need to be supplied:

- Telephone number
- IP address or fully qualified DNS name
- IP port (default: 443)

These three parameters map a telephone number to an IP address/IP port. The telephone number that would be dialed over a POTS connection by a payment terminal's modem is now mapped to the IP address and IP port that will be used by the payment processor. This information will be supplied to the merchant by the payment processor.

NOTE: As the telephone number is no longer actually being dialed, a single digit proxy can be used. Doing so will minimize dialing time compared to dialing a full telephone number. When supplying a proxy telephone number in the place of a full telephone number, ensure that the telephone number proxy supplied to the PayLink-IP/Dial is the same as the number that has been programmed into the payment terminal.

NOTE: If more than one IP address/port number is mapped to a single telephone number, the first IP address/port number will be used.

In addition to the parameters above, a "fallback" IP address and IP port can be supplied for each of the payment hosts configured. In the event that the PayLink-IP/Dial cannot connect to the primary address for the host, the fallback address will be attempted.

6. Terminal side configuration

Choosing "Configure SDLC or "Configure ASYNC" from the Host Side Configuration Settings screen will present a configuration screen for the specific host connection you have chosen. Its form will depend on whether the terminal has been configured for asynchronous communications or SDLC communciations in the main Configuration Menu.

If the terminal is configured for asynchronous communications, the following screen will appear:

Figure 6: Terminal side configuration (Asynchronous)

This page presents configuration dialogs for the PayLink-IP/Dial's modem, and for data formats for communication with your payment terminal.

Modem Settings

Baud Rate. This parameter provides a range of modem baud rates and modes. From 14400 V.32 bis to 1200 V.22/V.22 bis, the modem will negotiate downward until it can connect to the terminal.

- 14400 V.32 bis (Async)
- 12000 V.32 bis (Async)
- 9600 V.32/V.32 bis (with Trellis coding) (Async)
- 9600 V.32 (no Trellis coding) (Async)
- 7200 V.32 (Async)
- 4800 V.32/V 32.bis (Async)
- 2400 V.22 bis (Async)
- 1200 V.22/V.22 bis (Async)

Data bits

- 8 data bits
- 7 data bits

Stop bits

- 2 stop bits
- 1 stop bit

Parity

- No parity
- Even parity
- Odd parity

NOTE: If possible, choose a mode that will minimize negotiation of baud rate between the payment terminal's modem and the PayLink-IP/Dial. Doing so may reduce the total time required to process transactions. If the PayLink-IP/Dial's baud rate is set higher than the baud rate at which the terminal will communicate, unnecessary steps in baud rate negotiation will occur.

Terminal ID. When the message format requires a Terminal ID, enter it here. This field supports a maximum of 20 characters.

Terminal settings

The PayLink-IP/Dial can be configured to manage connecting to and from a terminal using a number of options, as outlined in the following pages.

Terminal Data Format

- 7 bits even parity (default)
- 7 bits odd parity
- 7 bits no parity
- 8 bits

NOTE: "Terminal Data Format" refers to the organization of the actual data transmitted by the terminal. The parity settings indicated here are *not* the same as the modem parity settings.

Message Negotiation

Message negotiation settings are:

- Send ENQ to terminal to initiate transmission

This setting should be enabled when the payment terminal expects to receive an ENQ prior to sending out transaction data. Possible settings are:

Default operation — "Send ENQ", "Use SYN/SYN/SYN", "Send ACK" all disabled (see page 18)
Opening a connection — "Send ENQ" enabled (see page 19)
Opening a connection — "Send ENQ" disabled (see page 20)

- Use SYN/SYN/SYN preamble to establish connection

This setting should be enabled when the payment terminal looks for a synchronization string before the initial ENQ string.

- Send ACK to terminal after each received message

This setting should be enabled when the payment terminal expects to receive an ACK after each message received by the server. Possible settings are:

Data flow — "Send ACK" enabled (see page 21)
Data flow — "Send ACK" disabled (see page 22)

Set InterChar delay

Inter-character delay specifies the maximum time that the PayLink-IP/Dial will accumulate data before forwarding it to its destination. Inter-character delay is a variable that can be set in the range 5-60 ms. By default the inter-character delay is set to 20 ms.

Transaction ended by:

The PayLink-IP/Dial can be configured to end a transaction with a payment terminal under a number of conditions. Possible settings are:

Closing connections — "Server (default)" mode (see page 23)
Closing connections — "ACK from terminal, EOT to terminal" mode (see page 24)
Closing connections — "ACK from terminal, ACK to terminal" mode (see page 25)
Closing connections — "EOT from terminal, EOT to terminal" mode (see page 26)
Closing connections — "EOT to terminal when TCP/IP closed" mode (see page 27)
Closing connections — "ACK to terminal when TCP/IP closed" mode (see page 28)

If the terminal is configured for SDLC communications, the following screen will appear:

Figure 7: Terminal side configuration (SDLC)
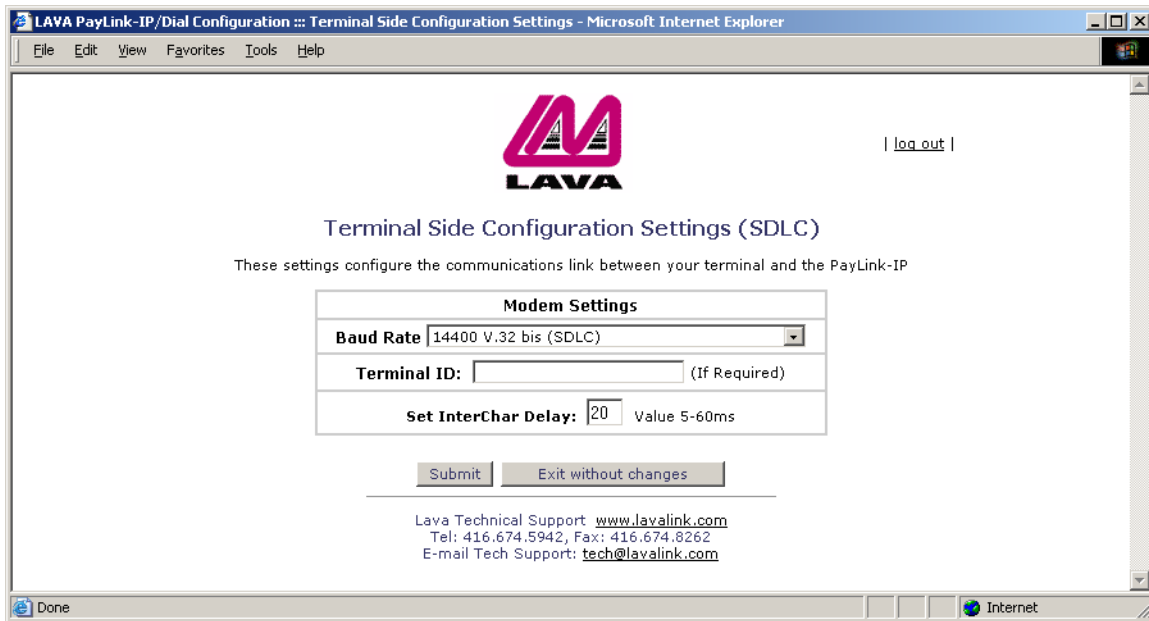
This page presents baud rate settings for the PayLink-IP/Dial's modem, terminal ID setting, and intercharacter delay setting for the terminal.

Modem Settings

Baud Rate. This parameter provides a range of modem baud rates. The modem will negotiate baud rate downward until it can connect to the terminal.

- 14400 V.32 bis (SDLC)
- 12000 V.32 bis (SDLC)
- 9600 V.32/V.32 bis (with Trellis coding) (SDLC)
- 9600 V.32 (no Trellis coding) (SDLC)
- 7200 V.32 (SDLC)
- 4800 V.32/V 32.bis (SDLC)
- 2400 V.22 bis (SDLC)
- 1200 V.22/V.22 bis (SDLC)

NOTE: If possible, choose a mode that will minimize negotiation of baud rate between the payment terminal's modem and the PayLink-IP/Dial. Doing so may reduce the total time required to process transactions. If the PayLink-IP/Dial's baud rate is set higher than the baud rate at which the terminal will communicate, unnecessary steps in baud rate negotiation will occur.

Terminal ID

When the message format requires a Terminal ID, enter it here. This field supports a maximum of 20 characters.

Set InterChar delay

Inter-character delay specifies the maximum time that the PayLink-IP/Dial will accumulate data before forwarding it to its destination. Inter-character delay is a variable that can be set in the range 5-60 ms. By default the inter-character delay is set to 20 ms.

7. Protocol configuration

If you choose any of the "Protocol Configuration" buttons from the Host Side Configuration page, a Protocol Configuration screen will appear. Each payment host set up on the Host Side Configuration page can be assigned its own protocol settings.

If the terminal is configured for asynchronous communications, the Protocol Configuration screen will take the following form:

Figure 8: Protocol configuration (Asynchronous)

If the terminal is configured for SDLC communications, the Protocol Configuration screen will take the following form:

Figure 9: Protocol configuration (SDLC)

These pages present the protocol configuration settings for the any of the PayLink-IP/Dial's payment hosts. The following can be configured:

Server Data Format (Async only)

This setting allows configuration PayLink-IP/Dial to match the data format of the server to which data is sent. Settings are:

- 7 bits even parity (default)
- 7 bits odd parity
- 7 bits no parity
- 8 bits

Message formats (Async only)

A selection of message formats are available for communicating with the remote server. The choice of format will depend on the requirements at the remote server. This information will be provided by the payment processor.

Pass through

Messages are passed between the PayLink-IP/Dial and the server without additional framing or parsing. In pass-through mode, data is sent when the maximum packet size is reached or when the inter-character delay limit is exceeded. Use this message format when terminal and server are framing packets identically.

Figure 10: Pass through message format

DP3000

Data is sent as raw packets with a user-defined 4-byte header. Each byte is entered as a two-character hexadecimal value. The default header setting is 00 00 00 00. Data is passed through the PayLink-IP/Dial to the server without framing or parsing. In DP3000 mode, data is sent when the maximum packet size is reached or when the inter-character delay limit is exceeded.

Figure 11: DP3000 message format

Header option	data

Merchant Link

Data is sent as packets with a header containing a user-defined element, the Gateway Message Format. The default Gateway Message Format used is VISA-II; other formats can be entered as character strings.

Visa 1/2 standard framing

Standard-mode Visa 1/2 frames packets with STX, ETX, and LRC framing elements as shown below:

Figure 12: VISA 1/2 standard framing

STX	data	ETX	LRC

Visa 1/2 transparent framing

Transparent-mode Visa 1/2 frames packets with DLE, STX, DLE, ETX, CRC1, and CRC2 framing elements as shown below:

Figure 13: VISA 1/2 transparent framing

DLE	STX	data	DLE	ETX	CRC1	CRC2

Length prefix framing

Includes a 2-byte header that indicates the total length of the data frame that follows, in Most Significant Bit, Least Significant Bit order. An ETX (End of TeXt) character can be optionally appended by checking the "Append ETX" checkbox.

Figure 14: Length prefix framing

MSB	LSB	data	ETX option

First Data framing

Framing to suit the First Data Merchant Services protocol. Includes a 2-byte header that indicates the total length of the data in the frame that follows, in Most Significant Bit, Least Significant Bit order. Data is also framed with Start of TeXt and End of TeXt characters, and a Longitudinal Redundancy Check checksum is appended.

Figure 15: First Data framing

MSB	LSB	STX	data	ETX	LRC
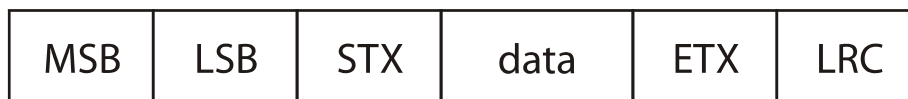
Send message as:

This dialog specifies encryption options for server connection used by the PayLink-IP/Dial. By default SSL is enabled. Options are:
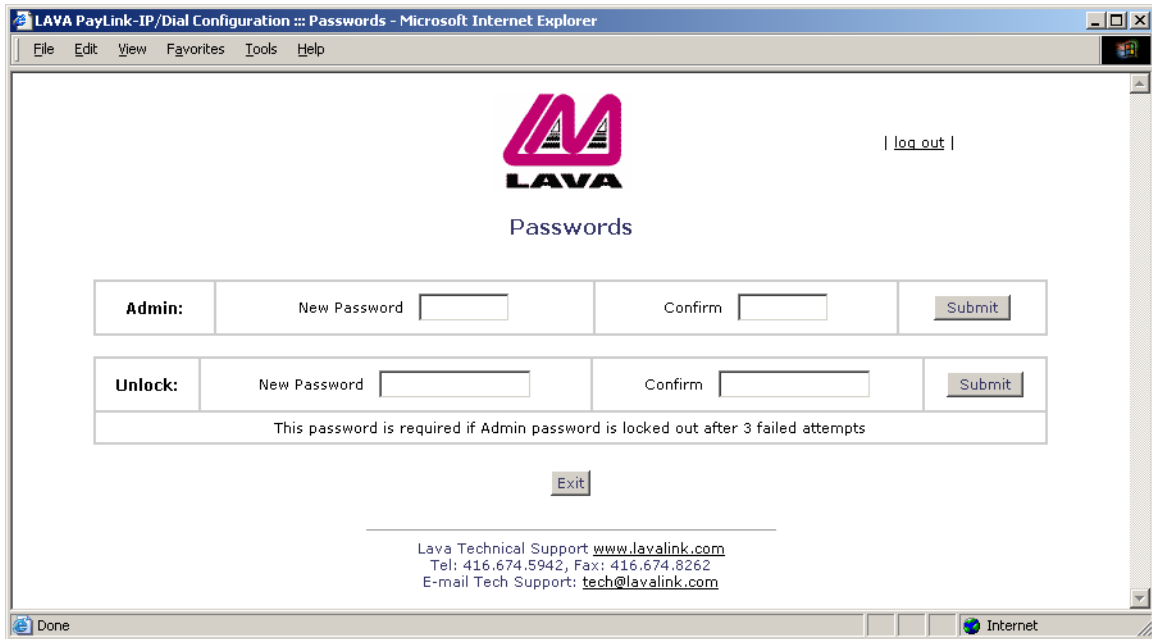
- SSL 3.0 encrypted data (default)
- Data Only - SSL off (no encryption)

NOTE: SSL *must be enabled* for secure payment processing.

8. Password configuration

If you choose the "Passwords" option from the main Configuration Menu, a screen of the following form will appear:

Figure 16: Password configuration

This dialog box allows a new administrator's password to be set for the PayLink-IP/Dial. Enter the new password, confirm it by retyping it in the second entry box, and then click the "Submit" button. To configure the PayLink-IP/Dial when no password is set, **do not enter any characters into the password box**; simply click on the "Configure" button.

This dialog box also has fields for entering a new "unlock password". This second password is used when the PayLink-IP/Dial has locked itself against three failed attempts being made to supply an administrator's password, as described below. Enter the new password, confirm it by retyping it in the second entry box, and then click the "Submit" button. To unlock the PayLink-IP/Dial when no password is set, **do not enter any characters into the password box**; simply click on the "Configure" button.

NOTE: As a security feature, after a user has made three consecutive failed attempts at entering an administrator's password, the PayLink-IP/Dial will refuse further password attempts. The password dialog box will also disappear from the opening screen.

To unlock the PayLink-IP/Dial, it must be given the "unlock password." To do so, direct a web browser to the address "xxx.xxx.xxx.xxx/unlock.htm", where "xxx.xxx.xxx.xxx" is the IP address of the unit. At this point the "unlock password" can be entered. Should six consecutive failed attempts at entering an unlock password be made, the PayLink-IP/Dial will be locked against configuration changes or further password attempts until it has been rebooted. On rebooting, the user will again need to supply the unlock password to configure the device. If the unlock password is unknown, contact Lava Technical Support for assistance.

Whether under administrative lockout or after rebooting, the PayLink-IP/Dial will continue to operate as currently configured, but will not be available for configuration changes until a proper password has been supplied.

9. Glossary

ACK. ACKnowledge character (HEX 06). A flow control character send from a receiver of a transmission to the sender of the transmission to indicate data has been received.

CRC. Cyclic Redundancy Check. An error-checking method that computes a value based on a block of data to be transmitted. The data and the computed value are then transmitted together. The receiver checks the CRC value against the data block to ensure the transmission was not corrupted.

DLE. Data Link Escape character (HEX 10). A transmission control character used to modify the meaning of characters immediately following it.

ENQ. ENQuire character (HEX 05). A flow control/poll character used to enquire whether a remote device is ready for communication.

EOT. End Of Transmission character (HEX 04). A flow control character used to indicate a cessation of communication between a sender and a receiver.

ETX. End of TeXt character (HEX 03). A flow control character used to delimit the end of a data block or frame.

LRC. Longitudinal Redundancy Check. An error-checking method that computes a parity value based on a block of data.

LSB. Least Significant Bit. The least significant bit is the lowest bit in a series of numbers in a binary number's representation. The LSB is located at the far right of a string.

MSB. Most Significant Bit. The most significant bit is the highest bit in a series of numbers in a binary number's representation. The MSB is located at the far left of a string.

STX. Start of TeXt character (HEX 02). A flow control character used to delimit the start of a data block or frame.
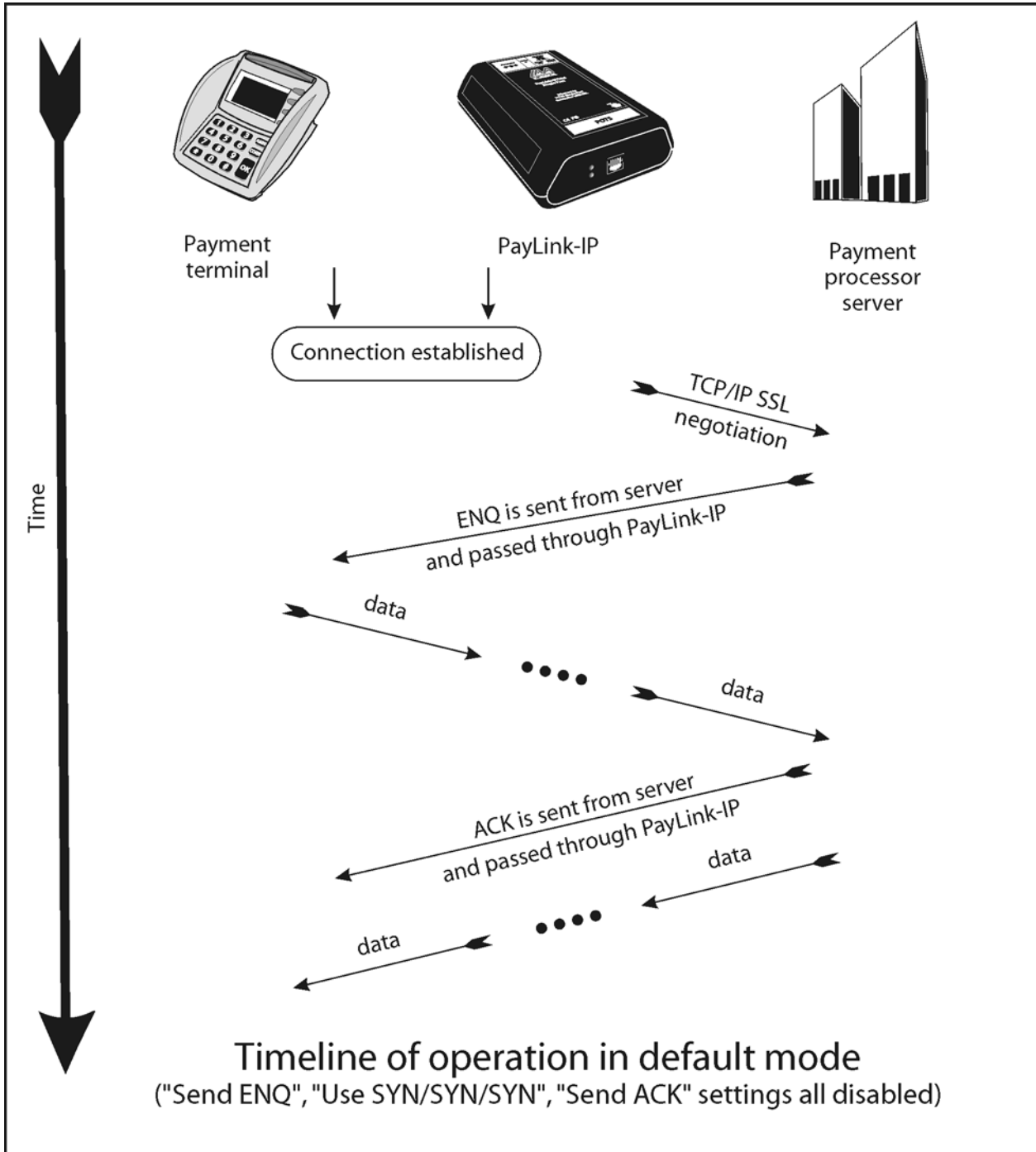
SYN. SYNchronize character. A flow control character sometimes used as part of a setup string in terminal-server negotiation.

10. Appendix A: Message negotiation

"Send ENQ", "Use SYN/SYN/SYN", "Send ACK" all disabled

By default, the three settings covered under this topic ("Send ENQ to terminal to initiate transmission", "Use SYN/SYN/SYN preamble to establish connection", and "Send ACK to terminal after each received message") are disabled. This means that by default the PayLink-IP/Dial operates transparently, passing all negotiation messages directly between the terminal and the payment server.

Figure 17: Default operation
"Send ENQ", "Use SYN/SYN/SYN", "Send ACK" all disabled

Payment terminal

PayLink-IP

Payment processor server

Connection established

TCP/IP SSL negotiation

ENQ is sent from server and passed through PayLink-IP

data

data

ACK is sent from server and passed through PayLink-IP

data

data

Time

Timeline of operation in default mode
("Send ENQ", "Use SYN/SYN/SYN", "Send ACK" settings all disabled)

Send ENQ to Terminal to initiate transmission

This setting should be enabled in two general situations:

•　　where the payment terminal expects an ENQ string to precede the transmission of data, and the payment processing server does not send that string or,

•　　where delays in transmission time (possibly resulting from SSL negotiation) would lead to the payment processing server's ENQ string being received late by the terminal, causing the terminal to time out.
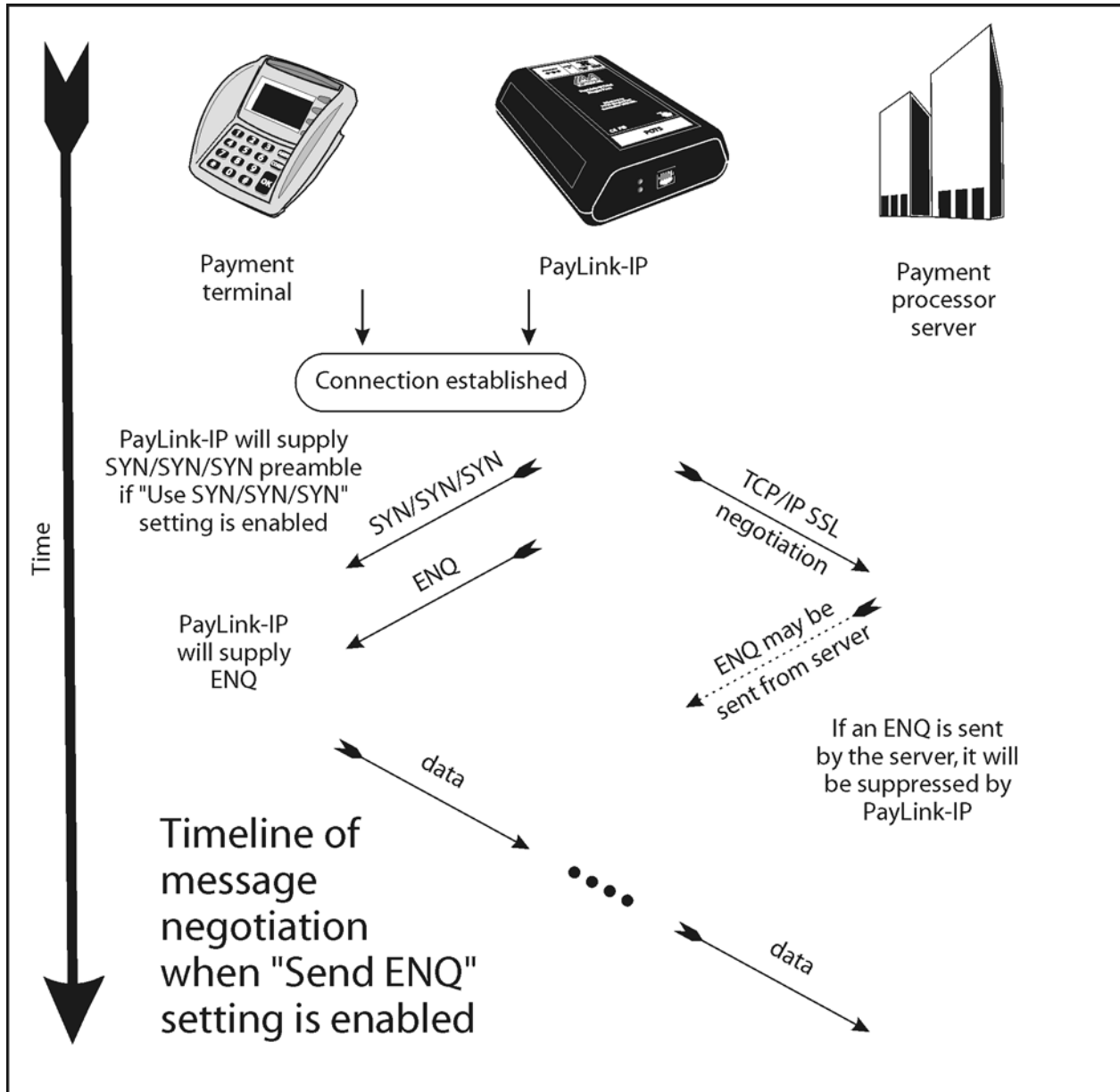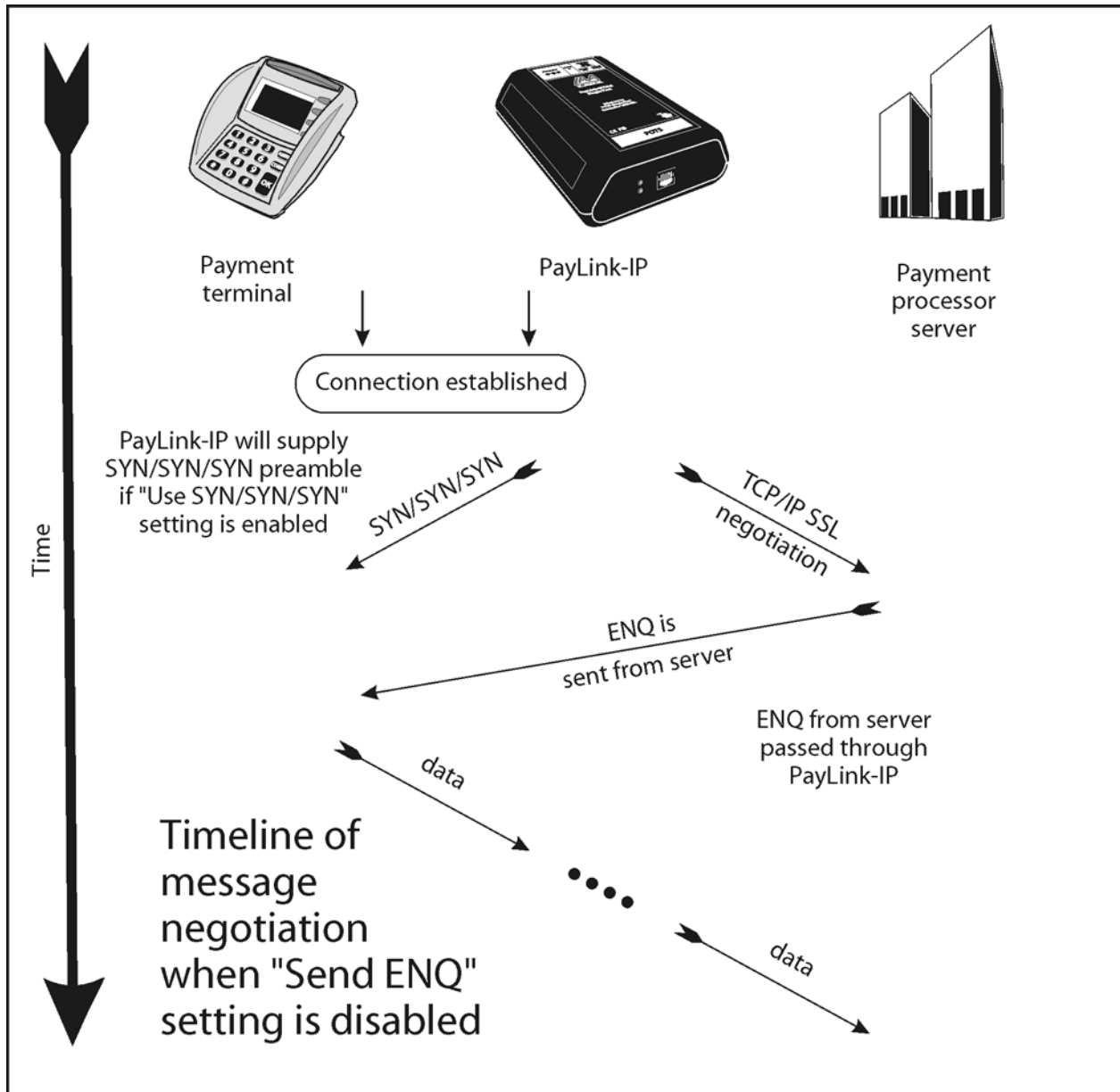
Figure 18: Opening a connection — "Send ENQ" enabled

Figure 19: Opening a connection — "Send ENQ" disabled

Send ACK to terminal after each received message

This setting should be enabled in two general situations:

• where the payment terminal expects an ACK string to follow the transmission of data, and the payment processing server does not send that string or,

• where delays in transmission time would lead to the payment processing server's ACK string being received late by the terminal, causing the terminal to time out.

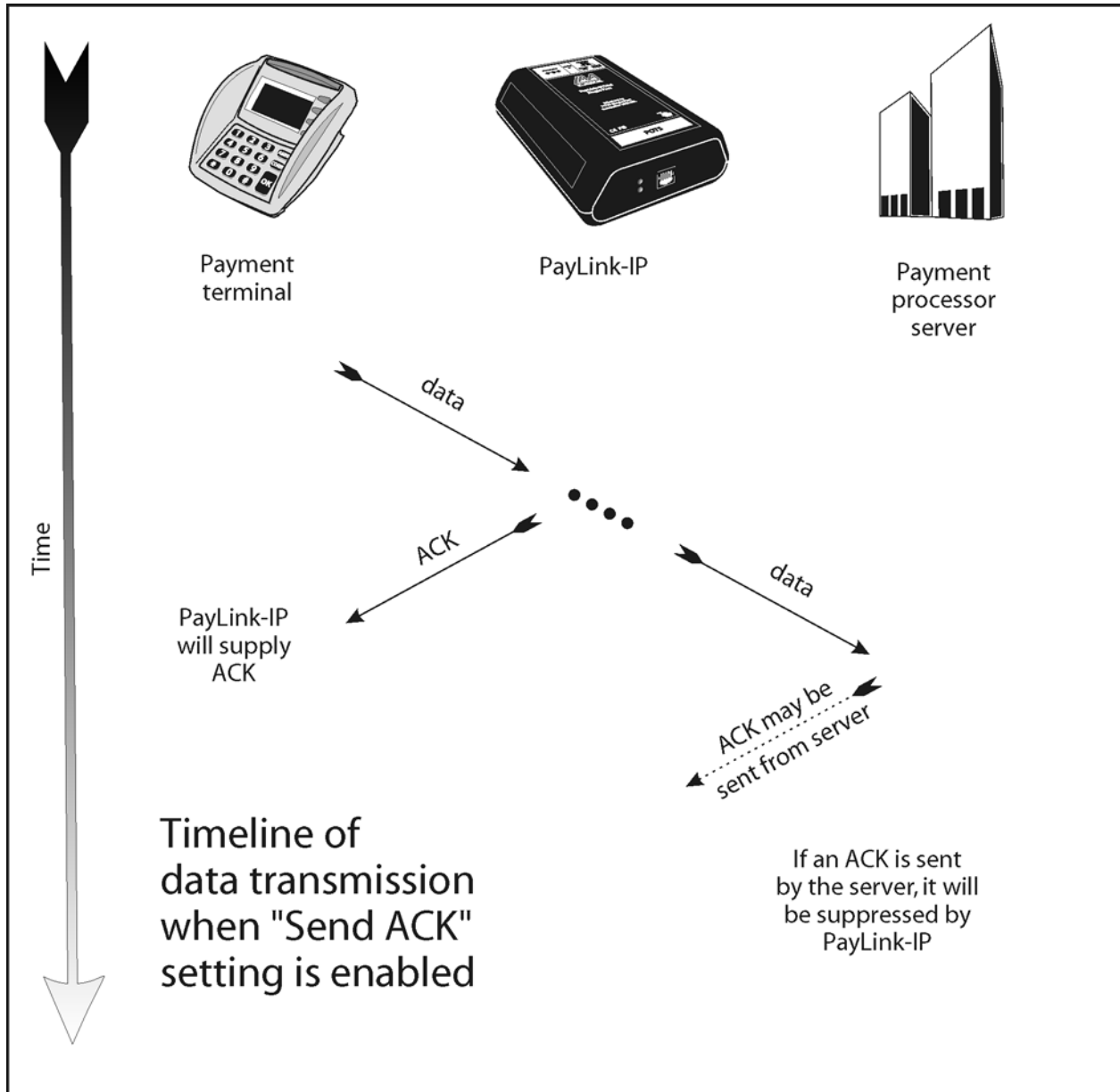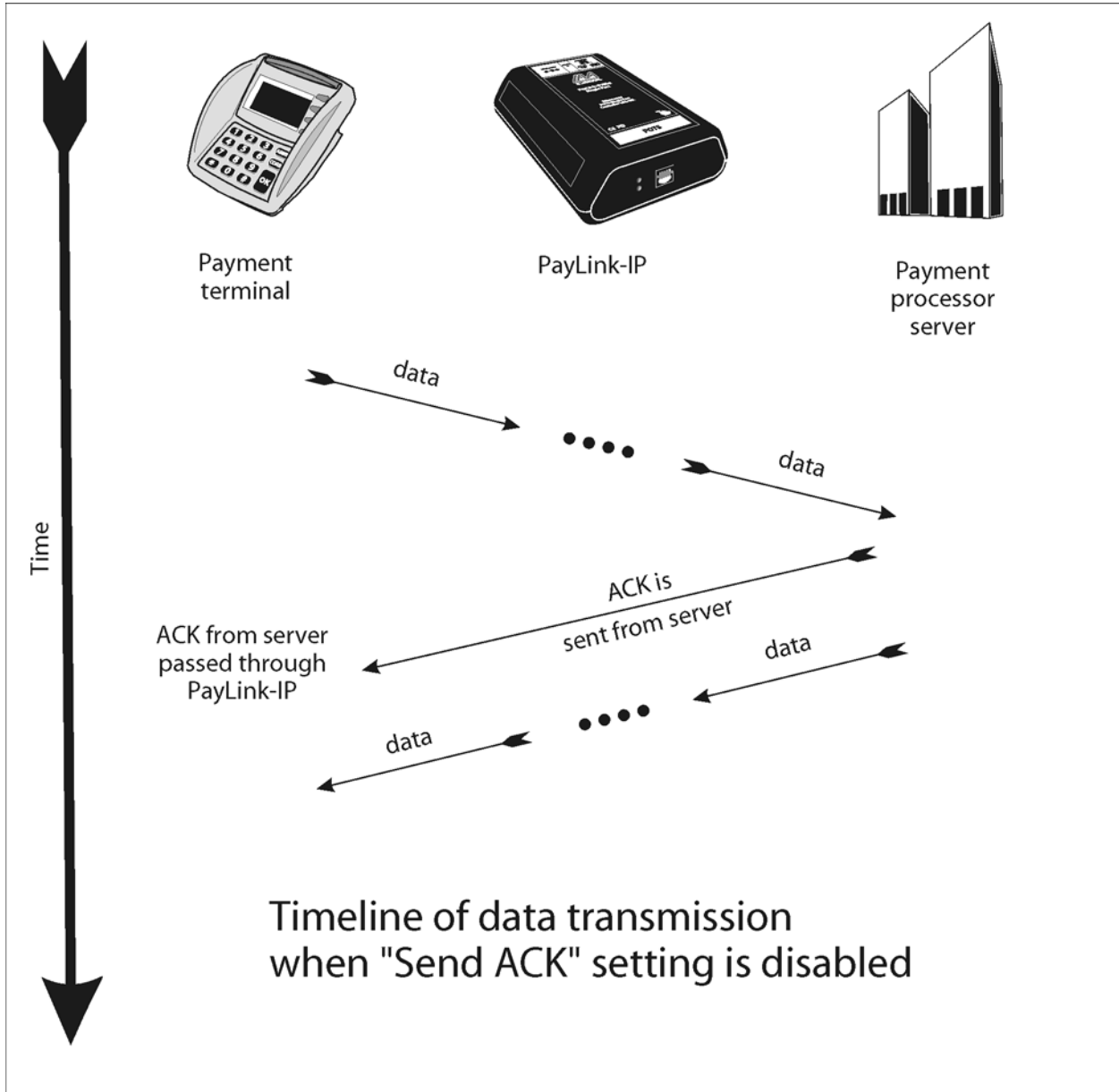**Figure 20: Data flow — "Send ACK" enabled**

Timeline of data transmission
when "Send ACK" setting is disabled

Transaction ended by Server (default):

In "Server (default)" mode, the PayLink-IP/Dial operates transparently between the terminal and the server and ends a transaction by passing closing commands between the server and the terminal on the assumption that those two devices are able to understand each other's command structures. The PayLink-IP/Dial keeps a connection open until one side closes the connection or until a 30-second no activity timeout has elapsed.
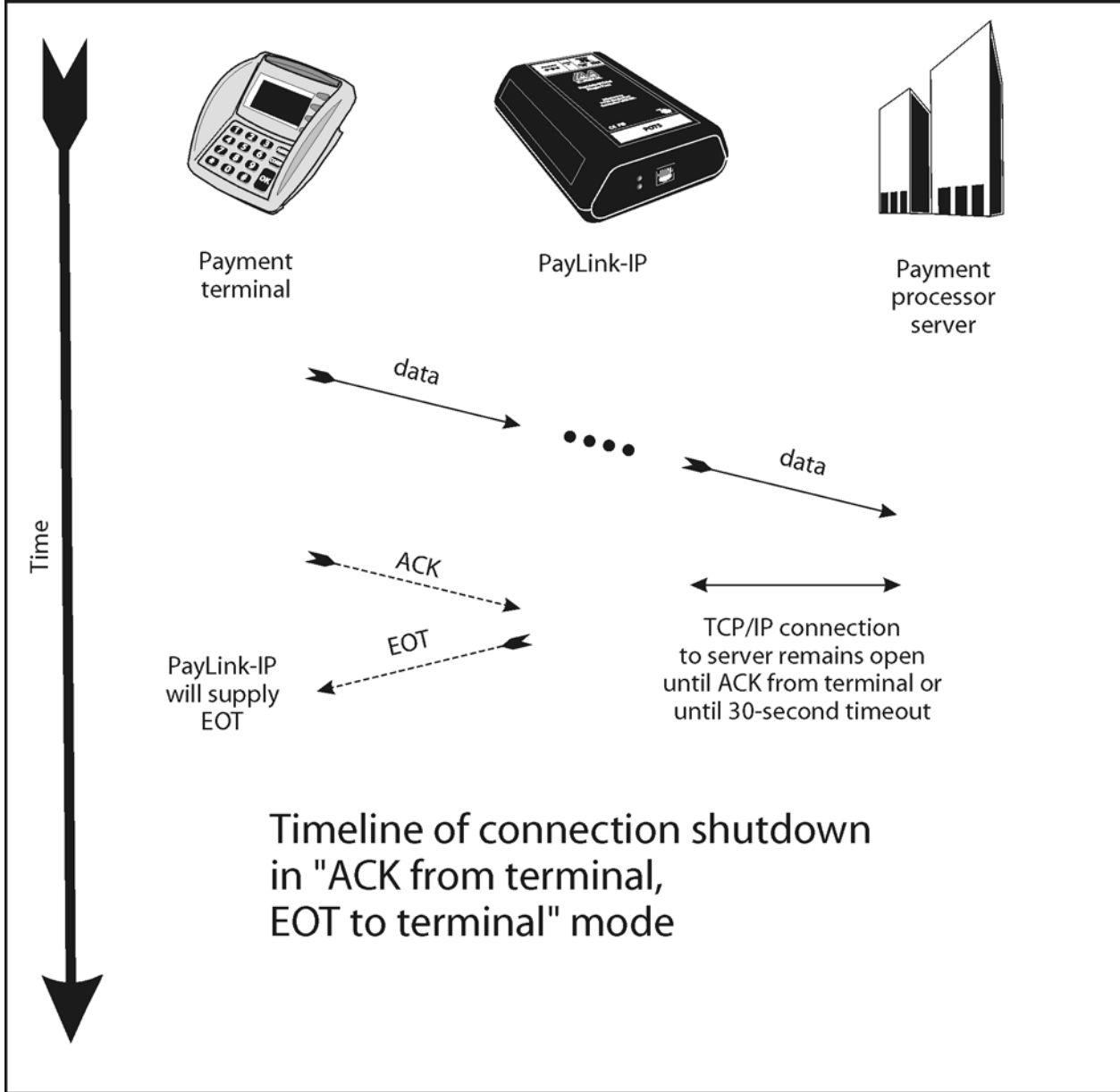
Figure 22: Closing connections — "Server (default)" mode
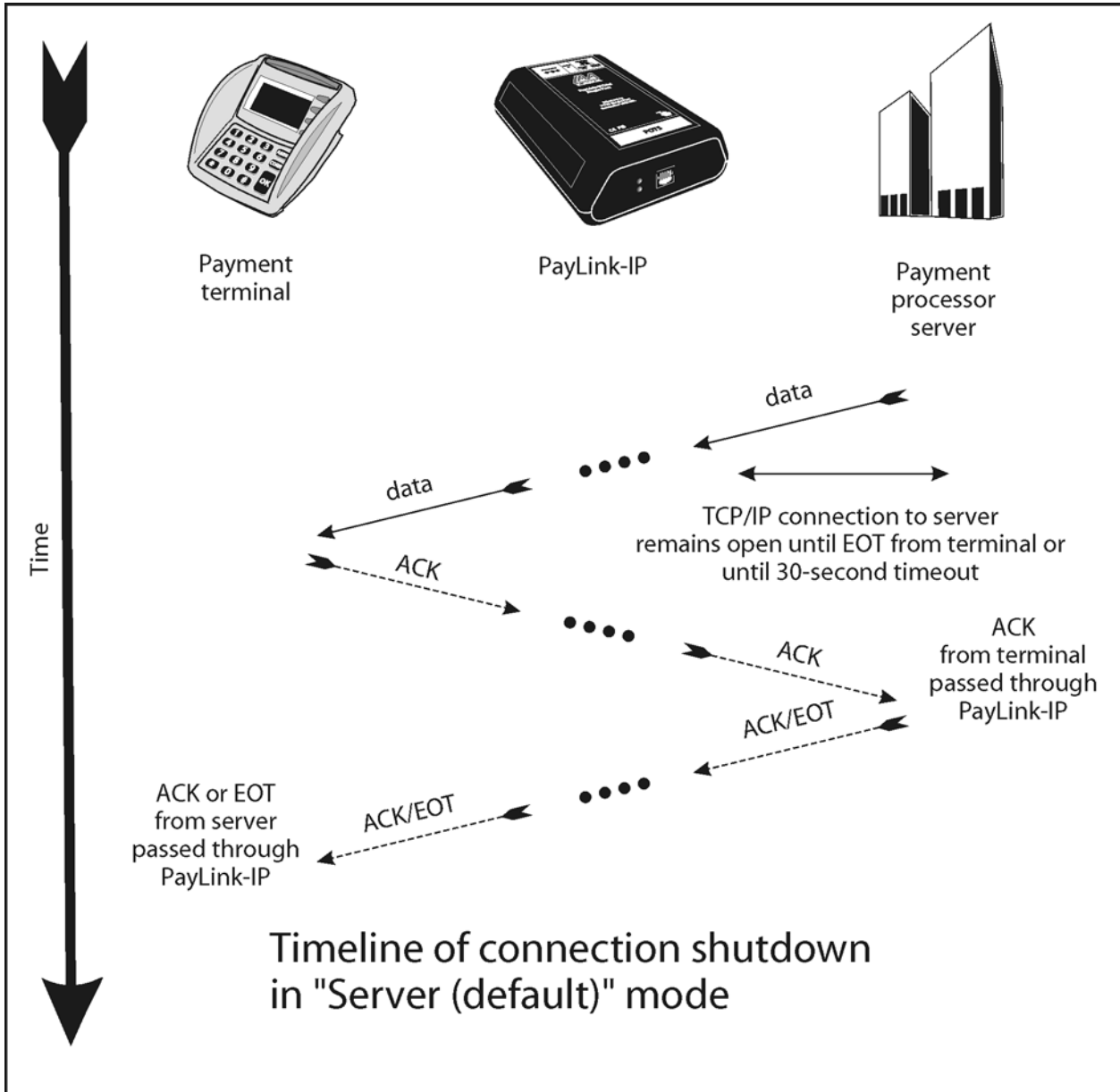
Transaction ended by ACK from terminal, EOT to terminal:

In "ACK from terminal, EOT to terminal" mode, the PayLink-IP/Dial receives an ACK character from the terminal and responds to the terminal with an EOT character. This shutdown mode is typically used when the terminal requires an EOT to close the connection, but the server is not programmed to send an EOT.
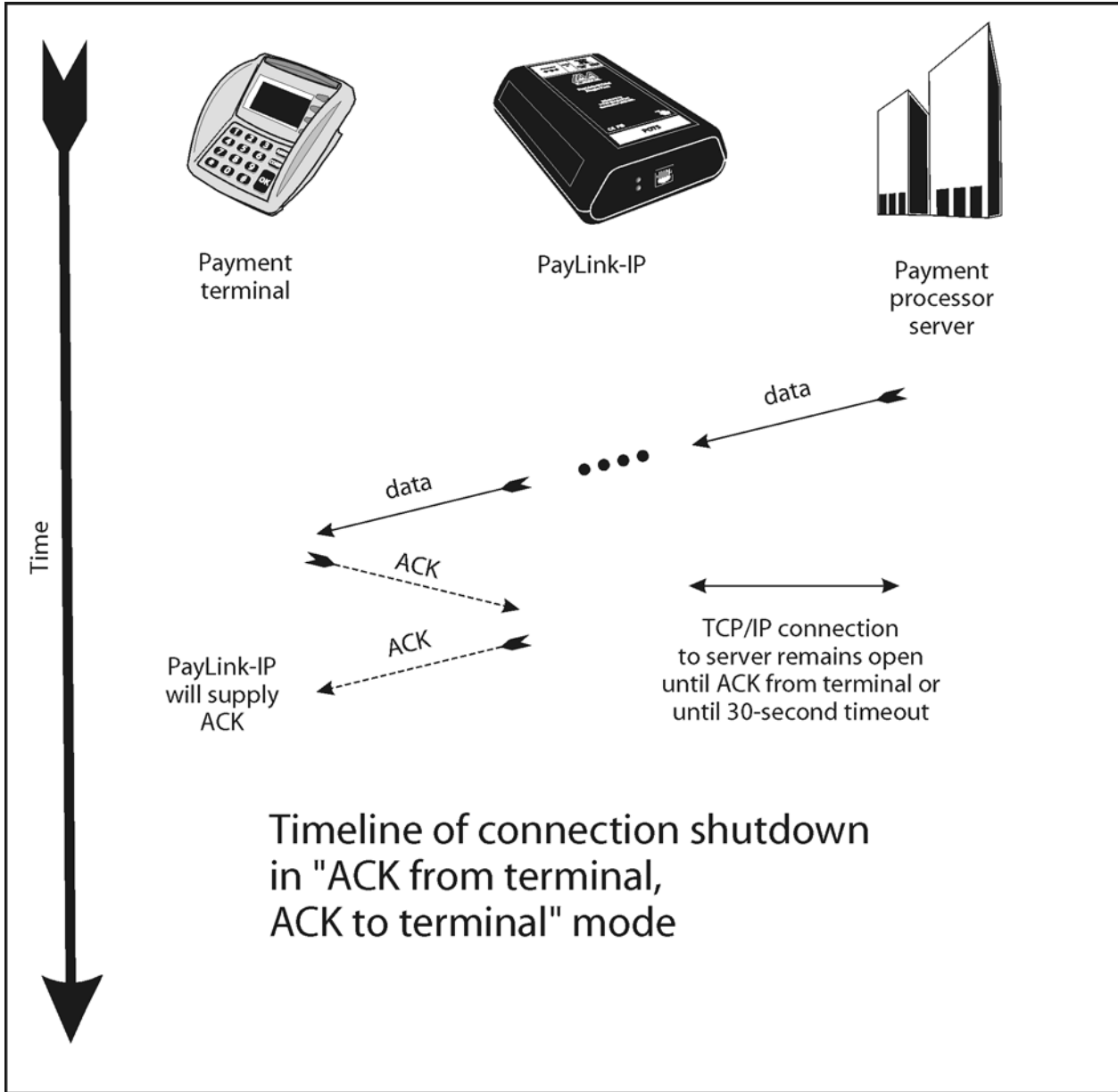
Figure 23: Closing connections — "ACK from terminal, EOT to terminal" mode

Transaction ended by ACK from terminal, ACK to terminal:

In "ACK from terminal, ACK to terminal" mode, the PayLink-IP/Dial receives an ACK character from the terminal and responds to the terminal with an ACK character. This setting is used for terminals that end connections after receiving an ACK rather than an EOT (usually supplied by a server).
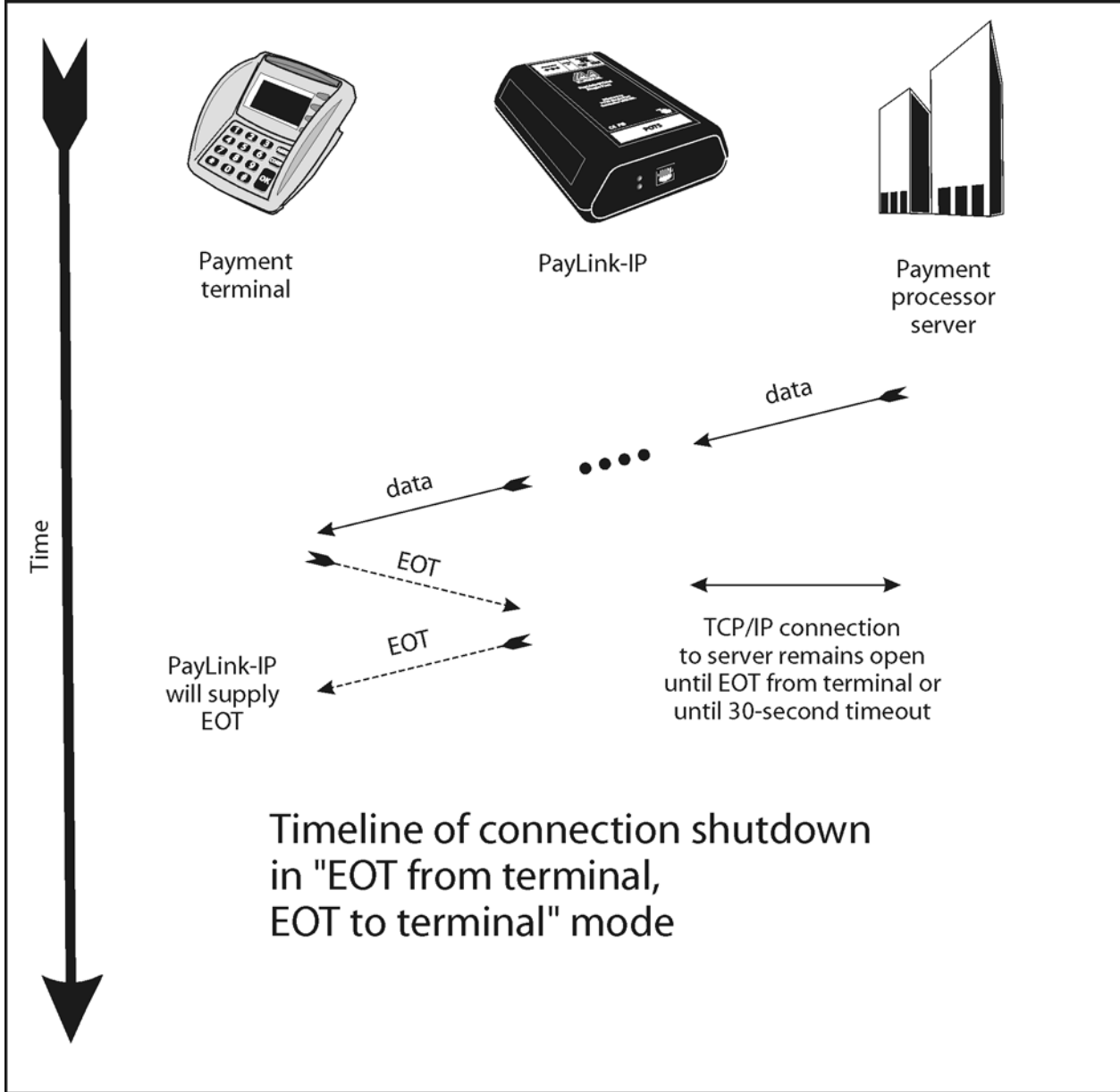
Figure 24: Closing connections — "ACK from terminal, ACK to terminal" mode

Transaction ended by EOT from terminal, EOT to terminal:

In "EOT from terminal, EOT to terminal" mode, the PayLink-IP/Dial receives an EOT character from the terminal and responds to the terminal with an EOT character. This shutdown mode is typically used when you want the terminal to close the connection (as when the terminal is performing a batch operation).
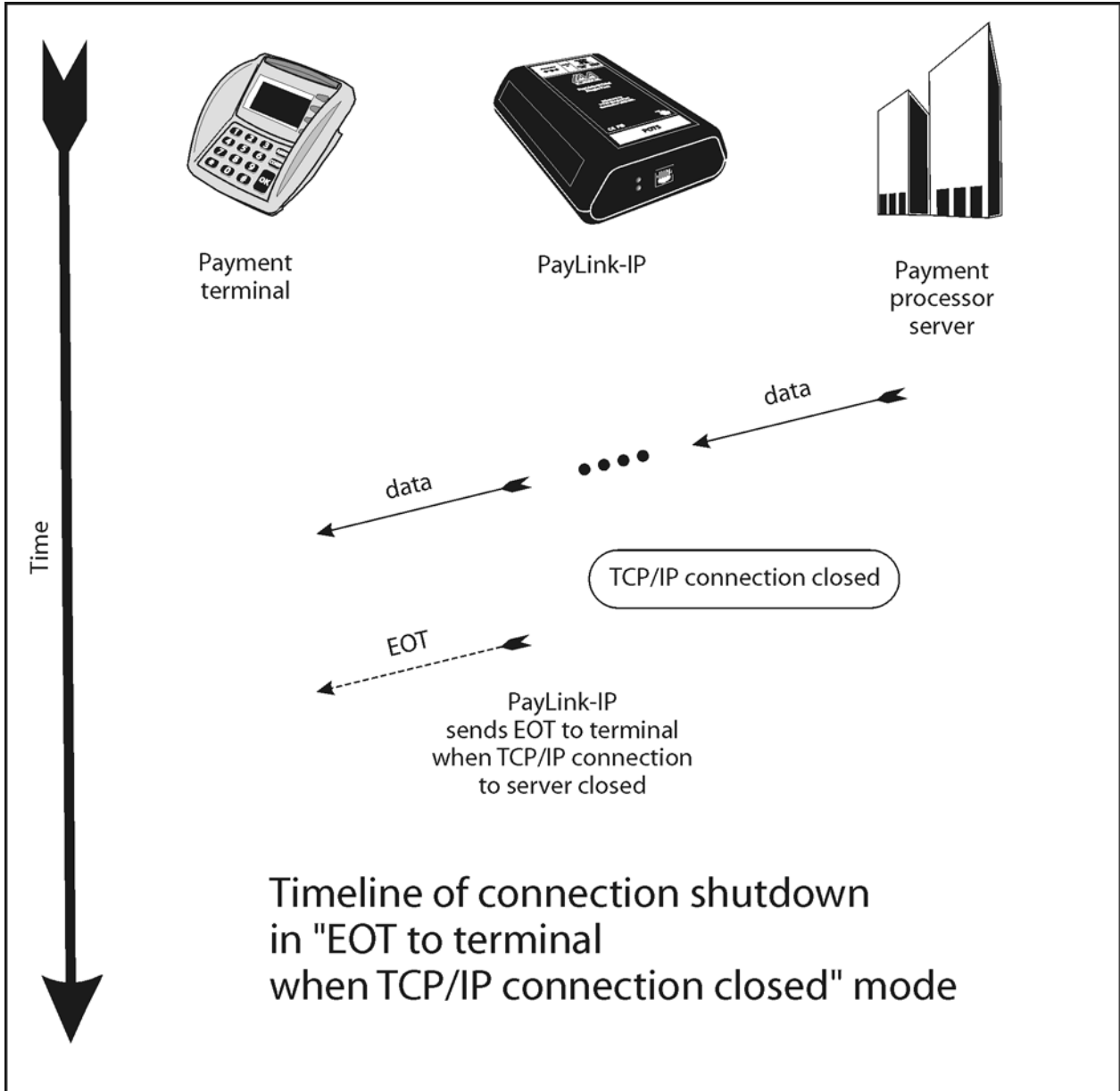
Figure 25: Closing connections — "EOT from terminal, EOT to terminal" mode

Transaction ended by EOT to terminal when TCP/IP closed:

In "EOT to terminal when TCP/IP closed" mode, the PayLink-IP/Dial sends an EOT character to the terminal if the TCP/IP connection is closed by the server.

Figure 26: Closing connections — "EOT to terminal when TCP/IP closed" mode

Transaction ended by ACK to terminal when TCP/IP closed:

In "ACK to terminal when TCP/IP closed" mode, the PayLink-IP/Dial sends an ACK character to the terminal if the TCP/IP connection is closed by the server.
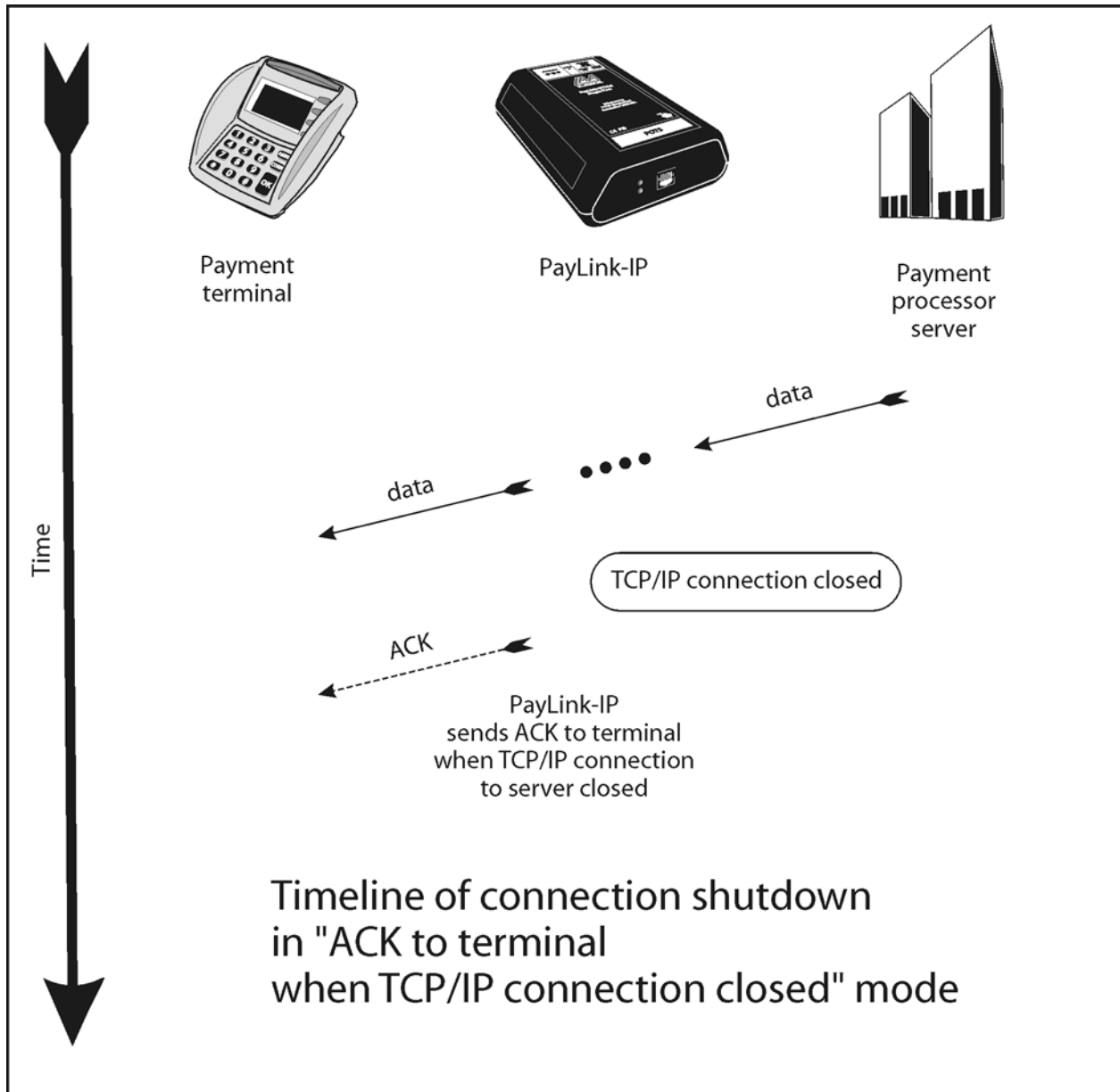
Figure 27: Closing connections — "ACK to terminal when TCP/IP closed" mode

11. Appendix B: Hardware status LEDs

Hardware Status LEDs	
Power	
RED - Power connection status	
ON	Power is being received by the PayLink-IP/Dial
OFF	Power is not being received by the PayLink-IP/Dial
Ethernet	
Green – LAN connection status	
ON	PayLink-IP/Dial is connected to LAN
OFF	PayLink-IP/Dial is not connected to the LAN, or the PayLink-IP/Dial is in the process of being reset
Amber – Data communications activity status	
ON-OFF-ON (Flickering)	Packets are being seen by the PayLink-IP/Dial
STEADY	No data activity is being seen by the PayLink-IP/Dial
Modem RJ-11	
Yellow – Status of the PayLink-IP/Dial modem connection to the POS terminal modem	
OFF	No communication between the PayLink-IP/Dial and the POS terminal
ON	A dial up sequence from the POS terminal has started, and modem-to-modem negotiation is in progress
	Negotiations are completed, and a modem-to-modem connection has been established
Green – Status of the PayLink-IP/Dial Ethernet interface with the IP server	
OFF	No PayLink-IP/Dial communication with a server
ON	PayLink-IP/Dial is establishing a TCP/IP or a SSL + TCP/IP connection to a server
	PayLink-IP/Dial has established a TCP/IP connection to a server