Table 8–12 lists the components shown in the above example and gives a description for each of them.

**Table 8–12: Link Test Components**

| Component | Description |
|---|---|
| <$03> | Message type identifier. |
| <“051997”> | Date information, consisting of six ASCII bytes. |
| <$22> | Separator |
| <“074905”> | Time information, consisting of six ASCII bytes |
| <$22> | Separator |
| <“01”> | Receiver number |
| <$22> | Separator |
| <“0000”> | Reference number, consisting of four ASCII bytes. |
| <$22> | Separator |
| <V-byte> | Validation Byte (V-byte). See Section 8.4.5. |
| <$0D> | End of message indicator. |

### 8.4.5 Validation Byte (V-Byte)

A V-byte always precedes the end of message indicator and is the only error checking used by the ADEMCO 8000 communication format.

The following equations are used to calculate the V-byte:

1. Add the 1st byte of the message to the 2nd byte.
2. Clear bit 7 of the result.
3. Set bit 6 of the result.
4. Add this result to the next byte of the message.
5. Repeat steps 2 through 4 until the last byte of the event data. (Up to and including the byte preceding the validation byte.) The range of the sum is from $40 to $7F.

### 8.4.6 ACKing and NACKing Data

After the end of message byte (<$0D>) is sent by the receiver, the automation computer will respond with an ACK (<$06>) or NACK (<$15>). This response can be delayed between 1 byte time (depending on the baud rate) and the ACK timeout period. See Section 5.3.3.5 page 5–19.

If the receiver doesn’t get a response within the ACK timeout period or receive a NACK from the automation computer, it will retransmit the data.

After two NACKs or two ACKs timeout, the receiver will generate a Computer Trouble message. When a computer trouble message is generated, then the receiver will continually send a heartbeat until it receives an ACK from the automation computer. When communication is restored, a Computer Trouble Restore message will be generated.

### 8.4.7 Commands Initiated by the Automation Computer

Typically all communications are initiated by the receiver; however, there are several commands available to the automation computer to control or request information from the receiver. The automation computer may send these requests only when the receiver is not transmitting data to it.

The following sub-sections show the message format that must be sent from the automation computer to the receiver in order that these command requests function properly.

The receiver will respond to these requests from the automation computer with one of the following messages:

**Table 8–13: Response Messages by the MX8000–3EX Receiver**

| ASCII Hex Character | Character Name | Description |
|---|---|---|
| $06 | ACK | The request is granted. |
| $15 | NACK | The request is unrecognized because of one of the following reasons:<br>• Checksum error<br>• Invalid request code/format |
| $1B | ESC (Escape) | The request is refused because of one of the following:<br>• Unauthorized access<br>• Invalid receiver/line card number<br>• Receiver/line card is busy<br>• Invalid PBX string<br>• Account list full<br>• Account number not found in the account list |

Table 8–14 lists which request can be made from the automation computer by request identifiers.

**Table 8–14: Command Requests by Identifiers**

| Command Request Identifier | Description |
|---|---|
| $4A | Log-on request |
| $4B | Log-off request |
| $05 | Hang up request |
| $04 | Add a listen-in account. (This adds an account number to the listen-in account list.) |
| $03 | Delete a listen-in account. (This deletes an account number from the listen-in account list.) |
| $4C | Listen-in extend request. |
| $48 | Listen-in end request. |
| $49 | PBX string request. |
| $0D | Link test request. |

### 8.4.7.1 Remote Log-on/Log-off

You must log-on to the receiver before you can change any system program options. Remote log-in and log-off commands can be sent from the automation computer to the receiver.

**To Log-in:**

```
<$4A><Receiver ID><$22><User PIN><V-byte><$0D>
```

**Table 8–15: Log-in Request Components**

| Component | Description |
|---|---|
| <$4A> | Command request identifier. See Table 8–14. |
| <Receiver ID> | Receiver ID number. 1 or 2 ASCII digits. |
| <$22> | Separator |
| <User PIN> | The users PIN code. |
| <V-byte> | Validation Byte (V-byte). See 8.4.5. |
| <$0D> | End of message indicator. |

**To Log-off:**

```
<$4B><Receiver ID><$22><User PIN><V-byte><$0D>
```