



Application Note #157:

Using MS Windows HyperTerminal with iModem Products

INTRODUCTION

Communication between the iModem and either the terminal emulation system or the DTE system is conducted over the iModem's V.24 serial port. This port is used for iModem programming and for routine communication, and may be used for embedded system debugging.

During evaluation of the iModem using the iModem Evaluation Board, it is necessary to employ a telecommunications software product to facilitate the transmission of information between the iModem evaluation board and the terminal emulation system/DTE/host system. This link is also useful for monitoring iModem communication. When system level debugging is required, Cermetek recommends terminal emulation products such as Anzio, MS HyperTerminal and PROCOMM.

iModem programming is required to personalize/customize various internet parameters and is typically a one-time event. Although the user may modify the internet parameters as often as needed, most users modify these parameters very infrequently. Cermetek's **iNetWizard**[®] program has been specifically designed to streamline the iModem programming activity and is the preferred iModem programming method. **iNetWizard**[®] is an MS Windows based application and is provided free of charge by Cermetek to all iModem customers. Refer to Cermetek Application Note # 159, [Using iNetWizard[®] with CH2124/60](#), for detailed step-by-step accessing instructions. Typical iModem programming examples are also included in Application Note # 159.

If preferred, rather than using Cermetek's **iNetWizard**[®] program, the user may utilize MS Windows HyperTerminal to program the iModem. HyperTerminal is standard on MS Windows environments. Application Note #157 employs a step by step procedure to lead the user through all necessary sequences to setup and activate the MS Windows HyperTerminal Application using both Windows 95/98 environments and Windows NT/XP environments. Typical iModem programming examples are also included in this application note.

GETTING STARTED

The step-by-step instructions presented below assume that HyperTerminal resides on the user's computer system in the following location for MS Windows 95/98 environment:

C:\PROGRAMS FILES\ACCESSORIES\HYPERTERMINAL

or

C:\PROGRAMS\ACCESSORIES\COMMUNICATIONS\HYPERTERMINAL

for MS Windows XP environments.

This is typically the case when installing the MS Windows application suite per Microsoft's default configuration setup directions.

IMPORTANT NOTE

Apply power to the iModem hardware application/evaluation board and verify proper operation of the hardware system and the PSTN connection PRIOR to initiating an MS Windows HyperTerminal session. The hardware system/evaluation board should remain powered up while initiating the HyperTerminal session. This will ensure that the COM Port connection between the hardware application/evaluation board and the PC will be correctly configured when MS Windows HyperTerminal auto connects.

ACCESSING HYPERTERMINAL IN MICROSOFT WINDOWS 95/98 ENVIRONMENT

HyperTerminal is accessed as follows:

Step 1. When in MS WINDOWS, proceed to the START button in the lower left corner of the monitor screen.

- Step 2. Single click on START.
- Step 3. Move the cursor to highlight PROGRAMS, then highlight ACCESSORIES, then highlight COMMUNICATIONS, and finally single click on HYPERTERMINAL.
- Step 4. The HyperTerminal window will open displaying various Connection Icons.

ACCESSING HYPERTERMINAL IN MICROSOFT WINDOWS XP ENVIRONMENT

Hyperterminal is accessed as follows:

- Step 1. When in MS WINDOWS, proceed to the START button in the lower left corner of the monitor screen.
- Step 2. Single click on START.
- Step 3. Move the cursor to highlight ALL PROGRAMS, then highlight ACCESSORIES, then highlight COMMUNICATIONS. If previous hypersessions have been saved, then highlight the HyperTerminal folder. The HyperTerminal folder will open displaying various Connection Icons with associated names.
- Step 4. If no previous sessions have been saved, then the HyperTerminal folder will be empty. Single click on the HYPERTERMINAL application.

SETTING UP HYPERTERMINAL

To configure hyperterminal for proper communication with the iModem device proceed as follows:

- Step 1. If desiring to use an existing Connection Icon (i.e., one created during a previous HyperTerminal session), simply double click on the appropriate Icon. Otherwise, proceed to Step 2 to create a new Connection Icon.
 - A. The HyperTerminal banner will appear momentarily and HyperTerminal will automatically configure the COM Port connection using the settings from the most recent HyperTerminal session associated with the Connection Icon selected.
 - B. The HyperTerminal data entry window will open. If the "BEEP THREE TIMES..." Box in the HYPERTERMINAL SETTINGS profile menu has been previously been selected, the PC will produce three distinct beeps or "clicking" sounds just after the session window appears.
 - C. HyperTerminal is now ready for use. Proceed to the next section of this application note.
- Step 2. If this is the initial HyperTerminal session, or if it is desired to create a new Connection Icon, double click on the HYPERTRM Connection Icon. Otherwise, go back to Step 1.
- Step 3. The HyperTerminal banner will appear momentarily.
- Step 4. The CONNECTION DESCRIPTION HyperTerminal window will open and two dialog boxes will appear.
 - A. In the ENTER A NAME AND CHOOSE AN ICON FOR THE CONNECTION dialog box, enter a descriptive name. DO NOT press <CR>.
 - B. In the ICON dialog box, select an icon from those displayed. Be sure to select an icon that has not been previously assigned.
 - C. Click on the icon. HyperTerminal will associate the name entered with the icon selected.
 - D. Click OK.
- Step 5. The CONNECTION DESCRIPTION window will close and the CONNECTION TO window will open.
- Step 6. Go to the CONNECT USING dialog box and use the scroll button to select the applicable DIRECT TO COM port response. Choose the COM Port corresponding to the COM Port currently connected to the hardware application/evaluation board.

- A. Note that all the other dialog boxes in the CONNECTION TO window are gray and will not accept any phone number related information. This is desired because the iModem product will control the PSTN connection not HyperTerminal.
- B. Click OK.

Step 7. The CONNECTION TO window will close and the COM PROPERTIES window will open.

Step 8. The PORT SETTINGS tab will automatically be selected.

- A. In the BITS PER SECOND window, use the pull down button to select **57600** for CH2160 products, **19200** for CH2165 or **2400** for CH2124 products. If **57600** (or **2400**, as appropriate) is already selected as the default value, skip to the next window.
- B. In the DATA BITS window, use the pull down button to select **8**. If **8** is already selected as the default value, skip to the next window.
- C. In the PARITY window, use the pull down button to select **None**. If **None** is already selected as the default value, skip to the next window.
- D. In the STOP BITS window, use the pull down button to select **1**. If **1** is already selected as the default value, skip to the next window.
- E. In the FLOW CONTROL window, use the pull down button to select **None**. If **None** is already selected as the default value, skip to OK.
- F. Click OK. The CONNECT TO window will close.

Step 9. The data entry HyperTerminal window is now open. Note that the name entered will appear in the upper left hand corner of the title bar. Also, notice that the session clock (appearing in the lower left hand corner of the bottom task bar) is running.

Step 10. Click on the far right icon in the STATUS BAR. This is the PROPERTIES icon.

- A. When the PROPERTIES window opens, click on the SETTINGS tab.
- B. Click on the TERMINAL KEYS button. A bullet will appear in the center of the button when selected.
- C. Click on the CTRL+H button. A bullet will appear in the center of the button when selected.
- D. In the EMULATION dialog box, select **ANSII** using the pull down button.
- E. In the TELNET TERMINAL dialog box, enter **ANSII** if not already entered. DO NOT press **<CR>**.
- F. Set BACKSCROLL BUFFER LINES to **500**.
- G. Click on the BEEP THREE TIMES WHEN CONNECTING OR DISCONNECTING box. A check mark will appear in the box.
- H. Click on the ASCII SETUP... button.
- I. When the ASCII SETUP window opens, verify that the following defaults are set:
 - LINE DELAY set to **0**.
 - CHARACTER DELAY set to **0**.
 - WRAP LINES option selected.
 - All other options should be blank or not selected.
- J. Click OK. This will close the ASCII SETUP window.
- K. Click OK. This will close the PROPERTIES window.

Step 11. The data entry HyperTerminal window is now open. HyperTerminal is properly configured and ready for use. Proceed to the next section of this application note.

SET HYPERTERMINAL DISPLAY WINDOW CONFIGURATION

Set the HyperTerminal data entry display window configuration using the following procedure. Although the configuration settings are typically set by default within the HyperTerminal application, they are included here for completeness.

Step 1. Click on VIEW in the upper menu bar (located above the TOOL bar) of the HyperTerminal window.

Step 2. If a check mark appears beside the STATUS BAR line, proceed to Step 3. If not, click on the STATUS BAR line and a check mark will appear.

- Step 3. If a check mark appears beside the TOOL BAR line, proceed to Step 4. If not, click on the TOOL BAR line and a check mark will appear.
- Step 4. The TOOL BAR should now be displayed at the top of the HyperTerminal window and the STATUS BAR will be displayed in the bottom of the HyperTerminal window.

VERIFY PROPER HYPERTERMINAL OPERATION

The following test procedures can be used to verify operation of the COM Port while using the current HyperTerminal configuration settings. These procedures are intended to provide a rudimentary debug strategy should the HyperTerminal application fail to operate as required. For more detailed techniques, refer to Microsoft HyperTerminal technical support.

- Step 1. Procedure to verify that the proper serial communication port (i.e., COM PORT) has been selected. Proceed as follows:
- Enter **AT<CR>** in the HyperTerminal date entry display window. If **AT<CR>** is echoed back on the screen followed by an **<CR>OK<CR>**, then the COM PORT selected is correct. Proceed to the next section of this application note. If **AT<CR>** is not displayed on the screen, proceed to B below.
 - Click on the far right icon in the TOOL BAR. This is the PROPERTIES icon.
 - Click on the CONNECT TO tab and select one of the alternative COM PORTs.
 - Click OK. This will close the PROPERTIES window and reconfigure HyperTerminal.
 - Enter **AT<CR>** in the HyperTerminal display window. If **AT<CR>** is echoed back on the screen followed by an **<CR>OK<CR>**, then the COM PORT selected is correct. If **AT<CR>** is not displayed on the screen, go back to B above and select a different COM Port. Repeat the verification process until all the possible COM Ports have been tested.
- Step 2. Procedure to verify that the proper communication speed and data format has been selected.
- The connection speed will be displayed in the STATUS BAR. If the connection speed and/or the data format is not as specified below, the **@T[®]** commands will not function properly and it is necessary to reconfigure the HyperTerminal application. The following is a summary of the required properties by product family:

	CH2160	CH2124/A	CH2165
Bits Per Second	57600	2400	19200
Data Bits	8 bits	8 bits	8 bits
Parity	None	None	None
Stop bits	1	1	1
Flow Control	None	None	None

Verify that the lower STATUS BAR displays **57600 8-N-1** for CH2160 products, **19200 8-N-1** for CH2165 or **2400 8-N-1** for CH2124/A products. If not, proceed as follows:

- Click on the far right icon in the TOOL BAR. This is the PROPERTIES icon.
- Click on the CONFIGURE button.
- In the BITS PER SECOND window, use the pull down button to select **57600** for CH2160, **19200** for CH2165 or **2400** for CH2124/A. If **57600** (**19200** for CH2165 **2400** for CH2124) is already selected as the default value, skip to the next window.
- In the DATA BITS window, use the pull down button to select **8**. If **8** is already selected as the default value, skip to the next window.
- In the PARITY window, use the pull down button to select **None**. If **None** is already selected as the default value, skip to the next window.
- In the STOP BITS window, use the pull down button to select **1**. If **1** is already selected as the default value, skip to the next window.
- In the FLOW CONTROL window, use the pull down button to select **None**. If **None** is already selected as the default value, skip to OK.
- Click OK. This will close the CONFIGURE window and reconfigure HyperTerminal.

- J. Verify that the STATUS BAR now displays **57600 8-N-1** for CH2160 products, **19200 8-N-1** for CH2165 or **2400 8-N-1** for CH2124/A products. If not, go back to B above and repeat the reconfiguration process.

TERMINATING HYPERTERMINAL

Upon completion of the iModem programming activity, the following steps are required to exit HyperTerminal and return to the MS Windows desktop screen. Two distinct methods are provided. Method 1 is preferred, but either method is adequate.

Method 1.

- Step 1. Move the cursor to the upper task bar (located above the TOOL bar) and single click on CALL.
- Step 2. A pull down dialog box will appear. Click on DISCONNECT to terminate the current HyperTerminal session.
- Step 3. The HyperTerminal window will close terminating the current session but the parent HyperTerminal window will remain open.
- Step 4. Move the cursor to the upper right hand corner of the parent HyperTerminal window and single click on the X. This will close the HyperTerminal window and return to the MS Windows desktop screen.

Method 2.

- Step 1. Move the cursor to the upper right hand corner of the HyperTerminal window and single click on the X.
- Step 2. The monitor screen will display a pop-up dialog box with the Comments: "YOU ARE CURRENTLY CONNECTED. ARE YOU SURE YOU WANT TO DISCONNECT NOW? Single Click on Yes to terminate the current HyperTerminal session.
- Step 3. The HyperTerminal window will close terminating the current session but the parent HyperTerminal window will remain open.
- Step 4. Move the cursor to the upper right hand corner of the parent HyperTerminal window and single click on the X. This will close the HyperTerminal window and return to the MS Windows desktop screen.

IMODEM COMMAND OVERVIEW

@T[®] Command Syntax. The @T[®] command syntax is identical to the industry standard Hayes AT command syntax. For a complete description of all available @T[®] commands, refer to Application Note #155, [@T[®] Command Set Description and Usage for CH2124/60 iModem Products.](#)

For the purposes of this document, the following conventions will be observed:

- <CR>** is used to denote carriage return (equivalent to HEX 0D).
- <LF>** is used to denote line feed (equivalent to HEX 0A).
- Enter: is used to denote the command string to be sent to the iModem.
- Action: is used to denote the action required by the user.
- Response: is used to denote the response sent (or action taken) by the iModem.

Any information listed in bold is a required portion of the command string. Brackets [] not in bold are intended to serve as delimiters only and are not part of the required command string. All embedded spaces are ignored except in the data field.

Each command line has the following format:

@T[command][=data field]<CR>

Where:

- @T[®]** is the iModem command attention sequence. Upper or lower case T is acceptable.
- [command]** is the specific command. Upper or lower case characters are acceptable.
- [=data field]** is the data field. Any ASCII character is acceptable (including blank spaces).

The = sign must precede the information entered in the data field (except for the case query commands).

<CR>

Use ? in the data field for the case of query commands. An = sign is not required for queries. is the termination sequence for all commands except for the @TM1 command as indicated below:

@T[M1][=data field]<CR>.<CR>.

@T® Command Data Entry. HyperTerminal DOES NOT support editing. DO NOT use the backspace character (HEX 08) to edit during data entry. Using the backspace key to perform character editing will cause the backspace character (HEX 08) to be included in the data stream. Unfortunately, the user may be lead to believe that character editing is allowed because the cursor will backspace when the backspace key is depressed. However, HyperTerminal is simply reacting to the HEX 08 character. In this case, the HEX 08 character will become part of the data stream and will cause considerable debugging headaches when the iModem attempts to execute a command string containing the HEX 08 character.

When editing is necessary, use either <CR> or <CR>.<CR>, as appropriate, to terminate data entry and then re-enter the entire data stream.

Email Message Types. The iModem currently has two basic types of email messages: the User Defined message and the Input Port Status message.

Input Port Status: The ASCII character configuration of the body of the Input Port Status email message is not user modifiable. However, the input port status reported can be changed at will by the user by changing the voltage applied to the input ports. The port voltage is reported in the message body as either HIGH or LOW.

User Defined: With the User Defined email message the ASCII character configuration of the message body is user modifiable. However, the input port status cannot be reported in this message type.

Email Message Send Commands. The iModem command set contains two commands for sending email messages. These commands are @TD and @TDM1.

@TD Command: The @TD command is a short cut version of the @TDM0 command and sends the Input Port Status message.

@TDM1 Command: The @TDM1 command only sends the User Defined email message. The ASCII character configuration of the email message sent by the @TDM1 command is currently limited to approximately 125 ASCII characters total, depending on header length, and including all spaces, <CR> and <LF>. The iModem will automatically terminate data entry when the maximum message length is reached. Each occurrence of spaces, <CR> and <LF> counts as 1 ASCII character. The @TDM1 command DOES NOT report the input port status.

IMPORTANT NOTE

The iModem family of products allows a maximum total message length of at least 125 ASCII characters depending on header length and including all spaces, <CR> and <LF>.

The @TM1 command is used to construct the user definable email message sent with the @TDM1 command. The @TM1 command will accept any ASCII character (including blanks, spaces, <CR> and <LF>) in the data field. Note that the termination sequence for the @TM1 command is <CR>.<CR> and not <CR>. Additionally, any <CR> included in the @TM1 data field is interpreted as <CR><LF>. This is done to maintain compatibility with various terminal emulation programs.

Email Message Subject Line. Regardless of the type of email message, the user has the ability to define the content of the subject line associated with the email message. The @TS1 command is used to set the content of the subject line. The subject line is currently limited to 15 ASCII characters. Blanks or spaces are allowed and each occurrence counts as 1 character. Note that currently the same subject line is used for both email messages.

For a more detailed discussion of the Send Email topic, refer to Cermetek Application Note #155, [@T®Command Set Description and Usage for CH2124/60 iModem Products](#). Refer to Cermetek Application Note #158, [Cermetek iModem Caveats and Definitions](#), for a summary of iModem conditions and requirements.

IMPORTANT NOTE

The following examples are intended to demonstrate various aspects of Cermetek iModem products while using MS Windows HyperTerminal[®] as the terminal emulation communication software. These examples are illustrative in nature. The user should consult the Device Programming Summary form supplied with each iModem for specific parametric values and settings.

IMODEM SETUP EXAMPLES

iModem Identification/Query Examples. The following examples illustrate the use of iModem query commands.

Example 1: Instruct the iModem to identify itself and display the firmware revision. This is also a convenient way to verify that communication with the iModem has been properly established.

Step 1. Enter: **@T[I]]<CR>**
 Response: **CH21XX Rev. A.BBB** Where **CH21XX** is the iModem Product and **Rev. A.BBB** is the firmware revision.

Example 2: Instruct the iModem to display the iModem unit name.

Step 1. Enter: **@T[U1][?]<CR>**
 Response: **Unit 01**

IMODEM SEND EMAIL MESSAGE EXAMPLES

The following examples are included in this application note to assist the user with typical iModem programming activities. These examples were created using an iModem socketed into the CH21XX Evaluation Board. The evaluation board was connected and configured per the instructions supplied with the board. For a complete description of the CH21XX Evaluation Board connection procedure, refer to Cermetek publication [iModem Evaluation Board Instructions](#). Refer to Application Note #158, [Cermetek iModem Caveats and Definitions](#), for a summary of iModem operational considerations and requirements. The following examples demonstrate various iModem setups and send email techniques.

Example 3: Send an email using the factory default ISP parameters. Note that the default parameters are pre-programmed by the factory prior to shipment and are based on the responses supplied by the user at the time of iModem order placement. Unless specifically indicated otherwise by the user, all default parameters incorporate the following assumptions:

1. A dial-up number is chosen from the same area code (if possible) as the voice phone number supplied by the user.
2. The user must first dial a 1, then area code, then phone number.
3. Whenever possible, the user account established on the Cermetek ISP shall have the same user name as the user's current email address user name.
4. The email will be sent to **<username@userdomain.com>** located at the Cermetek iModem **iModem Network** ISP. For the case of initial evaluations, this email destination address is the one supplied by the user at the time of order placement.

For a detailed discussion of the factory default ISP parameter set, refer to Cermetek Application Note # 156, [CH2124/60 iModem Default Configuration Profile](#).

Step 1. Verify the default ISP parameters.

Enter: **@T[V]<CR>** Review the preprogrammed ISP configuration profile.
 Response: **ISP Number (@TN1=n): 14089908604**
LOGIN NAME (@TL1=n): username@imodem.net
POP3 LOGIN ID (@TLM=n): username
LOGIN PASSWORD (@TP1=n): userpassword
POP3 PASSWORD (@TPM=n): userpassword
SMTP ADDRESS (@TOS1=n): C7AB36F7
POP3 ADDRESS (@TOP1=n): 18D6D210
FROM (@TE1=n): username@imodem.net
NAME (@TU1=n): DeviceName
TO (@TA1=n): username@imodem.net
SUBJECT (@TS1=n): iModem Test
MESSAGE (@TM1=n, end with <CR>.<CR>):

**This Message has been sent courtesy of
 Cermetek Microelectronics, using the
 CH21XX iModem.**

OK

Step 2. Verify email message. The **@TM1??<CR>** command displays the contents of the email header and the contents of the body of the email message.

Enter: **@T[M1][??] <CR>**
 Response: **Message-ID <CER30A7631.8F0F256B@pop.net>**
To: DeviceName <username@imodem.net>
Subject: iModem Test

**This Message has been sent courtesy of
 Cermetek Microelectronics, using the
 CH21XX iModem.**

OK

Example 4: Change the factory default email TO address. Send the User Defined email message to the new email destination address.

Step 1. Verify the default ISP parameters.

Enter: **@T[V]<CR>** Review the preprogrammed ISP configuration profile.
 Response: **ISP Number (@TN1=n): 14089908604**
LOGIN NAME (@TL1=n): username@imodem.net
POP3 LOGIN ID (@TLM=n): username
LOGIN PASSWORD (@TP1=n): userpassword
POP3 PASSWORD (@TPM=n): userpassword
SMTP ADDRESS (@TOS1=n): C7AB36F7
POP3 ADDRESS (@TOP1=n): 18D6D210
FROM (@TE1=n): username@imodem.net
NAME (@TU1=n): DeviceName
TO (@TA1=n): username@imodem.net
SUBJECT (@TS1=n): iModem Test
MESSAGE (@TM1=n, end with <CR>.<CR>):

**This Message has been sent courtesy of
 Cermetek Microelectronics, using the
 CH21XX iModem.**

OK

- Step 2. Change the destination email address to **<sendmemail@company.com>** where **sendmemail@company.com** represents the user's desired email "TO" destination email address.

Enter: **@T[A1][=sendmemail@company.com]<CR>**
 Response: **OK**

The iModem stores the User Defined message in message location M1. The full message is constructed in real time as the parameters are supplied by the user and are stored temporarily in internal memory. Although the email message body is updated into message location M1 immediately upon issuance of the **@TM1** command, the subject line (**@TS1** command), email TO (**@TA1** command) and email FROM (**@TE1** command) modifications are temporarily stored in flash memory and are only updated into message location M1 after the **@TM1** command is issued. Therefore, the user should modify the message body after all other desired modifications have been made to the subject line, email TO and email FROM parameters. Following this procedure will insure that the desired modifications are properly transferred to message location M1.

- Step 3. Verify that the email destination address has been changed.

Enter: **@T[V]<CR>** Review the preprogrammed ISP configuration profile.
 Response: **ISP Number (@TN1=n): 14089908604**
LOGIN NAME (@TL1=n): username@imodem.net
POP3 LOGIN ID (@TLM=n): username
LOGIN PASSWORD (@TP1=n): userpassword
POP3 PASSWORD (@TPM=n): userpassword
SMTP ADDRESS (@TOS1=n): C7AB36F7
POP3 ADDRESS (@TOP1=n): 18D6D210
FROM (@TE1=n): username@imodem.net
NAME (@TU1=n): DeviceName
TO (@TA1=n): sendmemail@company.com
SUBJECT (@TS1=n): iModem Test
MESSAGE (@TM1=n, end with <CR>.<CR>):

**This Message has been sent courtesy of
 Cermetek Microelectronics, using the
 CH21XX iModem.**

OK

- Example 5:** Create a User Defined email subject line and email message. Use the personalized ISP parameters from Example 4. Send the User Defined email using the **@TDM1** command.

- Step 1. Verify the default ISP parameters.

Enter: **@T[V]<CR>** Review the preprogrammed ISP configuration profile.
 Response: **ISP Number (@TN1=n): 14089908604**
LOGIN NAME (@TL1=n): username@imodem.net
POP3 LOGIN ID (@TLM=n): username
LOGIN PASSWORD (@TP1=n): userpassword
POP3 PASSWORD (@TPM=n): userpassword
SMTP ADDRESS (@TOS1=n): C7AB36F7
POP3 ADDRESS (@TOP1=n): 18D6D210
FROM (@TE1=n): username@imodem.net
NAME (@TU1=n): DeviceName
TO (@TA1=n): sendmemail@company.com
SUBJECT (@TS1=n): iModem Test
MESSAGE (@TM1=n, end with <CR>.<CR>):

This Message has been sent courtesy of Cermetek Microelectronics, using the CH21XX iModem.

OK

Step 2. Create a User Defined email subject line.

Enter: @T[S1][=Test Email 1]<CR> New email subject line
Response: OK

Step 3. Customize the body of the email message.

Enter: @T[M1][=This is test email 1.<CR>]<CR>.<CR> Note the use of the <CR>.<CR> termination sequence
Response: OK

Step 4. Verify the content of the User Defined email.

Enter: @T[M1][?]<CR>
Response: This is test email 1. Note that the <CR>.<CR> termination sequence is repeated verbatim in the message text. This sequence is needed by the various internet protocols to indicate end-of-message. The <CR>.<CR> will not appear in the transmitted email.
. **OK**

Step 5. Send the User Defined email message to <sendmemail@company.com>.

Enter: @T[DM1][?]<CR> Send User Defined email message M1
Response: <LF><CR> Audible modem negotiation with ISP modem
CONNECT Successful connection to ISP
PASSWORD OK Successful Logon to ISP email account
MESSAGE ACCEPTED Email message accepted by ISP
HANGING UP Termination of ISP Logon session

FOLLOWING IS THE FULL CONTENT OF THE USER DEFINED EMAIL SENT

Subject: Test Email 1
Date: Day: XX Mon Year Time The exact date/time of the email transmission is reported here
From: DeviceName <username@imodem.net>
To: <sendmemail@company.com>

This is test email 1.

Example 6: Alternatively, the user may send the message using the CH2124/60 iModem SEND PIN to send the email. Activating the iModem SEND PIN (Active TTL LOW) after redefining M1 as the default message will send the User Defined message rather than the default Input Port Status message.

Step 1. Redefine the User Defined email message M1 as the message to be sent when the SEND PIN (Pin # 6) is activated (Active TTL LOW). Send the User Defined email message to <sendmemail@company.com>.

Enter: @T[K8][=31]<CR> Set K8=31 to send User Defined message when SEND PIN activated
Response: OK
Action: Set SEND PIN Low Momentarily activating the SEND PIN (TTL LOW) automatically sends email

Response:	<LF><CR>	Audible modem negotiation with ISP modem
	CONNECT	Successful connection to ISP
	PASSWORD OK	Successful Logon to ISP email account
	MESSAGE ACCEPTED	Email message accepted by ISP
	HANGING UP	Termination of ISP Logon session

Step 5C. Use redefined default email message M1. Send the User Defined email message to **<sendmemail@company.com>** using push switch S3 on the CH21XX Evaluation Board. Note that the use of push switch S3 is made with the following assumptions:

1. The user has configured the CH21XX Evaluation Board per the instructions supplied with the evaluation board.
2. The user has verified proper operation of the evaluation board.
3. PROCOMM is active so as to monitor the response messages sent from the iModem.

Action: **Momentarily Depress S3** Momentarily activating the SEND PIN (TTL LOW) automatically sends email

Response:	<LF><CR>	Audible modem negotiation with ISP modem
	CONNECT	Successful connection to ISP
	PASSWORD OK	Successful Logon to ISP email account
	MESSAGE ACCEPTED	Email message accepted by ISP
	HANGING UP	Termination of ISP Logon session

Properly executing the instructions in Step 5A, 5B or 5C will produce the email listed in step 5 of example 5.

Example 7: Fully customize the email message. Send the User Defined email using the alternate ISP. Note that the use of an alternate ISP necessitates the following changes:

1. New local access ISP PHONE NUMBER.
2. New user EMAIL ACCOUNT or ADDRESS.
3. New USERNAME.
4. New user PASSWORD.
5. New MAIL SERVER IP ADDRESS.

Step 1. Verify the default ISP parameters.

Enter: **@T[V]<CR>** Review the preprogrammed ISP configuration profile.

Response: **ISP Number (@TN1=n): 14089908604**
LOGIN NAME (@TL1=n): username@imodem.net
POP3 LOGIN ID (@TLM=n): username
LOGIN PASSWORD (@TP1=n): userpassword
POP3 PASSWORD (@TPM=n): userpassword
SMTP ADDRESS (@TOS1=n): C7AB36F7
POP3 ADDRESS (@TOP1=n): 18D6D210
FROM (@TE1=n): username@imodem.net
NAME (@TU1=n): DeviceName
TO (@TA1=n): sendmemail@company.com
SUBJECT (@TS1=n): iModem Test
MESSAGE (@TM1=n, end with <CR>.<CR>):

**This Message has been sent courtesy of
Cermetek Microelectronics, using the
CH21XX iModem.**

OK

Step 2. Verify the content of the User Defined email.

Enter: **@T[M1][?]<CR>**

Response: **This is test email 1.** Note that the **<CR>.<CR>** termination sequence is

.
 Repeated verbatim in the message text. This sequence is needed by the various internet protocols to indicate end-of-message.
OK The <CR>.<CR> will not appear in the transmitted email.

Step 3. Change the ISP local access phone number.

Enter: @T[N1][=5551212]<CR> Where **555-1212** is the new local access phone number
 Response: **OK**

Step 4. Change the username.

Enter: @T[L1][=myname@imodem.net]<CR> Where **myname** is the new username
 Response: **OK**

Step 5. Change the password.

Enter: @T[P1][=password]<CR> Where **password** is the new password
 Response: **OK**

Step 6. Change the local email SMTP (i.e., Send to email) server address. The local email server address can be obtained by calling the ISP's technical support line. Be sure to convert the address to hexadecimal. Refer to Cermetek Application Note # 148, [Procedure to Convert Between Decimal, Hexadecimal and ASCII](#).

Enter: @T[OS1][=AAABBBCC]<CR> Where **AAABBBCC** is the HEX address
 Response: **OK**

Step 7. Change the local email account/address.

Enter: @T[E1][=account@isp.com]<CR> Where **account@isp.com** is the new user account
 Response: **OK**

Step 8. Change the email subject line.

Enter: @T[S1][=Test Email 2]<CR> New email subject line
 Response: **OK**

Step 9. Customize the body of the email message.

Enter: @T[M1][=This is test email 2.<CR>]<CR>.<CR> Note the use of the <CR>.<CR> termination sequence
 Response: **OK**

The iModem stores the User Defined message in message location M1. The full message is constructed in real time as the parameters are supplied by the user and are stored temporarily in internal memory. Although the email message body is updated into message memory area M1 immediately upon issuance of the @TM1 command, the subject line (@TS1 command), EMAIL TO (@TA1 command) and EMAIL FROM (@TE1 command) modifications are temporarily stored in flash memory and are only updated into message memory area M1 after the @TM1 command is issued. Therefore, the user should modify the message body after all other desired modifications have been made to the subject line, EMAIL TO and EMAIL FROM parameters. Following this procedure will insure that the desired modifications are properly transferred to message location M1.

Step 10. Verify that the ISP parameters have been modified correctly.

Enter: @T[V] []<CR>
 Response: **ISP Number (@TN1=n): 5551212**
LOGIN NAME (@TL1=n): myname@imodem.net
POP3 LOGIN ID (@TLM=n): username

LOGIN PASSWORD (@TP1=n): password
POP3 PASSWORD (@TPM=n): userpassword
SMTP ADDRESS (@TOS1=n): AAABBBCC
POP3 ADDRESS (@TOP1=n): 18D6D210
FROM (@TE1=n): account@isp.com
NAME (@TU1=n): DeviceName
TO (@TA1=n): sendmemail@company.com
SUBJECT (@TS1=n): Test Email 2
MESSAGE (@TM1=n, end with <CR>.<CR>):

This is test email 2.
OK

Step 11A. Send User Defined email message to **<sendmemail@company.com>** using the new ISP.

Enter:	@T[DM][1]<CR>	Send User Defined email message M1
Response:	<LF><CR>	Audible modem negotiation with ISP modem
	CONNECT	Successful connection to ISP
	PASSWORD OK	Successful Logon to ISP email account
	MESSAGE ACCEPTED	Email message accepted by ISP
	HANGING UP	Termination of ISP Logon session

Alternatively, the user may send the default message M1 as set by the factory and use the iModem SEND PIN to send the email. Momentarily activating the iModem SEND PIN (Active TTL LOW) will send the User Defined.

Step 11B. Define default email message as User Defined message M1. Send the User Defined email message to **<sendmemail@company.com>** by activating the iModem SEND PIN (Active LOW TTL).

Enter:	@T[K8][=31]<CR>	Set K8=31 to send User Defined message when SEND PIN activated
Response:	OK	
Action:	Set SEND PIN Low	Momentarily activating the SEND PIN (TTL LOW) automatically sends email
Response:	<LF><CR>	Audible modem negotiation with ISP modem
	CONNECT	Successful connection to ISP
	PASSWORD OK	Successful Logon to ISP email account
	MESSAGE ACCEPTED	Email message accepted by ISP
	HANGING UP	Termination of ISP Logon session

Step 11C. Send the User Defined email message to **<sendmemail@company.com>** using push switch S3 on the CH21XX Evaluation Board. Note that the use of push switch S3 is made with the following assumptions:

1. The user has configured the CH21XX Evaluation Board per the instructions supplied with the evaluation board.
2. The user has verified proper operation of the evaluation board.
3. PROCOMM is active so as to monitor the response messages sent from the iModem.

Action:	Momentarily Depress S3	Momentarily activating the SEND PIN (TTL LOW) automatically sends email
Response:	<LF><CR>	Audible modem negotiation with ISP modem
	CONNECT	Successful connection to ISP
	PASSWORD OK	Successful Logon to ISP email account
	MESSAGE ACCEPTED	Email message accepted by ISP
	HANGING UP	Termination of ISP Logon session

Properly executing the instructions in Step 11A, 11B or 11C will produce the identical email listed below.

FOLLOWING IS THE FULL CONTENT OF THE USER DEFINED EMAIL SENT

Subject: Test Email 2
Date: Day: XX Mon Year Time The exact date/time of the email transmission is reported here
From: DeviceName <account@isp.com>
To: <sendmemail@company.com>

This is test email 2.

The iModem stores the Input Port Status email message in message location M0. The full message is constructed in real time as the user supplies the parameters. Unlike the User Defined email message (stored in message location M1), the Input Port Status message is updated immediately upon issuance of each @T command. Therefore, the user is not required to observe any particular order when modifying the current ISP parameters.

Because the iModem stores the Input Port Status message in message location M0, the user may issue command @TD<CR> or command @TDM0<CR> to send the Input Port Status email message. Alternatively, the Input Port Status email message may be automatically sent by activating the iModem SEND PIN (Active TTL LOW).

Note that the email message sent by activating the iModem SEND PIN is determined by the value set in the K8 parameter: K8=30 for Input Port Status message or K8=31 for User Defined email message. See Example 5 below.

Example 8: Send Input Port Status message.

Step 1. Verify default Input Port Status email message.

Enter: @T[V1]<CR> Verify Input Port Status Email
Response:

EMAIL MESSAGE:

Remote product message

Input 1 **LOW** Depends on status of Input 1: either TTL HIGH or TTL LOW
Input 2 **HIGH** Depends on status of Input 2: either TTL HIGH or TTL LOW

Step 2. Send default Input Port Status email message to <sendmemail@company.com>.

Enter: @T[D]<CR>
Response: <LF><CR> Audible modem negotiation with ISP modem
 CONNECT Successful connection to ISP
 PASSWORD OK Successful Logon to ISP email account
 MESSAGE ACCEPTED Email message accepted by ISP
 HANGING UP Termination of ISP Logon session

Step 1. Send default email message.

Enter: @T[D]<CR> Send Input Port Status Email
Response: <LF><CR> Audible modem negotiation with ISP modem
 CONNECT Successful connection to ISP

Step 2. **PASSWORD OK** Successful Logon to ISP email account
 MESSAGE ACCEPTED Email message accepted by ISP
 HANGING UP Termination of ISP Logon session

Step 2. Retrieve email message 1.

Enter:	@T[DG][1]<CR>	Retrieve email message 1.
Response:	<LF><CR>	Audible modem negotiation with ISP modem.
	CONNECT	Successful connection to ISP. DCD (Pin 17) active TTL LOW.
	PASSWORD OK	Successful Logon to ISP email account. RXD (Pin 11) and TXD (Pin 10) active.
	Y Messages	Where Y is the number of email messages available.
Date:	Day: XX Mon Year Time	The exact date/time of the email transmission is reported here.
From:	DeviceName <sendmemail@company.com>	
Subject:	iModem Test	

This is test email 2.	Note that the <CR>.<CR> termination sequence is repeated verbatim in the message text. This sequence is needed by the various internet protocols to indicate end-of-message.
.	The <CR>.<CR> will not appear in the transmitted email.
RETRIEVAL COMPLETE	The message has been retrieved successfully.
SERVER CLOSED	The POP3 server connection is closed.
HANGING UP	Termination of ISP Logon session.

Delete Email Examples. Just as for the case of retrieve email, the email POP3 server needs to know the number of the message the user wishes to delete. This number is specified as **n** in the **@TDKn** delete email command.

The **@TDKn** command directs the iModem to connect to the internet, delete email message number **n** and then terminate the internet connection when the message has been deleted. Currently, the iModem will accept email message numbers from 1 to 99 (inclusive). The following iModem ISP parameters are utilized to uniquely identify the email message to be deleted:

1. The username as specified by the **TL1** command.
2. The EMAIL FROM internet account as specified by the **TE1** parameter.
3. The POP3 server as specified by the **TOP1** parameter.

Like the **@TDGn** command, the **@TDKn** command reports the total number of email messages available on the POP3 server as well as deleting email message **n**. The number of email messages is reported BEFORE email message **n** is deleted. **@TDKn** will delete only one message per command issuance. After the specified email has been deleted, the iModem terminates the internet connection. Additional emails must be deleted by issuing additional **@TDKn** commands.

For a more detailed discussion, refer to Cermetek Application Note #155, [@T®Command Set Description and Usage for CH2124/60 iModem Products](#).

The following examples illustrate the delete email feature of the iModem.

Example 10: Use the CH2160 to delete email message # 5.

Step 1. Verify the default ISP parameters.

Enter:	@T[V]<CR>	Review the current ISP configuration profile.
Response:	ISP Number (@TN1=n): 5551212	
	LOGIN NAME (@TL1=n): username@imodem.net	
	POP3 LOGIN ID (@TLM=n): username	
	LOGIN PASSWORD (@TP1=n): userpassword	
	POP3 PASSWORD (@TPM=n): userpassword	
	SMTP ADDRESS (@TOS1=n): C7AB36F7	
	POP3 ADDRESS (@TOP1=n): 18D6D210	
	FROM (@TE1=n): username@imodem.net	

NAME (@TU1=n): DeviceName
TO (@TA1=n): sendmemail@company.com
SUBJECT (@TS1=n): iModem Test
MESSAGE (@TM1=n, end with <CR>.<CR>):

This is test email 2.

OK

Step 2. Delete email message 5.

Enter: **@T[DK][5]<CR>**
 Response: **<LF><CR>**
CONNECT
PASSWORD OK

Y Messages
MESSAGE DELETED
SERVER CLOSED
HANGING UP

Delete email message 5.
 Audible modem negotiation with ISP modem.
 Successful connection to ISP. DCD (Pin 17) active TTL LOW.
 Successful Logon to ISP email account. RXD (Pin 11) and TXD (Pin 10) active.
 Where **Y** is the number of email messages available.
 The message has been successfully deleted.
 The POP3 server connection is closed.
 Termination of ISP Logon session. PSTN line released

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