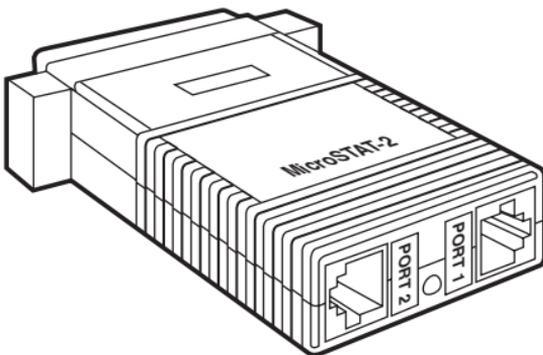




MicroSTAT-2



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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, may 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.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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 the Canadian Department of Communications.

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 le ministère des Communications du 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 conectado 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 objetos líquidos 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: Objetos 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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1. Specifications

Sub-Channels (Serial Devices)

Interface	RJ-45, V.24/RS-232C
Configuration	DCE
Transmission	Asynchronous, full duplex
Baud Rate	110, 300, 1200, 2400, 4800, 9600, 19,200, 38,400 bps selectable or auto-detected
Word Size	7 or 8 data bits
Parity	Odd, even, mark, space, or none
Stop Bits	1 or 2
Flow Control	Hardware (RTS/CTS), software (XON/XOFF)

Main Channel (Modem)

Interface	DB25 male, DTE, V.24/RS-232C
Transmission	Asynchronous, full duplex
Baud Rate	1200, 2400, 4800, 9600, 19,200, 38,400 bps selectable
Flow Control	RTS/CTS or no flow control
Temperature	32° to 158°F (0° to 70°C)
Humidity	Up to 95%, noncondensing
Altitude	Up to 15,000 feet (4570 m)
Power	Derived from the RS-232 interfaces; Pins 5, 6, and 9 on main channel DB25; Pins 3 and 8 on sub-channel RJ-45; 7 to 15V with 30 to 500 mA
Size	2.7"H x 2.1"W x 0.75"D (6.9 x 5.3 x 1.9 cm)
Weight	0.1 lb. (0.05 kg)

2. Introduction

The MicroSTAT-2 is a miniature statistical multiplexor that lets one asynchronous modem communicate with two asynchronous serial devices *at the same time*. Operating at data rates up to 38.4 Kbps, the MicroSTAT-2 uses specialized circuitry to monitor and prioritize data flow.

The MicroSTAT-2 can be configured so that upon startup it automatically senses the data rate of the device connected to either sub-channel. It can also be configured to go into Data Mode when the modem raises CD. For added convenience, the MicroSTAT-2 allows both local and remote multiplexors to be configured from local port 1 or 2.

The MicroSTAT-2 supports both hardware (RTS/CTS) and software (XON/XOFF) flow control. Connecting directly to the modem's DB25 port, the MicroSTAT-2 derives power from the RS-232 interface and requires no AC power or batteries for operation. Async input devices connect to the MicroSTAT-2 using dual RJ-45 modular interface jacks.

- Multiplexes two RS-232 devices into one RS-232 modem link

- Asynchronous sub-channel rates: 110, 300, 1200, 2400, 9600, 19,200, and 38,400 bps
- Asynchronous main channel rates: 1200, 2400, 4800, 9600, 19,200, and 38,400 bps and auto detect
- Interface powered—no AC power or batteries required
- Miniature design—plugs directly into DB25 modem port
- Modular RJ-45 sub-channel ports 1 and 2
- Convenient configuration using extended AT command set
- Configure local and remote units from either local port 1 or 2
- Supports both XON/XOFF and RTS/CTS flow control

3. Installation

The MicroSTAT-2 is typically installed by connecting the main channel to an asynchronous modem and the sub-channels to two asynchronous serial devices.

3.1 Connecting the Main Channel

To use both channels of your MicroSTAT-2, you must be linked to another MicroSTAT-2, which is usually located remotely and interconnected with a pair of modems. On one end of the MicroSTAT-2, you will find the asynchronous RS-232 Modem interface. This is a DB25 male connector, which *plugs directly into the DB25 female connector on your modem.*

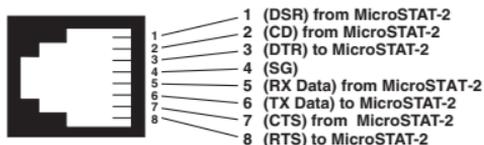
The following table lists the pin connections on the MicroSTAT's modem interface:

Pin #	Description	Direction
1	Protective Ground	N/A
2	Transmit Data	From MicroSTAT-2
3	Receive Data	To MicroSTAT-2
4	Request to Send	From MicroSTAT-2
5	Clear to Send	To MicroSTAT-2
6	Data Set Ready	To MicroSTAT-2
7	Signal Ground (common return)	N/A
8	Carrier Detect	To MicroSTAT-2
9	9 to 12 Volt Power (optional)	To MicroSTAT-2
20	Data Terminal Ready	From MicroSTAT-2
22	Ring Indicator	To MicroSTAT-2

If your application requires an RS-232 cable between the MicroSTAT-2 and the modem, it must be a *straight-through cable* (pinned 1-1, 2-2, 3-3, etc.) of the *shortest* possible length.

3.2 Connecting the Sub-Channels

The MicroSTAT-2's two asynchronous, serial sub-channels are RJ-45 female ports that conform to the EIA/TIA-561 interface (see the figure below). These ports connect to the two serial devices that will be multiplexed through the MicroSTAT-2's main RS-232 port. Any combination of the RS-232 devices may be connected to the MicroSTAT's sub-channels: PC and Macintosh® computers, terminals, printers, laptops, plotters, etc.



EIA/TIA-561 interface pinouts for MicroSTAT-2 RJ-45 jacks (ports 1 and 2).

Every serial device connected to channels 1 and 2 must have a special interface cable. On one end, this interface cable must have an RJ-45 male plug; on the other end, it must have a connector that fits into your RS-232 serial device.

The tables on this page show pin connections between the MicroSTAT-2's sub-channels and common RS-232 serial interfaces. You may use these diagrams to construct your own cables, or you may purchase pre-made cables from your supplier. See the **Appendix** for cable part numbers.

PC/XT™ or Serial Printer to MicroSTAT-2 Pinouts

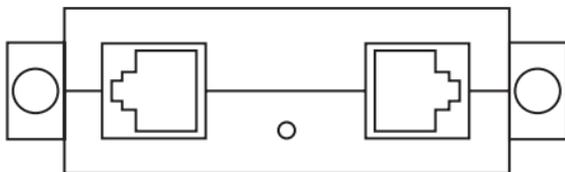
Serial DB25 Pin #	MicroSTAT-2 RJ-45 Pin #
6 (DSR)	1
8 (CD)	2
20 (DTR)	3
7 (SG)	4
3 (RX Data)	5
2 (TX Data)	6
5 (CTS)	7
4 (RTS)	8

Personal Computer AT® to MicroSTAT-2 Pinouts

Serial DB9 Pin #	MicroSTAT-2 RJ-45 Pin #
6 (DSR)	1
1 (CD)	2
4 (DTR)	3
5 (SG)	4
2 (RCV Data)	5
3 (TX Data)	6
8 (CTS)	7
7 (RTS)	8

3.3 LED Status Indicator

The MicroSTAT-2 has one LED indicator, which is located at the rear of the unit, between the two modular jacks (see the figure below). This LED glows to show that the local and remote MicroSTATs are in Data Mode, and are synchronized with each other.

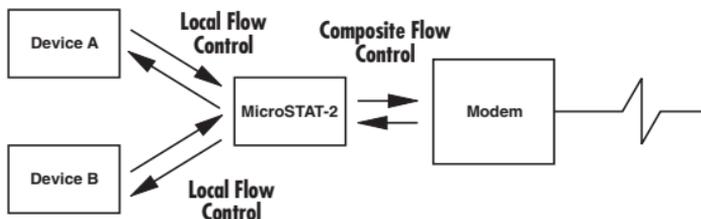


3.4 Power Requirements

The MicroSTAT-2 derives all necessary operating power from all three interfaces and requires no AC power or batteries for operation. When the DCE device is turned on, the MicroSTAT-2 automatically “powers up.”

3.5 Flow-Control Requirements

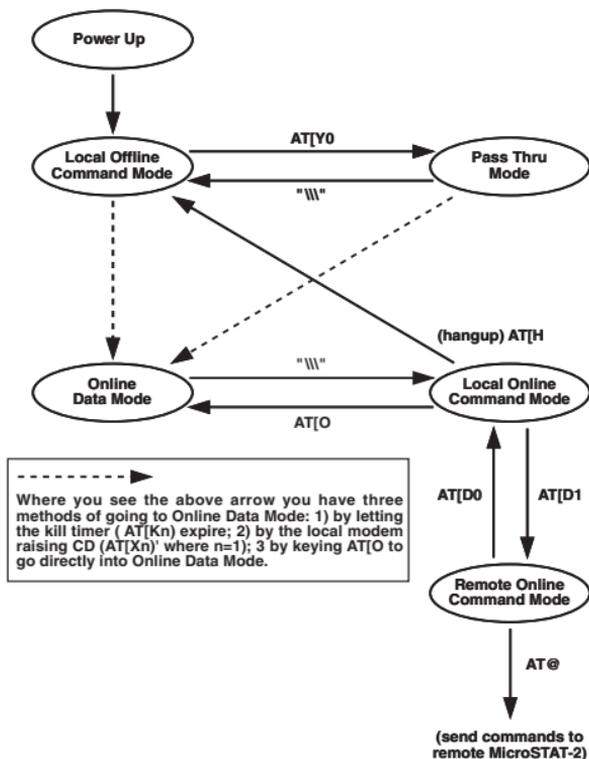
For each of the MicroSTAT-2 port connections, flow control may be set for X-ON/X-OFF (software), RTS/CTS (hardware), both methods, or no flow control (see the figure below). For *most* applications, the serial devices connected to sub-channels 1 and 2 must support *local* flow control (flow control between the device and the sub-channel port). In *all* cases, the flow-control setting of each MicroSTAT-2 port must match the flow-control setting of the device connected to that port.



MicroSTAT-2 flow-control requirements.

4. Operating Modes

This section gives descriptions of the five operating modes used by the MicroSTAT-2. When reading these descriptions it may be helpful to refer to the Navigation chart shown below.



4.1 Local Offline Command Mode

When first powered up, the MicroSTAT-2 automatically performs a self-test, configures itself, and enters Local Offline Command Mode. In this mode, **AT[** commands may be entered to configure the local MicroSTAT-2. These commands can be entered through sub-channel 1 or 2 on a “first come, first served” basis.

The MicroSTAT-2 will remain in local offline command mode for 2 minutes (or whatever timeout the user has selected). If the user does not enter a command within this time period, the local MicroSTAT-2 will connect with the remote MicroSTAT-2 and automatically enter Online Data Mode.

4.2 Online Data Mode

In Online Data Mode, sub-channels 1 and 2 are merged together into one data stream. This single data stream is transmitted through the modems, and separated back into data channels 1 and 2 at the remote end. The entire communication process is based upon the parameters that were set in the command modes.

4.3 PassThru Mode

In PassThru Mode, the multiplexing function of the local MicroSTAT-2 is disabled so that the local modem may be configured or dialed without disconnecting the MicroSTAT-2.

4.4 Local Online Command Mode

In Local Online Command Mode, the local MicroSTAT-2 can listen to a command while remaining connected to the remote end. This allows the user to 1) hang up/disconnect the local connection, or 2) go into Remote Online Command Mode to send commands to the remote MicroSTAT-2.

4.5 Remote Online Command Mode

In Remote Online Command Mode, **AT@** commands may be entered to configure the remote MicroSTAT-2. These commands can be entered through sub-channel 1 or 2 of the local MicroSTAT-2 on a “first come, first served” basis.

5. Command Entry

Before attempting to configure or operate the MicroSTAT-2, it is important to know how the unit handles command entry. This section provides rules for command entry, describes result codes, and gives a complete description of each valid AT command.

5.1 Rules for “AT” Command Entry

Rule 1: Since the MicroSTAT-2 only accepts ASCII characters, all command lines must start with the attention code “AT.” Local commands start with [(left bracket) character, and are stored in the local command buffer. Remote commands start with the @ character, and are stored in the remote command buffer. The remote commands can only be serviced when both MicroSTAT-2s are synchronized (in Online Data Mode) and the local MicroSTAT-2 is in Online Command Mode (i.e. after \\ is detected). Before a command or string of commands is executed, the <ENTER> or <CR> must be pressed.

Rule 2: The user may string commands together in one command line, and separate commands with spaces. However, the **AT[-directive** or the **AT@-directive** may be followed *by only 30 characters and spaces*. If a command line exceeds 30 characters, the MicroSTAT-2 aborts execution of the command line and will display an error reply code. This will occur before you press <ENTER/CR>.

Example:

AT[30-character MicroSTAT-2 command
<ENTER/CR>

Rule 3: Each command line must end with an <ENTER/CR>. The MicroSTAT-2 will not begin command execution until it receives a carriage-return character.

Rule 4: If you made an error while keying a command, you can edit your entry before you press <ENTER/CR>. Pressing <BACKSPACE> once deletes the last character entered. Pressing <BACKSPACE> repeatedly deletes the entire command line, except the AT command at the beginning of the line.

Note: Not all modems support the backspace edit function.

- Rule 5:* Many commands require a numeric parameter. If you omit this parameter, it will automatically be set at zero.
- Rule 6:* To store a new configuration in the MicroSTAT-2's non-volatile memory, the user must enter an **AT[W** or **AT@W** command.

5.2 Result Codes

Besides echoing back AT commands, the MicroSTAT-2 returns its own result codes to sub-channel 1 after executing a command. The result codes indicate whether or not the execution was satisfactory. You may define result codes as English words (**Q0**), or numeric digits (**Q1**), or you may disable them entirely (**Q2**). Table 5-2 describes these codes.

Digit Code	Word Code	Meaning of Code
0	OK	Command line executed without errors
4	ERROR	Error in the command line

NOTE

For screen display purposes, a carriage-return/line-feed character sequence will follow *word* result codes, while only a carriage-return character will follow *numeric* result codes.

If you do not have a remote MicroSTAT-2 connected to the communication line, an "error" result code will show when you hit <ENTER/CR>.

5.3 Complete “AT” Command Set

The MicroSTAT-2 command set has two types of commands: Mode Setting Commands and Channel Configuration Commands. The Mode Setting Commands select operating modes and parameter values for the MicroSTAT-2. The Channel Configuration Commands change the configuration of the channel that you have selected. Both will have an immediate effect when you press the <ENTER/CR> key. In order to store the commands in non-volatile memory, you must enter **AT[W** or **AT@W** after the commands have been entered.

5.3.1 MODE SETTING COMMANDS

The Mode Setting Commands select operating modes and parameter values for the MicroSTAT-2. The letter “n” that follows the command letter represents a numeric value. The text describes valid choices, where (*) is the initial selection after a software reset **T** command.

Table 5-1. Mode Setting Commands

Command	Function
AT	Command line prefix. The attention command precedes all other commands listed below.
[Directs the <i>local MicroSTAT-2</i> to execute the following commands. The MicroSTAT-2 discards all characters before the “[” character, unless it has a connection to a remote MicroSTAT-2 or you have enabled modem commands.
Dn	<p>Tells the remote MicroSTAT-2 to enter Remote Online Command Mode, so that it can be configured. Also tells the remote MicroSTAT-2 to return to Online Data Mode when configuration is finished. (Note: This command must be preceded by the AT[command, and can only be used when the local MicroSTAT-2 is in Local Online Command Mode.)</p> <p>n = 0 tells the remote MicroSTAT-2 to exit Remote Online Command Mode and return to Online Data Mode.</p> <p>n = 1 tells the remote MicroSTAT-2 to enter Remote Online Command Mode. The following statements apply:</p> <ul style="list-style-type: none"> • If this command was entered on local sub-channel 1, then it will request sub-channel 1 of the remote MicroSTAT-2 to enter Remote Online Command Mode. Sub-channel 2 will remain in Online Data Mode. • After this command is entered, only AT commands followed by @ will be sent to the remote MicroSTAT-2.
Gn	<p>Selects the behavior of Carrier Detect on sub-channels 1 and 2.</p> <p>*n = 0, CD always ON n = 1, CD of sub-channel follows composite port CD</p>

Table 5-1. Mode Setting Commands (continued)

Command	Function
\	<p>This command has two functions:</p> <ol style="list-style-type: none"> 1) If the command is entered while in pass-through mode (AT[Y0]), the local mux will leave that mode and return to offline command mode. 2) If the command is received from online data mode, either from sub-channel 1 or 2, local mux will enter online command mode on that channel.
Cn	<p>Selects channel number for subsequent channel configuration commands. At the start of each command line, selection reverts to 0 (“deselects any channel”).</p> <p>*n = 0, deselects any channel n = 2, channel 2 n = 1, channel 1 n = 3, communication link (modem)</p>
@	<p>Directs the <i>remote MicroSTAT-2</i> to execute the following commands. The remote MicroSTAT-2 responds to all the commands after the “@” character and returns the result code. The local unit does not process those commands. The local MicroSTAT-2 rejects the command line if: (a) the @ command is not immediately following the AT prefix, (b) the local MicroSTAT-2 does not have a connection to the remote MicroSTAT-2, (c) the remote MicroSTAT-2 is in Local Online Command Mode, and (d) this command was not preceded by the AT[D1] command to tell the remote unit to enter Remote Command Mode.</p>
H	<p>Hangup/disconnect command. Enter when the local MicroSTAT-2 is in Local Online Command Mode. Upon receiving this command, the local MicroSTAT-2 will drop DTR at the composite port for approximately 250 msec, and return to Local Offline Command Mode.</p>
Jn	<p>Selects XON character “n,” where “n” is a single ASCII character, either a control character or an upper- or lower-case letter (A through Z, or a through z). NULL, ETX, STX, and Carriage Return characters are not allowed.</p>

Table 5-1. Mode Setting Commands (continued)

Command	Function
Kn	<p>Sets the “no activity kill timer” (times out of Local Offline Command Mode or PassThru Mode and enters Online Data Mode if no activity is detected) in quarter-minute increments. Valid values are 0 through 15. K8 is the default, resulting in a 2-minute command mode timeout. The timer starts running when the “T” key of the “AT” command is pressed. Note: This time limit should not be set too short, or timeouts will occur during the entry of the AT commands.</p> <p style="padding-left: 40px;">n = 0, disabled n = 1, 1/4 minute n = 2, 1/2 minute n = 3, 3/4 minute n = 4, 1 minute n = 5, 75 seconds n = x, x/4 minute</p> <p>NOTE: If K0 is selected, the local MicroSTAT-2 will stay in Local Offline Command Mode indefinitely, until either CD of the main channel becomes active (if this option is enabled) or an AT[0] command is entered.</p>
Nn	<p>Selects XOFF character “n,” where “n” is a single ASCII character, either a control character or an upper- or lower-case letter (A through Z, or a through z). NULL, ETX, STX, and Carriage Return characters are not allowed.</p>
O	<p>Return to online data mode. If you have enabled multiplexor operation, the MicroSTAT-2 waits for a connection to the remote MicroSTAT-2. You only issue this to the local MicroSTAT-2.</p>
Rn	<p>Enables or disables remote control of the MicroSTAT-2.</p> <p style="padding-left: 40px;">*n = 0, remote control disabled n = 1, remote control enabled</p>

Table 5-1. Mode Setting Commands (continued)

Command	Function
T	<p>Causes a software reset with all MicroSTAT-2 modes and channel configurations set to factory-default values. The MicroSTAT-2 will then enter offline command mode.</p> <p>Note: The user must wait approximately 5 seconds after receiving the “OK” response before entering new commands.</p>
Un	<p>Packet-size selection. This configuration is applied to the composite channel to determine the size (in data bytes) of the data packet being transmitted to the modem.</p> <p>n = 0, 8 bytes *n = 1, 16 bytes n = 2, 24 bytes n = 3, 32 bytes n = 4, 48 bytes n = 5, 64 bytes n = 6, 96 bytes n = 7, 128 bytes</p>
Vn	<p>View channel configuration or mode configuration.</p> <p>n = 0, view the configuration of the composite channel n = 1, view the configuration of sub-channel 1 n = 2, view the configuration of sub-channel 2 n = 3, view the configuration of the composite channel</p>
W	<p>Stores configuration into non-volatile memory.</p>

Table 5-1. Mode Setting Commands (continued)

Command	Function
Xn	<p>Enables or disables entry into data mode based upon the status of Carrier Detect (CD) at the composite port. If this command is enabled, the MicroSTAT-2 will enter data mode when CD is raised, and exit data mode to go back to offline command mode when CD goes off. If this command is disabled, the status of CD will not effect whether or not the MicroSTAT-2 enters data mode.</p> <p style="text-align: center;">*n = 0, CD activation of data mode disabled n = 1, CD activation of data mode enabled</p>
Yn	<p>This command has two concurrent functions: 1) Causes local MicroSTAT-2 to enter PassThru Mode. 2) Enables or disables multiplexor operation. If the AT command to disable is issued through channel 1, the MicroSTAT-2 logically connects channel 1 to the communication link and disables channel 2. If the AT command to disable is issued through channel 2, the MicroSTAT-2 logically connects channel 2 to the communication link and disables channel 1. By disabling the multiplexor operation, you can use the attached modem or serial device for any single-channel purpose without physically disconnecting the MicroSTAT-2. You only issue this to the local MicroSTAT-2.</p> <p style="text-align: center;">n = 0, disable multiplexor</p> <p>NOTE: This option will not be stored in non-volatile memory. Multiplexor operation will be enabled again if AT[Z or \ is entered, or upon power-up reset.</p>
Z	<p>Causes a software reset with all MicroSTAT-2 modes and channel configurations set to previously stored values. The MicroSTAT-2 will then enter offline command mode.</p> <p>NOTE: The user must wait approximately 5 seconds after receiving the "OK" response before entering new commands.</p>

5.3.2 CHANNEL CONFIGURATION COMMANDS

The following commands change the configuration of the channel that you select with **Cn** command. The **Cn** command must be in the command line before a channel configuration command, or the MicroSTAT-2 rejects the configuration command. The letter “n” that follows the command letter represents a numeric value. The text describes the valid choices, where the first choice (*) is the initial selection after a software-reset **T** or **Z** command.

Table 5-2. Channel Configuration Commands

Command	Function
Bn	<p>Selects baud rate for the selected channel.</p> <p>*n = 0, auto select (applies only to sub-channels; see the NOTE) n = 1, 110 bps (applies only to sub-channels) n = 2, 300 bps (applies only to sub-channels) n = 3, reserved for future use n = 4, 1200 bps n = 5, 2400 bps n = 6, 4800 bps n = 7, 9600 bps n = 8, 19,200 bps n = 9, 38,400 bps n = 10, reserved for future use n = 11, reserved for future use</p> <p>NOTE: Sub-channel 1 factory defaults to auto-select; sub-channel 2 factory defaults to 19.2 Kbps.</p>
En	<p>Determines whether the local MicroSTAT-2 echoes the data received in the command mode back to its sub-channel 1 or 2. (NOTE: Each sub-channel can have its own echo option.)</p>

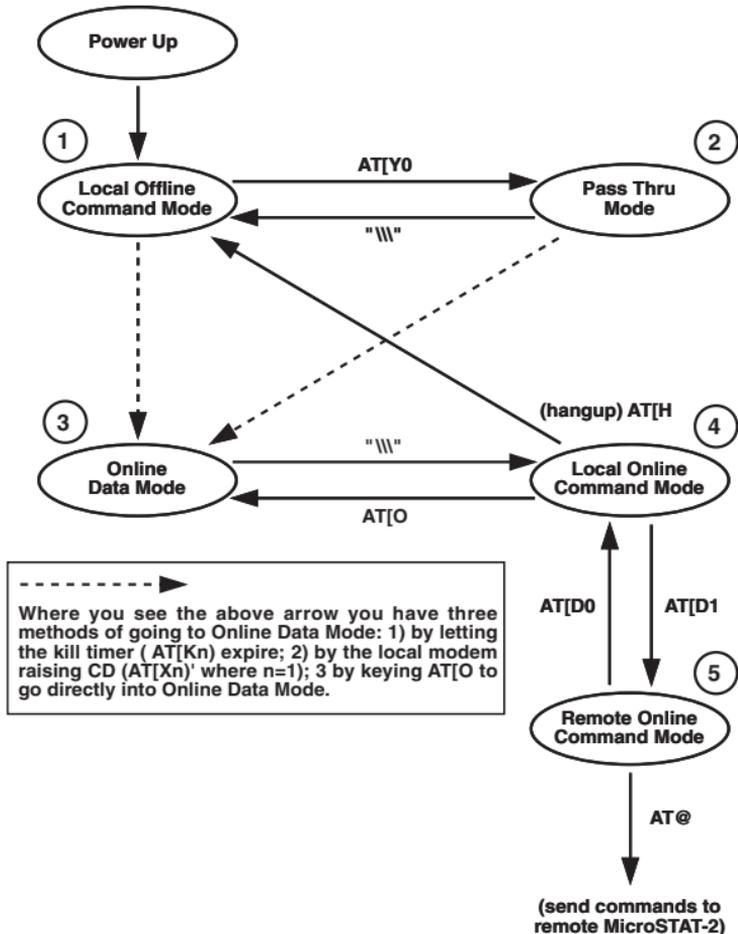
Table 5-2. Channel Configuration Commands (continued)

Command	Function
En (continued)	*n = 1, echo on n = 0, echo off
Fn	Selects the method of flow control used between the selected MicroSTAT-2 port and the peripheral device. n = 0, none *n = 1, RTS/CTS n = 2, XON/XOFF n = 3, Both methods
Ln	Selects data length for the channel. *n = 1, 8 bit data n = 0, 7 bit data
Pn	Selects parity for the channel. *n = 0, no parity n = 1, odd parity n = 2, even parity n = 3, mark n = 4, space
Qn	Determines format of result codes sent to sub-channels. (NOTE: Each sub-channel can have its own result-code format.) *n = 0, word codes n = 2, result codes not sent n = 1, digit codes
Sn	Selects the number of stop bits for the channel. *n = 1, 1 stop bit n = 0, 2 stop bits

6. Tutorial

This section provides basic step-by-step instructions for use of the MicroSTAT-2. Using these instructions, plus the AT command descriptions in **Chapter 5**, you should be able to operate the MicroSTAT-2 in almost any application. If you have additional questions, contact your supplier.

When going through the step-by-step instructions, use the figure on the next page as a guide to “walk” from mode to mode. This tutorial assumes a typical installation, where two MicroSTAT-2s are connected to each other via modem link, and each MicroSTAT-2 sub-channel port is connected to a PC or similar serial RS-232 device.



Operating Overview for the MicroSTAT-2.

Step #1: Verifying Local Setup Parameters

The first step in using the MicroSTAT-2 is checking to see that the local MicroSTAT-2 is connected and configured properly. Follow these instructions:

- 1) Power up the local modem. This should power up the local MicroSTAT-2 and put the unit automatically in Local Offline Command Mode. You will now have 2 minutes to type in the next command before the MicroSTAT-2 times out and goes into Online Data Mode. (If you do time out and go to Online Data Mode, you will not be able to enter any commands. Simply type `\\`, then **AT[H** to return to Local Offline Command Mode.) Set your terminal to 19.2 Kbps, 8 data bits, 1 stop bit, and no parity.
- 2) Enter **AT[** from the terminal connected to port 1 or port 2. The unit responds “OK” to let you know you are in command mode.
- 3) Enter **AT[V3** to view the setup parameters of the local MicroSTAT-2 DB25 port. Check to see that these parameters match those of your local modem. If not, change the necessary parameters using the **AT[** commands listed in **Chapter 5**.
- 4) Enter **AT[V1** and repeat the above process for sub-channel 1.

- 5) Enter **AT[V2** and repeat the above process for sub-channel 2.
- 6) If all three sets of parameters match those of your system, move to step 2.

Step #2: Dialing the Local Modem

After confirming the proper configuration of the local MicroSTAT-2, the next step is to dial the local modem so you can make a connection to the remote modem and MicroSTAT-2. Follow these instructions:

- 1) Enter **AT[Y0** to go from Local Offline Command Mode to PassThru Mode. The unit responds “OK.” You are now connected directly to your local modem, with the multiplexing function of the local MicroSTAT-2 disabled. It is as if your terminal has a straight-through connection to the modem.
- 2) Dial the local modem as you normally would if directly connected (for example, **ATDT14125551000**). After handshaking procedures, the unit responds “Connect 9600.”
- 3) Go to Online Data Mode. There are three ways you can do this. The first way is to wait for the “no activity kill timer” to expire, after which you will

go automatically into Online Data Mode. In the default setting, this should take about 20 to 30 seconds after you have dialed the modem. Second, you can enter **AT[O** to go directly from PassThru Mode to Online Mode. Third, if you have set the **AT[Xn** parameter to $n = 1$ and the **AT[Kn** parameter to $n = 0$, the MicroSTAT-2 will go into Online Data Mode as soon as it sees CD on the modem.

Step #3: Verifying the Remote Setup Parameters

If you have performed steps 1 and 2 correctly, the Local MicroSTAT-2 should be in Online Data Mode, and you should have an active connection between the local and remote modems. Check to see that the activity LED on your local MicroSTAT-2 is ON. If not, consult **Chapter 7**.

Assuming that you have a good connection and *are in Online Data Mode*, the next step is to verify the setup parameters of the remote MicroSTAT-2. Follow these instructions:

- 1) Type **** to go to Local Online Command Mode. This will keep your modem connection active, but will allow you to enter commands as well (remember, you cannot enter commands in Online Data Mode).

- 2) Enter **AT[DI** to go to Remote Online Command Mode. This will let you send commands to the *remote* MicroSTAT-2. To verify that you are in Remote Online Command Mode, enter **AT@**. The unit should respond “OK.”
- 3) Enter **AT@V3** to view the setup parameters of the remote MicroSTAT-2’s DB25 port. Check to see that these parameters match those of your local modem. If not, change the necessary parameters using the **AT@** commands listed in **Chapter 5**.
- 4) Enter **AT@V1** and repeat the above process for sub-channel 1.
- 5) Enter **AT@V2** and repeat the above process for sub-channel 2.
- 6) If all three sets of parameters match those of your system, move to step 4.

Step #4: Enabling End-to-End Data Transmission

If you have performed steps 1 through 3 correctly, all four serial devices (two at the local end and two at the remote end) should be set up to communicate with each other as if they were connected back to back. (Note: Be certain that the remote devices are

turned on and that all physical connections are made properly.) To enable end-to-end data transmission, follow these instructions:

- 1) Type **AT[D0** to go from Remote Online Command Mode to Local Online Command Mode. The unit responds “OK.”
- 2) Type **AT[O** to go from Local Online Command Mode to Online Data Mode. The unit will not issue a response because it is no longer in a command mode.

Step #5: Ending the Connection

If you have performed step 1 through 4 successfully, your four serial devices should be able to communicate across the modem link. If this is not happening, consult **Chapter 7**. The only remaining step is to end the connection. Follow these instructions:

- 1) Type **** to go from Online Data Mode to Local Online Command Mode. The unit responds “OK.”
- 2) Enter **AT[H** to hang up/disconnect the modem link and return to Local Offline Command Mode. The unit responds “OK.”

- 3) When the local modem is powered down, the MicroSTAT-2 will power down as well. Any configuration changes you have entered will be stored in the MicroSTAT-2's non-volatile memory if they have been saved with the **AT[W** or **AT@W** command.

7. Troubleshooting

Symptom	Possible Problem	Solution
ERROR response to AT[Y0] command	MicroSTAT-2 is in PassThru Mode MicroSTAT-2 is in Local Online Command Mode	Type \$\$\$ to return to Local Offline Command Mode. Key AT[H] to enter Local Offline Command Mode, then re-enter AT[Y0] .
ERROR response to AT[H] command	MicroSTAT-2 is in Local Offline Command Mode MicroSTAT-2 is in PassThru Mode	MicroSTAT-2 is already in default mode. Re-initiate start-up sequence. MicroSTAT-2 does not need disconnection.
MicroSTAT-2 does not respond to \$\$\$ command	MicroSTAT-2 is already in Local Online Command Mode MicroSTAT-2 is already in Local Offline Command Mode	Enter AT[O] to resume Online Data Mode and proceed with data transfer. Then type \$\$\$ and AT[H] to hang up. MicroSTAT-2 is already in default mode.
Typing garbage/incorrect characters	Bit-rate mismatch on connected channel	Change bit rate of connected device and type characters until characters typed are the same as on-screen characters.

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Symptom	Possible Problem	Solution
No responses to typing appears on screen; MicroSTAT-2 appears to be locked up	MicroSTAT-2 has timed out and is waiting to go into Online Data Mode Kill Timer (Kn) may be too short	Type \ to re-enter Local Online Command Mode. Then enter AT[H to re-enter Local Offline Command Mode. Lengthen Kill Timer (Kn command).
ERROR response to AT[command	Unit is in PassThru Mode	Type \ to re-enter Local Offline Command Mode.
Unit appears to be locked up	Flow-control parameters set incorrectly Improper sub-channel cable pinout MicroSTAT-2 not plugged into an RS-232 port, or is plugged into a DB25 port that cannot supply sufficient operating power (short-haul modem, laptop, etc.)	Disconnect MicroSTAT-2, then set flow control on the terminal (RTS/CTS or XON/XOFF). Reconnect MicroSTAT-2, then set MicroSTAT-2 flow control (Fn command) to be the same flow control method as the terminal's. Re-wire cable according to pinout diagrams in Section 3.2 . It needs power. Plug it into an RS-232 port.

Symptom	Possible Problem	Solution
<p>Modem connection has been established, but MicroSTAT-2 will not pass data</p>	<p>MicroSTAT-2 is still in PassThru Mode</p>	<p>Reset Kill Timer (Kn command) to be shorter time period.</p>
		<p>Reset MicroSTAT-2 to enter Online Data Mode based upon status of CD (AT[X1] command).</p>
	<p>Improper bit rate at modem channel (C3)</p>	<p>Break the modem connection and check the channel 3 configurations on both local and remote MicroSTAT-2s (AT[V]). Then reset C3 for proper throughput rate (AT[C3Bn]).</p>
	<p>Flow-control parameters set incorrectly</p>	<p>Verify proper flow control on all three channels of local and remote MicroSTAT-2.</p>
	<p>Data format (data bits, parity, stop bits) set incorrectly</p>	<p>Verify correct data format on all three channels of local and remote MicroSTAT-2.</p>

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Symptom	Possible Problem	Solution
ERROR response to remote configure AT@ command	Remote MicroSTAT-2 has not been alerted to respond to remote commands	Issue AT[D1] command to local MicroSTAT-2 (this command will be passed through to remote MicroSTAT-2 and will cause it to respond to remote commands).
	Remote MicroSTAT-2 has been disabled for remote configuration	Issue AT[R1] command to both local and remote MicroSTAT-2 (avoid changing the default R1 setting so that the unit may always be configured remotely if necessary).
	Remote MicroSTAT-2 is not in Online Data Mode	Wait until remote MicroSTAT-2 times out or issue AT[O] to remote MicroSTAT-2.
Modem will not respond to AT commands	MicroSTAT-2 is not in PassThru Mode	Issue AT[Y0] to MicroSTAT-2.
	Modem is not in command mode	Consult modem manual.

Appendix: Sub-Channel Cables

No sub-channel cables are supplied with the MicroSTAT-2. You may construct your own cables using the pinout diagrams in **Section 3.2**, or you may purchase one of the pre-made adapter cables listed below. Custom lengths are available.

Part Number	Cable Description (application)
EL08MS-00	RJ-45 Straight-pinned cable
FA025	DB25 male to RJ-45 modular adapter kit
FA027	DB25 female to RJ-45 modular adapter kit
FA066	DB9 male to RJ-45 modular adapter kit
FA065	DB9 female to RJ-45 modular adapter kit



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