USER MANUAL

MODEL 3022

MicroStat II
Miniature Statistical Multiplexer

PATTON Electronics Co.

Part# 07M3022-B
Doc# 068021UB
Revised 12/19/95

SALES OFFICE
(301) 975-1000
TECHNICAL SUPPORT
(301) 975-1007

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1.0 WARRANTY INFORMATION

Patton Electronics warrants all Model 3022 components to be free from defects, and will—at our option—repair or replace the product should it fail within one year from the first date of shipment.

This warranty is limited to defects in workmanship or materials, and does not cover customer damage, abuse, or unauthorized modification. If this product fails or does not perform as warranted, your sole recourse shall be repair or replacement as described above. Under no condition shall **Patton Electronics** be liable for any damages incurred by the use of this product. These damages include, but are not limited to, the following: lost profits, lost savings, and incidental or consequential damages arising from the use of or inability to use this product. **Patton Electronics** specifically disclaims all other warranties, expressed or implied, and the installation or use of this product shall be deemed an acceptance of these terms by the user.

1.1 RADIO AND TV INTERFERENCE

The Model 3022 generates and uses 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 and television reception. The Model 3022 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 from such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If the Model 3022 does cause interference to radio or television reception, which can be determined by disconnecting the RS-232 interface, the user is encouraged to try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, re-orienting the receiving antenna, and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

1.2 SERVICE

All warranty and non-warranty repairs must be returned freight prepaid and insured to Patton Electronics. All returns must have a Return Materials Authorization number on the outside of the shipping container. This number may be obtained from Patton Electronics Technical Service at **(301) 975-1007**. *Packages received without an RMA number will not be accepted.*

Patton Electronics' technical staff is also available to answer any questions that might arise concerning the installation or use of your Model 3022. Technical Service hours: **8AM to 5PM EST, Monday through Friday.**

Thank you for purchasing this Patton Electronics product. It has been designed, manufactured and tested to give you years of trouble-free service. If any questions or problems arise during use, please do not hesitate to call Patton Technical Support at (301) 975-1007.

2.1 FEATURES

- 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, 9600, 19,200 and 38,400 bps and auto detect
- Interface powered–no AC power or batteries required
- Miniature design–plugs directly into DB-25 modem port
- Modular RJ-45 sub-channel ports 1 & 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

2.2 DESCRIPTION

The Patton Model 3022 MicroStat II is a miniature statistical multiplexer 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 Model 3022 uses specialized circuitry to monitor and prioritize data flow. The Model 3022 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 Model 3022 allows both local and remote multiplexers to be configured from local port 1 or 2.

The Model 3022 supports both hardware (RTS/CTS) and software (X-ON/X-OFF) flow control. Connecting directly to the modem's DB-25 port, the Model 3022 derives power from the RS-232 interface and requires no AC power or batteries for operation. Async input devices connect to the Model 3022 using dual RJ-45 modular interface jacks. The Model 3022 is housed in a sturdy ABS plastic case measuring 2.66"w x 2.10"l x 0.73"h.

The Model 3022 is typically installed by connecting the main channel to an asynchronous modem and the sub-channels to two asynchronous serial devices. However, two Model 3022s may also be connected back-to-back. This section describes connection procedures, as well as LED indicator function, power requirements, and flow control requirements.

3.1 CONNECTING THE MAIN CHANNEL

To use both channels of your Model 3022, you must be linked to another Model 3022, which is usually located remotely and interconnected with a pair of modems. On one end of the Model 3022, you will find the asynchronous RS-232 Modem interface. This is a DB-25 male connector, which **plugs directly into the DB-25 female connector on your modem**. The following table lists the pin connections on the Model 3022's modem interface:

Pin#	Description	Direction
1	Protective Ground	N/A
2	Transmit Data	From Model 3022
3	Receive Data	To Model 3022
4	Request to Send	From Model 3022
5	Clear to Send	To Model 3022
6	Data Set Ready	To Model 3022
7	Signal Ground (common return)	N/A
8	Carrier Detect	To Model 3022
9	9 to 12 Volt Power (optional)	To Model 3022
20	Data Terminal Ready	From Model 3022
22	Ring Indicator	To Model 3022

If your application requires an RS-232 cable between the Model 3022 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 two asynchronous, serial sub-channels of the Model 3022 are RJ-45 female ports that conform to the EIA/TIA-561 interface (see Figure 1, below). These ports connect to the two serial devices that will be multiplexed through the main RS-232 port of the Model 3022. Any combination of RS-232 devices may be connected to the Model 3022's sub-channels: PCs, terminals, printers, laptops, Macs, plotters, etc.

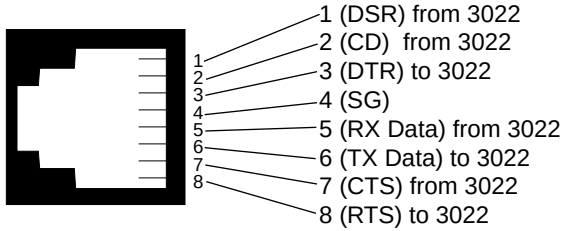

Figure 1. EIA/TIA-561 Interface pinouts for Model 3022 RJ-45 jacks (ports 1 & 2).

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 diagrams below and on the following page show pin connections between the Model 3022'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 Patton Electronics. See **Appendix B** for Patton cable part numbers.

PC/XT™ or Serial Printer to Model 3022 Pin-Outs:

Serial DB-25 Pin No.		Model 3022 RJ-45 Pin No.
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

(continued)

PC/AT™ to Model 3022 Pin-Outs:

Serial DB-9 Pin No.		Model 3022 RJ-45 Pin No.
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 CONNECTING TWO MODEL 3022s BACK-TO-BACK

You may connect two Model 3022s back-to-back, bypassing the modems. To do this, you must have two Patton Model 3P–MF power supply adapters (see **Section 3.5**), and one DB-25 female-female RS-232 cable. The cable should be no longer than 100 feet (shorter in some cases), and wired as a "null modem" or "crossover". The following table shows how to pin a null modem cable that will connect two Model 3022s back-to-back:

DB-25 Pin No.	Female Circuit		Female Circuit	DB-25 Pin No.
1	AA	----------	AA	1
2	BA	----------	BB	3
3	BB	----------	BA	2
4	CA	----------	CB	5
5	CB	----------	CA	4
6	CC	----------	CD	20
7	AB	----------	AB	7
9	Pwr	----------	Pwr	9
20	CD	----------	CC	6

Connect the Model 3P-MF adapters to the Model 3022 DB-25 ports. Then connect the null modem cable between the adapters. Do not plug the adapters into their respective AC outlets until the serial device connections have been made to the Model 3022s.

3.4 LED STATUS INDICATOR

The Model 3022 has one LED indicator, which is located at the rear of the unit, between the two modular jacks (see Figure 2, below). This LED glows to show that the local and remote Model 3022s are in Data Mode, and are synchronized with each other.

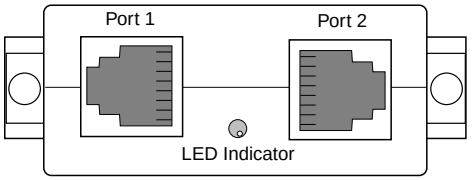

Figure 2. Model 3022 rear view showing LED indicator

3.5 POWER REQUIREMENTS

The Model 3022 derives all necessary operating power from the DB-25 interface, and requires no AC power or batteries for operation. When the DCE device is turned on, the Model 3022 automatically "powers up". **Note:** If you do not use a modem (as in Section 3.3), or your modem is interface powered, you will need to obtain a Patton Model 3P-MF power supply adapter. This adapter plugs into a standard AC wall outlet and supplies 100 milliwatts to pins 7 and 9 of the DB-25 interface.

3.6 FLOW CONTROL REQUIREMENTS

For each of the Model 3022 port connections, flow control may be set for X-ON/X-OFF (software), RTS/CTS (hardware), both methods or no flow control (see Figure 3, 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 Model 3022 port must match the flow control setting of the device connected to that port.

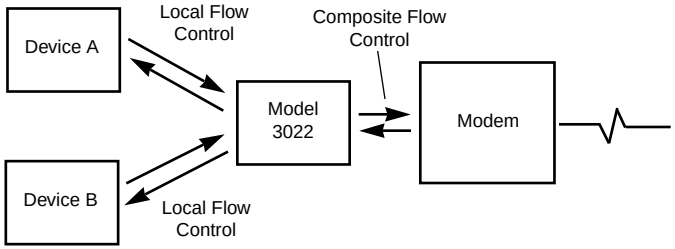

Figure 3. Model 3022 flow control requirements.

4.0 OPERATING MODES

This section gives descriptions of the five operating modes used by the Model 3022. When reading these descriptions it may be helpful to refer to the Navigation Chart shown in Figure 4 (below).

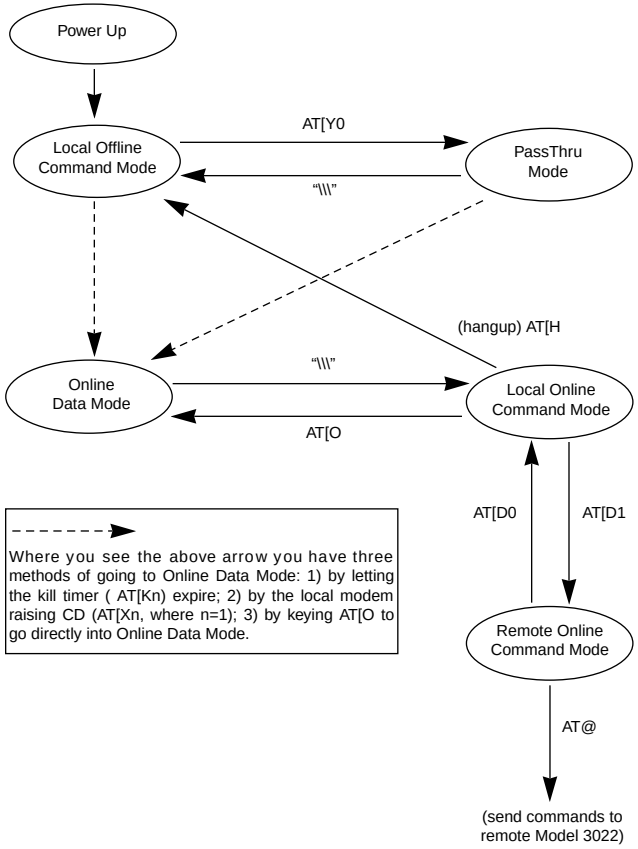

Figure 4. Navigation Chart for the Model 3022 Operating Modes

4.1 LOCAL OFFLINE COMMAND MODE

When first powered up, the Model 3022 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 Model 3022. These commands can be entered through sub-channel 1 or 2 on a “first come, first served” basis.

The Model 3022 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 Model 3022 will connect with the remote Model 3022 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 Model 3022 is disabled so that the local modem may be configured or dialed without disconnecting the Model 3022.

4.4 LOCAL ONLINE COMMAND MODE

In *Local Online Command Mode*, the local Model 3022 can listen to a command while remaining connected to the remote end. This allows the user to 1) hangup/disconnect the local connection, or 2) go into Remote Online Command Mode to send commands to the remote Model 3022.

4.5 REMOTE ONLINE COMMAND MODE

In *Remote Online Command Mode,* **AT**@ commands may be entered to configure the remote Model 3022. These commands can be entered through sub-channel 1 or 2 of the local Model 3022 on a “first come, first served” basis.

5.0 COMMAND ENTRY

Before attempting to configure or operate the Model 3022, 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 Model 3022 only accepts ASCII characters, all command lines must start with the attention code "**AT**" Local commands follow a **[**-directive, and are stored in the local command buffer. Remote commands follow an @-directive, and are stored in the remote command buffer. The remote commands can only be serviced when both Model 3022s are synchronized (in Online Data Mode) and the local Model 3022 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 Model 3022 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 Model 3022 command* <ENTER/CR>

Rule #3. Each command line must end with an <ENTER/CR>. The Model 3022 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 Model 3022’s non-volatile memory, the user must key an **AT[W** or **AT@W** command.

5.2 RESULT CODES

Besides echoing back AT commands, the Model 3022 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**). The chart on the following page 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[1]: 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.

Note[2]: If you do not have a remote Model 3022 connected to the communication line, an "error" result code will show *before* you hit <ENTER/CR>.

5.3 COMPLETE "AT" COMMAND SET

The Model 3022 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 Model 3022. 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 key **AT[W** or **AT@W** after the command have been entered.

5.3.1 MODE SETTING COMMANDS

The Mode Setting Commands select operating modes and parameter values for the Model 3022. 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.

Mode Setting Commands

Command	Function
AT	Command line prefix. The attention command precedes all other commands listed below.
[	Directs the **local Model 3022** to execute the following commands. The Model 3022 discards all characters before the “[“ character, unless it has a connection to a remote Model 3022 or you have enabled modem commands.

Mode Setting Commands (continued)

Command	Function
@	Directs the **remote Model 3022** to execute the following commands. The remote Model 3022 responds to all the commands after the “@” character and returns the result code. The local unit does not process those commands. The local Model 3022 rejects the command line if: (a) the @ command is not immediately following the AT prefix, (b) the local Model 3022 does not have a connection to the remote Model 3022, and (c) the remote Model 3022 is in Local Online Command Mode.
\\\	This command has two functions: 1) If entered while in pass through mode (AT[Y0), local mux will leave that mode and return to offline command mode. 2) If received from online data mode, either from sub-channel 1 or 2, local mux will enter online command mode on that particular channel
Cn	Selects channel number for subsequent channel configuration commands. At the start of each command line, selection reverts to “0 deselects any channel”. *n = 0, deselects any channel n = 2, channel 2 n = 1, channel 1 n = 3, communication link (modem)
Dn	Tells the remote Model 3022 to enter Remote Online Command Mode, so that it can be configured. Also tells the remote Model 3022 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 Model 3022 is in Local Online Command Mode). n = 0, tells the remote Model 3022 to exit Remote Online Command Mode and return to Online Data Mode.

Command	Function
	n = 1, tells the remote Model 3022 to enter Remote Online Command Mode. The following statements apply: • If this command was entered on local sub-channel 1, then it will request sub-channel 1 of the remote Model 3022 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 Model 3022.
H	Hangup/disconnect command. Enter when the local Model 3022 is in Local Online Command Mode. Upon receiving this command, the local Model 3022 will drop DTR at the composite port for approximately 250 msec, and return to Local Offline Command Mode.
Jn	Selects XON character “n”, where “n” is a single ASCII character, either a control character or an upper or lower case alpha character (A through Z, or a through z). NULL, ETX, STX and Carriage Return characters are not allowed.
Kn	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 one quarter minute increments. Valid values are 0 thru 15. K8 is the default, resulting an a 2 minute command mode time out. 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 time outs will occur during the entry of AT commands. 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 [Note: if K0 is selected, the local Model 3022 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.]

Command	Function
Nn	Selects XOFF character “n”, where “n” is a single ASCII character, either a control character or an upper or lower case alpha character (A through Z, or a through z). NULL, ETX, STX and Carriage Return characters are not allowed.
O	Return to online data mode. If you have enabled multiplexer operation, the Model 3022 waits for a connection to the remote Model 3022. You only issue this to the local Model 3022.
Rn	Enables or disables remote control of the Model 3022. *n = 0, remote control disabled n = 1, remote control enabled
T	Causes a software reset with all Model 3022 modes and channel configurations set to *factory default* values. The Model 3022 will then enter offline command mode. (Note: The user must wait approximately 5 seconds after receiving the “OK” response before entering new commands.)
Un	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. 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
Vn	View channel configuration or mode configuration 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

Mode Setting Commands (continued)

Command	Function
W	Stores configuration into non-volatile memory
Xn	Enables or disables entry into data mode based upon the status of carrier detect (CD) at the composite port. If enabled, the Model 3022 will enter data mode when CD is raised, and exit data mode to go back to offline command mode when CD goes off. If disabled, the status of CD will not effect whether or not the Model 3022 enters data mode. *n = 0, CD activation of data mode disabled n = 1, CD activation of data mode enabled
Yn	This command has two concurrent functions: 1) Causes local Model 3022 to enter PassThru Mode. 2) Enables or disables multiplexer operation. If the AT command to disable is issued through channel 1, the Model 3022 logically connects channel 1 to the communication link and disables channel 2. If the AT command to disable is issued through channel 2, the Model 3022 logically connects channel 2 to the communication link and disables channel 1. By disabling the multiplexer operation, you use the attached modem or serial device for any single channel purpose without physically disconnecting the Model 3022. You only issue this to the local Model 3022. n = 0, disable multiplexer (Note: This option will not be stored in non-volatile memory. Multiplexer operation will be enabled again if AT[Z or \\\ is entered, or upon power up reset
Z	Causes a software reset with all Model 3022 modes and channel configurations set to *previously stored* values. The Model 3022 will then enter offline command mode. (Note: The user must wait approximately 5 seconds after receiving the “OK” response before entering new commands.)

5.3.2 CHANNEL CONFIGURATION COMMANDS

The following commands change the configuration of the channel that you select with the Cn command. The Cn command must be in the command line before a channel configuration command, or the Model 3022 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.

Command	Function
Bn	Selects baud rate for the selected channel. *n = 0, auto select (applies only to sub-channels)[see 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 †note: sub-channel 1 factory defaults to auto-select; sub-channel 2 factory defaults to 19.2 Kbps.
En	Determines whether the local Model 3022 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) *n = 1, echo on n = 0, echo off
Fn	Selects the method of flow control used between the selected Model 3022 port and the peripheral device. n = 0, none *n = 1, RTS/CTS n = 2, XON / XOFF n = 3, Both methods

Channel Configuration Commands (continued)

Command	Function
Gn	Allows the user to select the behavior of Carrier Detect on sub-channels 1 and 2. *n = 0, CD always ON n = 1, CD of sub-channel follows composite port CD
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

This section provides basic step-by-step instructions for use of the Model 3022. Using these instructions, plus the AT command descriptions in Section 5.0, you should be able to operate the Model 3022 in almost any application. If you have additional questions, do not hesitate to contact Patton Technical Support at (301)975-1007.

When going through the step-by step instructions, use Figure 5 (below) as a guide to "walk" from mode to mode. This Tutorial assumes a typical installation, where two Model 3022s are connected to each other via modem link, and each Model 3022 sub-channel port is connected to a PC or similar serial RS-232 device.

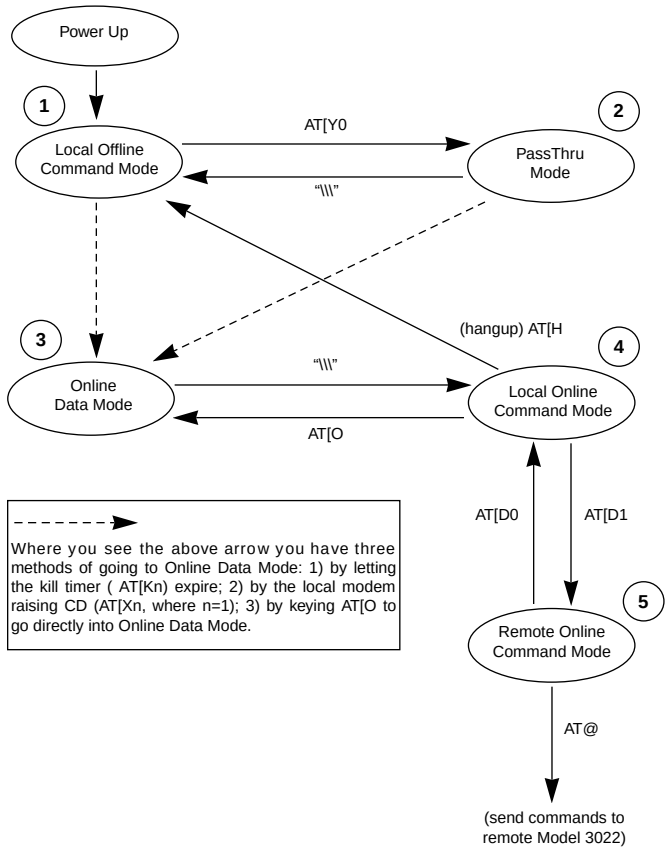

Figure 5. Operating Overview for the Model 3022

Step #1 - Verifying Local Setup Parameters

The first step in using the Model 3022 is checking to see that the local Model 3022 is connected and configured properly. Follow these instructions:

1) Power up the local modem. This should power up the local Model 3022 and put the unit automatically in Local Offline Command Mode. You will now have 2 minutes to key in the next command before the Model 3022 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 Key ****, then **AT[H** to return to Local Offline Command Mode.)

2) Key **AT[** from the terminal connected to port 1 or port 2. The unit responds "OK" to let you know you are in a command mode.

3) Key **AT[V3** to view the setup parameters of the local Model 3022 DB-25 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 Section 5.0.

4) Key **AT[V1** and repeat the above process for sub-channel 1.

5) Key **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 Model 3022, the next step is to dial the local modem so you can make a connection to the remote modem and Model 3022. Follow these instructions:

1) Key **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 Model 3022 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. (example: ATDT13019751000). After handshaking procedures, the unit responds "Connect 9600".

(continued)

Step #2 - Dialing the Local Modem (continued)

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 20-30 seconds after you have dialed the modem. Second, you can key **AT[O** to go directly from PassThru Mode to Online Data Mode. Third, if you have set the AT[Xn parameter to n=1 and the AT[Kn parameter to n=0, the Model 3022 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 Model 3022 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 Model 3022 is ON. If not, consult Section **7.0 Troubleshooting**.

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 Model 3022. Follow these instructions:

1) Key **** 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) Key **AT[D1** to go to Remote Online Command Mode. This will let you send commands to the *remote* Model 3022. To verify that you are in Remote Online Command Mode, key **AT**@. The unit should respond "OK".

3) Key **AT@V3** to view the setup parameters of the remote Model 3022 DB-25 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 Section 5.0.

4) Key **AT@V1** and repeat the above process for sub-channel 1.

5) Key **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.

(continued)

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

If you have performed steps 1 thru 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) Key **AT[D0** to go from Remote Online Command Mode to Local Online Command Mode. The unit responds "OK".

2) Key **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 steps 1 thru 4 successfully, your four serial devices should be able to communicate across the modem link. If this is not happening, consult Section **7.0 Troubleshooting**. The only remaining step is to end the connection. Follow these instructions:

1) Key **** to go from Online Data Mode to Local Online Command Mode. The unit responds "OK".

2) Key **AT[H** to hangup/disconnect the modem link and return to Local Offline Command Mode. The unit responds "OK".

3) When the local modem is powered down, the Model 3022 will power down as well. Any configuration changes you have entered will be stored in the Model 3022's non-volatile memory if they have been saved with the AT[W or AT@W command.

7.0 TROUBLESHOOTING

SYMPTOM	POSSIBLE PROBLEM	SOLUTION
1. ERROR response to AT[Y0 command	Model 3022 is in PassThru Mode	Enter \\\ to return to Local Offline Command Mode
	Model 3022 is in Local Online Command Mode	Key AT[H to enter Local Offline Command Mode, then re-enter AT[Y0
2. ERROR response to AT[H command	Model 3022 is in Local Offline Command Mode	Model 3022 is already in default Mode. Re-initiate start-up sequence.
	Model 3022 is in Pass-Thru Mode	Model 3022 does not need disconnection
3. Model 3022 does not respond to \\\ command	Model 3022 is already in Local Online Command Mode	Issue AT[O to resume Online Data Mode and proceed with data transfer. Then issue \\\ and AT[H to hang up.
	Model 3022 is already in Local Offline Command Mode	Model 3022 is already in default mode.
4. Keying garbage/incorrect characters	Bit rate mismatch on connected channel	Change bit rate of connected device and key characters until characters keyed are the same as on-screen characters.
5. No responses to keying appears on screen; 3022 appears to be 'locked up'.	3022 has timed out and is waiting to go into Online Data Mode	Key \\\ to re-enter Local Online Command Mode. Then key AT[H to re-enter Local Offline Command Mode.
	Kill Time Out (Kn) may be too short	Lengthen Kill Time Out (Kn command)

SYMPTOM	POSSIBLE PROBLEM	SOLUTION
6. ERROR response to AT[command	Unit is in PassThru Mode	Key \\\ to re-enter Local Offline Command Mode
7. Unit appears to be locked-up	Flow control parameters set incorrectly	Disconnect Model 3022, then set Terminal Device Flow Control (RTS/CTS or XON/XOFF). Reconnect Model 3022, then set Model 3022 flow control (Fn Command) to be the same Flow Control Method as Terminal Device.
	Improper sub-channel cable pinout	Re-wire cable according to pinout diagrams in Section 3.2.
	Model 3022 not plugged into an RS-232 port, or is plugged into a DB-25 port that cannot supply sufficient operating power (short haul modem, laptop, etc.)	It needs power! Plug it into an RS-232 port or obtain Model 3P-MF power supply adapter.

(continued)

SYMPTOM	POSSIBLE PROBLEM	SOLUTION
8. Modem connection has been established, but 3022 will not pass data	Model 3022 is still in PassThru Mode	Reset Kill Time Out (Kn command) to be shorter time period.
		Reset 3022 to enter Online Data Mode based upon status of CD (AT[X1 command)
	Improper bit rate at modem channel (C3)	Break the modem connection and check the channel 3 configurations on both local and remote Model 3022s (AT[V). Then reset C3 for proper throughput rate (AT[C3Bn).
	Flow control parameters set incorrectly	Verify proper flow control on all three channels of local and remote 3022
	Data format (data bits, parity, stop bits) set incorrectly	Verify correct data format on all three channels of local and remote 3022

(continued)

SYMPTOM	POSSIBLE PROBLEM	SOLUTION
9. ERROR response to remote configure AT@ command	Remote Model 3022 has not been alerted to respond to remote commands	Issue AT[D1 command to local Model 3022 (this command will be passed thru to remote 3022 and will cause it to respond to remote commands)
	Remote Model 3022 has been disabled for remote configuration	Issue AT[R1 command to both local and remote 3022 (avoid changing the default R1 setting so that the unit may always be configured remotely if necessary)
	Remote Model 3022 is not in Online Data Mode	Wait until remote 3022 times out or issue AT[O to remote 3022.
10. Modem will not respond to AT commands	Model 3022 is not in PassThru Mode	Issue AT[Y0 to Model 3022
	Modem is not in command mode	Consult modem manual

APPENDIX A

SPECIFICATIONS

Sub-Channels (Serial Devices)

Interface:	RJ-45, V.24/RS-232-C
Configuration:	DCE
Transmission:	Asynchronous, full duplex
Baud Rate:	110, 300, 1200, 2400, 4800, 9600, 19200, 38400 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:	DB-25 male, DTE, V.24/RS-232-C
Transmission:	Asynchronous, full duplex
Baud Rate:	1200, 2400, 4800, 9600, 19200, 38400 bps selectable
Flow Control:	RTS/CTS or no flow control

Environmental

Temp Range:	0 - 70ºC (32 - 158ºF)
Altitude:	0 - 15,000 Feet
Humidity:	up to 95% (non-condensing)
Dimensions:	2.7” x 2.1” x 7.4” (69mm x 53mm x 19mm)
Weight:	0.10 lb (0.045 Kg)

APPENDIX B

SUB-CHANNEL CABLES

No sub-channel cables are supplied with the Model 3022. You may construct your own cables using the pin-out diagrams in Section 5.2, or you may purchase one of the pre-made adapter cables listed below. Custom lengths are available.

Note: The part numbers below are completely distinct from the model number/suffix combinations shown on the previous page. *Do not combine these part numbers with the model number of the standalone unit when ordering. These are separate items.*

Patton Part Number	Cable Description (application)
3022-25M	DB-25 Male, to RJ-45 Male, 6 ft. (adapts to Serial Printer)
3022-25F	DB-25 Female, to RJ-45 Male, 6 ft. (adapts to PC/XT™ serial port)
3022-9F	DB-9 Female, to RJ-45 Male, 6 ft. (adapts to PC/AT™ serial port)
3022-45M	RJ-45 Male, to RJ-45 Male, 6 ft. (adapts to EIA/TIA-561 interface)