MultiConnect™ Adapter

Serial-to-Serial Adapter with IP

User Guide

MultiConnect™ Adapter User Guide
Serial-to-Serial Adapter (MTS2SA-T & MTS2SA-T-R)

PN S000354A, Version A

Copyright

Revisions

Revision Level	*Date*	*Description*
A	07/12/04	Initial release for Serial-to-Serial adapter.

Trademarks

Patents

This device is covered by one or more of the following patents: 6,031,867; 6,012,113; 5,628,030; 5,450,425. Other patents pending.

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Chapter 1 – Product Description & Specifications

Product Description

The MultiConnect serial-to-serial adapter enables installed serial devices to connect to the Internet for remote monitoring, control and configuration.

Internet-Enable Any Device. The MultiConnect adapter provides the powerful ability to IP-enable serial devices allowing more options for data acquisition, device management, and industrial control than would otherwise be available.

Simply install the MultiConnect between a serial device and an analog, ISDN, or wireless modem to send and receive data over the Internet. It can also serve as a single Web page in response to a Web browser request.

Reduces Development Time. MultiConnect can make your existing and next generation serial device IP-ready without requiring hardware changes to its design. MultiConnect actually provides faster time-to-market because it relieves the burden and expense of writing and maintaining Internet applications. The complete, ready-to-integrate MultiConnect adapter allows you to enhance your product while you focus on developing its core features.

Management and Configuration. MultiConnect has several means of management and configuration built into the design. It supports remote configuration, which means you can have central site setup and control of the remote adapters via the command line interface or telnet.

Applications

The MultiConnect adapters will IP-enable any device to provide remote monitoring, control and configuration of any system. The solution is ideal for the following applications:

- Appliances
- ATM terminals
- Credit card and check verification systems
- Data collection
- Gas pumps
- Industrial and medical remote monitoring systems
- Point-of-sale terminals
- Remote diagnostics
- Remote metering
- Security systems
- Ticketing machines
- Vending/gaming machines
- And more…..

Types of Adapters Available

Product	Adapter Description	Region
MTS2SA-T	Serial-to-Serial + IP (External Power)	Global
MTS2SA-T-R	Serial-to-Serial + IP (RS-232 Power)	Global
Note: The RS-232–powered adapters are powered through the DSR pin of the RS-232 cable.		

Package Contents

- One MultiConnect Adapter
- One universal power supply with power cord included with the externally powered adapters
- One RS-232 cable included with the RS-232 Serial-to-Serial Adapter
- Two mounting brackets
- Four adhesive-backed rubber feet (table-top mounting)
- One Quick Start Guide
- One MultiConnect CD

Handling Precautions

All devices must be handled with certain precautions to avoid damage due to the accumulation of static charge. Although input protection circuitry has been incorporated into the devices to minimize the effect of this static buildup, proper precautions should be taken to avoid exposure to electrostatic discharge during handling and mounting.

Specifications

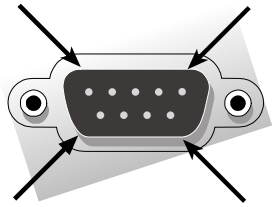
Category	Description
Memory	8 MEG
Flash Memory	2 MEG
Protocols Supported	ARP, DHCP, FTP, HTTP, ICMP, IP, POP3, PPP, SMTP, TCP, Telnet, TFTP, and UDP
Serial Interface	Standard DCE serial
Data Formats	Serial, binary, asynchronous
Data Rates	300; 1200; 2400; 4800; 9600; 19200; 38400; 57600; 115200; 230400 bps
Flow Control	RTS/CTS (hardware)
Management	Serial; Telnet
Security	Username and password authentication using local database
System Software	Flash ROM standard: downloadable from a TCP/IP host (TFTP) or Xmodem via Serial
LEDs	ACT (Activity) and STS (Status)
Ethernet	IEEE 802.3
Power Requirements	**With External Power (MTS2SA-T) Power Consumption** @ 9V DC: Typical 240mA Maximum 250mA **With RS-232 Power (MTS2SA-T-R) Power Consumption** @ 5V DC: Typical 95mA Maximum 105mA @ 10V DC: Typical 50mA Maximum 60mA @ 15V DC: Typical 35mA Maximum 45mA @ 20V DC: Typical 28mA Maximum 38mA @ 25V DC: Typical 24mA Maximum 34mA
Operating Temperature	32° to +120°F (0° to 50°C); humidity range 25-85% (non-condensing)
Storage Temperature	-40°C to +85°C
Physical Dimensions	3.5" w x 2.1" h x 0.98" d; 3.4 oz. 8.8 cm x 5.3 cm x 6 cm; 96 g
Certifications	**Safety Certifications:** UL60950 cUL60950 EN60950 ACA TS001 / AS 3260 **EMC Safety Approvals:** FCC Part 15 Class A EN55022 EN55024 **CE Marked**

Category	Description
Intelligent Features	High performance 10/100BaseT Ethernet bridge Half duplex or full duplex support on the WAN interface 256 frame buffer Stores 10,000 MAC addresses Automatically learns MAC addresses Serial interface supports DTE speeds to 230K bps External and RS-232 power options High performance processor runs ARP, DHCP, FTP, HTTP, ICMP, IP, POP3, PPP, SMTP, SNMP, SNMP, TCP, Telnet, TFTP, UDP protocols Command line interface Flash memory to update firmware with the latest enhancements Flexible IP protocol stack Compact, rugged industrial chassis design Desktop or panel mounting Two-year warranty
Software Features	**Internet Applications** **DHCP Client:** Request IP address for Ethernet Interfaces **Telnet Server:** Command Line Configuration Auto Dial-out Feature Command line via custom port (other than standard port 23) **Telnet Client:** Connect to remote Telnet Server Serial Auto Dial-in Feature **Terminal Server:** Network to Serial Connectivity Serial to Network Connectivity **TFTP Server:** Flash Upgrade **SMTP Client:** The email client embedded in the MultiConnect sends email to the configured recipients. **POP3 Client:** The email client embedded in the MultiConnect receives email from the POP3 Server. This feature is useful for field upgrades. Firmware upgrades can be sent as attachments. **HTTP Server:** To host Web pages on behalf of the serial device for monitoring and configuration of the serial device. **Functional Features** **Command Line Configuration over Serial or Ethernet** Serial **-** TTY Ethernet **-** Telnet **Username and Password Authentication Using Local Database** The Username and Password can be created using commands. The User database authenticates the Users before access to command mode of the MultiConnect adapter is enabled. **Remote Transparent Bridging** Ethernet to Serial Bridging **Point-to-Point Protocol (PPP)** Negotiations Bridging Control Protocol **-** 802.3 MAC Type CCP Compression

LED Indicators

Name	Description
ACT	Activity – Lit when data is being transmitted or received.
STS	Status – Blinks to indicate that the unit is functioning.

RS-232 9-Pin Connector Pinout



Pins for the Serial-to-Serial Adapter when Power Is Supplied Externally

Pin	Description
1	DCD
2	RX Data
3	TX Data
4	DTR
5	Ground
6	DSR
7	RTS
8	CTS
9	RI

Pins for the Serial-to-Serial Adapter when Power Is Supplied Through the RS-232 Pin

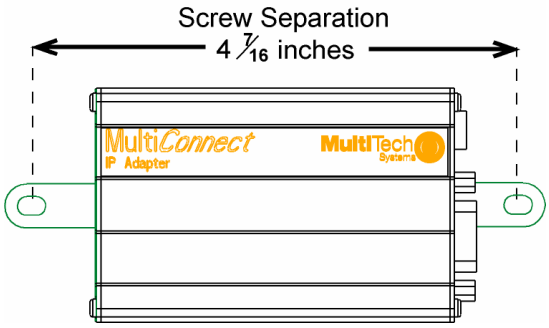
Pin	Description
1	DCD
2	RX Data
3	TX Data
4	DTR
5	Ground
6	Power
7	RTS
8	CTS
9	RI

Chapter 2 – Installation

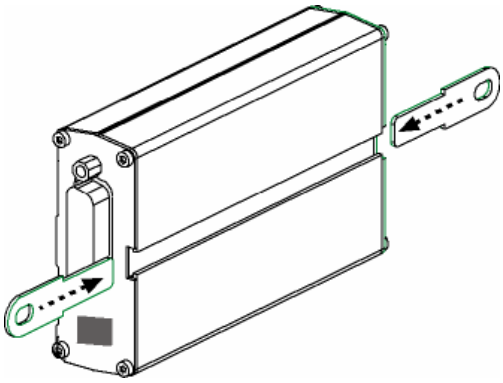
Attaching the MultiConnect to a Fixed Location

The MultiConnect adapter is design to be used on the desktop or to be panel-mounted. To attach the bracket for panel-mounting, following these steps:

1. Typically, the MultiConnect adapter is mounted against a flat surface with two mounting screws. Drill the mounting holes at the desired location. The mounting holes must separated by 4 -7/16 inches center-to-center.

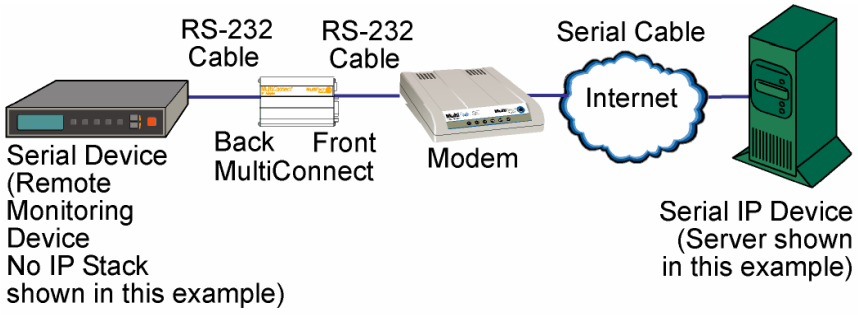


2. To attach the brackets to the MultiConnect, slide the mounting brackets into the corresponding slots on the back of the MultiConnect chassis.

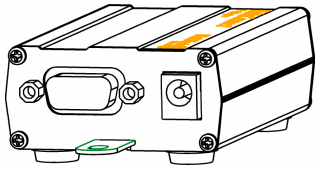
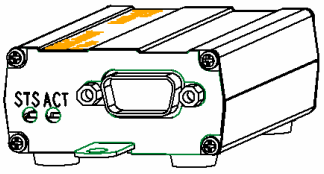


3. Attach the adapter to the surface with two screws.

Serial-to-Serial Adapter Installation



Connecting the Cables

Serial-to-Serial Adapter
 ***Front***    ***Back shown with External Power Option***
1. Plug one end of the RS-232 cable into the **front** of the Serial-to-Serial adapter. Plug the other end into the RS-232 connector on the modem that is setup with an Internet connection. **2.** Plug one end of the other RS-232 cable into the **back** of the Serial-to-Serial adapter. Plug the other end into the RS-232 connector on the serial device you want connected to the Internet.

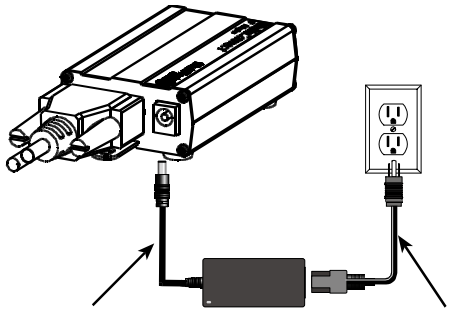
Connecting the Power

The adapters are powered in one of two ways:

- **Through the DSR Pin of the RS-232 Cable**
  Adapters powered this way are shipped with an RS-232 cable that has a power pin instead of a DSR pin.
- **Through an External Power Supply**
  Adapters powered this way are shipped with a universal power supply and its accompanying power cord and an RS-232 cable that has a DSR pin instead of a power pin.

Connecting the External Power

1. Plug the power supply cable with attached transformer block into the power connector on the back of the MultiConnect adapter.
2. Plug the AC cord receptacle into the transformer block. Plug the other end into a power outlet.



Chapter 3 – Managing and Configuring the MultiConnect Adapter

Two Ways to Login

Login Using TTY

- Use TTY to configure your MultiConnect IP for the first time. Configure the host serial port using the defaults listed below:

  Baud: 115.2K
  Data: 8
  Parity: N
  Stop: 1
  Flow-Control: None

- Press the Enter key three times to get to the Login prompt or send three carriage returns.
- At the Login prompt, type *admin*.
  At the Password prompt, type *admin*.

Important: The user name and password are case sensitive. They must be typed in lowercase letters.

Login Using Telnet through the PPP Interface

- Open the PPP interface on the modem port.
- Upon successful establishment of a Telnet session, the MultiConnect IP displays the Login prompt.

  At the Login prompt, type *admin*.
  At the Password prompt, type *admin*.
- After a successful login, the MultiConnect IP enters **Command Mode**. In Command Mode, the MultiConnect IP can be configured and managed using the Command Line Interface (CLI) command set.

About Command Mode and Data Mode

- In **Command Mode**, a # sign designates the prompt. If you type the word **Help** at the command prompt, a complete list of commands displays.
- If you type the word **Usage** at the command prompt, a list of the command semantics displays.
- In **Data Mode,** the # sign is not displayed.
- To leave Command Mode, exit your terminal or Telnet session or type the word **Exit** at the command prompt.

Note: See the **Restore** command and **IP Escape String** command.

Chapter 4 – Command Line Interface (CLI)

The MultiConnect commands are grouped based on the functionality.

- **General Setup Commands**
- **IP Setup Commands**
- **Serial Setup Commands**
- **PPP Setup Commands**
- **HTTP Setup Commands**
- **SMTP Setup Commands**
- **POP3 Setup Commands**
- **FTP Client Setup Commands**
- **SNTP Client Setup Commands**

General Notes

- Required command parameters are indicated between < >.
- Optional command parameters are indicated between [ ].
- Parameter choices are delineated by /.
- Upon successful execution of a command, the “OK” string is echoed to the client.
- When an unsuccessful command is executed, an appropriate error message is displayed followed by an "ERROR" string.
- All the commands are case sensitive (they must be typed in lower case).
- PPP is enabled on the modem interface S1.
- All serial-related applications such as dial-in and dial-out are with respect to the serial interface S0.
- The PPP interface is the modem interface S1.

General Setup Commands

General setup of a MultiConnect IP is port-independent (physical S0, S1 etc.). The following command set is used to set the global configuration of MultiConnect IP.

Command Syntax	dialout serial s0
Description	Manual Telnet dialout (Internet-to-serial connectivity). Invoked from the command shell.
Default Value	NA
Success	OK
Error	**1. Too few arguments** "Usage: dialout serial <serial port> Type 'dialout ?' for more information" **2. Invalid argument** Possible argument(s) are: *Serial* **1. When invoked from Serial Shell** This command is not supported through serial dial-in

Command Syntax	Exit
Description	Exits the command parser, unlocks the configurations, terminates session.
Default Value	NA
Success	OK

Command Syntax	Help
Description	Provides the first level of commands in MultiConnect IP.
Default Value	NA
Success	OK

Command Syntax	restore default-config
Description	Restores the factory defaults. **Note:** All previous configurations will be lost upon invoking this command. The changes are made permanent only if *save config* is invoked.
Default Value	NA
Success	OK
Error	**1. Too few arguments** "Possible arguments are *default-config* and *session* **2. Invalid argument** Invalid argument *"invalid string"* Valid arguments are *default-config* and *session*

Command Syntax	restore session
Description	On Telnet dialout, the control is transferred to the command parser passing the escape sequence "+++ inet". Invoking "restore session" would resume the Telnet dialout exiting the command parser.
Default Value	NA
Success	OK
Error	**1. Too few arguments** Possible arguments are *default-config* and *session* **2. ERROR: Session not opened**

Command Syntax	reset modem
Description	At will, reset the built-in modem.
Default Value	NA
Success	OK
Error	**1. Too few arguments** Possible argument(s) are *modem*

Command Syntax	save
Description	Command to Save the configuration to the flash and reboot.
Default Value	NA
Success	OK

Command Syntax	telnet <dial-ip-addr> [<port>]
Description	Manual serial dial-in (device port to modem port connectivity). Invoked from the command shell.
Default Value	NA
Success	OK
Error	**1. Too few arguments** **2. Invalid IP address/Port** "(Error: hostp = "configured host". Error: hostp="configured IP address" **3. When invoked from Command shell connected through Telnet** This command is not supported through Telnet

Command Syntax	Usage
Description	Provides the command semantics for all the commands.
Default Value	NA
Success	OK

Command Syntax	user add <user-name> [<passwd>]
Description	Add the user name and the password to the group. **Notes:** Default Groups: admin, users Default Users: admin, ipmodule Only Admin can configure the MultiConnect IP
Default Value	NA
Success	OK
Error	**1. Too few arguments** "Too few arguments. Possible value(s) are username followed by password" **2.** Unable to add the user name: "user 'username' exists"

Command Syntax	user delete <user-name>
Description	Delete the user name from the group.
Default Value	NA
Success	OK
Error	**1. Too few arguments** "Too few arguments. Possible value(s) are username followed by password" **2.** Unable to delete the user name: "user 'username' does not exist"

Command Syntax	user password <username> <new password>
Description	Change the password for a user.
Default Value	NA
Success	OK
Error	**1. Too few arguments** "Too few arguments. Possible value(s) are username followed by password" **2. Unable to change the password** "Password does not match Unable to change user <username> password"

Command Syntax	set operation-mode <modem/ipmodule>
Description	***modem*** - In the modem mode, the target functions like a modem ***ipmodule*** - In the ipmodule mode, all the functional features of MultiConnect IP can be achieved.
Default Value	Ipmodule
Success	OK
Error	**1. Too few arguments** "Too few arguments. Possible argument(s) are *modem* and *ipmodule* **2. Invalid string** "Invalid argument "string" Valid argument(s) are *modem* and *ipmodule*

Command Syntax	set boot-messages <enable/disable>
Description	**enable** - Prints the boot-messages during module boot-up. **disable** - Suppresses the boot-messages during module boot-up.
Default Value	Enable
Success	OK
Error	**1. Too few arguments** "Too few arguments. Possible argument(s) are *disable* and *enable* **2. Invalid string** "Invalid argument "string" Valid argument(s) are *disable* and *enable*

Command Syntax	set date <DD/MM/YYYY>
Description	Sets the system date.
Default Value	Jan 1 1970
Success	OK
Error	**1. Too few arguments** Usage: set date DD/MM/YYYY Type 'set date ?' for more information Error: Date in DD/MM/YYYY format Too few arguments. Possible argument(s) are ip ppp date serial login time

Command Syntax	set login
Description	Prompts the Login for the command shell when enabled, and doesn't when disabled.
Default Value	Enable
Success	OK
Error	**1. Too few arguments** "Usage: set login <enable/disable> Type 'set login ?' for more information" **2. Invalid string** "error: set login <enable/disable>"

Command Syntax	set login auto-dialout-login <enable/disable>
Description	Enables/Disables authentication for Telnet auto-dialout.
Default Value	Disable
Success	OK
Error	**1. Too few arguments** "Usage: set login auto-dialout-login <enable/disable> Type 'set login auto-dialout-login ?' for more information" **2. Invalid string** "error: set login auto-dialout-login <enable/disable>"

Command Syntax	set time <HH:MM:SS>
Description	Sets the system time.
Default Value	00:00:00
Success	OK
Error	**1. Too few arguments** Usage: set date HH:MM:SS Type 'set date ?' for more information Error: Time in HH:MM:SS format Too few arguments. Possible argument(s) are ip login serial date ppp time

Command Syntax	set watchdog <enable/disable>
Description	Enables/Disables the watchdog timer. The timer value is set to 6.5 seconds. This is the upper threshold value. **Note:** Watchdog timer comes into effect only after reboot. Hence, invoking this command calls for a reboot on save.
Default Value	Enable
Success	OK
Error	**1. Too few arguments** "Usage: set watchdog <enable/disable> Type 'set watchdog <enable/disable> ?' for more information" **2. Invalid string** "error: set watchdog <enable/disable>"

General Commands – Setup

Command Syntax	show buildrun
Description	**Command Line Configuration - History.** Upon invoking any command, either through Telnet or Serial TTY, the command is added to the *buildrun* file. This is very useful in case of version updates.
Default Value	NA
Success	OK
Error	**1. Too few arguments** "Too few arguments. Possible argument(s) are serial date statistics users buildrun ip sys-info configuration ppp time **2. Invalid argument** Invalid argument "string". Valid arguments are serial date statistics users buildrun ip sys-info configuration ppp time

General Commands – Show

Command Syntax	show configuration
Description	Displays the MultiConnect IP configuration.
Default Value	NA
Success	OK
Error	**1. Too few arguments** "Too few arguments. Possible argument(s) are: serial ppp sys-info device-parameter configuration recv-mail time date http users buildrun statistics send-mail **2. Invalid argument** Valid arguments are: serial ppp sys-info device-parameter configuration recv-mail time date http users buildrun statistics send-mail

Command Syntax	show date
Description	Shows the system date.
Default Value	NA
Success	OK
Error	**1. Too few arguments** Too few arguments. Possible argument(s) are: ip statistics users configuration ppp sys-info date serial time **2. Invalid argument** Invalid argument "*Invalid string*". Valid arguments are ip statistics users configuration ppp sys-info date serial time

Command Syntax	show statistics
Description	Displays MultiConnect IP statistics.
Default Value	NA
Success	OK
Error	**1. Too few arguments** "Too few arguments. Possible argument(s) are: ip statistics users configuration ppp sys-info date serial time **2. Invalid argument** Valid arguments are: ip statistics users configuration ppp sys-info date serial time

Command Syntax	show sys-info
Description	Displays the system related information. • Hardware information • System Uptime • Memory Utilization • Flash Memory Map
Default Value	NA
Success	OK
Error	**1. Too few arguments** Too few arguments. Possible argument(s) are: ip statistics users configuration ppp sys-info date serial time **2. Invalid argument** Invalid argument "*Invalid string*". Valid arguments are: ip statistics users configuration ppp sys-info date serial time

Command Syntax	show time
Description	Displays the system time.
Default Value	NA
Success	OK
Error	**1. Too few arguments** Too few arguments. Possible argument(s) are serial ip sys-info configuration ppp time date statistics users **2. Invalid argument** Invalid argument "*Invalid string*" Valid arguments are: serial ip sys-info configuration ppp time date statistics users

Command Syntax	show users
Description	Displays the configured users.
Default Value	NA
Success	OK
Error	**1. Too few arguments** "Too few arguments. Possible argument(s) are: serial ip sys-info configuration ppp time date statistics users **2. Invalid argument** Valid arguments are: serial ip sys-info configuration ppp time date statistics users

IP Setup Commands

Command Syntax	set ip dns <enable/disable>
Description	Enables/disables the DNS client.
Default Value	Enabled
Success	OK
Error	**1. Too few arguments** "Usage: set ip dns <enable/disable> Type 'set ip dns ?' for more information" **2. Invalid string** Type 'set ip dns ?' for more information"

Command Syntax	set ip hostname <hostname>
Description	Sets the host name of the MultiConnect IP.
Default Value	"MultiConnectIP"
Success	OK
Error	**1. Too few arguments** "Usage: set ip hostname <hostname> Type 'set ip hostname ?' for more information"

Command Syntax	set ip pri-dns <ip addr>
Description	Sets the primary DNS IP address to 0.0.0.0.
Default Value	0.0.0.0
Success	OK
Error	**1. Too few arguments** "Usage: set ip pri-dns <ip addr> Type 'set ip pri-dns ?' for more information" **2. Invalid IP Address** "error: Invalid IP address Type 'set ip pri-dns ?' for more information"

Command Syntax	set ip sec-dns <ip addr>
Description	Sets the secondary DNS IP address to 0.0.0.0.
Default Value	0.0.0.0
Success	OK
Error	**1. Too few arguments** "Usage: set ip sec-dns <ip addr> Type 'set ip sec-dns ?' for more information" **2. Invalid IP Address** "error: Invalid IP address Type 'set ip sec-dns ?' for more information"

Command Syntax	set ip syslogd <enable/disable>
Description	Enables/Disables syslogd.
Default Value	Disable
Success	OK
Error	**1. Too few arguments** "Usage: set ip syslogd <enable/disable> Type 'set ip syslogd ?' for more information"

Command Syntax	set ip syslogd-server <ip addr>
Description	Sets the remote syslog server's IP address.
Default Value	0.0.0.0
Success	OK
Error	**1. Too few arguments** "Usage: set ip syslogd-server <ip_addr> Type 'set ip syslogd-server ?' for more information" **2. Invalid IP address** "error: Invalid IP address Type 'set ip syslogd-server ?' for more information"

Command Syntax	set ip tcp-keepalive <t mins>
Description	Sets the TCP keep-alive timeout for the MultiConnect IP. 't' : range from 3-120 minutes
Default Value	3 minutes
Success	OK
Error	**1. Too few arguments** "Usage: set ip tcp-keepalive <t mins> Type 'set ip tcp-keepalive ?' for more information" **2. Invalid IP address** "error: Invalid value, rante [3-120] mins Type 'set ip tcp-keepalive ?' for more information"

Command Syntax	set ip telnet <enable/disable>
Description	Enables/disables the Telnet Server. This is a global setting, which will enable/disable the Telnet Server in the MultiConnect IP. **Note:** Upon disabling Telnet server, the administrator cannot configure the MultiConnect IP over the built-in Modem interface (wherein PPP has acquired IP Address). The only option is to connect through a terminal application over the Serial port.
Default Value	Enabled
Success	OK
Error	**1. Too few arguments** Too few arguments. Possible argument(s) are set ip telnet<enable/disable> Type : set ip telnet ? for more information) **2. Multiple matches** telnet telnet-port **3. Invalid String** Invalid argument *"invalid string"* Valid arguments are auto-dialout escape-string inactivity inactivity-timeout escape-monitor raw-mode Possible value(s) are *enable* or *disable*

Command Syntax	set ip telnet auto-dialout <enable/disable>
Description	Enables Telnet connectivity between the MultiConnect IP and the remote device. This flag enables/disables the Telnet Auto dialout globally.
Default Value	Enabled
Success	OK
Error	**1. Too few arguments** "Usage: set ip telnet auto-dialout <enable/disable> Type 'set ip telnet auto-dialout ?' for more information" **2. Invalid String** Type 'set ip telnet auto-dialout ?' for more information"

Command Syntax	set ip telnet escape-string <string>
Description	The Telnet Server scans for this escape sequence and transfers the control to the command parser. By default, the Telnet Server scans for "+++inet".
Default Value	+++ inet
Success	OK
Error	**1. Too few arguments** "Usage: set ip telnet escape-string <string> Type 'set ip telnet escape-string ?' for more information" **2. Multiple matches** escape-monitor escape-string

Command Syntax	set ip telnet escape-monitor <enable/disable>
Description	Enables/disables the ''monitor'' flag that scans for the escape sequence.
Default Value	Enabled
Success	OK
Error	**1. Too few arguments** "Usage: set ip telnet escape-monitor <enable/disable> Type 'set ip telnet escape-monitor ?' for more information" **2. Multiple matches** escape-monitor escape-string **3. Invalid String** Type 'set ip telnet escape-monitor ?' for more information"

Command Syntax	set ip telnet inactivity <enable/disable>
Description	Enables/disables the inactivity functionality.
Default Value	Disable
Success	OK
Error	**1. Too few arguments** "Usage: set ip telnet inactivity <enable/disable> Type 'set ip telnet inactivity ?' for more information" **2. Multiple matches** inactivity inactivity-timeout **3. Invalid String** Type 'set ip telnet inactivity ?' for more information"

Command Syntax	set ip telnet inactivity-timeout <t secs>
Description	If the Telnet session is inactive for 't' secs, the connection is terminated. This functionality is applicable only if "set telnet inactivity" is enabled. (Refer to 'set ip telnet inactivity' command).
Default Value	5 min
Success	OK
Error	**1. Too few arguments** "Usage: set ip telnet inactivity-timeout <t secs> Type 'set ip telnet inactivity-timeout ?' for more information" **2. Multiple matches** *inactivity* and *inactivity-timeout* **3. Invalid timeout value** "error: 't secs range : 0 – 300 Type 'set ip telnet inactivity-timeout ?' for more information"

Command Syntax	set ip telnet-port <port_num >
Description	This Telnet-port corresponds to the port number that the MultiConnect IP will wait on for configuring the box. Default port number is TCP 23. You have the option to change this number. **Note:** Invoking this command terminates the current Telnet session.
Default Value	23
Success	OK
Error	**1. Too few arguments** "Usage: set ip telnet-port <port-num> Type 'set ip telnet-port ?' for more information" **2. Invalid port-num** "error: Invalid port number Type 'set ip telnet-port ?' for more information"

Command Syntax	set ip telnet raw-mode <enable/disable>
Description	This is a global setting of raw-mode for the Telnet application. This setting is applicable for both Telnet auto-dialout, serial auto-dial-in.
Default Value	Disabled
Success	OK
Error	**1. Too few arguments** "Usage: set ip telnet raw-mode <enable/disable> Type 'set ip telnet raw-mode ?' for more information" **2. Invalid String** ERROR

Command Syntax	set ip tftp <enable/disable >
Description	Enables/disables the TFTP Server. When the TFTP Server is enabled, the network administrator can upload the firmware to the flash.
Default Value	Enabled
Success	OK
Error	**1. Too few arguments** "Usage: set ip tftp <enable/disable> Type 'set ip tftp ?' for more information" **2. Invalid string** error: Invalid string Type 'set ip tftp ?' for more information"

Serial Setup Commands

Command Syntax	set serial auto-telnet <enable/disable>
Description	This command globally enables serial auto dial-in support. **Notes:** This feature provides a Telnet session to the serial device connected to S0 through the IP-enabled modem port (S1) Also, Telnet can be used only after PPP is up and has acquired an IP address on the modem's (S1) port.
Default Value	Disabled
Success	OK
Error	**1. Too few arguments** "Usage: set serial auto-telnet <enable/disable> Type 'set serial auto-telnet ?' for more information" **2. Invalid string** error: Invalid string Type 'set serial auto-telnet ?' for more information

Command Syntax	set serial <serial-interface> escape-monitor <enable/disable>
Description	Sets a "monitor" flag that enables/disables the scanning of escape sequence.
Default Value	Enable
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 escape-monitor <enable/disable> Type 'set serial s0/s1escape-monitor ?' for more information" **2. Multiple matches** escape-monitor escape-string **3. Invalid string** error: Invalid string Type 'set serial s0/s1 escape-monitor ?' for more information"

Command Syntax	set serial <serial-interface> escape-string <string>
Description	The Telnet client scans for this escape sequence and transfers the control to the command parser. By default, the Telnet client scans for "+++inet".
Default Value	+++ inet<serial-interface>
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 escape-string <string> Type 'set serial s0/s1 escape-string ?' for more information" **2. Multiple matches** escape-monitor escape-string

Command Syntax	**hangup [serial interface]** Valid serial interface – Modem port S1
Description	When this command is issued, the established live link is brought down. This command is only valid only for ***modem port (S1)***
Default Value	-
Success	If physical link is brought down, **OK** and ***Physical link is successfully brought down*** messages are given
Error	**1. Too few arguments** "Usage: hangup [S1] Type 'hangup [S1] ?' for more information" **2. "error: Link could not be brought down"** message is given when link could not be brought down

Command Syntax	**linkup [serial interface]** Valid serial interface – Modem port S1
Description	Establishes a physical link and PPP on the modem port. This command is relevant only when the serial interface is a dialing end with **`dialing-trig-mode`** configured as "**`command`**"
Default Value	-
Success	If physical link is established OK and CONNECT 14400 LAPM COMPRESSED (i.e., CONNECT message from the modem) are given
Error	**1. Too few arguments** "Usage: linkup [S1] Type 'linkup [S1]' for more information" **2. "error: Link cannot be brought up"** message is given when dialing-trig-mode is not "command" **3. "error: Link is not established"** message is given when link is not established (in case PPP fails to get the logical link up) **4. "error: Link is already up"** message is given when link is established and this command will not tear down and bring up the link **5. "error: NO CARRIER / NO DIALTONE / NO ANSWER"** or any error return code from the modem

Command Syntax	set serial [s0] auto-dialin <enable/disable>
Description	Enables/disables the device port to Internet connectivity for the serial port S0. This command is valid only for device port S0
Default Value	Disabled
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0 auto-dialin <enable/disable> Type 'set serial s0 auto-dialin ? for more information" **2. Multiple matches** auto-dialin auto-dialin-protocol auto-dialout-protocol auto-dialin-ipaddress auto-dialout auto-dialin-port auto-dialout-port **3. Invalid string** "error: Invalid string Type 'set serial s0 auto-dial-in ? for more information" **4.** If "set serial s1 auto-dialin <enable/disable>" is given "error: Command not supported on the modem port s1"

Command Syntax	set serial [s0] auto-dialin-ipaddress <ipaddr>
Description	Specifies the auto dial-in IP address. **Note:** When a connection is established from serial, a session is established to the IP address mentioned above. This command is valid only for device port S0.
Default Value	NULL
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0 auto-dialin-ipaddress <ipaddr> Type 'set serial s0 auto-dialin-ipaddress ? for more information" **2. Multiple matches** auto-dialin auto-dialin-protocol auto-dialout-protocol auto-dialin-ipaddress auto-dialout auto-dialin-port auto-dialout-port **3. Invalid IP Address** "error: Invalid IP address Type 'show serial s0 auto-dialin-ipaddress ? for more information" **4.** If "set serial s1 auto-dialin-ipaddress 192.168.2.2" is given "error: Command not supported on the modem port s1"

Command Syntax	set serial [s0] auto-dialin-port [port_num]
Description	Command to specify the auto dial-in port number. **Note:** [port_num] is optional here. If port_num is not specified, the standard port 23 of the Telnet protocol shall be used. This command is valid only for device port S0
Default Value	23
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0 auto-dialin-port [port_num] Type 'set serial s0 auto-dialin-port ? for more information" **2. Multiple matches** auto-dialin auto-dialin-protocol auto-dialout-protocol auto-dialin-ipaddress auto-dialout auto-dialin-port auto-dialout-port **3. Invalid port** "error: Invalid port number Type 'set serial s0 auto-dialin-port ? for more information" **4.** If "set serial s1 auto-dialin-port 23" is given "error: Command not supported on modem port s1"

Command Syntax	set serial [s0] auto-dialin-protocol <telnet>
Description	By default, Telnet is the protocol used to establish the serial-to-Internet connectivity. **Note:** This syntax provides for future extensibility (SSH Client, etc.) This command is valid only for device port S0<ftp protocol setting is not yet implemented>
Default Value	Telnet
Success	OK
Error	1. Too few arguments "Usage: set serial s0 auto-dialin-protocol <telnet/ftp> Type 'set serial s0 auto-dialin-protocol ? for more information" 2. Multiple matches auto-dialin auto-dialin-protocol auto-dialout-protocol auto-dialin-ipaddress auto-dialout auto-dialin-port auto-dialout-port 3. Invalid protocol selected "error: Selected protocol not supported Type 'set serial s0 auto-dialin-protocol ? for more information" 4. If "set serial s1 auto-dialin-protocol telnet" is given "error: Command not supported on modem port s1"

Command Syntax	set serial [s0] auto-dialin trig-mode <char/ dtr/ dtr-char/ none>
Description	This mode is applicable only when **auto dial-in** is enabled on the serial port S0. This command is valid only for device port S0. **Parameter Description** **char** Initiate a session (Telnet) to the auto-dialin-ipaddress, only on a reception of a character on the serial port S0. **dtr** Initiate a session (Telnet) to the auto-dialin-ipaddress, only on seeing a DTR signal on the serial port S0 **dtr-char** Initiate a session (Telnet) to the auto-dialin-ipaddress, either on reception of a character **(OR)** seeing the DTR signal on the serial port S0. **none** Initiate a Telnet session to the auto-dialin-ipaddress on module boot-up.
Default Value	dtr-char
Success	OK
Error	**1. Too few arguments** Too few arguments. Possible argument(s) are char dtr-char dtr none **2. Invalid string** “Invalid string "string" Valid arguments are char dtr-char dtr none **3.** If “set serial s1 auto-dialin trig-mode <char/dtr/dtr-char/none>” is given “error: Command not supported on modem port s1”

Command Syntax	set serial [s0] auto-dialout-port <port_num>
Description	If auto-dialout is enabled, specifies the auto dialout-port on which the client can connect. Default is 5000. **Note:** The port number should be other than standard TCP ports. This command is valid only for device port S0.
Default Value	5000
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0 auto-dialout-port <port_num> Type 'set serial s0 auto-dialout-port ? for more information" **2. Multiple matches** auto-dialin auto-dialin-protocol auto-dialout-protocol auto-dialin-ipaddress auto-dialout auto-dialin-port auto-dialout-port **3. Invalid Port Number** "error: Invalid port number Type 'set serial s0 auto-dialout-port ? for more information" **4.** If "set serial s1 auto-dialout-port 5000" is given "error: Command not supported on modem port s1"

Command Syntax	set serial [s0] auto-dialout-protocol <telnet/>
Description	**Note:** This syntax gives a provision for future extensibility. <SSH Server, etc>. This command is valid only for device port S0.
Default Value	Telnet
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0 auto-dialout-protocol <telnet/> Type 'set serial s0 auto-dialout-protocol ?' for more information" **2. Multiple matches** auto-dialin auto-dialin-protocol auto-dialout-protocol auto-dialin-ipaddress auto-dialout auto-dialin-port auto-dialout-port **3. Invalid string** error: Invalid parameter Type 'set serial s0 auto-dialout-protocol ?' for more information" **4.** If "set serial s1 auto-dialout-protocol telnet" is given "error: Command not supported on modem port s1"

Command Syntax	set serial [s0/s1] baud-rate <baud>
Description	Sets the serial baud rate.
Default Value	115200
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 baud-rate <baud> Type 'set serial s0/s1 baud-rate ?' for more information" **2. Invalid baud-rate** "error: baud-rate range : [300,……] Type 'set serial s0/s1 baud-rate ?' for more information"

Command Syntax	set serial [s0/s1] buffer-datasize <0/d bytes>
Description	This command primarily buffers the data.
Default Value	0 – No buffering.
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 buffer-datasize <0/d bytes> Type 'set serial s0/s1 buffer-datasize ?' for more information" **2. Multiple matches** buffer-datasize buffer-time **3. Datasize range** "error: Buffer data-size range : [1 - 1500] bytes Type 'set serial s0/s1 buffer-datasize ?' for more information"

Command Syntax	set serial [s0/s1] buffer-time <0/t secs>
Description	This command is related to the 'set serial s0/s1 buffer-datasize' command. The buffering of data shall either wait for datasize configured (in the previous command) or time t secs. **Example:** ***Sl*** ***Buffer-datasize*** ***Buffer-time (secs)*** ***Descriptions*** 1 0 - Default 0 - Default ***No buffering.*** Passes the data to the serial application on the reception of a character on the serial application. 2 10 0 ***Buffer*** till it reaches buffer-datasize (10); then passes it to the serial application. 3 0 10 ***No buffering.*** Pass the data to the serial application on the reception of a character on the serial. 4 10 10 ***Buffer*** the characters till it reaches the buffer-datasize (10) (OR) wait for the buffer-time (10Secs). The data is passed on to the serial application depending on which condition is satisfied first.
Default Value	0 – No buffering
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 buffer-time <0/t secs> Type 'set serial s0/s1 buffer-time ?' for more information" **2. Multiple matches** buffer-datasize buffer-time **3. Time limit** "error: Time limit supported : <1 – 60 secs> Type 'set serial s0/s1 buffer-time ?' for more information"

Command Syntax	set serial [s0/s1] chat-script <line-num> <expect-string> <send-string>
Description	Sets *expect* and *send* strings for the chat script to act on the modem. Triggers for a reboot upon save. **Important Note:** Use double quotes if more than one word is used in the <expect-string>/<send-string>.
Default Value	NA
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 chat-script <line-num> <expect-string> <send-string> Type 'set serial s0/s1 chat-script ?' for more information"

Command Syntax	Set serial [s0/s1] connect-type <direct/modem>
Description	Sets the connect type of the serial port to direct/modem connect. **Note:** Modem port (S1) will always have connect-type as *modem* since it is a built-in modem
Default Value	Direct
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 connect-type <direct/modem> Type 'set serial s0/s1 connect-type ?' for more information" **2. Invalid string** "error: Invalid string Type 'set serial s0/s1 connect-type ?' for more information" **3.** If "set serial s1 connect-type direct" is given error: modem port s1 is a built-in modem interface; it cannot be set to direct

Command Syntax	set serial [s0/s1] connect-state <answering/dialing/both>
Description	Sets the connect state of the serial port to *answering/dialing/both* state.
Default Value	Both
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 connect-state <answering/dialing/both> Type 'set serial s0/s1 connect-state ?' for more information" **2. Invalid string** "error: Invalid string Type 'set serial s0/s1 connect-state ?' for more information"

Command Syntax	set serial [s0/s1] data-bits <7/8>
Description	Set the data-bits.
Default Value	8
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 data-bits <7/8> Type 'set serial s0/s1 data-bits ?' for more information" **2. Invalid data-bit setting** "error: Data-bits range supported: [7/8] Type 'set serial s0/s1 data-bits ?' for more information"

Command Syntax	Set serial [s0/s1] flow-control <none/rts-cts>
Description	Set the flow-control of the serial port. By default flow-control is disabled on the serial port.
Default Value	rts-cts
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 flow-control <none/rts-cts> Type 'set serial s0/s1 flow-control ?' for more information" **2. Invalid flow-control setting** "error: flow-control supported: [none/rts-cts] Type 'set serial s0/s1 flow-control ?' for more information"

Command Syntax	set serial [s0] host-interaction-mode <enable/disable>
Description	This parameter is set by the host to enable the host-interactive-mode. When this mode is set, the host/serial device can use SMTP client, POP3 client, and HTTP server. Host interaction mode is valid only for device port S0. **Note:** Telnet Auto-Dialout and PPP cannot be enabled when this mode is enabled.
Default Value	Disable
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0 host-interaction-mode <enable/disable> Type set serial s0 host-interaction-mode ?" **2. Invalid string** Type set serial s0 host-interaction-mode ?" **3.** Port used by Auto-dialout "ERROR: Port used by Auto-dialout" **4.** "set serial s1 host-interaction-mode s1" is given "error: Command not supported on modem port s1"

Command Syntax	set serial [s0/s1] modem connect-string <connect-str>
Description	Sets the Modem Connect string. Triggers for a reboot upon save. **Note:** The configured modem strings takes precedence over the MODEM.CNF
Default Value	CONNECT
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 modem connect-string <connect-str> Type 'set serial s0/s1 modem connect-string ?' for more information"

Command Syntax	set serial [s0/s1] modem dial-number <phone-num>
Description	Sets the dial-number to be dialed.
Default Value	NA
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 modem dial-number <phone-num> Type 'set serial s0/s1 modem dial-number ?' for more information"

Command Syntax	set serial [s0/s1] modem dial-prefix <dialprefix>
Description	Sets the Modem Dial-Prefix. Triggers for a reboot upon save. **Note:** The configured modem strings takes precedence over the MODEM.CNF
Default Value	ATDT
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 modem dial-prefix <dialprefix> Type 'set serial s0/s1 modem dial-prefix ?' for more information"

Command Syntax	Set serial [s0/s1] modem dial-suffix <dialsuffix>
Description	Sets the Modem Dial-suffix. Triggers for a reboot upon save. **Note:** The configured modem strings takes precedence over the MODEM.CNF
Default Value	^M
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 modem dial-suffix <dialsuffix> Type 'set serial s0/s1 modem dial-suffix ?' for more information"

Command Syntax	Set serial [s0/s1] modem dialing-method <configuration/chat-script>
Description	Sets the modem dialing method. 1. Configuration method: The user shall provide only the dial-number to reach. 2. Choosing the 'chat' as the dialing-method, the user can write his/her own script by providing an **Expect** and a **Send** sequence. Refer to: 'set serial s0/s1 chat-script ?' for providing an "Expect" and a "Send" sequence. Triggers for a reboot upon save.
Default Value	Configuration
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 modem dialing-method <configuration/chat-script> Type 'set serial s0/s1 modem dialing-method ?' for more information"

Command Syntax	set serial [s1] modem dialing-trig-mode <none/dtr/command>
Description	Sets the dialing trigger mode for the modem port S1. If dialing trig mode is none: The serial interface will initialize the modem and dial as per the configured parameters. If dialing trig mode is dtr: As soon as a serial device is connected to **S0 (DTR** goes high), the S1 serial interface will initialize the modem and dial as per the configured parameters. If dialing trig mode is command: The serial interface will dial only on demand. The possible commands that can trigger the link are: • "linkup s1" command is issued • Application trigger (SMTP, POP3 Client, etc) **Note:** This command triggers a reboot upon **save**.
Default Value	Command
Success	OK
Error	**1. Too few arguments** "Usage: set serial s1 modem dialing-trig-mode <none/dtr/command> Type 'set serial s1 modem dialing-trig-mode ?' for more information" **2. Invalid string** "error: Invalid string Type 'set serial s1 modem dialing-trig-mode ?' for more information"

Command Syntax	set serial s1 modem country-code <value>
Description	This command is valid only for port S1.
Default Value	-
Success	OK
Error	**1. Too few arguments** “Usage: set serial s1 modem country-code value <value> Type ‘set serial s1 modem country-code value ?’ for more information”

Command Syntax	set serial [s0/s1] modem hangup-string <hangup-str>
Description	Sets the Modem hang-up string. Triggers for a reboot upon save.
Default Value	+++ATH0
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 modem hangup-string <hang-str> Type 'set serial s0/s1 modem hangup-string ?' for more information"

Command Syntax	set serial [s0/s1] modem init-string <init-num> <init-str>
Description	Configures the modem initial strings. Init-num can range from 1-5. Triggers for a reboot upon save. **Example:** Set serial s0 modem init-string 1 ATZ Set serial s0 modem init-string 1 "ATZ AT&F" **Important Note:** Use double quotes if more than one word is used in the <init-str>. Refer to example 2 above. This holds true for all the following commands that need a string as a parameter.
Default Value	Init-string 1 is set to 'ATZ' Init-string 2 is set to ' ' Init-string 3 is set to ' ' Init-string 4 is set to ' ' Init-string 5 is set to ' '
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 modem init-string <init-num> <init-str> Type 'set serial s0/s1 modem init-string ?' for more information" Invalid init-num "ERROR: init-num range supported : [1-5]"

Command Syntax	set serial [s0/s1] modem ok-string <ok-str>
Description	Sets the modem OK string. Triggers for a reboot upon save.
Default Value	OK
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 modem ok-string <ok-str> Type 'set serial s0/s1 modem ok-string ?' for more information"

Command Syntax	set serial [s0/s1] modem ring-string <ring-str>
Description	Sets the modem ring string. Triggers for a reboot upon save.
Default Value	RING
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 modem ring-string <ring-str> Type 'set serial s0/s1 modem ring-string ?' for more information"

Command Syntax	set serial [s0/s1] parity <even/odd/none>
Description	Sets parity to even/odd/none.
Default Value	None
Success	OK
Error	**1. Too few arguments** “Usage: set serial s0/s1 parity <even/odd/none> Type ‘set serial s0/s1 parity ?’ for more information” **2. Invalid parity setting** “error: parity supported: [even/odd/none] Type ‘set serial s0/s1 parity ?’ for more information”

Command Syntax	set serial [s0] login-string <login-string>
Description	Sets a login-string to the serial port. This command is valid only for port S0. The Login string can be of length maximum 8 characters. Upon module boot-up, Login is displayed on the console only if the characters entered match the login-string configured. **Note:** This is applicable only if the "***set serial s0 auto-dialin trig-mode***" is **char**
Default Value	""
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0 login-string <login-string> Type 'set serial s0 login-string ? for more information" **2. Invalid string** "ERROR: Invalid string Type 'set serial s0 login-string ? for more information" **3.** If 'set serial s1 login-string <login-string>' is given "error: Command not supported on modem port s1"

Command Syntax	set serial [s0] raw-dialin <enable/disable>
Description	Enables/disables raw mode support for serial auto dial-in on the device port S0.
Default Value	Disabled
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0 raw-dialin <enable/disable> Type 'set serial s0 raw-dialin ? for more information" **2. Multiple matches** raw-dialin raw-dialout **3. Invalid string** "ERROR: Invalid string Type 'set serial s0 raw-dialin ? for more information" If 'set serial s1 raw-dialin <enable/disable>' is given "error: Command not supported on modem port s1"

Command Syntax	set serial [s0] raw-dialout <enable/disable>
Description	Enables/disables raw mode support for auto dialout on the device port S0.
Default Value	Disabled
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 raw-dialout <enable/disable> Type 'set serial s0/s1 raw-dialout ? for more information" **2. Multiple matches** raw-dialin raw-dialout **3. Invalid string** "error: Invalid string Type 'set serial s0/s1 raw-dialout ? for more information" **4.** If 'set serial s1 raw-dialout <enable/disable>' is given "error: Command not supported on modem port s1"

Serial Commands – Setup

Command Syntax	set serial [s0/s1] stop-bits <1/1.5/2>
Description	Sets the stop bits.
Default Value	1
Success	OK
Error	**1. Too few arguments** "Usage: set serial s0/s1 stop-bits <1/1.5/2> Type 'set serial s0/s1 stop-bits ?' for more information" **2. Invalid stop-bit setting** "ERROR: Stop-bit supported : [1, 1.5, 2] Type 'set serial s0/s1 stop-bits ?' for more information"

Serial Commands – Show

Command Syntax	show serial [s0/s1] chat-script
Description	Displays the **Expect** and **Send** sequence for the serial port S0 or S1.
Default Value	NA
Success	OK
Error	1. Too few arguments Possible value(s) are statistics modem-configuration configuration chat-script

Command Syntax	show serial [s0/s1] configuration
Description	Displays serial S0/S1 configuration.
Default Value	-
Success	OK
Error	**1. Too few arguments** Possible value(s) are statistics modem-configuration configuration chat-script

Command Syntax	show serial [s0/s1] modem-configuration
Description	Displays the modem-related configuration for serial port S0 or S1.
Default Value	NA
Success	OK
Error	**1. Too few arguments** Possible value(s) are statistics modem-configuration configuration chat-script

Command Syntax	**show serial [s0/s1] statistics**
Description	Displays Serial Statistics. • Status (If serial is used by any application) • Rx Bytes • Rx Errors • Tx Bytes • Tx Errors • Status of EIA signals (CTS, DSR, DCD, RTS, DTR). ***Important Note:*** Serial statistics are only for the current session. Rx Bytes, Tx Bytes will be reset for every session opened on the serial.
Default Value	-
Success	OK
Error	**1. Too few arguments** Possible value(s) are statistics modem-configuration configuration chat-script

Command Syntax	**show serial modem country code** **This command is supported on S1 only.**
Description	Displays the supported country codes for this product.
Default Value	-
Success	OK
Error	**1. Too few arguments** Possible value(s) are statistics modem-configuration chat-script configuration country-code

PPP Setup Commands

Note: All PPP Commands use the ppp0 interface, which corresponds to the modem port S1.

Command Syntax	set ppp <interface> authentication <enable/disable>
Description	Enables/disables PPP Authentication.
Default Value	Disabled
Success	OK
Error	**1. Too few arguments** Possible argument(s) are *disable* and *enable* **2. Invalid string** Invalid argument. Valid argument(s) are *disable* and *enable* **3. Multiple matches:** *auth-type* and *authentication*

Command Syntax	set ppp <interface> auth-type <pap/chap/pap-chap>
Description	Sets the protocol to authenticate the remote peer: PAP/CHAP/PAP-CHAP
Default Value	PAP
Success	OK
Error	**1. Too few arguments** Too few argument(s). Possible argument(s) are: chap, pap, and pap-chap **2. Invalid authentication type** Invalid argument. Valid argument(s) are chap, pap, and pap-chap **3. Multiple matches:** *auth-type* and *authentication*

Command Syntax	set ppp <interface> compression <enable/disable>
Description	Enables/disables CCP compression.
Default Value	Disabled
Success	OK
Error	**1. Too few arguments** Possible argument(s) are *disable* and *enable* **2. Invalid string** Invalid argument. Valid argument(s) are *disable* and *enable*

Command Syntax	set ppp <interface> comp-type <both/bsd/deflate>
Description	Sets the compression type to BSD, DEFLATE or BOTH. **In the case of NON-RAWMODE:** When **both** is configured as the compression type, the module tries to negotiate DEFLATE first. In the event of failure, the BSD is negotiated. **In case of RAW-MODE:** Compress-type **both** is not supported in RAW-MODE, since there are no negotiations between MultiConnect IP Modules.
Default Value	Deflate
Success	OK
Error	**1. Too few arguments** Too few argument(s). Possible argument(s) are *both, bsd, deflate* **2. Invalid string** Invalid argument *"string"* Valid argument(s) are *both, bsd, deflate*

Command Syntax	set ppp <interface> dialing-max-retries <0-100>
Description	**Maximum** dialing retry is **100**
Default Value	5
Success	OK
Error	**1. Too few arguments** "Usage: set ppp ppp0 dialing-max-retires [0-100](times) Type 'set ppp ppp0 dialing-max-retries ?' for more information" **2. Multiple matches** *dialing-max-retries* and *dialing-retry-interval* **3. Retry range** "error: dialing-max-retries range : [0 - 100] Type 'set ppp ppp0 dialing-retry-interval ?' for more information"

Command Syntax	set ppp <interface> dialing-retry-interval <0-300>
Description	**Maximum** dialing retry is **300.**
Default Value	15
Success	OK
Error	**1. Too few arguments** "Usage: set ppp ppp0 dialing-retry-interval [0-300](secs) Type 'set ppp ppp0 dialing-retry-interval ?' for more information" **2. Multiple matches** *dialing-max-retries* and *dialing-retry-interval* **3. Retry range** "error: dialing-retry-interval range : [0 - 300] Type 'set ppp ppp0 dialing-retry-interval ?' for more information"

Command Syntax	set ppp <interface> idle-timeout <0-900>
Description	**Maximum** dialing retry is **900 secs**
Default Value	600 secs
Success	OK
Error	**1. Too few arguments** "Usage: set ppp ppp0 idle-timeout <0-900> Type set ppp ppp0 idle-timeout ?' for more information" **2 Idle timeout range** "error: dod-idle-timeout range : [0 - 900] Type 'set ppp ppp0 idle-timeout ?' for more information"

Command Syntax	set ppp <interface> ipcp-mode <client-only/client-or-lan>
Description	Sets the IPCP mode-to-client-only or client or LAN.
Default Value	**client-only**
Success	OK
Error	**1. Too few arguments** Possible argument(s) are *client-only* and *client-or-lan* **2. Invalid string** Invalid argument. Valid argument(s) are *client-only* and *client-or-lan*

Command Syntax	set ppp <interface> local-ip-addr <ipaddr> mask <ipmask>
Description	During IPCP negotiations, the configured IP address is sent for the local interface. In the case where the peer is requested to provide the IP address, it can be configured as 0.0.0.0
Default Value	0.0.0.0 255.255.255.0
Success	OK
Error	**1. Too few arguments** Possible arguments are *IP Address* and *Mask* **2. Invalid IP address/Mask** Invalid argument

Command Syntax	set ppp <interface> password <password >
Description	Sets the password that remote peers will use for authentication.
Default Value	Ipmodule
Success	OK
Error	**1. Password Length** Password should have minimum of 8 characters

Command Syntax	set ppp <interface> remote-ip-addr <ipaddr> mask <ipmask>
Description	During IPCP negotiations, this configured IP address is sent for the remote interface. In the case of the peer being requested to provide the IP address, it can be configured as 0.0.0.0
Default Value	0.0.0.0 255.255.255.0
Success	OK
Error	**1. Too few arguments** Possible arguments are *IP Address* and *Mask* **2. Invalid IP address/Mask** Invalid argument

Command Syntax	set ppp <interface> username <username>
Description	Sets the user name that the remote peer will use for authentication.
Default Value	Ipmodule
Success	OK
Error	**1. Too few arguments** Possible value(s) are valid user name

Command Syntax	show ppp ppp0 configuration
Description	Displays: PPP Status (enabled/disabled) Authentication status Authentication type Username and password for authentication Compression status Compression type IPCP Mode Local IP Address Remote IP Address
Default Value	NA
Success	OK
Error	**1. Too few arguments** Possible argument(s) are configuration ip-addr statistics link-status **2. Invalid argument** Invalid argument Valid argument(s) are configuration ip-addr statistics link-status

Command Syntax	show ppp <interface> ip-addr
Description	Displays: Local IP Address Remote IP Address
Default Value	NA
Success	OK
Error	**1. Too few arguments** Possible argument(s) are configuration ip-addr statistics link-status **2. Invalid argument** Invalid argument Valid argument(s) are configuration ip-addr statistics link-status

Command Syntax	show ppp <interface> link-status
Description	Displays the link status on ppp interface.
Default Value	-
Success	OK Up / Down
Error	**1. Too few arguments** Possible argument(s) are configuration ip-addr statistics link-status **2. Invalid argument** Invalid argument Valid argument(s) are configuration ip-addr statistics link-status

Command Syntax	show ppp <interface> statistics
Description	Displays PPP Statistics.
Default Value	-
Success	OK
Error	**1. Too few arguments** Possible argument(s) are configuration ip-addr statistics link-status **2. Invalid argument** Invalid argument Valid argument(s) are: configuration ip-addr statistics link-status

HTTP Server Commands

The commands in this section are listed in the order in which they might be used.

Command Syntax	set ip http-page <default/serial>
Description	This parameter is used by the http server to host the default HTML index or host-defined http-serial-S0 HTML page.
Default Value	Default
Success	OK
Error	**1. Too few arguments** "Usage: set ip http-page <default/serial> Type set ip http-page ?" **2. Invalid string** Type "set ip http-page ?"

Command Syntax	set ip http <enable/disable>
Description	This enables the **http** server on the MultiConnect IP to listen on Port 80.
Default Value	Disable
Success	OK
Error	**1. Too few arguments** "Usage: set "ip http <enable/disable> Type 'set ip http ?' for more information" **2. Invalid string** "ERROR: Invalid string Type 'set ip http ?' for more information"

Command Syntax	set ip http-port <port>
Description	Sets the HTTP server to listen on the specified port.
Default Value	80
Success	OK
Error	**1. Too few arguments** "Usage: set ip http-port <port> Type set 'ip http-port ?' for more information" **2. Invalid port number** "ERROR: Invalid port number Type set 'ip http-port ?' for more information"

Command Syntax	set device-parameter P<n> <value> where n = 0 to 99.
Description	Sets the value of the parameter from the host/serial device.
Default Value	Value in the default parameter list file uploaded through TFTP.
Success	OK
Error	**1. Too few arguments** "Usage: set device P<n> <value> Type 'set device P<n> ?' for more information" **2. Invalid string** "ERROR: Invalid string Type 'set device P<n> ?' for more information"

HTTP Server Commands – Setup

Command Syntax	save param
Description	Invoking this command will save the host parameters into the flash. The "**/var/apps**" directory is gun zipped to **apps.tar.gz** and written into flash. (APPS _SECTOR)
Default Value	-
Success	OK
Error	**1. Too few arguments** "ERROR: Too few arguments Type 'save ?' for more information"

HTTP Server Commands – Show

Command Syntax	show http configuration
Description	Displays the HTTP related configurations.
Default Value	-
Success	OK
Error	**1. Too few arguments** "ERROR: Too few arguments Type 'show http configuration ?' for more information"

Command Syntax	show device-parameter P<n> where n = 0 to 99.
Description	Displays the value of the requested parameter from MultiConnect IP.
Default Value	-
Success	OK
Error	**1. Too few arguments** "ERROR: Too few arguments Type 'show device-parameter ?' for more information"

Command Syntax	show device-parameter modified
Description	Displays the status of the host parameters; for example, whether they are changed by the browser. Returns "Device parameters changed" when values are changed by the remote browser. Returns "Device parameters not changed" when values are not changed.
Default Value	-
Success	OK
Error	**1. Too few arguments** "ERROR: Too few arguments Type 'show device-parameter ?' for more information"

SMTP Client Commands

The commands in this section are listed in the order in which they might be used.

Command Syntax	set send-mail smtp-server-name <name/ip-address>
Description	Sets the SMTP server name or IP address. Server names must be such that they can be resolved by the DNS.
Default Value	NULL
Success	OK
Error	**1. Too few arguments** "Usage: set send-mail smtp-server-name <name/ip-address> Type 'set send-mail smtp-server-name ?' for more information" **2. Invalid name/IP address** "ERROR: Invalid SMTP Server Name/IP Address"

Command Syntax	set send-mail smtp-server-port <port>
Description	Sets the SMTP Server port.
Default Value	25
Success	OK
Error	**1. Too few arguments** "Usage: set send-mail smtp-server-port <port> Type 'set send-mail smtp-server-port ?' for more information"

Command Syntax	set send-mail host-name <host name>
Description	Sets the SMTP Client host name.
Default Value	NULL
Success	OK
Error	**1. Too few arguments** "Usage: set send-mail host-name <host name> Type 'set send-mail host-name ?' for more information"

Command Syntax	set send-mail from-address-identity <name>
Description	Sets the 'From:' description in the email header as <name>.
Default Value	NULL
Success	OK
Error	**1. Too few arguments** "Usage: set send-mail from-address-identity <name> Type 'set send-mail from-address-identity ?' for more information"

Command Syntax	set send-mail from-address <email-address>
Description	Sets the email-address as the Default From address information.
Default Value	NULL
Success	OK
Error	**1. Too few arguments** "Usage: set send-mail from-address <email-address> Type 'set send-mail from-address ?' for more information"

Command Syntax	set send-mail to-address <n> <email-address> where n = 1 to 5.
Description	Sets the email-address as one of the primary addressee. This is the default email address to which email messages are sent.
Default Value	NULL
Success	OK
Error	**1. Too few arguments** “Usage: set send-mail to-address <n> <email-address> Type 'set send-mail to-address <n> ?' for more information” ***2.*** **Invalid to-address number** “ERROR: to-address numbers supported: [1 to 5] Type 'set send-mail to-address <n> ?' for more information”

Command Syntax	set send-mail cc-address <n> <email-address> where n = 1 to 5.
Description	Sets the email-address as the alternate addressee (carbon copy). This is the default email address that the primary addressee's email messages are copied.
Default Value	NULL

orte: [1 to]e
Typ 'set sed-mailr(e)575(ss)6(<n)575(> ' for more inform)5.2(ation”)]T ET0 0 0.5 rg75.724830.06 1.5 -0.24

Command Syntax	**send-mail [-b]** **[-t <email-address1, email-address2, ...>]** **[-c <email-address1, email-address2, ...>]** **[-s <data>]** **[-d <msg body>]**
Description	Triggers the SMTP Client application. The application enters the interactive mode or sends the mail according to the command arguments. **Notes:** All the arguments are optional. This implies that an email can be sent by specifying the parameter(s) in the command line (or) entering them in the order prompted by MultiConnect IP. **Usage:** -b : binary mode {default is text mode} -t : To addresses -c : CC addresses -s : Subject Data -d : Message Body
Default Value	-
Success	Email Sent Successfully OK
Error	**1. Too few arguments** Usage: send-mail [<-b>] [-t <email-address, ...>] [-c <email-address, >] [-s <data>] [-d <msg body>] … Type 'send-mail ?' for more information”

Command Syntax	**show send-mail configuration**
Description	Displays the SMTP configuration.
Default Value	-
Success	OK
Error	**1. Too few arguments** “Usage: show send-mail configuration Type 'show send-mail ?' for more information”

POP3 Client Commands

Command Syntax	set recv-mail server-name <server-name>
Description	This parameter is set by the host to establish the POP3 connection for receiving the email from the remote server. This also needs DNS to be enabled on the MultiConnect IP.
Default Value	None
Success	OK
Error	**1. Too few arguments** Usage: set recv-mail server-name <server-name> Type 'set recv-mail server-name ?' for more information ***2. Invalid string*** Type 'set recv-mail server-name ?' for more information

Command Syntax	set recv-mail server-port <server-port>
Description	This parameter is set by the host to establish the POP3 connection for receiving email from the remote server.
Default Value	110
Success	OK
Error	**1. Too few arguments** Usage: set recv-mail server-port <server-port> Type 'set recv-mail server-port ?' for more information **2. Invalid string** Type 'set recv-mail server-port ?' for more information

Command Syntax	set recv-mail mailbox-name <mailbox-name>
Description	Sets the mail box user name for POP3 server authentication.
Default Value	None
Success	OK
Error	**1. Too few arguments** Usage: set recv-mail mailbox-name <mailbox-name> Type 'set recv-mail mailbox-name ?' for more information **2. Invalid string** Type 'set recv-mail mailbox-name ?' for more information

Command Syntax	set recv-mail mailbox-password <mailbox-password>
Description	Sets the mail box password for POP3 server authentication.
Default Value	None
Success	OK
Error	**1. Too few arguments** Usage: set recv-mail mailbox-password <mailbox-password> Type 'set recv-mail mailbox-password ?' for more information **2. Invalid string** Type 'set recv-mail mailbox-password ?' for more information

Command Syntax	set recv-mail leave-on-server <enable/disable>
Description	Set the variable “leave a copy of message on server” flag, which tells the POP3 server not to delete the emails from it once the emails are received.
Default Value	Disable
Success	OK
Error	**1. Too few arguments**

Command Syntax	recv-mail list [index]
Description	This command retrieves list of emails from the mailbox. Displays the list of emails in the order below: <index of the mail> <size in bytes> or Mailbox is empty
Default Value	-
Success	OK
Error	**1. Too few arguments** Usage: recv-mail list [index] Type 'recv-mail ?' for more information

Command Syntax	recv-mail header [index]
Description	This command receives the header information of all the emails present in the mailbox if index is not issued. If index is issued, the mail header corresponding to the index is retrieved.
Default Value	-
Success	OK
Error	**1. Too few arguments** Usage: recv-mail header [index] Type 'recv-mail ?' for more information

Command Syntax	recv-mail mail [index]
Description	This command retrieves all the pending emails present in the mailbox if index is not given. If index is issued, the email corresponding to the index is retrieved.
Default Value	-
Success	OK
Error	**1. Too few arguments** Usage: recv-mail mail [index] Type 'recv-mail ?' for more information

Command Syntax	recv-mail delete <index>
Description	Deletes the email corresponding to the index. The emails will not be deleted until the **“recv-mail quit”** command is executed.
Default Value	-
Success	OK
Error	**1. Too few arguments** Usage: recv-mail delete <index> Type 'recv-mail ?' for more information

POP3 Client Commands – Setup

Command Syntax	recv-mail top <index> <n>
Description	Displays the first <n> lines of the mail corresponding to index. If n is greater the email size then the whole message is displayed.
Default Value	-
Success	OK
Error	**1. Too few arguments** Usage: recv-mail top [index] Type 'recv-mail top' for more information

POP3 Client Commands – Show

Command Syntax	recv-mail unique-id-listing [index]
Description	Displays the unique ID listing from the server in the order below: <index of the mail> <unique id>. If index is specified, only the corresponding unique ID is displayed. If index is not specified, all unique IDs in the mail box are displayed.
Default Value	-
Success	OK
Error	**1. Too few arguments** Usage: recv-mail unique-id-listing [index] Type 'recv-mail ?' for more information

Command Syntax	recv-mail stat [index]
Description	Displays the statistics of an email or emails for a given index.
Default Value	-
Success	OK
Error	**1. Too few arguments** Usage: recv-mail stat [index] Type 'recv-mail ?' for more information

Command Syntax	show recv-mail configuration
Description	Displays the recv-mail related configuration.
Default Value	-
Success	OK
Error	**1. Too few arguments** Possible value(s) are configuration

FTP Client Commands

Command Syntax	**set ftp device <default/ip-address/host-name>** **login <username>** **[password <password> [account <account password >]**
Description	Sets/clears the device login name, password and account password details that will be used by FTP for automatic authentication. The Password is an optional parameter and can be configured along with the machine and login names only The Account Password is an optional parameter and can be configured along with device login name and password only. The IP module prompts for login name and password if these details are NULL. **Note:** **"set ftp machine"** resets all these parameters to NULL
Default Value	NULL
Success	OK
Error	**1. Invalid arguments** "error: Login name cannot be null Type set ftp ? for more information" **2. Invalid arguments** error: Password cannot be null Type set ftp ? for more information" **3. Invalid arguments** error: Account Password cannot be null Type set ftp ? for more information" **4. Invalid arguments** error: Invalid usage Type set ftp ? for more information" **5. Too few arguments** "Usage: set ftp machine <default/ip-address/hostname (1-40)> login <username (1-20)> [password <password (1-20)>] [account <account password (1-20)>] Type set ftp ? for more information"

Command Syntax	**ftp <Ftp Server-ip-addr>**
Description	The FTP client on board connects to the remote FTP server. Upon successful connection, the Send and Receive commands of the FTP can be used to perform the required operation.
Default Value	NA
Success	OK
Error	**1. Too few arguments** Possible argument(s) are: IP-address **2. Invalid IP address** error: invalid ipaddress. **3. When invoked from Command shell connected through TELNET** This command is not supported through Telnet

FTP Client Commands – Setup

Command Syntax	ftp < [-l] [-t] [-r] > [-p] <ip-address/host-name>
Description	Triggers the FTP client to establish the FTP session with the remote server and to perform the required action according to the specified option. **-p :** Opens the Data connection in Passive mode. (If this option is not given, the data connection will be opened in Active mode by default). **-l :** Requests for the directory and lists the contents of the specified directory in the server. **-t :** Requests for the filename and filesize to the transmitted and reads the data from the host device and transmits to the server. **-r :** Requests for the remote filename to be received. It informs the host device about the size of the file and retrieves the data from the server when serial device is ready. **Note:** 1. FTP session can be aborted by issuing **Ctrl+C** at any given time.
Default Value	NULL
Success	OK
Error	**1. Invalid arguments** ftp < [-l] [-t] [-r] > [-p] <ip-address/hostname> Type set ftp ? for more information" **2. Too few arguments** "Usage: ftp < [-l] [-t] [-r] > [-p] <ip-address/hostname> Type set ftp ? for more information"

FTP Client Commands – Show

Command Syntax	show ftp configuration
Description	Displays the FTP profile configured in the MultiConnect IP.
Default Value	NULL
Success	OK
Error	**1. Too few arguments** Possible value(s) are configured.

SNTP Client Commands

Command Syntax	set sntp client <enable/disable>
Description	Starts the SNTP Client to contact the configured server on UDP port 123 and set the local time.
Default Value	Disable
Success	OK
Error	**1. Too few arguments** "Usage: set sntp-client <enable/disable> Type set sntp-client ? for more information"

Command Syntax	set sntp-client ntp-server-name <ip-address>
Description	Sets the NTP server IP address to which the SNTP Client has to contact to update the time.
Default Value	0.0.0.0
Success	OK
Error	**1. Invalid arguments** "error: Invalid IP address" Type set sntp-client ? for more information" **2. Too few arguments** "Usage: set sntp-client ntp-server-name <ip-address> Type set sntp-client ntp-server-name ? for more information"

Command Syntax	set sntp-client time-zone <string (0-3)>
Description	Sets the time zone.
Default Value	UTC
Success	OK
Error	**1. Invalid arguments** "error: Invalid Time Zone" **2. Too few arguments** "Usage: set sntp-client time-zone <string (0-3)> Type set sntp-client time-zone ? for more information"

Command Syntax	set sntp-client time-zone-offset <+/-hh:mm> where hh = 00 to 23 mm = 00 to 59
Description	Sets the offset time from UTC.
Default Value	+00:00
Success	OK
Error	**1. Invalid arguments** "error: Invalid Offset" **2. Too few arguments** "Usage: set sntp-client time-zone-offset <+/-hh:mm> Type set sntp-client time-zone-offset ? for more information"

Command Syntax	**set sntp-client polling-time <value>** **where** **value = 2 to 1440**
Description	Sets the polling time at which SNTP client requests the server to update the time.
Default Value	300
Success	OK
Error	**1. Invalid arguments** "error: Invalid Polling time" **2. Too few arguments** “Usage: set sntp-client polling-time <value> Type set sntp-client polling-time ? for more information”

Command Syntax	**set sntp-client daylight-saving <enable/disable>**
Description	Enables/Disables the Day Light Saving Mode.
Default Value	Enable
Success	OK
Error	**1. Invalid arguments** "error: Invalid parameter" **2. Too few arguments** “Usage: set sntp-client daylight-saving <enable/disable> Type set sntp-client daylight-saving ? for more information”

Command Syntax	**set sntp-client daylight-saving offset <+/-value>** **where** **value = 0 to 120 minutes**
Description	Sets the offset to use during the Day Light Saving Mode.
Default Value	60
Success	OK
Error	**1. Invalid arguments** "error: Invalid offset value" **2. Too few arguments** “Usage: set sntp-client daylight-saving offset <value> Type set sntp-client daylight-saving offset ? for more information”

Command Syntax	**set sntp-client daylight-saving start-ordinal <string>** **where** **string = first/second/third/forth/last**
Description	Sets the start ordinal to use during the Day Light Saving Mode.
Default Value	First
Success	OK
Error	**1. Invalid arguments** "error: Invalid start ordinal" **2. Too few arguments** “Usage: set sntp-client daylight-saving start-ordinal <string> Type set sntp-client daylight-saving start-ordinal ? for more information”

Command Syntax	**set sntp-client daylight-saving start-weekday <dayofweek>** **where** **dayofweek = sunday, monday ... Saturday**
Description	Sets the start weekday to use during the Day Light Saving Mode.
Default Value	Sunday
Success	OK
Error	**1. Invalid arguments** "error: Invalid start day of the week" **2. Too few arguments** “Usage: set sntp-client daylight-saving start-weekday <dayofweek> Type set sntp-client daylight-saving start-weekday ? for more information”

Command Syntax	**set sntp-client daylight-saving start-month <month>** **where** **month = january, february .... December**
Description	Sets the start month to use during the Day Light Saving Mode.
Default Value	April
Success	OK
Error	**1. Invalid arguments** "error: Invalid start month" **2. Too few arguments** “Usage: set sntp-client daylight-saving start-month <month> Type set sntp-client daylight-saving start-month ? for more information”

Command Syntax	**set sntp-client daylight-saving start-time <hh:mm>** **where** **hh = 00 to 23** **mm = 00 to 59**
Description	Sets the start time to use during the Day Light Saving Mode.
Default Value	02:00
Success	OK
Error	**1. Invalid arguments** "error: Invalid start time" **2. Too few arguments** “Usage: set sntp-client daylight-saving start-time <hh:mm> Type set sntp-client daylight-saving start-time ? for more information”

Command Syntax	**set sntp-client daylight-saving end-ordinal <string>** **where** **string = first/second/third/forth/last**
Description	Sets the end ordinal to use during the Day Light Saving Mode.
Default Value	Last
Success	OK
Error	**1. Invalid arguments** "error: Invalid end ordinal" **2. Too few arguments** “Usage: set sntp-client daylight-saving end-ordinal <string> Type set sntp-client daylight-saving end-ordinal ? for more information”

SNTP Client Commands – Setup

Command Syntax	**set sntp-client daylight-saving end-weekday <dayofweek>** **where** **dayofweek = Sunday, Monday … Saturday**
Description	Sets the end weekday to use during the Day Light Saving Mode.
Default Value	Sunday
Success	OK
Error	**2. Invalid arguments** „error: Invalid end day of the week“ **2. Too few arguments** “Usage: set sntp-client daylight-saving end-weekday <dayofweek> Type set sntp-client daylight-saving end-weekday ? for more information”

Command Syntax	**set sntp-client daylight-saving end-month <month>** **where** **month = january, …december**
Description	Sets the end month to use during the Day Light Saving Mode.
Default Value	October
Success	OK
Error	**2. Invalid arguments** „error: Invalid end month“ **2. Too few arguments** “Usage: set sntp-client daylight-saving end-month <month> Type set sntp-client daylight-saving end-month ? for more information”

Command Syntax	**set sntp-client daylight-saving end-time <hh:mm>** **where** **hh = 00 to 23** **mm = 00 to 59**
Description	Sets the end time to use during the Day Light Saving Mode.
Default Value	02:00
Success	OK
Error	**2. Invalid arguments** „error: Invalid end time“ **2. Too few arguments** “Usage: set sntp-client daylight-saving end-time <hh:mm> Type set sntp-client daylight-saving end-time ? for more information”

SNTP Client Commands – Show

Command Syntax	**show sntp configuration**
Description	Displays the SNTP configuration
Default Value	NA
Success	OK
Error	**1. Too few arguments** Possible value(s) are *configuration*

Chapter 5 – Setting Country or Region Codes Using the CLI

The Default Country or Region Code is B5.
If You Want to Change the Country or Region Code, Use the Command Line Interface:

Command Syntax	set serial s1 modem country-code value <value>
Description	This command is valid only for port S1. Applicable only if the country-code type is set to **code.**
Default Value	-
Success	OK
Error	**1. Too few arguments** "Usage: set serial s1 modem country-code value <value> Type 'set serial s1 modem country-code value ?' for more information" **Notes:** There is no validation on the country code value.

To View Country or Region Code:

Command Syntax	show serial modem country code This command is supported on S1 only.
Description	Displays the supported country codes for this product.
Default Value	-
Success	OK
Error	**1. Too few arguments** Possible value(s) are statistics country-code configuration chat-script modem-configuration

Country or Region Codes –

Country/Region	Value (Country Code)
Japan	00
Luxembourg	FD
Norway	FD

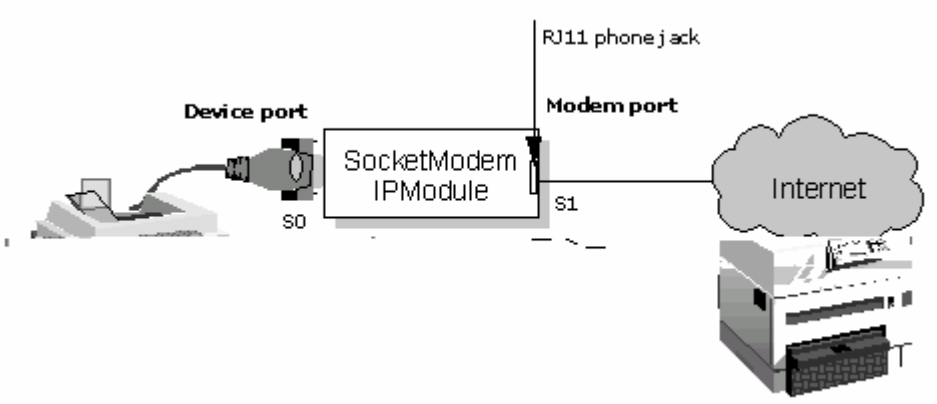
Chapter 6 – Prerequisite Configurations

This chapter covers prerequisite tasks, those tasks or configurations that must be completed before you can set up certain operating scenarios.

Other prerequisite tasks related to specific operating scenarios are described throughout the rest of this document.

1. MultiConnect IP Communication Interfaces and Conventions

The Serial Interface ports, S0 and S1, correspond to **Device Port** and **Modem Port** respectively. This convention is used throughout this document.



Serial Ports

1. **S0 - Device Port** - RS-232 port connects to the Host/Serial device.
2. **S1 - Modem Port** - RJ-11 phone jack port dials the Service Provider, obtains an IP Address, and provides the IP ability to reach the Host/Serial devices connected over the device port.

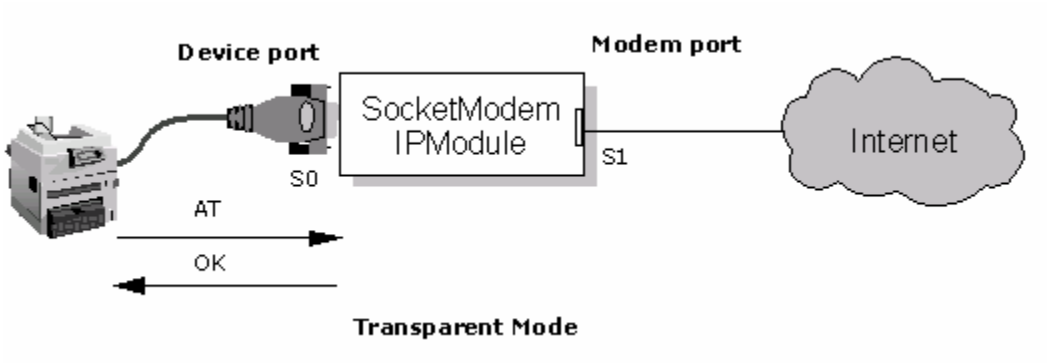
2. MultiConnect IP Modes of Operation

The MultiConnect IP can function in two modes:

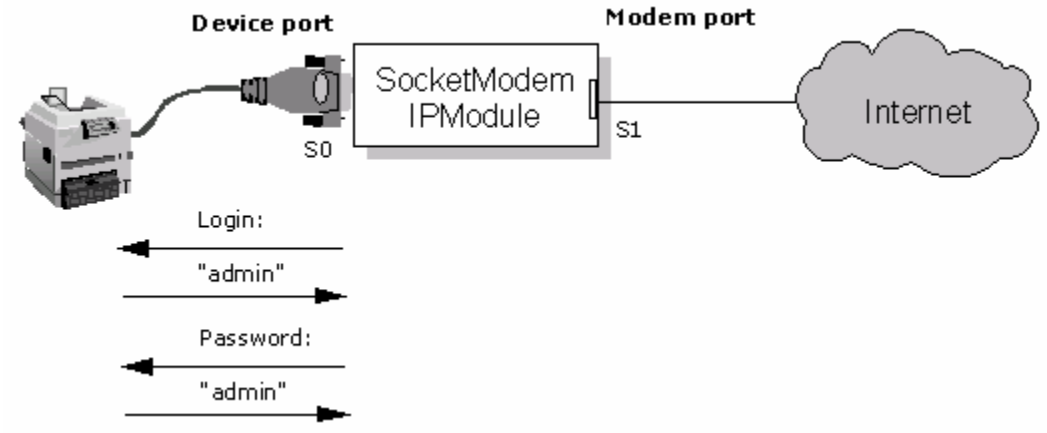
- **Transparent Mode**
  When the MultiConnect IP is configured to function in the ***modem*** operation mode, it functions as a modem. The Host/Serial device connected on the ***device port*** can use the MultiConnect IP as a modem in transparent mode.
  Refer to **Chapter 9** for application examples that use Transparent Mode.

- **IP Mode**
  When the MultiConnect IP is configured to function in the IP operation mode, it provides an IP ability to reach the Hosts/Serial devices connected over the device port. Application such as SMTP Client, POP3 Client, Telnet Client, Telnet Server, FTP Client, etc. provide this IP ability to reach the Host/Serial devices.

The figure below depicts the two modes of operation. The modes can be configured through the Command Line Interface (CLI). By default the MultiConnect IP is set to operate in the **IP Mode**.



Transparent Mode



IP Mode

3. Physical Link Established over the Modem Port

For any application such as SMTP Client, HTTP Server, POP3 Client, etc. to function, the PPP link must be opened up on the modem port.

MultiConnect IP implementation provides three mechanisms for establishing the physical link over the modem port:

- Dialing-trig-mode NONE
- Dialing-trig-mode DTR
- Dialing-trig-mode Command

Choose the method you desire by configuring the physical link through the Command Line Interface (CLI). Use the following command to configure the **Physical Link Establishment Method**:

```
# set serial [serial-interface] modem dialing-trig-mode
                    <none/dtr/command>
```

Note: The modem port is set to **modem-answering** by default.

The command **`dialing-trig-mode`** can be used to set the modem port to **dial**.

Dialing-trig-mode	Functionality
None	Upon boot-up, the modem starts dialing using the set of configured parameters.
DTR	Upon boot-up, the modem is set to the answering state by default. When the **DTR** goes high on the device port S0, the modem starts to dial on the modem port.

Command	Link establishment and link termination is at your discretion.
	Command to establish the physical link:
	`# linkup [serial-interface]`
	Notes:
	• This command is valid only for modem port S1 and is invalid for device port S0.
	• This command can be issued only when the **`dialing-trig-mode`** is **command**.
	Examples:
	`# linkup s1`
	ERROR: '**`dialing-trig-mode`** is not set to **command**.
	`# linkup s1`
	OK: 'CONNECT 14400 LAPM COMPRESSED'
	`# linkup s1`
	ERROR: 'NO DIALTONE'
	`# linkup s1`
	ERROR: 'NO CARRIER'
	`# linkup s1`
	ERROR: 'NO ANSWER'
	Command to terminate the physical link:
	`# hangup [serial-interface]`
	Notes:
	• This command is valid only for modem port S1 and is invalid for device port S0
	• This command can be issued only when the **`dialing-trig-mode`** is **command**.
	Example:
	`# hangup s1`
	OK
	This hangs up the physical link

Chapter 7 – Telnet Dialout

Introduction

Telnet Dialout Feature

The Telnet feature allows you to access the serial port and establish two-way traffic between the Telnet/RAW-TCP client and the serial device.

This chapter provides examples of a Telnet client on an IP network (over the modem port) connecting to a remote serial device. The MultiConnect IP acts as a Terminal Server using the Telnet dialout feature.

Features

The MultiConnect IP, acting as a Terminal Server, accommodates the following features:

- Authenticates the serial port.
- Monitors and waits for activity on the standard Telnet port (23) or user-defined RAW-Socket.
- Opens the serial port from the command prompt (manual dialout) .
- Opens the serial port directly (auto dialout) using a TCP Client according to the configured port-number.
- Switches between the command prompt and a dial-out session when the session is in Telnet mode.

Prerequisites

Mandatory Configuration Settings

The following items must be configured in order to use the dial-out feature:

- Disable the Host Interaction Mode to restrict Telnet-Dial-Out and PPP.
  ```
  # set serial s0 host-interaction-mode disable
  ```
- Enable Auto dial-out globally on all the serial ports.
  ```
  # set ip telnet auto-dialout enable
  ```
- Enable Auto dial-out on the serial port S0 .
  ```
  # set serial s0 auto-dialout enable
  ```
- Set the Auto dialout port for the serial port S0.
  ```
  # set serial s0 auto-dialout-port <port_number>
  ```
- Set the Auto dialout protocol for the serial port S0.
  ```
  # set serial s0 auto-dialout-protocol telnet
  ```

An ERROR message displays if any of the above details are not configured or are not valid.

Optional Configuration Commands

(Return to Scenario 1 - Setup Manual Dialout Notes:)
(Return to Scenario 2 - Auto Dialout Prerequisites)
(Return to Scenario 3 - Auto Dial-out in RAW-Mode Notes:)

The following commands can be used for optional configurations:

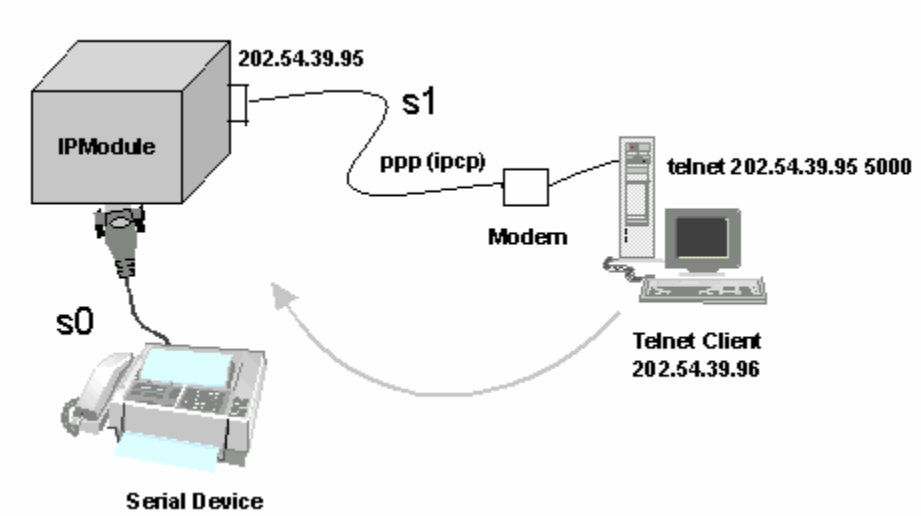
- Enable/Disable the Authentication for Dial-out session
  ```
  # set login auto-dialout-login <enable/disable>
  ```
- Enable/Disable the Switching-between-Dialout & Command Prompt feature
  ```
  # set ip telnet escape-monitor <enable/disable>
  ```
- Set the Escape-Monitor-String to switch between Dialout and Command Prompt sessions.
  ```
  # set ip telnet escape-string "+++inet"
  ```
- Enable/Disable the RAW mode globally for all Dial-out sessions.
  ```
  # set ip telnet raw-mode <enable/disable>
  ```
- Enable/Disable the RAW mode for the serial port S0.
  ```
  # set serial s0 raw-dialout <enable/disable>
  ```
- Set the Baud rate for the serial port S0 to be taken for a Dialout session.
  ```
  # set serial s0 baud-rate <Baud-rate>
  ```
- Set the Flow control for the serial port S0 to be taken for a Dialout session.
  ```
  # set serial s0 flow-control <rts-cts/none>
  ```
- Set the Parity for the serial port S0 to be taken for a Dialout session.
  ```
  # set serial s0 parity <even/odd/none>
  ```
- Set the Data bits for the serial port S0 to be taken for a Dialout session.
  ```
  # set serial s0 data-bits <7/8>
  ```
- Set the Stop bits for the serial port S0 to be taken for a Dialout session.
  ```
  # set serial s0 stop-bits <1/1.5/2>
  ```
- Set the Flow control for the serial port S1 to be taken for a PPP session
  ```
  # set serial s1 flow-control <rts-cts/none>
  ```
- Set the Parity for the serial port S1 to be taken for a PPP session
  ```
  # set serial s1 parity <even/odd/none>
  ```
- Set the Data bits for the serial port S1 to be taken for a PPP session
  ```
  # set serial s1 data-bits <7/8>
  ```
- Set the Stop bits for the serial port S1 to be taken for a PPP session
  ```
  # set serial s1 stop-bits <1/1.5/2>
  ```

Scenario 1 – Manual Dialout

Connect to the MultiConnect IP using a Telnet Client on port 23 (configuration port).

At the command prompt, invoke **# dialout serial s0**. Once the session is opened successfully, there can be two-way traffic between the Telnet client and the serial device.

- You can switch from Command Prompt to Dialout session using the **restore session** command.
- You can switch from Dialout session to Command Prompt using **<escape-monitor-string>**.



Manual Dialout Feature Through the Command Shell

MultiConnect IP Manual Dialout Setup Commands

```
# set serial s0 stop-bits 1
# set serial s0 baud-rate 115200
# set serial s0 data-bits 8
# set serial s0 parity none
# set serial s0 flow-control rts-cts

# set serial s1 stop-bits 1
# set serial s1 baud-rate 115200
# set serial s1 data-bits 8
# set serial s1 parity none
# set serial s1 flow-control rts-cts
# set serial s1 connect-type modem
# set serial s1 modem dial-number 123

# set serial s1 modem dialing-trig-mode none
```

(Refer to Chapter 6 - *Prerequisite Configurations - Physical Link Established over the Modem Port* for more details)

```
# set ppp ppp0 ipcp-mode client-only
# set ppp ppp0 username "MultiConnect"
# set ppp ppp0 password "MultiConnect"
# save
```

Enable Authentication for PPP Commands

```
# set ppp ppp0 authentication enable
# set ppp ppp0 authentication-type <pap/chap/pap-chap>
```

Enable PPP Compression (on both the PPP peers) Commands

```
# set ppp ppp0 compression enable
# set ppp ppp0 comp-type <both/bsd/deflate>
```

The Authentication and Compression variations can be used while bringing up the PPP logical link in all the scenarios (except for Transparent Mode)

Once the physical link is up and PPP interface has acquired an IP address, the MultiConnect IP is ready to accept a Dial-Out connection.

Use a remote Telnet client and connect to 202.54.39.95 on port 23 (refer to the figure above). On successful login, at the MultiConnect IP command prompt, invoke

```
# dial-out serial s0
```

(The serial port now opens for use.)

Notes:

1. Only one dialout session can be open at a time.
2. The Dialout session is closed when the Telnet session is closed, thereby releasing the serial port.
3. When the Dialout session authentication is enabled as specified in the Optional Configuration Commands list, the session prompts for the user name and password before opening the session successfully. (Enabled by default).
4. The serial port is opened with the current serial configuration.
5. When **escape-monitor** is enabled, care should be taken during file transfer that the **escape-monitor-string** is not part of the data.

Scenario 2 – Auto Dialout

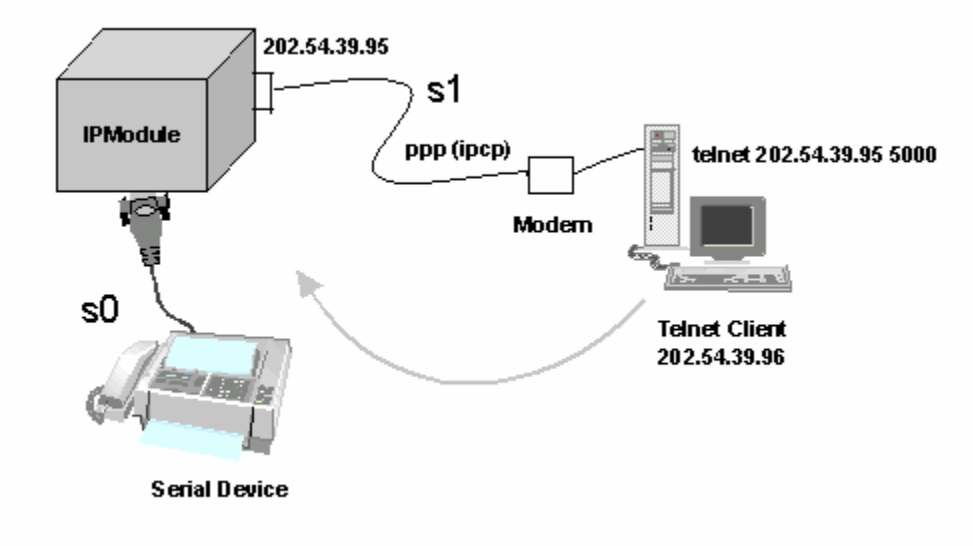
In this scenario, the Auto Dialout session in Telnet mode is opened using a Telnet client.

Prerequisites

RAW mode (global and each port) **MUST BE DISABLED** using the Optional Configuration Commands.

A Telnet client can open an auto Dialout session by specifying the configured auto-dialout port.

- **Once the session is opened successfully, there can be two-way traffic between the Telnet session and the remote serial device.**



Auto Dialout Feature in Telnet Mode

MultiConnect IP Auto Dialout in Telnet Mode Setup Commands

```
# set ip telnet auto-dialout enable

# set serial s0 auto-dialout enable
# set serial s0 auto-dialout-port 5000
# set serial s0 auto-dialout-protocol telnet

# set serial s0 baud-rate 115200
# set serial s0 data-bits 8
# set serial s0 parity none
# set serial s0 stop-bits 1
# set serial s0 flow-control rts-cts

# set serial s1 baud-rate 115200
# set serial s1 data-bits 8
# set serial s1 parity none
# set serial s1 stop-bits 1
# set serial s1 flow-control rts-cts
# set serial s1 connect-type modem
# set serial s1 modem dial-number 123

# set serial s1 modem dialing-trig-mode none
```

(Refer to Chapter 6 – Prerequisite Configurations - Physical Link Established over the Modem Port for more details)

```
# set ppp ppp0 ipcp-mode client-or-lan
# set ppp ppp0 authentication enable
# set ppp ppp0 auth-type pap
# set ppp ppp0 username "MultiConnect"
# set ppp ppp0 password "MultiConnect"
# set ppp ppp0 local-ip-addr 202.54.39.95 mask 255.255.255.255
# set ppp ppp0 remote-ip-addr 202.54.39.96 mask 255.255.255.255
# save
```

Once the physical link is up and PPP interface has acquired an IP address the MultiConnect IP is ready to accept an auto-dialout connection.

Use a Telnet client and connect to 202.54.39.95 on port 5000. This eventually establishes a Telnet auto-dialout session between the MultiConnect IP and the serial device.

Closing the Telnet client closes the serial port in use.

Notes:

1. Only one dialout session to the same port can be opened at one time.
2. When a dialout session authentication is enabled as specified in the optional commands, the session prompts for a user name and password before opening the session successfully. (Enabled by default).
3. The serial port is opened with the current serial configuration.

Scenario 3 – Auto Dialout in RAW Mode

In this scenario, the Auto-Dialout session in RAW mode is opened using a RAW-TCP client.

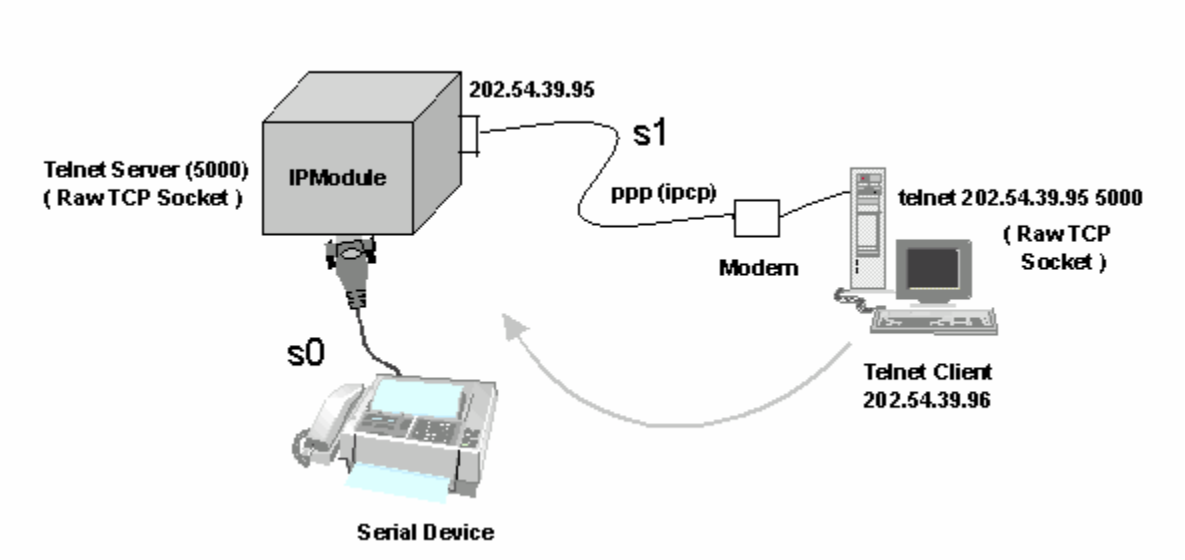
Prerequisites

RAW mode (Global and each port) **MUST BE ENABLED** using the Optional Configuration Commands.

The Auto Dialout session can be opened by a RAW-TCP client by specifying the auto-dialout configured port. Once the session is opened successfully, there can be two-way traffic between the Telnet session and the remote serial device.

Important

You cannot switch between the Command Prompt and the Dialout session in RAW-mode.



Auto Dialout Feature in RAW Mode

Commands to Setup Auto Dial-out in RAW-Mode for MultiConnect IP

```
# set ip telnet auto-dialout enable
# set ip telnet raw-mode enable

# set serial s0 stop-bits 1
# set serial s0 baud-rate 115200
# set serial s0 data-bits 8
# set serial s0 parity none
# set serial s0 flow-control rts-cts

# set serial s0 auto-dialout enable
# set serial s0 raw-dialout enable
# set serial s0 auto-dialout-port 5000
# set serial s0 auto-dialout-protocol telnet

# set serial s1 stop-bits 1
# set serial s1 baud-rate 115200
# set serial s1 data-bits 8
# set serial s1 parity none
# set serial s1 flow-control rts-cts
# set serial s1 connect-type modem
# set serial s1 modem dial-number 123

# set serial s1 modem dialing-trig-mode none
```

(Refer to Chapter 6 – Prerequisite Configurations - Physical Link Established over the Modem Port for more details)

```
# set ppp ppp0 ipcp-mode client-only
# set ppp ppp0 username "MultiConnect"
# set ppp ppp0 password "MultiConnect"
# save
```

Once the physical link is up and PPP interface has acquired an IP address the

MultiConnect IP is ready to accept Auto dialout connection.

Use a Telnet client and connect to 202.54.39.95 on port 5000 (RAW TCP socket). This eventually establishes a Telnet auto-dial-out session (In RAWMODE) with the MultiConnect IP, thereby opening the serial port for use.

Closing the Telnet client closes the serial port in use.

Notes:

1. You cannot open more than one dialout session to the same port.
2. When the Dialout session authentication is enabled as specified in the Optional Configuration Commands, the session prompts for a user name and password before opening the session successfully.
3. The serial port is opened with the current serial configuration.

Chapter 8 – Auto Dial-in Feature

Introduction

The auto dial-in feature enables the MultiConnect IP to act as a Telnet client thus facilitating the serial device to access any Telnet/terminal servers on the IP network (over the built-in modem interface). Once the session (Serial Client to Server) is opened successfully, it allows two-way traffic between the serial device and the remote server.

The MultiConnect IP, acting as a Telnet/RAW-TCP client, accommodates the following features when configured:

- Support to open the session using Telnet client (residing in the MultiConnect IP) in Telnet Mode or RAW Mode.
- Support to open the session to the specified port from a Serial Command prompt (Manual Dial-in).
- Switching between a Command prompt and a Dial-in session when the session is in Telnet mode.
- Support to open the session to the configured port directly (Serial Auto Dial-in) whenever the serial port is free.

Prerequisites

Mandatory Configuration Settings

The following items must be configured in order to use the dial-in feature

- Enable Auto dial-in globally on all the serial ports.
  ```
  # set serial auto-telnet enable
  ```
- Enable Auto dial-in on the serial port S0.
  ```
  # set serial s0 auto-dial-in enable
  ```
- Set the Auto dial-in protocol.
  ```
  # set serial s0 auto-dialin-protocol telnet
  ```
- Set the Auto dial-in Server IP Address.
  ```
  # set serial s0 auto-dialin-ipaddress <ipaddress>
  ```
- Set the port to the one, which the Telnet client will be connected.
  ```
  # set serial s0 auto-dialin-port <port_number>
  ```

An ERROR message will display if any of the above details are not configured or not valid.

Optional Configuration Settings

The following commands can be used for optional configurations:

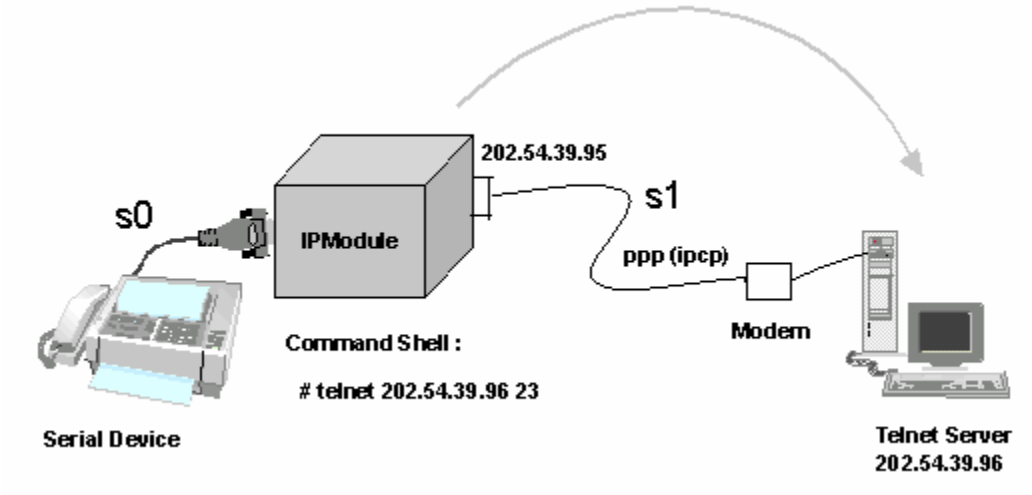
- Enable/Disable **Switching-between-Dial-in** and the Command Prompt feature.
  ```
  # set serial escape-monitor <enable/disable>
  ```
- Set the **Escape-Monitor-String** to switch between Dial-in and Command Prompt sessions.
  ```
  # set serial escape-string "+++inet"
  ```
- Set the **Serial Dial-in Trigger mode**. It dictates the criterion for establishing a connection. The options provided are on reception of <char/ dtr/ dtr-char/ none>.
  Refer to the command line configuration section for details about this command.
  ```
  # set serial s0 auto-dialin trig-mode <char/dtr/dtr-char/none>
  ```
- Enable/Disable the **RAW mode globally** for all Auto-Dial-in sessions.
  ```
  # set ip telnet raw-mode <enable/disable>
  ```
- Enable/Disable the **RAW mode for Auto-Dial-in** session on serial port S0.
  ```
  # set serial s0 raw-dial-in <enable/disable>
  ```

Scenario 1 – Manual Serial Dial-in

Login to the Command prchat-scriptompt from the serial side.

Invoke **# telnet <ip-address> <port>** at the command prompt. Once the session is opened successfully, there can be two-way traffic between the serial device and the remote server.

- You can switch from Command Prompt to Dial-in session using the **restore session** command.
- You can switch from Dial-in session to Command Prompt using **<escape-monitor-string>**.



Manual Dial-in Feature through the Command Shell

MultiConnect IP Manual Dial-In Setup Commands

```
# set serial s0 baud-rate 115200
# set serial s0 data-bits 8
# set serial s0 parity none
# set serial s0 stop-bits 1
# set serial s0 flow-control rts-cts

# set serial s1 baud-rate 115200
# set serial s1 data-bits 8
# set serial s1 parity none
# set serial s1 stop-bits 1
# set serial s1 flow-control rts-cts
# set serial s1 connect-type modem
# set serial s1 modem dial-number 123

# set serial s1 modem dialing-trig-mode none
```

(Refer to the Chapter 6 Prerequisite Configurations - Physical Link Established over the Modem Port for more details)

```
# set ppp ppp0 ipcp-mode client-or-lan
# set ppp ppp0 authentication enable
# set ppp ppp0 auth-type pap
# set ppp ppp0 username "MultiConnect"
# set ppp ppp0 password "MultiConnect"
# set ppp ppp0 local-ip-addr 202.54.39.95 mask 255.255.255.255
# set ppp ppp0 remote-ip-addr 202.54.39.96 mask 255.255.255.255
# save
```

Once the physical link is up and the PPP interface has acquired an IP address, the MultiConnect IP is ready to use.

Login to the module through the serial port. At the command shell invoke:

```
# telnet 202.54.39.96 23
```

The Telnet client on board in the MultiConnect IP establishes a virtual serial tunnel between the serial device and the Telnet Server.

Notes:

- You cannot open more than one dial-in session.
- The dial-in session is closed when the Telnet session is closed.
- When **escape-monitor** is enabled, care should be taken during file transfer that the **escape-monitor-string** is not part of the data.

Scenario 2 – Serial Auto Dial-in in Telnet Mode

This example shows how to setup a serial auto dial-in session in Telnet mode. The auto dial-in session is opened by Telnet client embedded in the MultiConnect IP to the configured server on a configured port.

Once the session is opened successfully, there can be two-way traffic between the serial device and the remote server.

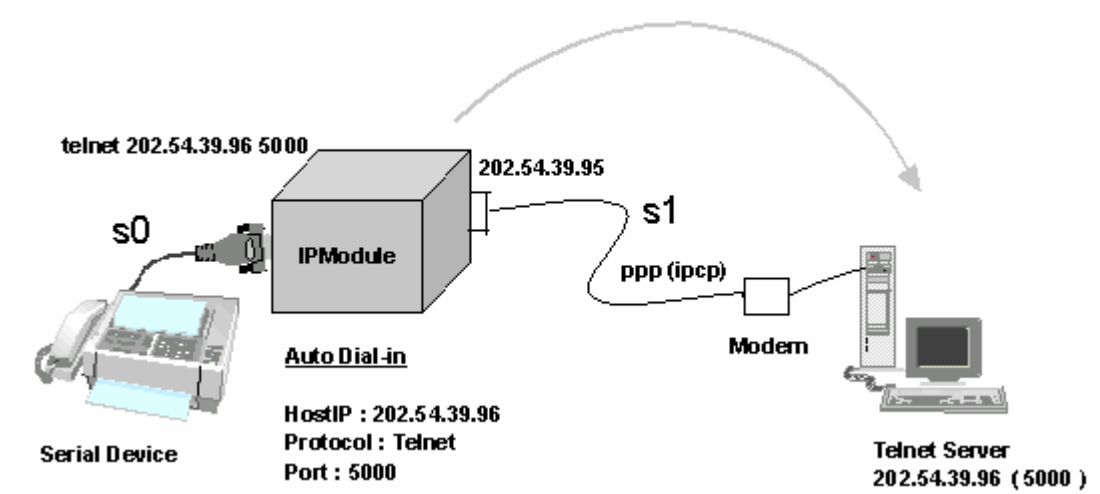
- You can switch from Command Prompt to Dial-in session using the **restore session** command.
- You can switch from Dial-in session to Command Prompt using **<escape-monitor-string>**.

Prerequisites

- RAW mode (Global and each port) **MUST BE DISABLED** using the following command:

  Enable/Disable the **RAW mode globally** for all Auto-Dial-in sessions:

  ```
  # set ip telnet raw-mode <enable/disable>
  ```



Auto Dial-in Feature in Telnet Mode

MultiConnect IP Auto Dial-In Setup in Telnet Mode Commands

```
# set serial auto-telnet enable
# set serial s0 auto-dialin enable
# set serial s0 auto-dialin trig-mode dtr-char
# set serial s0 auto-dialin-ipaddress 202.54.39.96
# set serial s0 auto-dialin-port 5000
# set serial s0 auto-dialin-protocol telnet

# set serial s0 stop-bits 1
# set serial s0 baud-rate 115200
# set serial s0 data-bits 8
# set serial s0 parity none
# set serial s0 flow-control rts-cts

# set serial s1 stop-bits 1
# set serial s1 baud-rate 115200
# set serial s1 data-bits 8
# set serial s1 parity none
# set serial s1 flow-control rts-cts
# set serial s1 connect-type modem
# set serial s1 modem dial-number 123

# set serial s1 modem dialing-trig-mode none
```

(Refer to the Chapter 6 Prerequisite Configurations - Physical Link Established over the Modem Port for more details)

```
# set ppp ppp0 ipcp-mode client-only
# set ppp ppp0 username "MultiConnect"
# set ppp ppp0 password "MultiConnect"
# save
```

Once the PPP link is up with an IP address, the auto dial-in session can be probed. When detecting either a DTR signal or when any character is received from the serial device connected to the RS-232 serial port of MultiConnect IP, the Telnet client on board in the MultiConnect IP establishes a Telnet session to 202.54.39.96 on port 23.

The serial tunnel between the serial device and the Telnet Server terminates in one of the following conditions.

- The connection is broken between the serial device and the serial port of the MultiConnect IP.
- The Telnet Client on board is terminated.
- The Telnet Server terminates the session.

Notes:

1. You cannot open more than one Dial-in session.
2. The Dial-in session is closed when the configuration session is closed (if opened).
3. When **escape-monitor** is enabled, care should be taken during file transfer that the **escape-monitor-string** is not part of the data.

Scenario 3 – Auto Dial-in Session in RAW Mode

This scenario shows how to configure an auto dial-in session in RAW mode. The auto dial-in session is opened by Telnet client (embedded in the MultiConnect IP) in **RAW-mode** to the configured server on a configured port number. Once the PPP link is up with an IP address, the auto dial-in session can be probed as in the Auto Dial-In scenario below.

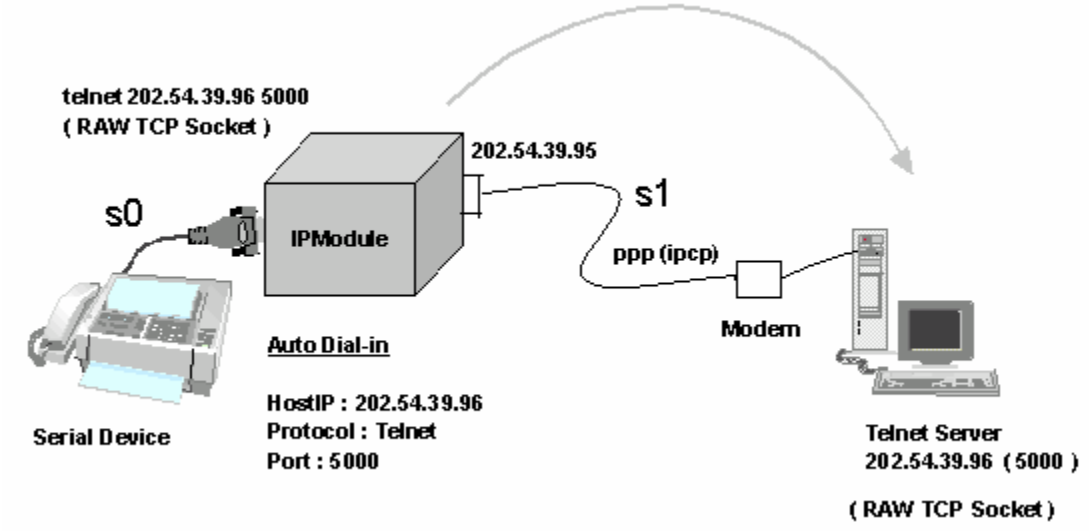
Prerequisites

RAW mode (Global and each port) **MUST BE ENABLED** using the following command:

Enable/Disable the **RAW mode globally** for all Auto-Dial-in sessions:

```
# set ip telnet raw-mode <enable/disable>
```

Important **– You cannot switch between the Command Prompt and a Dial-in session in RAW-mode. Also, you cannot open more than one Dial-in session.**



Auto Dial-in Feature in RAW Mode

MultiConnect IP Auto Dial-In in RAW Mode Setup Commands

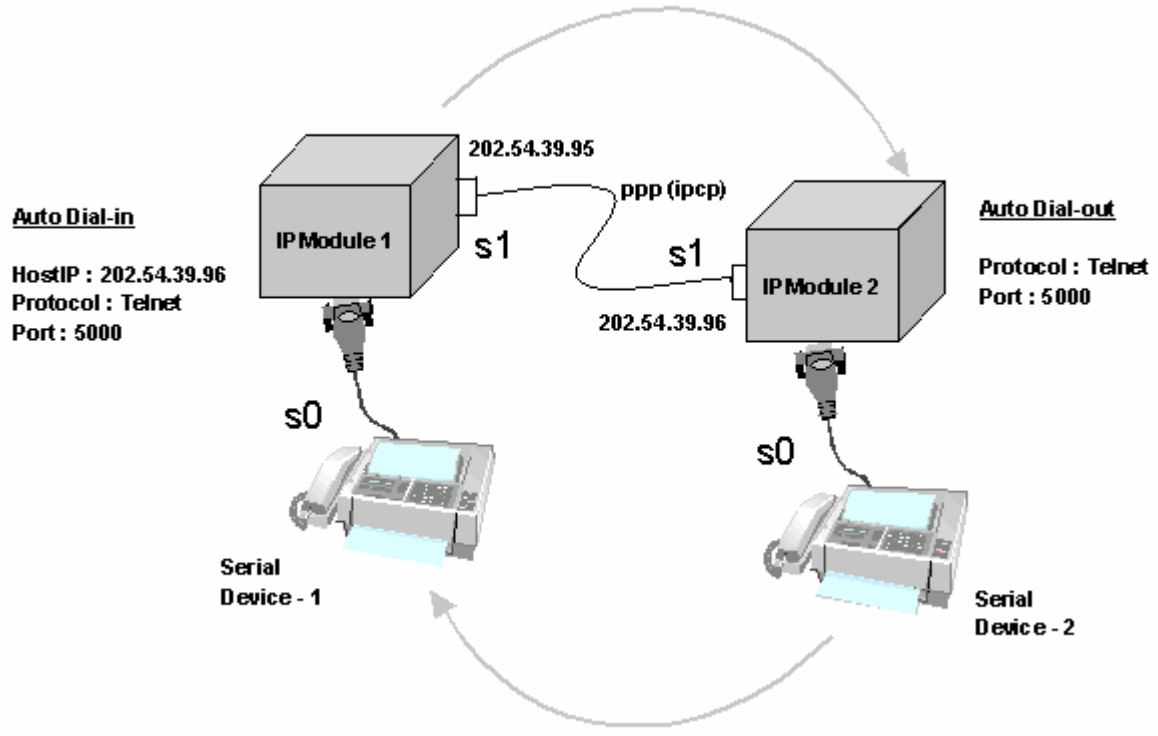
```
# set ip telnet raw-mode enable

# set serial auto-telnet enable
# set serial s0 auto-dialin enable
# set serial s0 raw-dialin enable
# set serial s0 auto-dialin trig-mode dtr-char
# set serial s0 auto-dialin-ipaddress 202.54.39.96
# set serial s0 auto-dialin-port 5000
# set serial s0 auto-dialin-protocol telnet

# set serial s0 stop-bits 1
# set serial s0 baud-rate 115200
# set serial s0 data-bits 8
# set serial s0 parity none
# set serial s0 flow-control rts-cts

# set serial s1 stop-bits 1
# set serial s1 baud-rate 115200
# set serial s1 data-bits 8
# set serial s1 parity none
# set serial s1 flow-control rts-cts
# set serial s1 connect-type modem
# set serial s1 modem dial-number 123

# set serial s1 modem dialing-trig-mode none
```

(Refer to Chapter 6 - Prerequisite Configurations - Physical Link Established over the Modem Port)

```
# set ppp ppp0 ipcp-mode client-only
# set ppp ppp0 username "MultiConnect"
# set ppp ppp0 password "MultiConnect"
# save
```

Scenario 4 – Serial Tunneling Mode

The scenario shows a serial tunnel established between two serial devices (Serial Device-1, Serial Device-2) using two MultiConnect IP modules, which are located apart geographically. Once the PPP link is up with an IP address on S1, the dial-in session can occur.
The Serial Devices then communicate to each other across the MultiConnect IP modules.



Serial Tunneling

Commands for Serial Tunneling Setup Using Two MultiConnect IP Modules

Commands for MultiConnect IP Module 1 (Configure for Serial Auto Dial-in)

```
# set ip telnet raw-mode enable

# set serial auto-telnet enable
# set serial s0 auto-dialin enable
# set serial s0 raw-dialin enable
# set serial s0 auto-dialin trig-mode dtr-char
# set serial s0 auto-dialin-ipaddress 202.54.39.96
# set serial s0 auto-dialin-port 5000
# set serial s0 auto-dialin-protocol telnet

# set serial s0 stop-bits 1
# set serial s0 baud-rate 115200
# set serial s0 data-bits 8
# set serial s0 parity none
# set serial s0 flow-control rts-cts

# set serial s1 stop-bits 1
# set serial s1 baud-rate 115200
# set serial s1 data-bits 8
# set serial s1 parity none
# set serial s1 flow-control rts-cts

# set serial s1 connect-type modem
# set serial s1 modem dial-number 123

# set serial s1 modem dialing-trig-mode none
```

(Refer to Chapter 6 – Prerequisite Configurations - Physical Link Established over the Modem Port)

```
# set ppp ppp0 enable
# set ppp ppp0 ipcp-mode client-or-lan
# set ppp ppp0 authentication enable
# set ppp ppp0 auth-type pap
# set ppp ppp0 username "MultiConnect"
# set ppp ppp0 password "MultiConnect"
# set ppp ppp0 local-ip-addr 202.54.39.95 mask 255.255.255.255
# set ppp ppp0 remote-ip-addr 202.54.39.96 mask 255.255.255.255
# save
```

Commands for MultiConnect IP Module 2 (Configure for Telnet Auto Dial-out)

```
# set ip telnet auto-dialout enable
# set ip telnet raw-mode enable

# set serial s0 auto-dialout enable
# set serial s0 auto-dialout-port 5000
# set serial s0 auto-dialout-protocol telnet
# set serial s0 raw-dialout enable

# set serial s0 baud-rate 115200
# set serial s0 data-bits 8
# set serial s0 parity none
# set serial s0 stop-bits 1
# set serial s0 flow-control rts-cts

# set serial s1 baud-rate 115200
# set serial s1 data-bits 8
# set serial s1 parity none
# set serial s1 stop-bits 1
# set serial s1 flow-control rts-cts
# set serial s1 connect-type modem

# set serial s1 modem dialing-trig-mode command
```

(The default mode is answering. This command changes the mode to answering.)

```
# set ppp ppp0 enable
# set ppp ppp0 ipcp-mode client-or-lan
# set ppp ppp0 authentication enable
# set ppp ppp0 auth-type pap
# set ppp ppp0 username "MultiConnect"
# set ppp ppp0 password "MultiConnect"
# set ppp ppp0 local-ip-addr 202.54.39.96 mask 255.255.255.255
# set ppp ppp0 remote-ip-addr 202.54.39.95 mask 255.255.255.255
# save
```

Chapter 9 – Modem (Transparent) Mode

Introduction

In the modem mode (also called transparent mode), raw data is communicated between serial ports 1 and 2. This means that:

- Data received on serial port S0 is transmitted on serial port S1
- Data received on serial port S1 is transmitted on serial port S0

Transparent mode can be used in the following applications:

- The MultiConnect IP is used as a Modem
- Serial Tunneling

Prerequisites

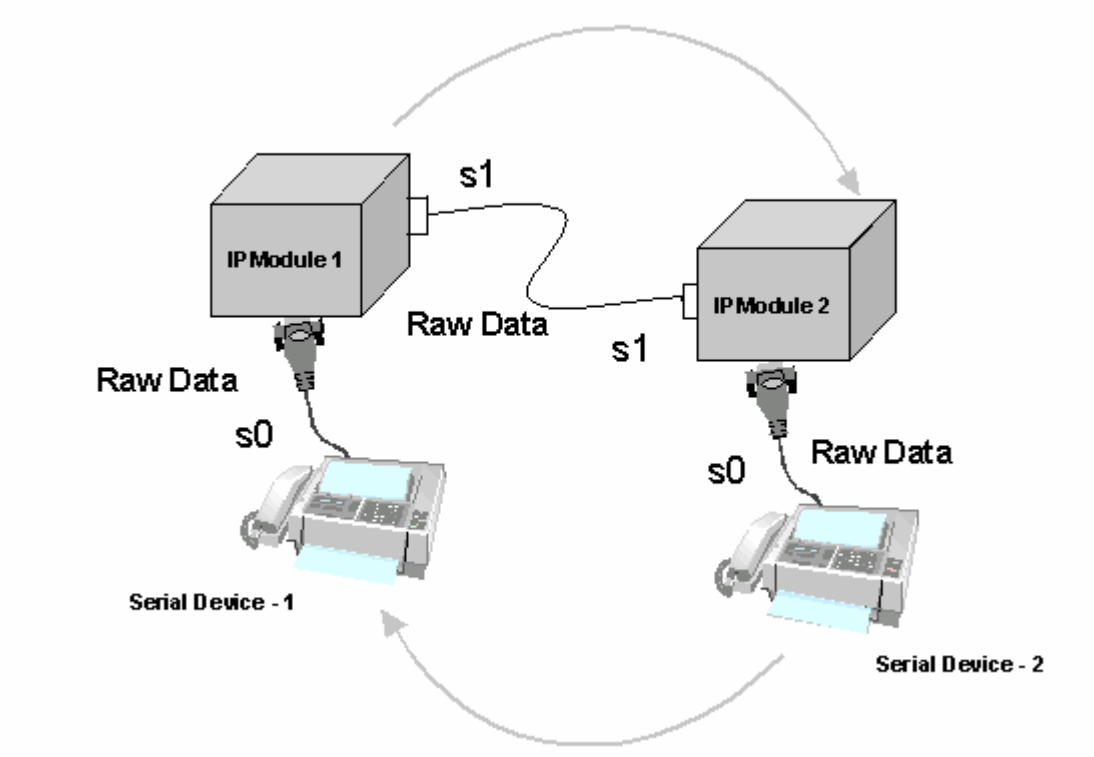
- Transparent Mode must be enabled
  # set operation-mode modem
- Host Interaction mode must be disabled
  # set serial s0 host-interaction-mode disable
- Enable Switching-between Data mode and Command mode
  `# set serial s0 escape-monitor enable`
- Set the Escape-Monitor-String to switch between Data mode and Command mode
  `# set serial s0 escape-string "+++inets0"`

Scenario 1 – MultiConnect IP as a Modem

In this scenario, once the physical link is up on the built-in modem interface; i.e., by dialing or answering,

Scenario 2 – Serial Tunneling in Transparent Mode

In this scenario, two MultiConnect IP modules in transparent mode aid in the communication between two serial devices that are connected to the RS-232 interface (S0) of the MultiConnect IP modules. Serial tunneling is achieved in the transparent mode where raw data is communicated.



Serial Tunneling in Transparent Mode

Commands for MultiConnect IP - 1 (Dialing End)

```
# set operation-mode modem
# set serial s0 escape-monitor enable
# set serial s0 escape-string "+++inets0"

# set serial s0 stop-bits 1
# set serial s0 baud-rate 115200
# set serial s0 data-bits 8
# set serial s0 parity none
# set serial s0 flow-control rts-cts

# set serial s1 stop-bits 1
# set serial s1 baud-rate 115200
# set serial s1 data-bits 8
# set serial s1 parity none
# set serial s1 flow-control rts-cts
# save
```

Commands for MultiConnect IP - 2 (Answering End)

```
# set operation-mode modem

# set serial s0 escape-monitor enable
# set serial s0 escape-string "+++inets0"

# set serial s0 baud-rate 115200
# set serial s0 data-bits 8
# set serial s0 parity none
# set serial s0 stop-bits 1
# set serial s0 flow-control rts-cts

# set serial s1 baud-rate 115200
# set serial s1 data-bits 8
# set serial s1 parity none
# set serial s1 stop-bits 1
# set serial s1 flow-control rts-cts
# save
```

Steps for Establishing a Physical Link in Transparent Mode

1. Complete the configuration listed above.
2. At the dialing end, invoke the following commands:
   ```
   atz
   at&f
   atdt <dial no>
   ```
3. Once the physical connection is up, the data channel between the two MultiConnect IP modules is established.
   Note: Only raw data is forwarded between the MultiConnect IP modules, and no data integrity check is provided.
4. Type **+++** followed by **ATH0** to hangup the modem.

Notes

- You can switch from Data mode to Command mode using the **escape-monitor-string** command. The Command mode transfers control to the **Command Shell** of MultiConnect IP.
- You can switch from Command mode to Data mode using the **restore session** command.
- The data session is dropped if the physical link goes down.

Chapter 10 – Modem Mode AT Commands, S-Registers, Result Codes

This chapter covers the V.22bis, V.32, V.34, and V.92 commands, S-Registers, and Result Codes. The AT commands are used to control the operation of your modem. They are called *AT* commands because the characters ***AT*** must precede each command to get the *AT*tention of the modem.

AT commands can be issued only when the modem is in command mode or online command mode. The modem is in *command mode* whenever it is not connected to another modem. The modem is in *data mode* whenever it is connected to another modem and ready to exchange data. *Online command mode* is a temporary state in which you can issue commands to the modem while connected to another modem. To put the modem into online command mode from data mode, you must issue an *escape sequence* (**+++**) followed immediately by the *AT* characters and the command, e.g., **+++** to hang up the modem. To return to data mode from online command mode, you must issue the command **ATO**.

To send AT commands to the modem you must use a communications program, such as the HyperTerminal applet in Windows, or some other available terminal program. You can issue commands to the modem either directly, by typing them in the terminal window of the communications program, or indirectly, by configuring the operating system or communications program to send the commands automatically. Fortunately, communications programs make daily operation of modems effortless by hiding the commands from the user. Most users, therefore, need to use AT commands only when reconfiguring the modem, e.g., to turn autoanswer on or off.

The format for entering an AT command is **AT*Xn***, where ***X*** is the command and ***n*** is the specific value for the command, sometimes called the command *parameter*. The value is always a number. If the value is zero, you can omit it from the command; thus, **AT&B** is equivalent to **AT&B0**. Most commands have a *default* value, which is the value that is set at the factory.

You must press ENTER (depending on the terminal program it could be some other key) to send the command to the modem. Any time the modem receives a command, it sends a response known as a *result code*. The most common result codes are *OK*, *ERROR*, and the *CONNECT* messages that the modem sends to the computer when it is connecting to another modem. For a table of valid result codes, see “Result Codes” at the end of this chapter.

You can issue several commands in one line, in what is called a command *string*. The command string begins with **AT** and ends when you press ENTER. Spaces to separate the commands are optional; the command interpreter ignores them. The most familiar command string is the *initialization string*, which is used to configure the modem when it is turned on or reset, or when your communications software calls another modem.

Escape Code Sequence +++

When the modem has established a connection and has entered online data mode, it is possible to break into the data transmission in order to issue further commands to the modem in an online command mode. This is achieved by the DTE sending to the modem a sequence of three ASCII characters specified by S-Register S2. The default character is '+'. The maximum time allowed between receipt of the last character of the three-escape character sequence (+++) from the DTE and sending of the OK result code to the DTE is controlled by the S12 register.

Command Organization

The commands in this chapter are listed in the following order:

- First, the commands that begin with letters are listed in alphabetical order
- Then the commands that begin with symbols are listed in this order &, \, –, %, +, #, +++
- Fast Connect Commands
- V.92 Commands

Command Types

The following list should help if you are looking for a particular type of command. This list categorizes AT Commands by function.

Generic Modem Control Commands

Z	
+VCID	
+VRID	
\N	
I	
+GMI	
+GMM	
+GMR	
+GCAP	
+GCI	
&F	
&T	
&Y	
&W	
&Z*n*=*x*	

DTE–Modem Interface Commands

E	
Q	
V	
W	
X	
&C	
&D	
&K	
&R	
&S	
+IPR	
+IFC	
+ILRR	

Call Control Commands

D	
T	
P	
A	
H	
O	
L	
M	
&G	
&P	
&V	
&V1	
\V	
%L	
%Q	
-STE	

Call Control Commands

+MS	
+MR	
%E	
%U	Select µ-Law or A-Law Codec Type
B	

Error Control Commands

+ES	
+EB	
+ESR	
+EFCS	
+ER	
+ER <type>	
+ETBM	
\B	
\K	
-K	

Data Compression Commands

+DS	
+DR	
%C	

V.8/V.8bis Commands

+A8E	

+A8I

Command Detail

AT **Attention Code**

ENTER Key

A **Answer**

Description: Answer call before final ring. The modem will go off-hook and attempt to answer an incoming call if correct conditions are met. Upon successful completion of answer handshake, the modem will go on-line in answer mode. This command may be affected by the state of Line Current Sense, if enabled. (Most countries do not require Line Current Sense.) Operation is also dependent upon country-specific requirements.

The modem will enter the connect state after exchanging carrier with the remote modem.
If no carrier is detected within a period specified in register S7, the modem hangs up.
Any character entered during the connect sequence will abort the connection attempt.

A/ **Repeat Last Command**

B*n* **Communication Standard Setting – ITU-T or Bell**
n

D*s* **Dial**
s

Note:

Dial Modifiers

0-9
*****
#
A-D

L **ATD**

P

T

R
S=n

!

W

@

&

,

;

^
( )
-
<space>
<i>
>

E*n* **Echo Command**
n

Description: The modem enables or disables the echo of characters to the DTE. The valid parameter value is written to S14 bit 1.

H*n* **Disconnect (Hang Up)**
n

I*n* **Identification**

This command causes the modem to reports the requested result according to the command parameter.

n

I0 Reports product code, e.g., “2400”.

I1 Reports the least significant byte of the stored checksum in decimal. Reports 255 if the prestored checksum value is FFh.

OK *ERROR*

I3 Reports ROM Code Revision-Modulation (e.g., 2109-V90). Revision, Modulation, and Model.

I4 Reports OEM defined identifier string.

I5 Reports Country Code parameter (see +GCI).

I6 Reports modem data pump and internal code revision.

I7 Reports OK.

L*n* **Monitor Speaker Volume**

n

M*n* **Monitor Speaker Mode**

n

O*n* **Return to Online Data Mode**

P **Set Pulse Dial Default**

T **T**

T

Q*n* **Quiet Result Codes Enable/Disable**
n

Description: The command enables or disables the sending of result codes to the DTE. The parameter value, if valid, is written to S14 bit 2.

T **Set Tone Dial Default**

P **P**

DP

V*n* **Result Code Form**
n

V0 Enables short-form (terse) result codes. Line feed is not issued before a short-form result code.
V1 Enables long-form (verbose) result codes.

W*n* **Connect Message Control**
n

X*n* **Extended Result Codes and Call Progress Information**
n

Z*n* **Soft Reset and Restore Profile**
n

&C*n* **RLSD (DCD) Option**
n

&D*n* **Data Terminal Ready (DTR) Option**
n

&F*n* **Restore Factory Configuration (Profile)**
n

&G*n* **Select Guard Tone**
n

&K*n* **Flow Control**
n

&P*n* **Select Pulse Dial Make/Break Ratio**
n

Description: This command determines the make/break ratio used during pulse dialing. It is only effective if the appropriate bit to enable this command is set through the country profile. The default is country-dependent. The parameter value, if valid, is written to S28 bits 3 and 4.

&R **RTS/CTS Option**

&S*n* **DSR Override**
n

&T*n* **Local Analog Loopback Test**

n

&T1

+++

CONNECT

&V **Display Current Configuration and Stored Profiles**

Note:

&V1 **Display Last Connection Statistics**
n

RBS Pattern

Digital Loss
Flex
First byte
Second byte
Third byte
Fourth byte
Fifth byte
Sixth byte

μ
μ
μ
μ
μ

&W*n* **Store Current Configuration Settings**
n

&V
Z **&Y**

&Y **Designate a Default Reset Profile**

&Z*y*=*x* **Store Telephone Number**
y

\B*n* **Transmit Break to Remote**
n

\K*n* **Break Control**
n

B

Data Mode. The modem receives a break from the computer:

K0

K0

Data Mode. The modem receives a break from the remote modem:

K0

K2

K4

Online Command Mode. The modem receives a *Bn* command from the computer:

K0

K2

K4

\N*n* **Operating Mode – Error Correction**
n

Description: Controls the preferred error-correcting mode to be negotiated in a subsequent data connection.

- \N0 Selects normal speed buffered mode (disables error-correction mode).
- \N1 Serial interface selected - Selects direct mode and is equivalent to &M0 mode of operation.
- \N2 Selects reliable (error-correction) mode. The modem will first attempt a LAPM connection and then an MNP connection. Failure to make a reliable connection results in the modem hanging up. (Forces S36=4 and S48=7.)
- \N3 Selects auto-reliable mode. This operates the same as \N2 except failure to make a reliable connection results in the modem falling back to the speed buffered normal mode. (Forces S36=7 and S48=7.)
- \N4 Selects LAPM error-correction mode. Failure to make an LAPM error-correction connection results in the modem hanging up. (Forces S48=0.)
- \N5 Selects MNP error-correction mode. Failure to make an MNP error-correction connection results in the modem hanging up. (Forces S36=4 and S48=128.)

\V*n* **Single Line Connect Message Enable**
n

Note

Note

–*Kn* **MNP Extended Services**
n

–ST*En* **Set Telephony Extension**
n

Note
Defined Values:

<value> (Dec.)	Remote Hangup	Extension Pickup	Line-in-Use

Reporting Current or Selected Values

Reporting Supported Range of Parameter Values

Behavior in Data Mode

Operation in Data Mode
Line-In-Use (Enabled by AT-STE=1, AT-STE=3, AT-STE=5, or AT-STE=7)
Case 1: Telephone Line is in Use

Case 2: Telephone Line is in Use But Disconnected

Case 3: Telephone Line is Not Connected to Modem

Extension Pick-up (Enabled by AT-STE=2, AT-STE=3, AT-STE=6, or AT-STE=7):
Case 1: Modem off-hook, Local Handset Goes Off-Hook

Case 2: Modem off-hook, Extension Pick-up

Remote Hang-up (enabled by AT-STE=4, AT-STE=5, AT-STE=6, or AT-STE=7):
Case 1: Modem off-hook, Remote Hang-up

%C*n* **Enable/Disable Data Compression Control**
n

%E*n* **Enable/Disable Line Quality Monitor and Auto-Retrain**
n

Fallback/Fall Forward.

%L*n* **Line Signal Level Report**

%Q*n* **Line Signal Quality Report**

%U*n* **Select µ-Law or A-Law Codec Type**

+A8E **V.8 and V.8bis Operation Controls**

On-Hook

Off-Hook

<v8o>=

<v8a>=

<v8cf>=

<v8b>=

ATD ***ATA***

Reporting Current or Selected Values

Reporting Supported Range of Parameter Values

+A8I CI Signal Indication

+DR Data Compression Report

Reporting Current or Selected Values

Reporting Supported Range of Parameter Values

+DR: <type> Intermediate Result Code

+DS Data Compression

<direction>

<compr_neg>

<max_dict>

<max_string>

Reporting Current or Selected Values

Reporting Supported Range of Parameter Values

+EB Break Handling in Error Control Operation

<break selection>

<timed>

<default_length>
Reporting Current or Selected Values

Reporting Supported Range of Parameter Values

+EFCS 32-bit Frame Check Sequence

Reporting Current or Selected Values

Reporting Supported Range of Parameter Values

+ER Error Control Report

Reporting Current or Selected Values

Reporting Supported Range of Parameter Values

+ER <type>

+ES Error Control Selection

Reporting Current or Selected Values:

Reporting Supported Range of Parameter Values:

+ESR Selective Reject

Reporting Current or Selected Values:

Reporting Supported Range of Parameter Values:

+ETBM Call Termination Buffer Management

<pending_TD>

<pending_RD>

<timer>

Reporting Current or Selected Values

Reporting Supported Range of Parameter Values

+GCAP Complete Capabilities List Request

Sample Responses

+GMI Manufacturer Identification Request

+GMM Model Identification Request

+GMR Revision Identification Request

I3

+IFC DTE-Modem Local Flow Control

Values defined by <modem_by_DTE> S

Values defined by <DTE_by_modem>

Reporting Current or Selected Values

Reporting Supported Range of Parameter Values

+ILRR DTE-Modem Local Rate Control

Description: This extended-format numeric parameter controls whether or not the extended-format +ILRR:<rate> information text is transmitted from the modem to the DTE.

Reporting Current or Selected Values

Reporting Supported Range of Parameter Values

Reported Rate
<rate>

Defined Values:
<rate>

<rx_rate>

+IPR Fixed DTE Rate

<rate>

Defined Values:
<rate>

Reporting Current or Selected Values

Reporting Supported Range of Parameter Values

+MR Modulation Reporting Control

Reporting Current or Selected Values

Reporting Supported Range of Parameter Values

Report Syntax +MCR

<carrier>

Report Syntax +MRR

<tx_rate>
<rx_rate>

+MS Modulation Selection

Table 8-1. +MS Command Supported Rates

Modulation	<carrier>	Possible (<min_rx_rate>, <min_rx_rate>, (<min_tx_rate>), and <max_tx_rate>) Rates (bps)
Note:		

2bis

Reporting Current or Selected Values

Reporting Supported Range of Parameter Values

+VCID Caller ID (CID)

+VRID Report Retrieved Caller ID (CID)

#UD Last Call Status Report

Data Call State Model:

1.
   -
   -
2.
   -
   -
   -
   -
3.
   -
   -
   -
4.
   -
   -
   -
   -

Command Syntax:

OK

Monitoring an Active Connection

Notes for AT#UD Tables

1.
2.

3. **callCleared codes from 3.6.4/V.58-1994 –**

Table 8-2. AT#UD Last Call Status Report Format

Key	Value(s)	Definition

Table 8-3. Call Setup Result Codes

Code	Definition

Table 8-4. Multimedia Modes
Code Definition

Table 8-5. DTE-DCE modes
Code Definition

Table 8-6. V.34 INFO bit report
Bits Source bits Definition

Table 8-7. gstnModulationSchemeActive from 3.7.2/V.58
Value Description

Table 8-8. errorControl Active from 3.5.2/V.58
Value Description

Table 8-9. compressionActive from 3.2.2/V.58
Value Description

Table 8-10. callCleared codes from 3.6.4/V.58-1994

Value	Description	Notes

Example Modem Response and Usage

Table 8-11. Completed Data Call, with some errors and rate retrain during the call

Modem Response Line	Description

+++<CR> Escape Sequence

+

FastConnect Commands

$F	**FastConnect Control**

V.92 Commands (+P and –Q Commands)

+PCW **Call Waiting Enable**

+PMH **Modem-on-Hold Enable**

+PMHR **Initiate Modem-on-Hold**

Note:

+PMHT **Modem-on-Hold Timer**

+PIG **PCM Upstream Ignore**

+PMHF **V.92 Modem-on-Hold Hook Flash**

+PQC **V.92 Phase 1 and Phase 2 Control**

+PSS **Use Short Sequence**

–QCPC **Force Full Startup Procedure on Next Connection**

–QCPS **Enable Quick Connect Profile Save**

S-Registers

S - Read/Write S-Register

n ***n***
n=v ***v***
n? ***n***
n

n
v

S

Table of S-Registers

Register	***Unit***	***Range***	***Default***	***Description***
S0	*ring*			**Number of Rings to Auto-Answer:**
S1				**Ring Counter.**
S2				**Escape Character.**
S3				**Carriage Return Character.**
S4				**Line Feed Character.**
S5				**Backspace Character.**

Register	Unit	Range	Default	Description
S6				Wait Time Before Blind Dialing or for Dial Tone.
S7				Wait Time for Carrier, Silence, or Dial Tone.
S8				Pause Time for Dial Delay.
S9				Carrier Detect Response Time.
S10				Lost Carrier to Hang Up Delay. Note:
S11				DTMF Tone Duration.
S12				Escape Prompt Delay (EPD).

Register	Unit	Range	Default	Description
S14				**General Bit-Mapped Options Status.**
S16				**Test Mode Bit-Mapped Options Status.**
S19 **and** *S20*				**Reserved**
S21				**V.24/General Bit-Mapped Options Status.**

Register	Unit	Range	Default	Description
S22				**Speaker/Results Bit-Mapped Options Status.**
S23				**General Bit-Mapped Options Status.**
S24				**Sleep Inactivity Timer.**
S25				**Delay to DTR OFF.**
S26				**RTS-to-CTS Delay.**

Register	Unit	Range	Default	Description
S27				**General Bit-Mapped Options Status.**
S28				**General Bit-Mapped Options Status.**
S29				**Flash Dial Modifier Timer.**
S30				**Disconnect Inactivity Timer.**
S31				**General Bit-Mapped Options Status.**

Register	Unit	Range	Default	Description
S36				**LAPM Failure Control.**
S37 (V.22bis only)				**Specifies Desired Line Connection Speed.** **F*n***
S38				**Delay Before Forced Hang Up.**
S39				**Flow Control Bit-Mapped Options Status.**

Register	Unit	Range	Default	Description
S40				**General Bit-Mapped Options Status.**
S41S41S41				

Register	*Unit*	*Range*	*Default*	*Description*
S82 (V.22bis only)				**Break Handling Options**
S86				**Call Failure Indication.**
S91				**PSTN Transmit Attenuation Level.**

Register	Unit	Range	Default	Description
S95				Extended Result Codes Control.
				Note:
S210				V.34 Symbol Rate.

&W

Result Codes

-
-

V.92 Terminology **V.90 Terminology**

Note: **(*)**

Table of Result Codes

Short Form	Long Form	Description
		Fax data speed.

Short Form	Long Form	Description
		Connected at 4800 bps and speed reporting enabled.
		Connected at 9600 bps and speed reporting enabled.
		Connected at 7200 bps and speed reporting enabled.
		Connected at 12000 bps and speed reporting enabled.
		Connected at 14400 bps and speed reporting enabled.
		Connected at 19200 bps and speed reporting enabled.
		Connected at 38400 bps and speed reporting enabled.
		Connected at 57600 bps and speed reporting enabled.
		Connected at 115200 bps and speed reporting enabled.
		Connected at 230400 bps and speed reporting enabled.
		V.23 connection and line speed reporting enabled.
		V.23 connection and line speed reporting enabled.
		Delay is in effect for the dialed number.
		Dialed number is blacklisted.
		Connected in fax mode.
		Connected in data mode.
		Connected at 300 bps and carrier reporting enabled.
		V.23 backward channel.
		V.23 forward channel.
		Connected at 1200 bps and carrier reporting enabled.
		Connected at 2400 bps and carrier reporting enabled.
		Connected at 4800 bps and carrier reporting enabled.
		Connected at 7200 bps and carrier reporting enabled.
		Connected at 9600 bps and carrier reporting enabled.
		Connected at 12000 bps and carrier reporting enabled.
		Connected at 14400 bps and carrier reporting enabled.
		Connected at 16800 bps and carrier reporting enabled.
		Connected at 19200 bps and carrier reporting enabled.
		Connected at 21600 bps and carrier reporting enabled.
		Connected at 24000 bps and carrier reporting enabled.
		Connected at 26400 bps and carrier reporting enabled.
		Connected at 28800 bps and carrier reporting enabled.

Short Form	Long Form	Description
		Connected at 16800 bps and DTE speed reporting enabled.
		Connected at 21600 bps and DTE speed reporting enabled.
		Connected at 24000 bps and DTE speed reporting enabled.
		Connected at 26400 bps and DTE speed reporting enabled.
		Connected at 28800 bps and line speed reporting enabled.
		Connected in MNP Class 5 data compression.
		Connected in V.42 bis data compression.
		Connected without data compression.
		Connected without any protocol.
		Connected in V.42 LAPM mode.
		Connected at 31200 bps; carrier reporting enabled.
		Connected at 33600 bps; carrier reporting enabled.
		Connected in MNP mode.
		Line in use.
		Connected at 33600 bps.
		Connected at 31200 bps.
		Connected with Bell 103 modulation.
		Connected with Bell 212 modulation.
		Connected with ITU-T V.21.
		Connected with ITU-T V.22.
		Connected with ITU-T V.22B.
		Connected with ITU-T V.23.
		Connected with ITU-T V.32.
		Connected with ITU-T V.34.
		Connected with ITU-T V.90.
		Connected at 32000 bps.
		Connected at 34000 bps.
		Connected at 36000 bps.

Short Form	Long Form	Description
		Connected at 38000 bps.
		Connected at 40000 bps.
		Connected at 42000 bps.
		Connected at 44000 bps.
		Connected at 46000 bps.
		Connected at 48000 bps.
		Connected at 50000 bps.
		Connected at 52000 bps.
		Connected at 54000 bps.
		Connected at 56000 bps.
		Connected at 32000 bps.
		Connected at 34000 bps.
		Connected at 36000 bps.
		Connected at 38000 bps.
		Connected at 40000 bps.
		Connected at 42000 bps.
		Connected at 44000 bps.
		Connected at 46000 bps.
		Connected at 48000 bps.
		Connected at 50000 bps.
		Connected at 52000 bps.
		Connected at 54000 bps.
		Connected at 56000 bps.
		Connected at 230400 bps.
		Connected at 28000 bps.
		Connected at 29333 bps.
		Connected at 30667 bps.
		Connected at 48000 bps.
		Connected at 34667 bps.
		Connected at 37333 bps.
		Connected at 38667 bps.

Short Form	Long Form	Description
		Connected at 41333 bps.
		Connected at 42667 bps.
		Connected at 45333 bps.
		Connected at 46667 bps.
		Connected at 49333 bps.
		Connected at 50667 bps.
		Connected at 53333 bps.
		Connected at 54667 bps.
		Connected at 28000 bps.
		Connected at 29333 bps.
		Connected at 30667 bps.
		Connected at 33333 bps.
		Connected at 34667 bps.
		Connected at 37333 bps.
		Connected at 38667 bps.
		Connected at 41333 bps.
		Connected at 42667 bps.
		Connected at 45333 bps.
		Connected at 46667 bps.
		Connected at 49333 bps.
		Connected at 50667 bps.
		Connected at 53333 bps.
		Connected at 54667 bps.

Note: **(*)**

Chapter 11 – Point-to-Point Protocol

Introduction

Point-to-Point Protocol (PPP) is the Internet Standard for transmission of IP packets over serial links. This protocol is commonly used in serial links (asynchronous or synchronous) to transfer packets between two endpoints. These links provide full-duplex simultaneous bi-directional operation and are assumed to deliver packets in order. It is intended that **PPP** provide a common solution for easy connection of a wide variety of hosts, bridges, and routers.

The advantage of **PPP** is that it allows for inter-operability between endpoints (for example, routers) using **PPP** for their serial communication.

Components of PPP

- A method for encapsulating multi-protocol data grams.
- A **Link Control Protocol** (LCP) for establishing, configuring, and testing the data-link connection. The LCP is used to automatically agree upon the encapsulation format options, handle varying limits on sizes of packets, detect a looped-back link and other common configuration errors, and terminate the link.
- A family of **Network Control Protocols** (NCPs) for establishing and configuring different network-layer protocols. In the MultiConnect IP, IPCP will be negotiated

Prerequisites for Establishing a PPP Session

- Before establishing a PPP session, users should be added to the user database. The user name and password supplied by the remote peer will be authenticated using the local database.
- The following sections describe the commands to add / delete user names and passwords to the local database.

Adding Users and Passwords

Upon successful execution of this command, the MultiConnect IP will return an OK or an error message.

Command:

```
# user add <username> [password]
```

Example:

```
# user add user1 user1
OK
```

(Or)

```
# user add user1
OK
```

Setting Passwords

Upon successful execution of this command, the MultiConnect IP will return an OK or an error message.

Command:

```
# user password <username> <password>
```

Example:

```
# user password user1 user1
OK
```

Deleting Users

Upon successful execution of this command, the MultiConnect IP will return an OK or an error message.

Command:

```
# user delete <username>
```

Example:

```
# user delete user1
OK
```

Notes

- PPP is enabled on the modem port
- PPP interface is the IP-enabled interface in MultiConnect IP
- All IP-enabled services can be used only after the PPP link is up with an IP Address
- In the event of a PPP link down, SMTP and POP3 requests can trigger the PPP link establishment and termination

PPP Configuration

PPP Interface Related Parameters

- Enable PPP
- Enable/Disable Authentication and Authentication Type
- Configure user name/password for remote peer to authenticate
- Configure IPCP mode
- Configure local and remote IP addresses
- Enabling/Disabling compression
- Configure the compression algorithm

Serial Interface Related Parameters

- Configure the Connect Type
- Configure the modem settings
- Configure the dialing trigger mode

PPP Interface Related Parameters

Enabling/Disabling Authentication

This command enables or disables a PPP Authentication session . If Authentication is enabled, then the authentication protocol, the user name, and password should also be set.

Command:

```
# set ppp [interface] authentication <enable/disable>
```

Example:

```
# set ppp ppp0 authentication enable
OK
```

Authentication Type - Protocol

This command sets the Authentication type.

Command:

```
# set ppp [interface] auth-type <pap/chap/pap-chap>
```

Example:

```
#set ppp ppp0 auth-type pap
OK
```

User Name & Password for Remote Peer Authentication

This command sets the user name with which the remote server will authenticate. If authentication is disabled, this need not be configured.

Command:

```
# set ppp [interface] username
# set ppp [interface] password
```

Example:

```
# set ppp ppp0 username user1
OK
#set ppp ppp0 password user1
OK
```

IPCP Mode

This command sets the IPCP mode.

Command:

```
# set ppp [interface] ipcp-mode <client-only/client-or-lan>
```

Examples:

```
# set ppp ppp0 ipcp-mode client-only
OK
```

When ipcp-mode is set to client-only, the local and remote ip addresses are set to 0.0.0.0 automatically

```
# set ppp ppp0 ipcp-mode client-or-lan
OK
```

When ipcp-mode is set to client-or-lan, the local and remote ip addresses have to be configured

Show Commands

This command allows you to view the PPP configuration settings.

Command:

```
#show ppp ppp0 configuration
```

This command allows you to view the PPP logical link status

Command:

```
# show ppp [interface] link-status
```

Example:

```
#show ppp ppp0 link-status
Up / Down
OK
```

This command allows you to view the PPP link IP address

Command:

```
# show ppp [interface] ip-addr
```

Example:

```
#show ppp ppp0 ip-addr
local: 192.168.2.1
remote: 192.168.2.2
OK
```

Serial Interface Related Parameters

Connect Type

This command sets the connection type. A connection type can be either a direct connection or a connection through a modem. In case of a modem connection, the modem settings also have to be configured as described in the following sections.

Command:

```
# set serial [serial-interface] connect-type <direct/modem>
```

Example:

```
#set serial s0 connect-type direct
OK
```

(Or)

```
#set serial s0 connect-type modem
OK
#set serial s1 connect-type direct
"Modem port s1 is an inbuilt modem interface and cannot be set to direct"
ERROR
#set serial s1 connect-type modem
OK
```

Modem Settings - For Modem Connection Only

This command sets the initialization string of the modem.

Command:

```
# set serial [serial-interface] modem init-string <line-no> <init string>
```

Example:

```
#set serial s1 modem init-string 1 ATS0=1
OK
```

This command sets the hangup string of the modem.

Command:

```
# set serial [serial-interface] modem hangup-string <hangup string>
```

Example:

```
#set serial s1 modem hangup-string +++ATH0
OK
```

This command sets the dial-prefix string of the modem.

Command:

```
# set serial [serial-interface] modem dial-prefix <dial-prefix string>
```

Example:

```
#set serial s1 modem dial-prefix ATDT
OK
```

This command is used to set the dial number on the dialing end.

Command:

```
# set serial [serial-interface] modem dial-number <phone no>
```

Example:

```
#set serial s1 modem dial-number 224824
OK
```

This command is used to set the dialing trigger mode

Command:

```
# set serial [serial-interface] modem dialing-trig-mode
<none/dtr/command>
```

Note: By default, the modem on modem port S1 is in the answering state.

This command is valid only for the modem port S1.

Examples:

```
# set serial s0 modem dialing-trig-mode <none/dtr/command>
```

ERROR : 'Command not supported on device port s0'

```
# set serial s1 modem dialing-trig-mode <none/dtr/command>
```

OK

none: When the **`dialing-trig-mode`** is configured none, the modem dials immediately once the target boots up.

dtr: When the **`dialing-trig-mode`** is configured dtr, the modem dials as soon as the TR goes high on the device port S0; i.e., when the serial device is connected to S0.

command: When the **`dialing-trig-mode`** is configured as **`command`**, the serial device can control the physical link establishment and link termination with the aid of the commands **`linkup s1`** and **`hangup s1`** respectively.

Chapter 12 – HTTP Server

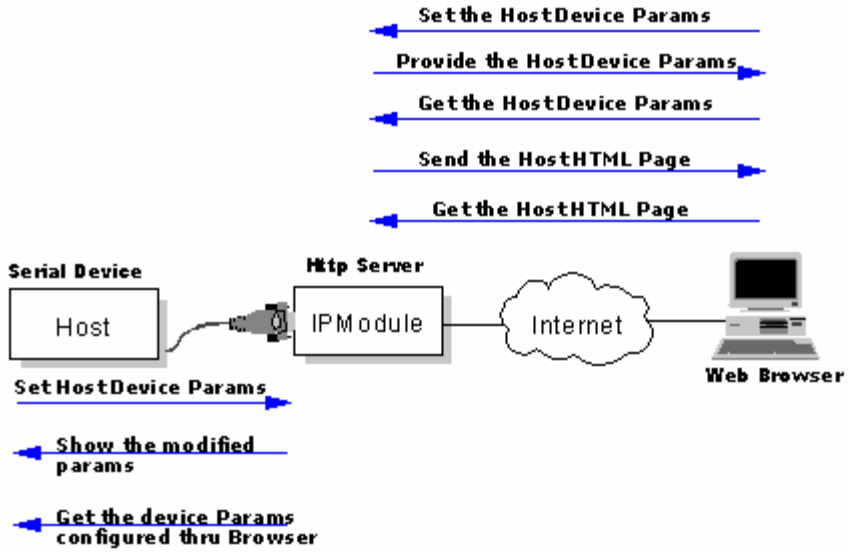
Introduction

The HTTP Server on the MultiConnect IP supports hosting of embedded Web pages on behalf of the host. The host-defined embedded pages support live host parameter monitoring and configuration update through a remote browser.

In addition to serving HTML Web pages, the HTTP Server also features:

- Dual configuration modes
  - Host Device Configuration
    - Remote configuration of the Host Device using a Web browser
    - Monitoring of the Host Device remotely
    - Supports live parameter updates on the Web browser.
  - MultiConnect IP Configuration
    - MultiConnect IP configuration
- Flexibility to design embedded home pages by the OEMs using normal ASCII text HTML code.
- Supports downloading of a home page using TFTP.
- Access Authentication.
- Support for configuring either Default or Serial Page display.

The MultiConnect IP acts as a proxy between the Host-Serial Device and the Web Browser.



Typical Functions Supported by the HTTP Server

Important Notes:

- This application is applicable only in the MultiConnect IP's non-transparent mode.
- This application can be used only after the **PPP link is UP** with an IP Address on the modem port.

Setup and Configuration

Prerequisite for Enabling the HTTP Server

Before being able to access the MultiConnect IP or the serial host through the Web browser, the HTTP support on the MultiConnect IP needs to be enabled and configured.

The following configuration is mandatory and can be configured using CLI either through serial or through Telnet.

Mandatory Setup for HTTP Server

set ip http enable
Successful execution of this command starts the HTTP daemon thus enabling the HTTP server.

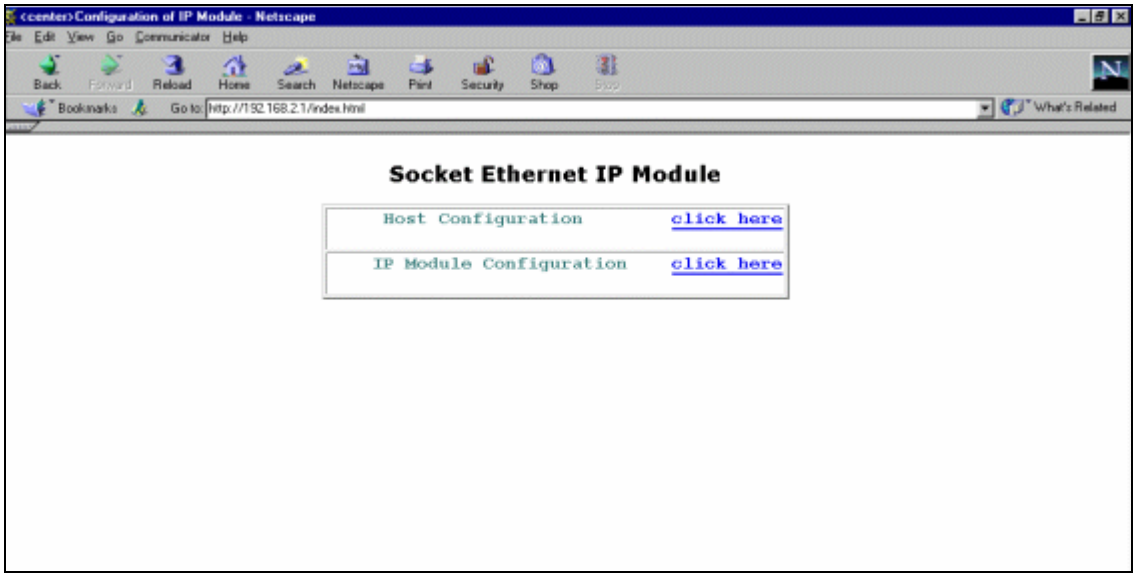
set ip http port <port-number>
By default the HTTP server listens on port 80. However, the default port number can be changed.

set ip http-page <default/serial>
This command basically decides the Web page that will be displayed when the MultiConnect IP is accessed through the browser.

Note: The default Index.htm is displayed when

- The http-page is set to ***default*** and
- The MultiConnect IP is accessed through the Web.

The default HTML page contains two links, one for the host configuration and another for the MultiConnect IP configuration. Both these modes are described in subsequent sections.



Index.htm (Default Index Page)

In the event that the http-page is set to **serial**, the **http-s0.HTML** Web page will display upon accessing the MultiConnect IP through the browser. (The Index.htm will not be accessible).

The **http-s0.HTML** Web page can be replaced by the OEM's Home Page specific to the product. More details regarding design conventions, procedure for uploading, and hosting this page are explained later in this chapter.

Configuration Modes

The embedded HTTP Server on the MultiConnect IP supports two configuration modes. This option is available when the http-page is set to ***serial*** (see **Mandatory Setup** instructions).

- **Host Configuration Mode**
- **MultiConnect IP Configuration Mode** (not supported at this point of time)

In the **Host Configuration Mode**, the OEM's embedded home page is sent to the remote browser. The page serves as a means of monitoring the host parameters live remotely. Further, the host parameters can be updated or configured through the browser.
The **MultiConnect IP Configuration Mode** enables the configuration of the MultiConnect IP remotely through any standard Web browser. All parameters can be configured or their status can be viewed remotely through the interactive GUI provided. Further, vital statistics of the MultiConnect IP can be viewed remotely.

Host Configuration Mode

The **Host Configuration Mode** provides the OEM flexibility to design and implement a product-specific embedded Web page, which is stored, managed, and hosted by the MultiConnect IP module's HTTP server on behalf of the host device.
The OEM can design the Web page to contain the host parameters that will display live values for monitoring and for providing options for setting and configuring the host parameters remotely.
The three essential components of host configuration are the:

- **Parameter List**
- **HTML Page**
- **CGI Scripts**

Note: Certain **File naming and size** conventions are to be strictly adhered to and followed by the Web developer. See details later in this chapter.

The Parameter List

The OEM's customized host HTML page, which is uploaded, may contain parameters (for Configuration or for Monitoring). All these parameters must be available in the **Serial Device Parameter List**, which must be loaded onto the MultiConnect IP.
The format of the Serial device parameter list is shown here:

P<n>:Description:Type:Minimum:Maximum:<Data>

n ranges from **0** to **99**

Description = Name of the parameter

Type = **I**: Integer

S: String

Minimum = If the **Type** is integer, corresponds to Minimum value.

If the **Type** is String, corresponds to Minimum no of characters.

Maximum = If the **Type**

Example:

P0:temperature:I:1:65535:100
P1:username:S:8:50:MultiConnect IP

Here, ***P0*** and ***P1*** are two ***parameters***, which correspond to the names like ***Temperature*** & ***username*** specified in the HTML page.

I/S represents ***Integer*** and ***String*** respectively.
1 is the ***minimum value*** for the parameter P0
65535 is the ***maximum value*** for the parameter P0.

8 is the ***minimum*** number of ***characters*** for the parameter P1.
50 is the ***maximum*** number of ***characters*** for the parameter P1.

100: in P0 is an ***integer Data***
MultiConnect IP: in P1 is a ***string Data***.

The serial device parameter list file (http-host-param) for the demo Web page, which is included with the default setup, (see Figure 3) uses the following parameters and values:

P0:UPSstatus:S:0:5:ON
P1:Efficiency:I:0:100:90
P2:NoiseLevel:I:0:100:5
P3:OverloadCapacity:I:0:100:89
P4:Tolerance:I:0:100:90
P5:InputCurrent:I:0:100:78
P6:InputLineVoltage:I:0:100:90
P7:OutputVoltage:I:0:100:45
P8:BatteryVoltage:I:0:100:78
P9:Load:S:0:100:90
P10:Alarm:S:0:10:silence

The Embedded HTML Page

The **embedded Web page** stored on the MultiConnect IP consists of normal ASCII text HTML code, which can be generated using any HTML editing tool. The page can include scripts, links to remote Web sites, graphic images, text files, etc.

A maximum 30 KB (uncompressed) of flash space for the OEM's Home Page and an additional 10 KB maximum memory is reserved for the device parameter list.

The OEM Web page must contain the **Parameter Tags**, which are the placeholders in HTML files. These tags are replaced on the fly with real-time values when the page is sent to the browser. The value of the parameter tags also can be changed through the browser in order to configure the host through the MultiConnect IP.

The developer should ensure that the parameter values, which are to be replaced, are qualified with **%P<n>%**.

Example:

```
<HTML>
--
--
--
--
Efficiency  <input  type="text" name = "P1" value = "%P1%">
--
--
</HTML>
```

In the above sample code segment, when the browser requests a page, the ***%P1%*** is replaced with Parameter P1's value. This value is extracted from the serial device parameter file.

CGI Scripts

- **Post-Query** is a built-in CGI script that will parse the new values set by the browser and replace them in the **http-host-param** file. See the section entitled Parameters Manipulation from the Browser for more technical information about the **Post-Query** CGI script.
- The MultiConnect IP supports a user-defined CGI script, which performs host-specific processing to the parameters configured by the remote Web browser.

Important: The user-defined CGI-script **MUST** be a shell script.

File Naming and File Size Conventions

The following file naming conventions and file size constraints must be followed by the OEM Web page developer.

File Name(s)	Description
http-s0.HTML	Serial Device Main Page
http-host-param	Default Serial Device Parameter List
http-*.HTML	Any HTML file, should have the filename prefixed with "http-"
cgi-*	Any cgi script should have the filename prefixed with "cgi-"
Constraints	
The HTML file size cannot exceed 30KB Max.	
The Parameter list file cannot exceed 10KB Max.	
The Parameter tags **<P1, P2, …>** should be contained in the parameter list.	
The URL for ***Host Configuration*** is **http-s0.HTML**. Therefore, the main page must have the filename **http-s0.HTML** when the host device's HTML page is uploaded to the MultiConnect IP.	

Uploading the Web Page and Parameter List

The Host Device Files (.HTML, default parameter List….) can be uploaded to the MultiConnect IP using TFTP CLIENT.

It is possible to upload these files in two different ways. In either case, file naming and file size conventions described previously must be followed.

- **Compressed** and **Zipped** formats (tar.gz) or
- **Uncompressed** individual files.

Uploading Compressed and Zipped Files (http.tar.gz)

In order to load files in the compressed (http.tar.gz) format, the following directory structure has to be strictly followed.

http/
HTML/
http-s0.HTML
http-host-param
http-*.HTML
cgi-bin/
cgi-* (Supports only Shell scripts)

- Place the HTML files and the default serial device parameter list in the **/http/HTML** directory. All the HTML file-names should be prefixed with **http-**.
- Place the CGI scripts in the **/http/cgi-bin** directory. All the CGI scripts should be prefixed with **cgi-**.
- Create an **http.tar.gz** from the source directory (http/). This file should be in the GZIP format only.
- Upload **http.tar.gz** using any TFTP Client with binary mode set.
- Use the following commands to upload **http.tar.gz** to the MultiConnect IP.

```
[root@admin /root]# tftp 192.168.2.1 (Address of the MultiConnect IP)
tftp>trace
tftp>binary
tftp>verbose
tftp>put http.tar.gz
tftp>quit
```

Upload Uncompressed Files Individually

- Use TFTP client with binary mode set.
- Upload HTML files, the default serial device parameter list, and the CGI bin files individually using the following commands:

```
tftp 192.168.2.92 (IP-Address of the MultiConnect IP)
tftp>verbose
tftp>binary
tftp>trace
tftp>put http-host-param
tftp>put http-s0.HTML.
```

- Upload all the files using the similar command.

Monitoring and Configuring the Host through a Browser

If you have successfully completed the preceding configuration sections and completed the uploading, you are now ready to View, Monitor, and Configure the Host through the Web browser.

In order to view the device home page, enter the IP Address of the MultiConnect IP into the URL Address bar.

Example: http://192.168.2.1
The IP address 192.168.2.1 corresponds to the IP address of MultiConnect IP.

Depending upon the configuration selected under **set ip http-page <default/serial>**, the appropriate page is displayed.

- If the http-page is set to **default**, the **index.HTML** page displays or
- If the http-page is set to **serial**, the OEM's customized Web page **http-s0.HTML** displays.

Technical Information

This section describes additional details and implementation suggestions related to the MultiConnect IP.

Parameter Value Display on the Fly

The HTML file can be any valid HTML file. However, it should be ensured that the parameter values, which are to be replaced, are qualified with **%P<n>%**.

Example:

```
<HTML>
---------
--------
Efficiency  <input  type="text" name = "P1" value = "%P1%">
----------
</HTML>
```

In the above code segment, when the browser requests a page, the **%P1%** is replaced with Parameter P1's value. This value is extracted from the serial device parameter file **(http-host-param)**.

Parameter Value Manipulation from the Browser

To update a parameter from the browser, key in the new values and click the **Submit** button.

The **Submit** button in turn invokes the **POST** command as shown below.

<form method = "POST" name= "formUPS" ACTION="/cgi-bin/post-query">

Post-Query is a built-in CGI script that will parse the new values set by the browser and replace them in the **http-host-param** file.

Should you need to update the newly set parameters in the **http-host-param** file, include the **/cgi-bin/post-query** path in the **ACTION** field of your HTML file. The rest is set by the Post-Query script.

Serial Device Parameter Updating Process

The serial device probes/polls the MultiConnect IP for newly configured parameter values from the browser.

Chapter 13 – SMTP Client

Introduction

SMTP Client is used to establish a TCP session on an SMTP server running on port 25.

SMTP Client supports sending ASCII text or MIME-encoded binary attachment emails with different media types and subtypes from the host/serial device through commands to the MultiConnect IP.

SMTP Client supports the following methods for sending emails:

- To the hosts/email addresses specified in the **command prompt**.
- To the hosts/email addresses **pre-configured**.
- To the hosts/email addresses entered in **interactive mode**.

Command:

send-mail [-b]

[-t "<Email-Id#1, Email-Id#2..>"]

[-c "<Email-Id#3, Email-Id#4..>"]

[-s "<subject>"]

[-d "<message-body>"]

Note: All of these commands are optional. The **send-mail** command prompts for the details required if they are neither given as options nor pre-configured. Various scenarios are covered later in this chapter.

Important Notes:

- This application is applicable only in the MultiConnect IP in non-transparent mode.
- This application can be used only after the **PPP link is UP** with an IP Address on the modem port. (Refer to Chapter 6 Prerequisite Configurations - *Physical Link Established over the Modem Port* for more details)
- In the event of PPP link DOWN, the SMTP request triggers PPP link establishment.

Setup and Configuration Prerequisites

The following details are **mandatory** for configuration and have to be validated before sending an email:

- Host Interaction Mode enabled to restrict Telnet-Dialout and PPP.
  Command: **set serial <s0> host-interaction-mode enable**
- Set SMTP server name or IP address of maximum length 64 characters.
  Command: **set send-mail smtp-server-name <ipaddress/servername>**
- Set SMTP server port.
  Command: **set send-mail smtp-server-port <25>**
- Set Host name of maximum length 64 characters.
  Command: **set send-mail host-name <hostname>**
- Set From address identity of maximum length 64 characters.
  Command: **set send-mail from-address-identity <hostnameidentity>**
- Set From address of maximum length 64 characters.
  Command: **set send-mail from-address <email-Id>**

Notes:

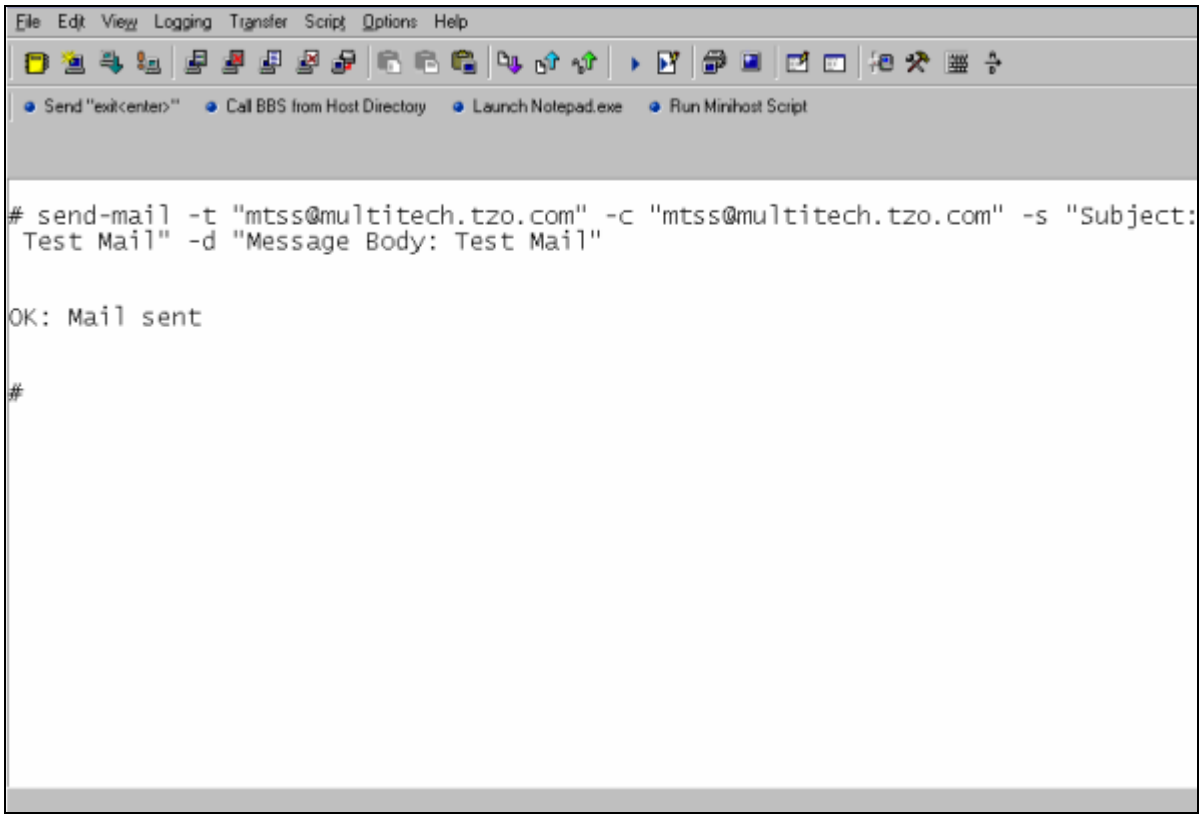
1. The **send-mail** command prompts for the ERROR message if any of the above details are not configured or not valid.
2. The following configuration suggestions are **optional**:
   - Set reply-to address of maximum length 64 characters. By default the server takes the **from address** as the reply-to-address.
   - If this is configured, this address is taken as the reply to address.
     set send-mail reply-to-address <email-ID>

Scenario 1 – Sending a Text Email from the Command Prompt

Issue the following command:

send-mail
-t "<email #1>, <email #2>"
-c "<email #3>, <email #4>"
-s "subject data"
-d "Messagebody"

A message is then given as shown in the figure below and the email is sent only to the **to-addresses** (if any) and the **cc-addresses** (if any) entered from the command prompt. The **subject** and **message body** are also taken from the command prompt.



Notes:

1. The email is **not** sent to addresses pre-configured using set commands.
2. At least one address, either the **to-address** or the **cc-address**, should be given as an alternative for sending email directly from command prompt.
3. If the **subject** option is not specified and is not pre-configured using set commands, SMNP enters into interactive mode and requests a subject to be entered.
4. Type **Ctrl+C** to quit the email at any given time.

Scenario 2 – Sending a Text Email from the Interactive Mode

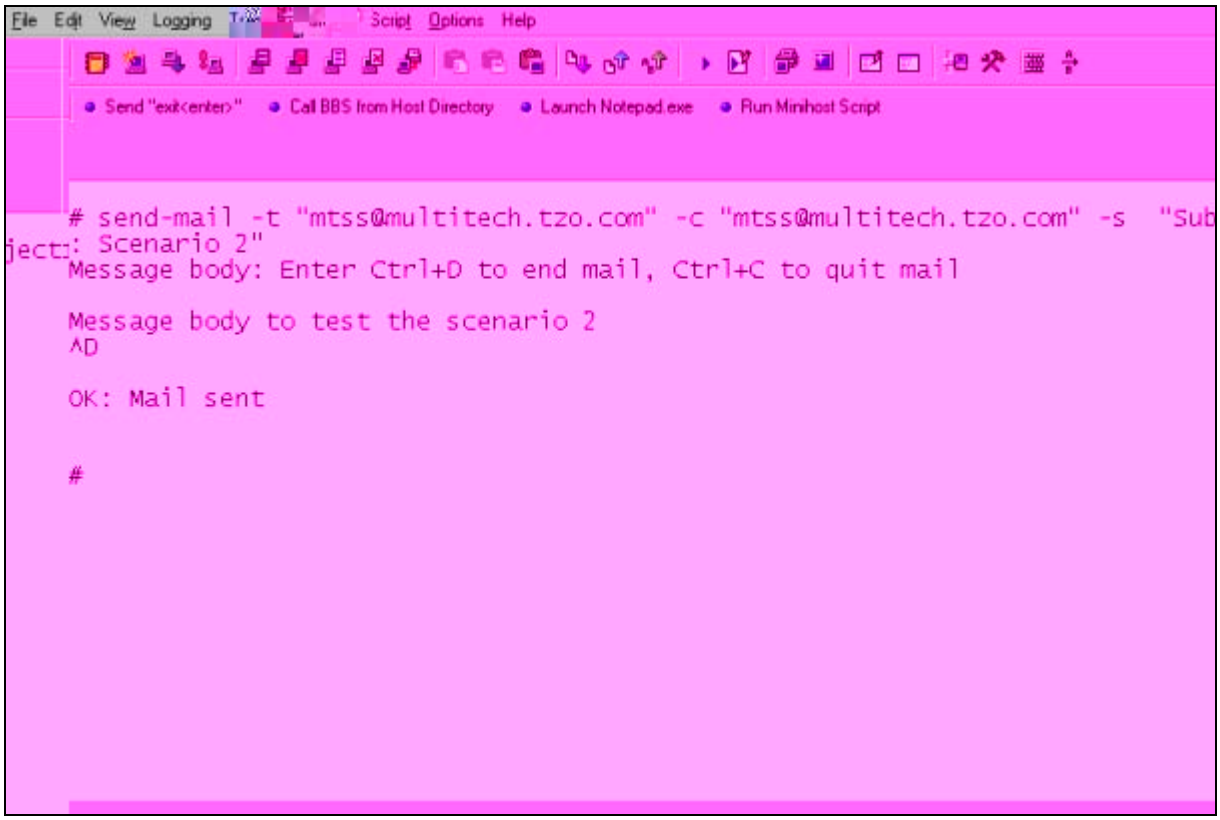
Message body is entered in interactive mode

Issue the following command:

send-mail
-t "<email #1>, <email #2>"
-c "<email #3>, <email #4>"
-s "subject data"

The SMTP session then enters into interactive mode and requests that the **message body** be entered (see the figure below). After typing the message, type **Ctrl+D** to end the message.

The email is sent only to the **to-addresses** (if any) and the **cc-addresses** (if any) entered from the command prompt. The **subject** is taken from the command prompt.



Notes:

1. The email is **not** sent to addresses pre-configured using set commands.
2. At least one address, either the **to-address** or the **cc-address**, should be given as an alternative to sending email directly from the command prompt.
3. If the **subject** option is not specified and is not pre-configured using set command, SNMP enters into interactive mode and requests a subject to be entered.
4. Type **Ctrl+C** to quit the email at any given time.

Scenario 3 – Sending a Text Email Using Configuration and Interactive Mode

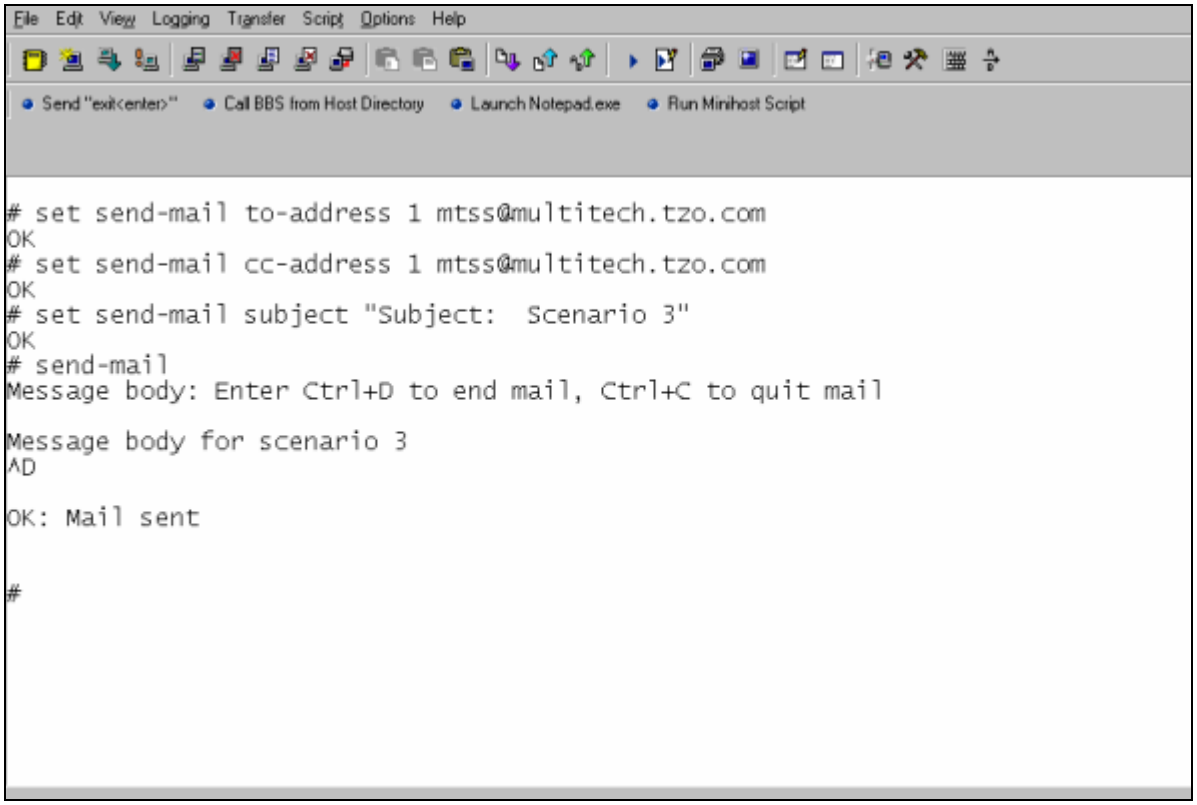
- **The to-addresses, cc-addresses, and subject taken from the configuration and**
- **The message body is entered in interactive mode.**

To support this scenario, you must configure the following details in addition to the mandatory configuration

- Set subject data of maximum length 255 characters.
  Command: **set send-mail subject subject data**
- Set to-addresses of maximum length 64 characters.
  Command: **set send-mail to-address 1 <email-id #1>**
  set send-mail to-address 2 <email-Id#2>
- Set cc-addresses of maximum length 64 characters.
  Command: **set send-mail cc-address 1 <email-ID#3>**
  set send-mail cc-address 2 <email-ID#4>

Issue the following command at the serial command prompt: **#send-mail**

The SMTP session then enters into interactive mode and requests that the **message body** be entered as shown in the figure below. After completing the message, type **Ctrl+D** to end the message.



The email is sent only to pre-configured recipients. The subject is also taken from the configuration.

Notes:

1. The email is sent to addresses pre-configured using set commands.
2. At least one address, either the **to-address** or the **cc-address,** should be configured using set commands; otherwise, the SMTP session enters into interactive mode prompting you to enter the required details.
3. If the **subject** option is not specified or is not pre-configured using set commands, SNMP enters into interactive mode and requests a subject to be entered.
4. Type **Ctrl+C** to quit the email at any given time.

Scenario 4 – Sending a Text Email Using No Configuration

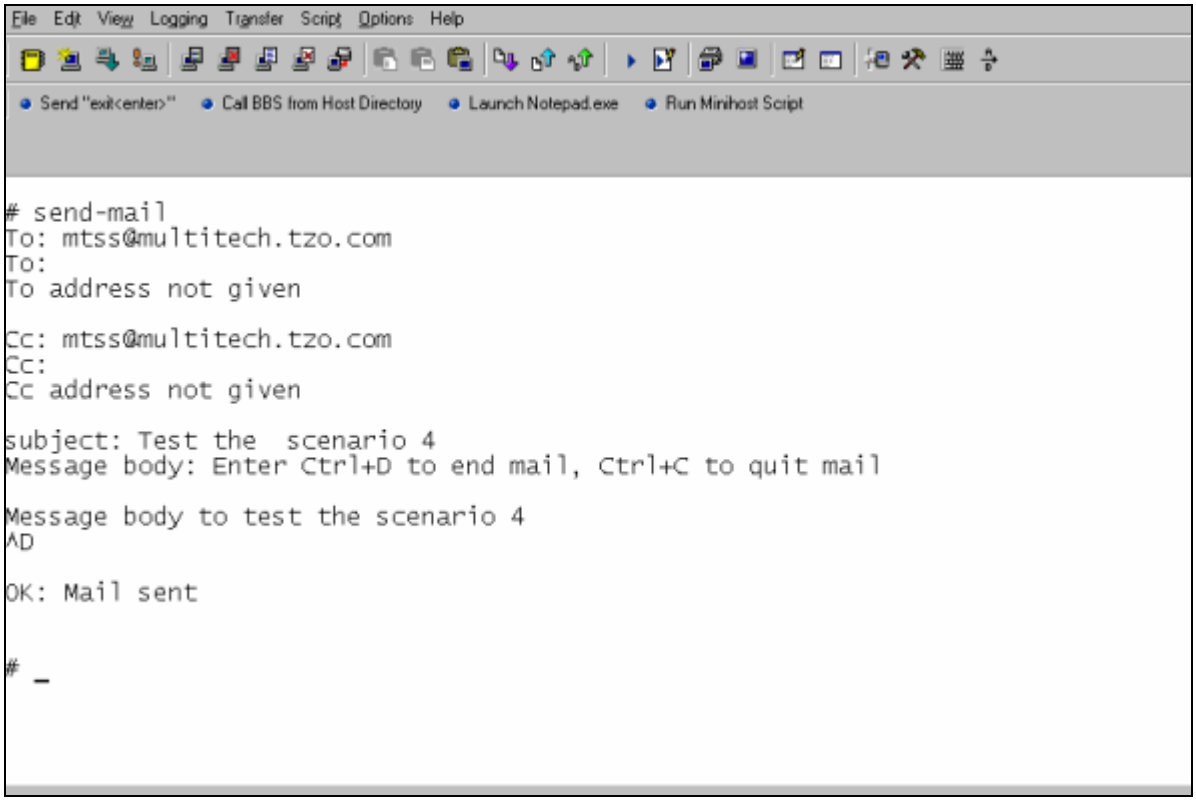
The *to-address*, *cc-address*, and *subject are NOT configured in this example.*

Issue the following command:

send-mail

The SMTP session then enters into interactive mode requesting the **to-address**, **cc-address**, **subject** and the **message body** to be entered. After entering a message, type **Ctrl+D** to end the message.

The email is sent only to the entered **to-addresses** (if any) and **cc-addresses** (if any). The **subject** and **message body** are taken as given in the interactive mode.



Notes:

1. The email is sent only to addresses entered in interactive mode.
2. If the **subject** is already configured using set command, it will be taken as the subject for the email.
3. Type **Ctrl+C** to quit the email at any given time.

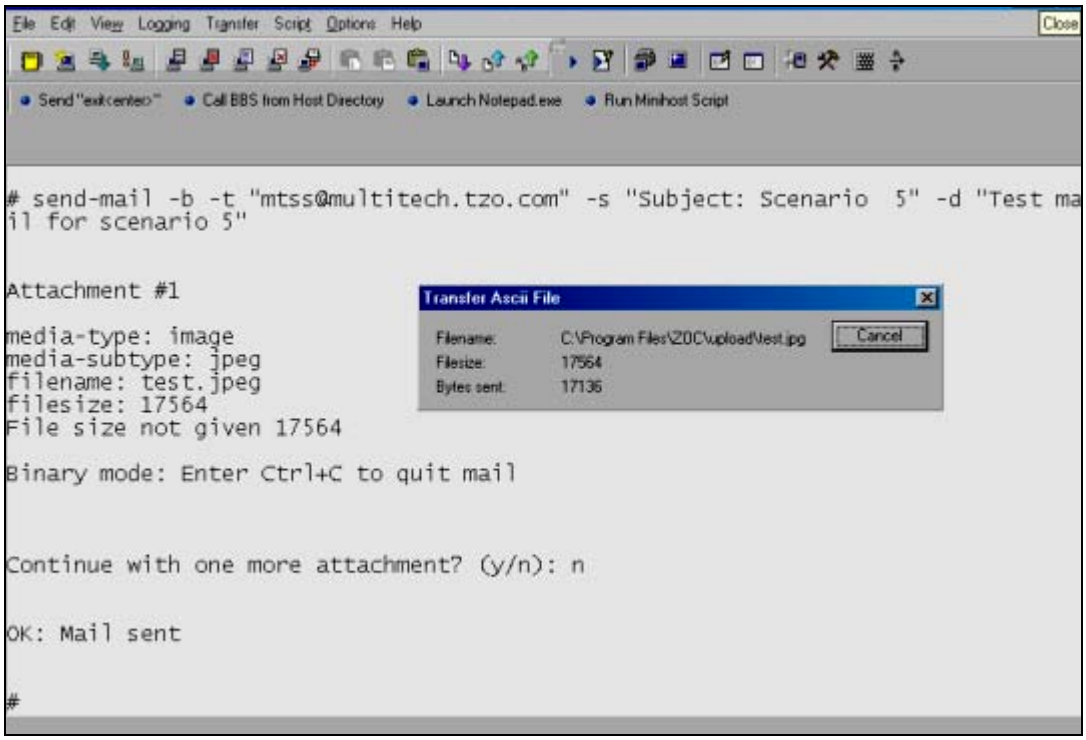
Scenario 5 – Sending a Mime Encoded Binary Attachment Using Command Prompt

The email addresses, subject, and message body are taken from the command prompt.

Issue the following command:

send-mail
-b
-t "<email-id #1>, <email-id #2>"
-c "<email-id #3>, <email-id #4>"
-s "subject data"
-d "Message body"

The SMTP session then enters into interactive mode requesting media-type, media-subtype, filename, filesize, and the attachment body as shown in this figure.



When the attachment body reaches the filesize, another message is displayed asking whether to continue with one more attachment as shown in figure. Type **n** for **No**. The email with its attachment is sent only to the **to-addresses** (if any) and **cc-addresses** (if any) entered from the command prompt. The **subject** and **message body** are also taken from the command prompt.

Notes:

1. The email is not sent to addresses pre-configured using set commands.
2. At least one address, either the **to-address** or the **cc-address,** should be given as an alternative to sending email directly from command prompt.
3. If the **subject** option is not specified and is not configured using set commands, SMTP enters into interactive mode requesting the **subject** to be entered.
4. Type **Ctrl+C** to quit the email at any given time.
5. If the host wants to quit the email while sending the binary attachment body, type **Ctrl+C** and wait for 3 seconds without entering any character to quit the email.

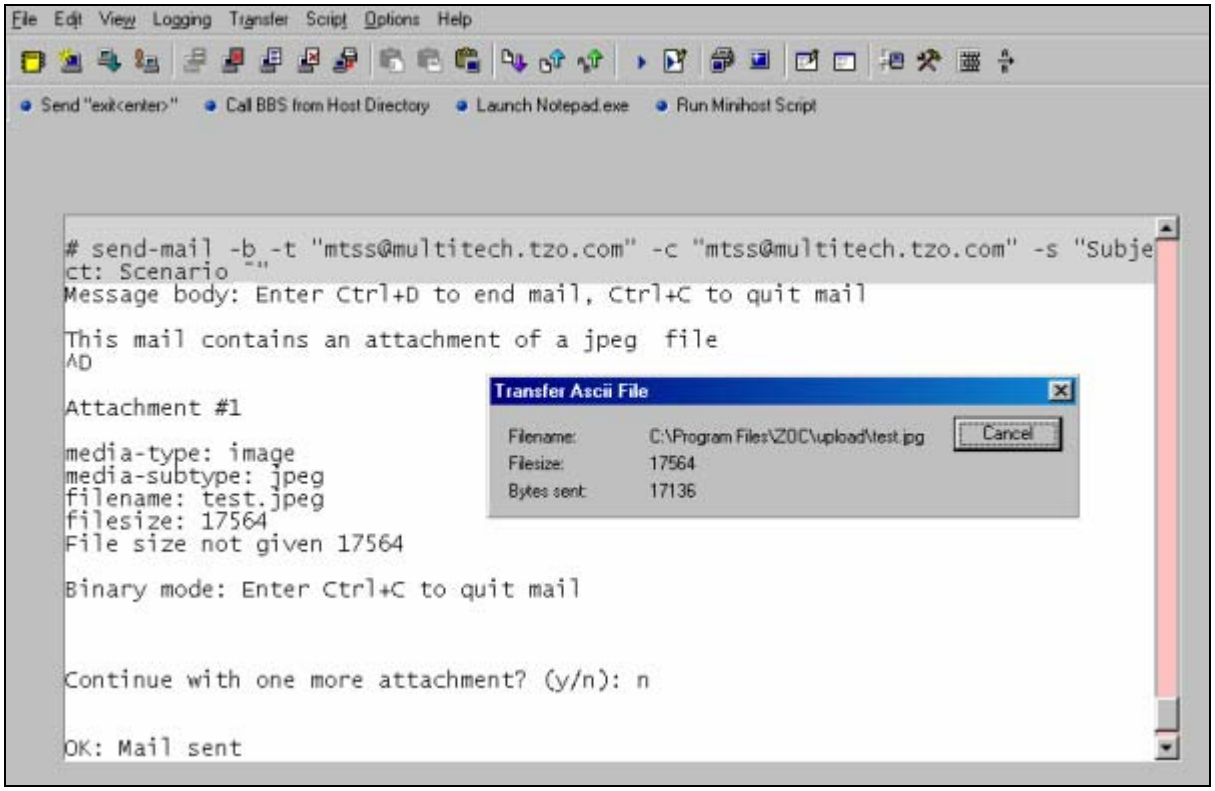
Scenario 6 – Sending a Mime Encoded Binary Attachment Using the Command Prompt

- **The *to-address*, *cc-address*, and *subject* are entered through the command prompt**
- **The message body is entered in the Interactive Mode**

Issue the following command:

send-mail
-b
-t "<email-id#1>, <email-id#2>"
-c "<email-id#3>, <email-id#4>"
-s "subject data"

The SMTP session then enters into interactive mode requesting the **message body** as shown in the figure to be entered. After entering the message, type **Ctrl+D** to end the message.



The SMTP session then enters into interactive mode requesting media-type, media-subtype, filename, filesize, and the attachment body as shown in the figure.

When the attachment body reaches the filesize, another message displays asking whether to continue with one more attachment as shown in the figure. Type **n** for **No**. The email with its attachment is sent only to the **to-addresses** (if any) and **cc-addresses** (if any) entered from the command prompt. The **subject** is taken from the command prompt.

Notes:

1. The email is **not** sent to addresses pre-configured using set commands.
2. At least one address, either **to-address** or **cc-address**, should be given as an option to the command prompt.
3. If the **subject** option is not specified and is not configured using set commands, SMTP enters into interactive mode and requests the subject to be entered.
4. Type **Ctrl+C** to quit the email at any given time.
   If the host wants to quit the email while sending the binary attachment body, type **Ctrl+C** and wait for 3 seconds without entering any character to quit the email.

Scenario 7 – Sending a Mime Encoded Binary Attachment Using Configuration and Interactive Mode

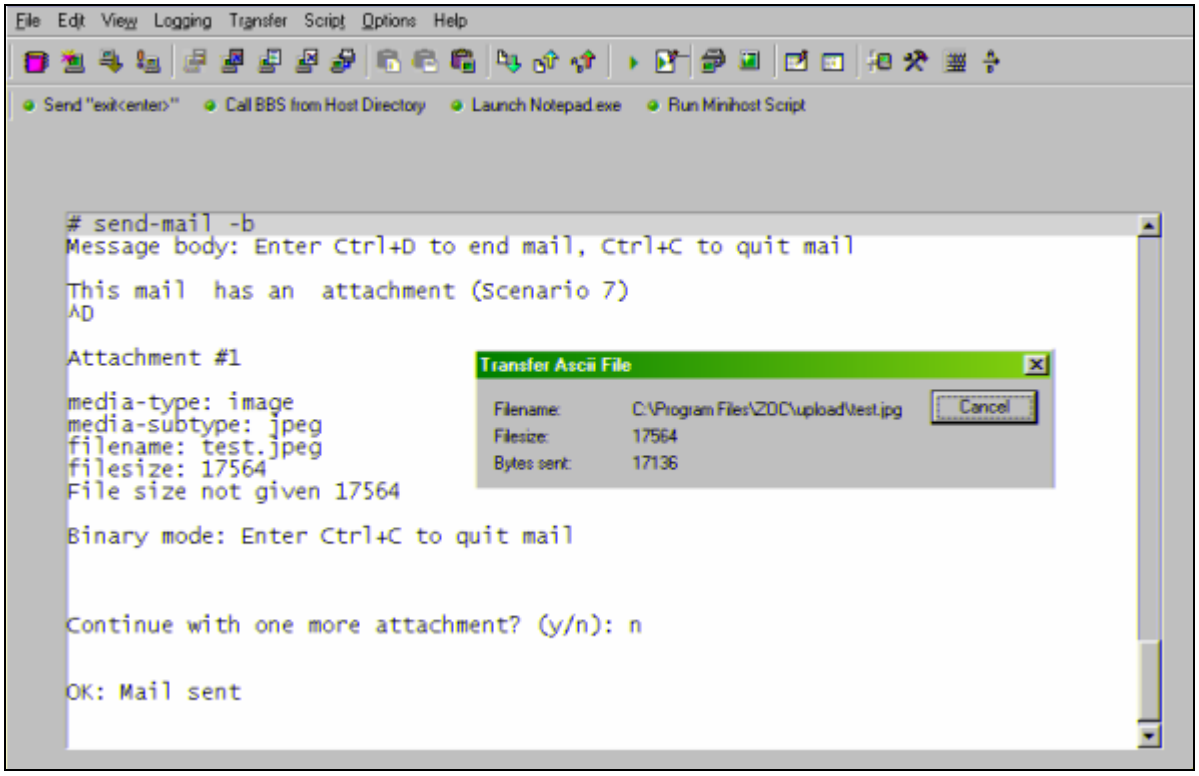
- **The to-address, cc-address, and subject are pre-configured.**
- **The message body is entered in the Interactive Mode.**

Configure the following details apart from the mandatory configuration:

- Set subject data of maximum length 255 characters.
  Command: **set send-mail subject "subject data"**
- Set to-addresses of maximum length 64 characters.
  Command: **set send-mail to-address 1 email-id#1**
  set send-mail to-address 2 email-id#*2*
- Set cc-addresses of maximum length 64 characters.
  Command: **set send-mail cc-address 1 email-id#3**
  set send-mail cc-address 2 email-id#4

Issue the following command: **# send-mail -b**

The SMTP session then enters into interactive mode requesting the message body to be entered as shown in this figure. After entering the message, type **Ctrl+D** to end the message. When the attachment body reaches the file size, you will be asked whether to continue with one more attachment. Type **n** for **No**. The email with its attachment is sent only to the pre-configured **to-addresses** and **cc-addresses,** if any. The **subject** is also taken from the configuration.



Notes:

1. The email is sent to addresses pre-configured using set commands.
2. At least one address, either the **to-address** or the **cc-address**, should be configured using set commands; otherwise, the SMTP session will enter into interactive mode prompting for the required details to be entered.
3. If the **subject** is not configured using commands, SMTP will request the subject to be entered.
4. Type **Ctrl+C** to quit the email at any given time.
5. If the host wants to quit the email while sending the binary attachment body, type **Ctrl+C** and wait for 3 seconds without entering any character.

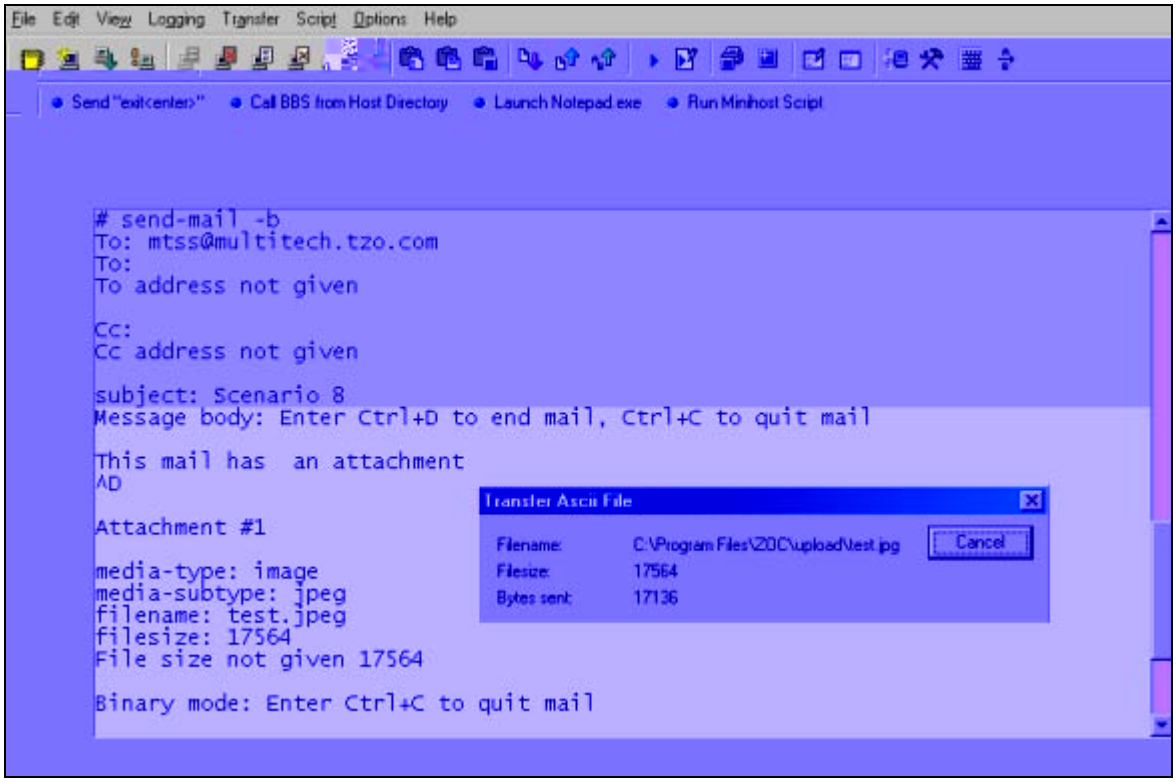
Scenario 8 – Sending a Mime Encoded Binary Email with Attachment Using Interactive Mode

Issue the following command: **send-mail -b**

The SMTP session then enters into interactive mode requesting the **to-address**, the **cc-address**, **subject,** and **message body** to be entered. After completion of the message, type **Ctrl+D** to end the message.

The SMTP session in interactive mode requests media-type, media-subtype, filename, filesize, and the attachment body as shown in the figure.

When the attachment body reaches the filesize, another message is displayed asking whether to continue with one more attachment. Type **n** for **No**. The email with its attachment is sent only to the entered **to-addresses** (if any) and **cc-addresses** (if any). The **subject** and **message body** are used as entered in the interactive mode.



Notes:

1. The email is sent only to addresses entered in interactive mode.
2. If the **subject** is pre-configured using set com80.5 -1.159(eit willbe eusd a)s

Chapter 14 – POP3 Client

Introduction

The MultiConnect IP can be configured as a POP3 client to retrieve emails from a POP3 server. The POP3 client, available in MultiConnect IP, can do the following:

- List the number of messages and message sizes
- Retrieve the header information of messages
- Retrieve the complete email
- Retrieve the top 'n' lines of a message
- Delete an email on the server
- Retrieve the unique email ID listing

Important Notes:

- This application is applicable only in the non-transparent mode.
- This application can be used only after the **PPP link is UP** with an IP Address on the modem port. (Refer to Chapter 6 Prerequisite Configurations - *Physical Link Established Over the Modem Port* for more details)
- In the event of PPP link DOWN, the POP3 request triggers PPP link establishment.

Setup and Configuration Prerequisites

To fulfill the prerequisites for receiving/retrieving emails from the email server, configure the following parameters:

- pop3 server name/ip address
  Command: **set recv-mail server-name <server-name>**
- pop3 port number
  Command: **set recv-mail server-port <port-number>**
- pop3 account/user name
  Command: **set recv-mail mailbox-name <account/user name>**
- pop3 account/user password
  Command: **set recv-mail mailbox-password <account/user password>**

These commands need to be executed only to set the initial configuration. However, they must be executed whenever a parameter is changed.

Example

Assuming that the POP3 server is **192.168.2.10**, POP3 port is **110**, account/user name is **mtss**, and the account/user password is **mtsspass**, execute the following commands to configure the MultiConnect IP to retrieve emails.

set recv-mail server-name 192.168.2.10
OK

set recv-mail server-port 110
OK

set recv-mail mailbox-name mtss
OK

set recv-mail mailbox-password mtsspass
OK

Example of the *show recv-mail* configuration

Use the **show recv-mail** configuration to check the configuration.

```
+-------------------------------------------------------+
|                    pop3 configuration                 |
+-------------------------------------------------------+
| server-name              : 192.168.2.10   |
| server-port                      : 110            |
| mailbox-name             : mtss           |
| mailbox-password                 : mtsspass       |
+-------------------------------------------------------- +
```

If any of the above fields are missing, then the email cannot be retrieved.

Optional Configuration for Deleting Emails from the Server

An optional parameter that can be configured is:

 # recv-mail leave-mail-on-server disable
OK

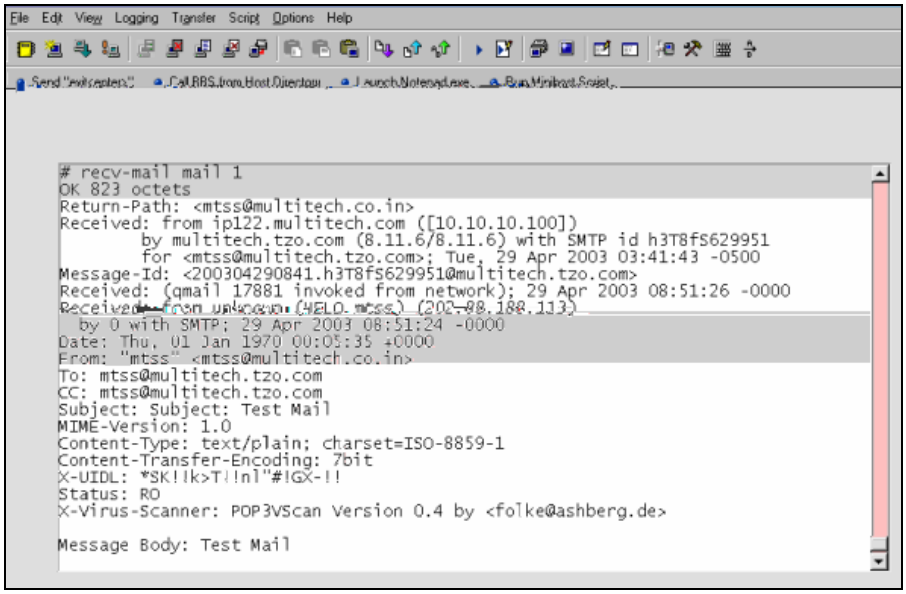
The command **recv-mail leave mail on server <enable/disable>** is used to indicate that email retrieved from the POP3 server should be deleted.

If **leave mail on server** is **disabled**, then an email retrieved from the POP3 server using the commands **recv-mail mail** or **recv-mail mail <n>**, where **n** is the message number, is deleted from the POP3 server. The default value is **enable**.

Scenario 1 – Retrieving Emails

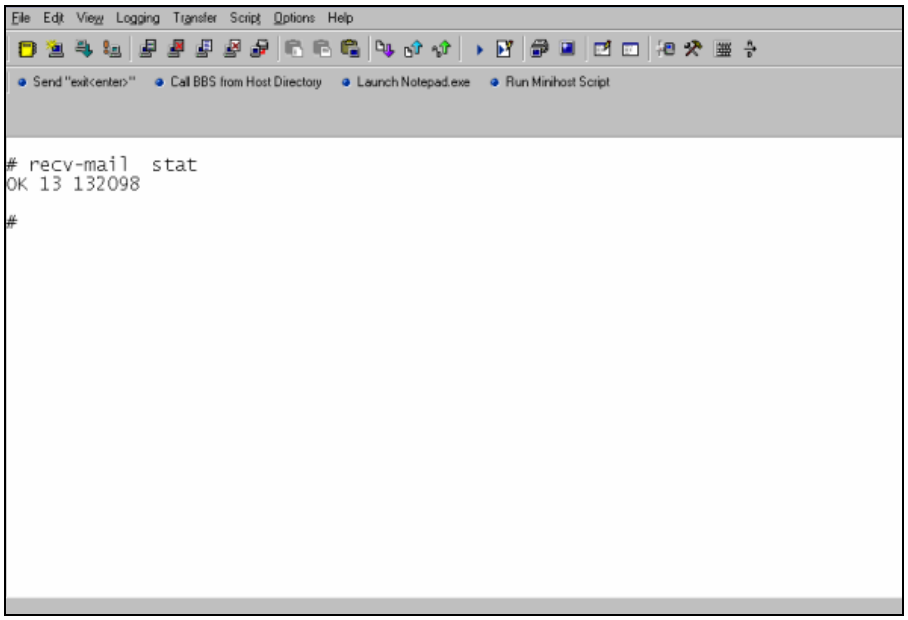
The command **recv-mail mail** can be used to retrieve all the emails from a POP3 server. This command will retrieve all the email with headers, message body, and attachments.

The command **recv-mail mail <n>**, where **n** is the message number, can be used to retrieve the **n**th message.



Scenario 2 – Retrieving the Number of Emails and the Total Email Size

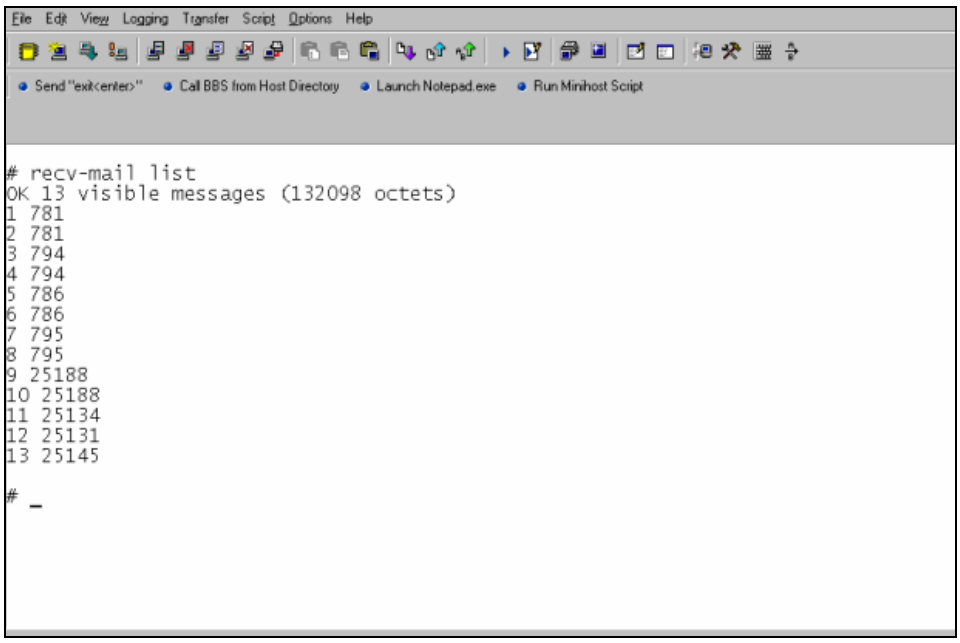
Use the command **recv-mail stat** to retrieve the number of emails and the total email size in octets. The output is single line.



Scenario 3 – Retrieving the Email List

Use the command **recv-mail list** to retrieve the email list containing the message number and the size of the individual messages (in octets). The output is multi-lined.

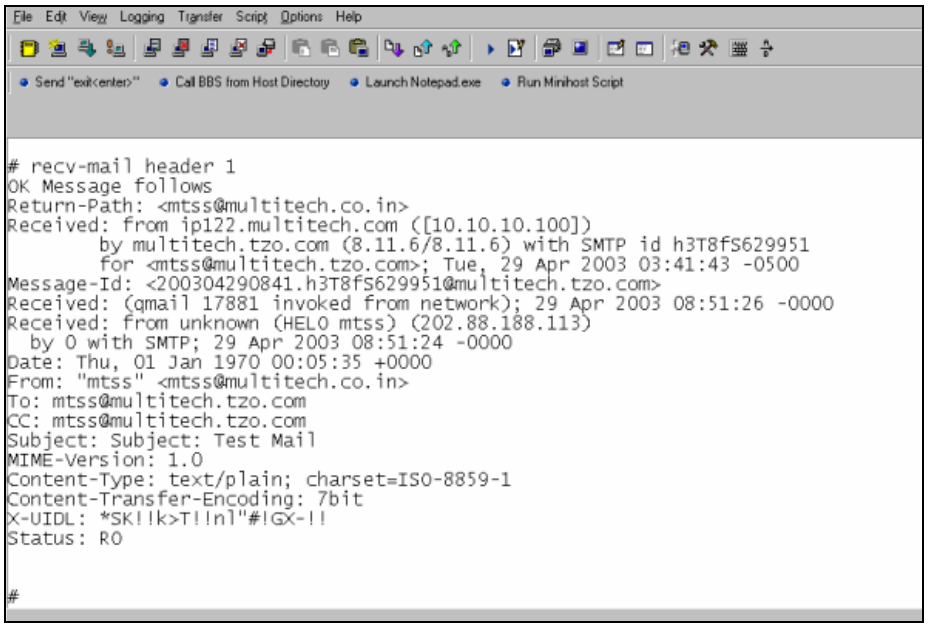
Use the command **recv-mail list <n>** to retrieve the message size of the **n**th message. The output is multi-lined.



Scenario 4 – Retrieving Emails Headers

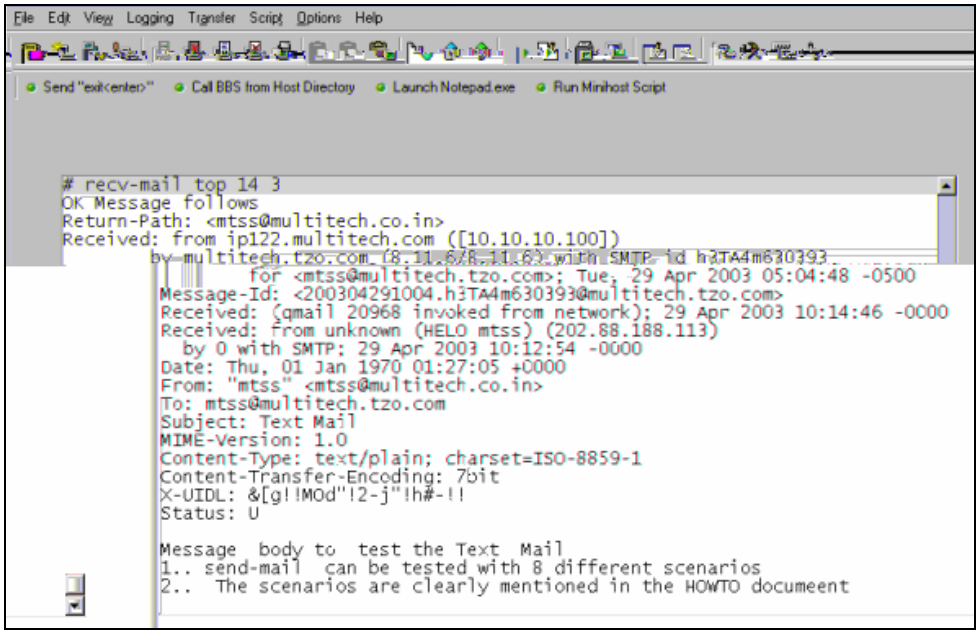
Use the command **recv-mail header** to retrieve the message header of all emails. The output is multi-lined.

Use the command **recv-mail header <n>** to retrieve the message header of the **n**th email. The output is multi-lined.



Scenario 5 – Retrieving First *t* Lines

To retrieve the first few lines of an email, use the command **recv-mail top <n> <t>**, where **n** is the message number and **t** is the number of lines to be retrieved. This command shows the message headers and the first **t** number of lines. The output is multi-lined.



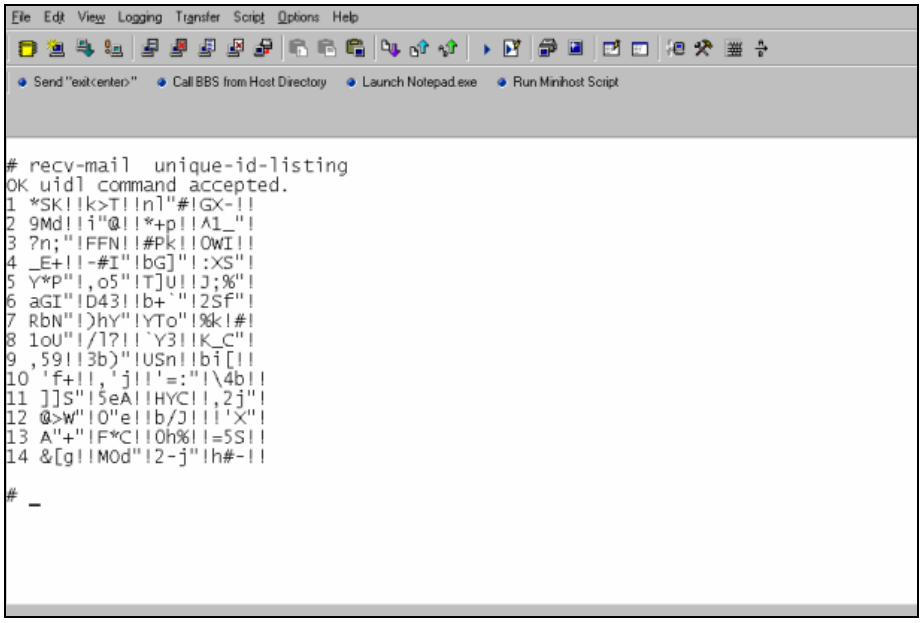
Scenario 6 – Deleting an Email on the Server

Use the command **recv-mail delete <n>**, where **n** is the message number of the email that should be deleted from the server.

 # recv-mail delete 1
OK

Scenario 7 – Retrieving the Unique Email ID

Use this command to retrieve the unique email ID of a message. The unique message ID is used to identify the message with a unique string.



Error Messages

- **ERROR Invalid parameters. Check POP3 parameters**

  This error message is displayed if the POP3 parameters are not configured correctly. See prerequisites for POP3.
- **ERROR: Set up failed**

  This error occurs if the server is not accessible or the POP3 client is not able to connect to the POP3 server on the configured port.
- **ERROR: Unable to login**

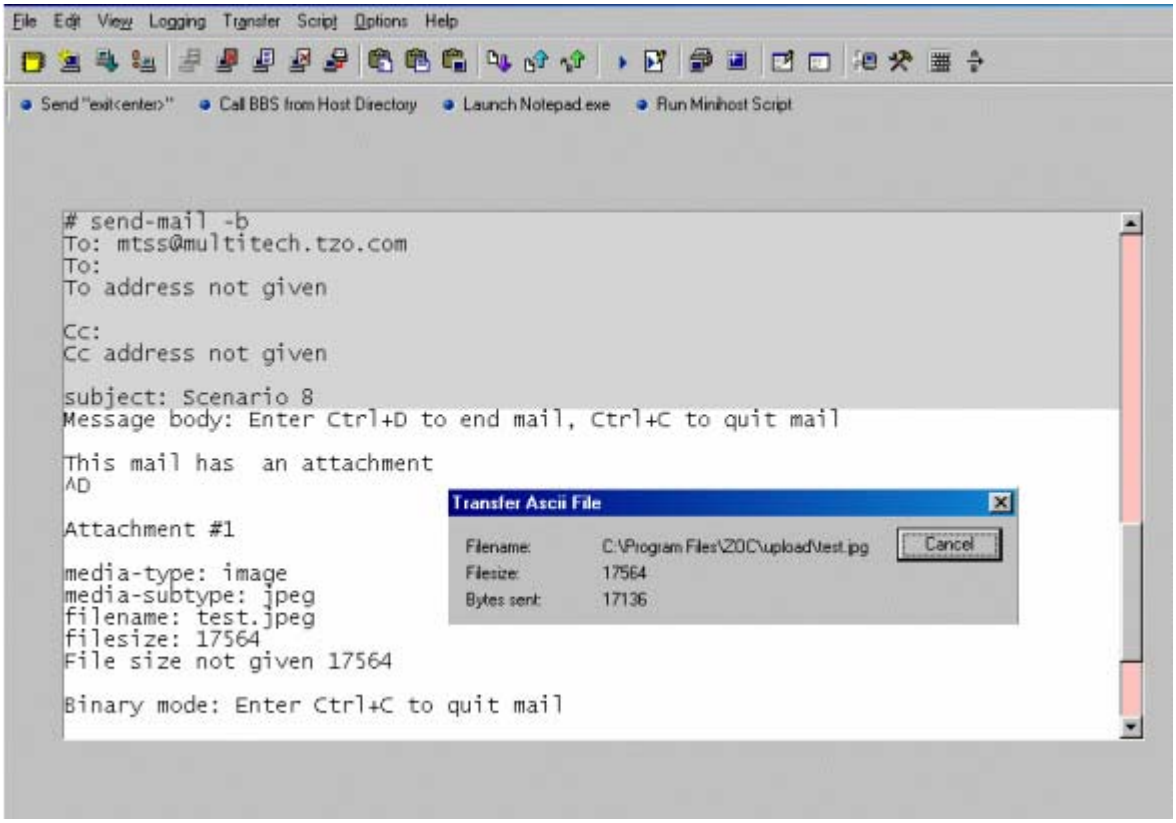
  This error occurs if the POP3 client could not authenticate to the POP3 server. This could happen when the username or password is not valid.
- **Other errors**

  Other errors might occur due to **timeout**, **none availability of resources**, etc.

Scenario 8 – Sending a Mime Encoded Binary Email Using Interactive Mode

Issue the following command: **send-mail -b**

The SMTP session then enters into interactive mode requesting the **to-address**, the **cc-address**, **subject,** and **message body** to be entered. After completion of the message, type **Ctrl+D** to end the message.



The SMTP session enters into interactive mode requesting media-type, media-subtype, filename, filesize, and the attachment body as shown in the figure.

When the attachment body reaches the filesize, another message is displayed asking whether to continue with one more attachment. Type **n** for **No**. The email with its attachment is sent only to the entered **to-addresses** (if any) and **cc-addresses** (if any). The **subject** and **message body** are used as entered in the interactive mode.

Notes:

1. The email is sent only to addresses entered in interactive mode.
2. If the **subject** is pre-configured using set commands, it will be used as the subject for the email.
3. Type **Ctrl+C** to quit the email at any given time.
4. If the host wants to quit the email while sending the binary attachment body, type **Ctrl+C** and wait for 3 seconds without entering any character to quit the email.

Chapter 15 – FTP Client

Introduction

The FTP Client is used to establish a TCP session to the FTP server running on port 21. This chapter covers the FTP Client Features and provides you with ten FTP Client Scenarios.

FTP Client Features

- Supports automatic authentication to the FTP server depending on the configuration.
- Supports listing the contents of the specified directory of the FTP server
- Supports active and passive modes of data transfer.
- Supports sending files from the host/serial device to the FTP server.
- Supports receiving files from the FTP server to the host/serial device.

Command to List Directory Contents or to Send/Receive Files

The host/serial device can use the following command to list the contents of the directory or to send/receive text/binary files to/from a remote server depending upon the requirement.

ftp < [-l] [-t] [-r] > [-p] <ip-address/host-name>

The FTP command will prompt for the details required if these details were not configured previously.

Important:

1. The user must have access permission to perform the above functionality.
2. FTP client cannot be accessed through a Telnet session.
3. By default, the data connection is in active mode. This can be optionally changed to passive mode by using **-p** option in the command.
4. By default, the Format control is set to NON_PRINT, the structure type is set to FILE, and the Transmission mode is set to STREAM mode in the client.
5. The file transfer can be done only if the server supports BINARY/IMAGE data type.
6. The file can be received only if the server supports SIZE command.

Prerequisites

The host/serial device must ensure the validity of the following details before using FTP client:

1. If the host device wants to use domain names instead of an IP address for a remote server, then the following parameters must be set:
   - Default Gateway should be configured to a valid IP address.
     ```
     # set ip def-gway <ip-address>
     ```
   - DNS should be enabled.
     ```
     # set ip dns <enable>
     ```
   - DNS address should be configured to a valid ip-address.
     ```
     # set ip pri-dns <ip-address>
     ```

2. If you want the host device to use automatic authentication to a particular FTP server, then set the following parameters:
   - **Mandatory:** The device name should be configured to a valid the IP address/host-name. The login name should be set to a valid user name.
     ```
     #set ftp machine <ip-address/host-name/default> login
     <user-name>
     ```
   - **Optional:** The password can be optionally configured as the password corresponding to the user name.
     ```
     # set ftp machine <ip-address/host-name/default>
     login <user-name> password <passwd>
     ```
   - **Optional:** The account password can be optionally configured as the password corresponding to the user name. This is an extra authentication that can be used when an FTP server asks for an account password.
     ```
     # set ftp machine <ip-address/host-name/default>
     login <user-name> password <passwd> account <passwd>
     ```

ERROR Messages

An ERROR message displays if any of the above details are not configured or are not valid.

How to Delete a Previous Configuration

The previous configuration can be deleted by specifying the following command:

"set ftp machine" without any arguments.

Notes:

- If a value is configured as the default, the FTP client tries to authenticate for every FTP server.
- If the above mandatory fields are not configured or if the configured device and the server specified in the command line are different, MultiConnect IP prompts the user to enter login name and password.

Scenario 1 - Listing Directory Contents

This scenario describes how to list the contents of the specified directory of the FTP server without Automatic Authentication (default) and the data connection in ACTIVE mode.

Description	The MultiConnect IP establishes the control connection to the specified FTP server and prompts the host device to enter the login name, password:
	`Name (ip-address:admin)`: mtss <CR>
	`Password`: **** <CR>
	If successfully logged in, MultiConnect IP sends a message and prompts the host device to enter the *remote directory, the* contents of which will then be displayed.
	`Connected`
	`Remote directory: <CR> or <Directory-Path>`
	If the Host simply enters <CR> without specifying the directory, then the contents of the present working directory are listed. If the complete path of the directory is given, then the contents of that directory are listed.
	By default the data connection is in active mode. The client sets the data transfer mode as 'ASCII' to receive the list of contents of the directory.

Configuration	None
Command	`ftp -l ip-address`
Result Response	OK: FTP session closed

Scenario 2 - Listing Directory Contents

This scenario describes how to list the contents of the specified directory of the FTP server without Automatic Authentication (default) and the data connection in PASSIVE mode.

Description	The MultiConnect IP establishes the control connection to the specified FTP server and prompts the host device to enter the login name, password:
	`Name (ip-address:admin)`: mtss <CR>
	`Password`: **** <CR>
	If successfully logged in, MultiConnect IP sends a message and prompts the host device to enter the *remote directory, the* contents of which will then be displayed.
	`Connected`
	`Remote directory: <CR> or <Directory-Path>`
	If the Host simply enters <CR> without specifying the directory, then the contents of the present working directory are listed. If the complete path of the directory is given, then the contents of that directory are listed.
	The data connection is in passive mode due to the **'-p'** option. The client sets the data transfer mode as 'ASCII' to receive the list of contents of the directory.

Configuration	None
Command	`ftp -l -p ip-address`
Result Response	OK: FTP session closed

Scenario 3 - Listing Directory Contents

This scenario describes how to list the contents of the specified directory of the FTP server

a) With Automatic Authentication enabled by specifying all authentication details: IP address of the device, valid login name, valid password, and valid account password.

b) Data connection in ACTIVE mode.

Description	The MultiConnect IP establishes a control connection, automatically checks for the configured values, and logs into the FTP server. If successfully logged in, it sends a message and prompts the host device to enter the *remote directory*, the contents of which are then displayed as follows:
	`Connected`
	`Remote directory: <CR> or <Directory-Path>`
	If the Host simply enters <CR> without specifying the directory, then the contents of the present working directory are listed. If the complete path of the directory is given, then the contents of that directory are listed.
	By default the data connection is in active mode. The client sets the data transfer mode as 'ASCII' to receive the list of contents of the directory.
	Note: If the **'-p'** option is specified in the command, the data connection will be in passive mode

Configuration	`set FTP device <ip-address/host-name> login <user-name> password <passwd> account <passwd>`
Command	`ftp -l [-p] ip-address`
Result Response	OK: FTP session closed

Scenario 4 - Listing Directory Contents

This scenario describes how to list the contents of the specified directory of the FTP server

a) With Automatic Authentication enabled by specifying a few authentication details: IP address of the device and a valid login name.

b) Data connection in ACTIVE mode.

Description	The MultiConnect IP establishes a control connection, automatically checks for the configured values, and logs into the FTP server. If the user is a valid user, the host device is prompted to enter Password as shown here:
	`Password:` *** <CR>
	If successfully logged in, the MultiConnect IP sends a message and prompts the host device to enter the *remote directory*, the contents of which are then displayed as follows:
	`Connected`
	`Remote directory: <CR> or <Directory-Path>`
	If the Host simply enters <CR> without specifying the directory, then the contents of the present working directory are listed. If the complete path of the directory is given, then the contents of that directory are listed.
	By default the data connection is in active mode. The client sets the data transfer mode as 'ASCII' to receive the list of contents of the directory.
	Note: If the **'-p'** option is specified in the command, the data connection will be in passive mode

Configuration	`set ftp machine <ip-address/host-name> login <user-name>`
Command	`ftp -l [-p] ip-address`
Result Response	OK: FTP session closed

Scenario 5 - Sending a File to the FTP Server

This scenario describes how to send a file to the FTP server:
a) Without Automatic Authentication (default).
b) Data connection in ACTIVE mode.

Description	The MultiConnect IP establishes a control connection to the specified FTP server and prompts the host device to enter the login name and password as shown here: Name (ip-address:admin): mtss <CR> Password: **** <CR> If successfully logged in, the MultiConnect IP sends a message and prompts the host device to enter **Filename** and **Filesize** and sends a message as shown here: Connected Filename: filename <CR> Filesize: filesize <CR> Enter data. To terminate press Ctrl + C with 3 seconds delay. ------ File Transfer ---- When the specified filesize is reached, the FTP session responds with the OK message. By default the data connection is in active mode. The client sets the data transfer mode as 'BINARY/IMAGE' during the file transfer. **Note:** If the **'-p'** option is specified in the command, the data connection will be in passive mode
Configuration	None
Command	ftp -t [-p] ip-address
Result Response	OK: FTP session closed

Scenario 6 - Sending a File to the FTP Server

This scenario describes how to send a file to the FTP server:
a) With Automatic Authentication enabled by specifying all authentication details: IP address of the device, valid login name, valid password, and valid account password.
b) Data connection in ACTIVE mode.

Description	The MultiConnect IP establishes a control connection, automatically checks for the configured values, and logs into the FTP server. If successfully logged in, it sends a message and prompts the host device to enter Filename, Filesize, and then it sends a message as shown here: Connected Filename: filename <CR> Filesize: filesize <CR> Enter data. To terminate press Ctrl + C with 3 seconds delay ------ File Transfer ---- When the specified filesize is reached, the FTP session responds with the OK message. By default the data connection is in active mode. The client sets the data transfer mode as 'BINARY/IMAGE' during the file transfer. **Note:** If the **'-p'** option is specified in the command, the data connection will be in passive mode
Configuration	set ftp machine <ip-address/host-name> login <user-name> password <passwd> account <passwd>
Command	ftp -t [-p] ip-address
Result Response	OK: FTP session closed

Scenario 7 - Sending a File to the FTP Server

This scenario describes how to send a file to the FTP server:

a) With Automatic Authentication enabled by specifying a few authentication details: IP address of the device and valid login name.

b) Data connection in ACTIVE mode.

Description	The MultiConnect IP establishes the control connection to the specified FTP server, automatically checks for the configured values, and logs into the FTP server. If the user is valid, the MultiConnect IP prompts the host device to enter the Password as below: Password: **** <CR> If successfully logged in, the MultiConnect IP sends a message and prompts the host device to enter **Filename** and **Filesize** and sends a message as shown here: Connected Filename: filename <CR> Filesize: filesize <CR> Enter data. To terminate press Ctrl + C with 3 seconds delay. ------ File Transfer ---- When the specified filesize is reached, the FTP session responds with the OK message. By default the data connection is in active mode. The client sets the data transfer mode as 'BINARY/IMAGE' during the file transfer. **Note:** If the **'-p'** option is specified in the command, the data connection will be in passive mode
Configuration	set ftp machine <ip-address/host-name> login <user-name>
Command	ftp -t [-p] ip-address
Result Response	OK: FTP session closed

Scenario 8 - Receiving a File from the FTP Server

This scenario describes the receiving of a file from the FTP server:

a) Without Automatic Authentication (default).

b) Data connection in ACTIVE mode.

Description	The MultiConnect IP establishes a control connection to the specified FTP server and prompts the host device to enter the login name and password as shown here: Name (ip-address:admin): mtss <CR> Password: **** <CR> If successfully logged in, the MultiConnect IP sends a message and prompts the host device to enter **Filename** and sends a message as shown here: Connected Filename: filename <CR> size = <filesize from server> Press <CR> to receive file <CR> ------ File Transfer ---- When the complete file is received, the FTP session responds with OK. By default the data connection is in active mode. The client sets the data transfer mode as 'BINARY/IMAGE' during the file transfer. **Note:** If the **'-p'** option is specified in the command, the data connection will be in passive mode
Configuration	None
Command	ftp -r [-p] ip-address
Result Response	OK: FTP session closed

Scenario 9 - Receiving a File from the FTP Server

This scenario describes the receiving of a file from the FTP server:

a) With Automatic Authentication enabled by specifying all authentication details: IP address of the device, valid login name, valid password, and valid account password.

b) Data connection in ACTIVE mode.

Description	The MultiConnect IP establishes a control connection, automatically checks for the configured values, and logs into the FTP server. If successfully logged in, the MultiConnect IP sends a message and prompts the host device to enter the Filename, and then it sends a message as shown here: Connected Filename: filename <CR> size = <filesize from server> Press <CR> to receive file <CR> ------ File Transfer ---- When the complete file is received, the FTP session responds with OK. By default the data connection is in active mode. The client sets the data transfer mode as 'BINARY/IMAGE' during the file transfer. **Note:** If the **'-p'** option is specified in the command, the data connection will be in passive mode
Configuration	set ftp machine <ip-address/host-name> login <user-name> password <passwd> account <passwd>
Command	ftp -r [-p] ip-address
Result Response	OK: FTP session closed

Scenario 10 - Receiving a File from the FTP Server

This scenario describes the receiving of a file from the FTP server:

a) With Automatic Authentication enabled by specifying a few authentication details: IP address of the device and a valid login name

b) Data connection in ACTIVE mode.

Description	The MultiConnect IP establishes a control connection to the specified FTP server, automatically checks for the configured values, and logs into the FTP server. If the user is a valid user, the MultiConnect IP prompts the host device to enter the Password shown here: Password: **** <CR> If successfully logged in, the MultiConnect IP sends a message and prompts the host device to enter a Filename, and then it sends a message as below: Connected Filename: filename <CR> size = <filesize from server> Press <CR> to receive file <CR> ------ File Transfer ---- When the complete file is received, the FTP session responds with OK. By default the data connection is in active mode. The client sets the data transfer mode as 'BINARY/IMAGE' during the file transfer. **Note:** If the **'-p'** option is specified in the command, the data connection will be in passive mode
Configuration	set ftp machine <ip-address/host-name> login <user-name>
Command	ftp -r [-p] ip-address
Result Response	OK: FTP session closed

How to Close or Abort the FTP Session

The host can abort the FTP session by issuing "Ctrl+C" at any given time.

How to Abort a File Transfer Session

The host can abort the file transfer by issuing "Ctrl+C" with a delay of 3 seconds. The file into which data was written will be deleted by the client, and the data connection will be closed.

Note About Read and Store

The serial device has to read and store the data received. It has to implement timeout mechanisms to come out in cases where the network is prone to errors.

Chapter 16 – SNTP Client

Introduction

SNTP Client is used to synchronize timekeeping among a set of distributed time servers and clients. It is built on the IP and UDP, which provide a connectionless transport mechanism.

Features

- Supports SNTP client built on UDP (port 123) to update the local time after booting and at periodic intervals.
- Supports to set Standard Name of Time Zone.
- Supports to set offset from UTC.
- Supports Daylight savings feature.
- Supports the configuration of Offset During Daylight Savings, Start of Daylight Savings Time, and End of Daylight Savings Time.

Command to Enable/Disable SNTP Client

The host/serial device can the use the command below to enable/disable the SNTP client.

```
# set sntp-client <enable/disable>
```

Prerequisites

Mandatory Prerequisites: The following details are **mandatory** configuration and have to be validated before starting SNTP client:

- Set NTP server name or IP address.
  ```
  # set sntp-client ntp-server-name <ipaddress>
  ```
- Set the time-zone (Default is UTC).
  ```
  # set sntp-client time-zone <UTC>
  ```
- Set the time zone offset to be added
  ```
  # set sntp-client time-zone-offset <+00:00>
  ```
- Set the polling time.
  ```
  # set sntp-client polling-time <300>
  ```

ERROR Message

The *send-mail* command prompts for the ERROR message if any of the above details are not configured or not valid.

Optional Prerequisites: The following configurations are **optional** and can be used when you want the host device to enable daylight savings mode.

- Enable the Daylight Savings Mode
  # set sntp-client daylight-saving <enable>
- Set the Daylight Savings Offset value
  # set sntp-client daylight-saving offset <+60>
- Set the Start Ordinal/week for Daylight Savings.
  # set sntp-client daylight-saving start-ordinal <First>
- Set the Start Weekday for Daylight Savings.
  # set sntp-client daylight-saving start-weekday <sunday>
- Set the Start Month for Daylight Savings.
  # set sntp-client daylight-saving start-month <april>
- Set the Start Time for Daylight Savings.
  # set sntp-client daylight-saving start-time <10:00>
- Set the End Ordinal/ week for Daylight Savings.
  # set sntp-client daylight-saving end-ordinal <Last
- Set the End Weekday for Daylight Savings
  # set sntp-client daylight-saving end-weekday <sunday>
- Set the End Month for Daylight Savings.
  # set sntp-client daylight-saving end-month <october>
- Set the End Time for Daylight Savings.
  # set sntp-client daylight-saving end-time <10:00>

Scenario 1 - Updating Time from the NTP Server

This scenario describes the updating of time from the NTP server with Daylight Savings Mode **disabled**.

Description	The MultiConnect IP time and date are updated with the time specified by the server and with the time-zone offset added to the time. SNTP client should send periodic requests to the server for the time update function depending on the polling time.
Configuration	1. Mandatory configuration.
Command	`set sntp-client enable`
Result Responses	Use "show date" or "show time" commands to check. Time and Date should be synchronized with the server. OK

Scenario 2 - Updating Time from the NTP Server

This scenario describes the updating of time from the NTP server with Daylight Savings Mode **enabled**.

Description	The MultiConnect IP time and date are updated with the time specified by the server and with the daylight offset added to the time if the time falls between start and end configuration. SNTP client should send periodic requests to the server for the time update function depending on the polling time.
Configuration	1. Mandatory configuration. 2. Optional configuration.
Command	`set sntp-client enable`
Result Responses	Use "show date" or "show time" commands to check. Time and Date should be synchronized with the server. OK

Note:
When the server cannot be reach or is not running, the SNTP client tries to reach the server every 10 seconds for 6 times and waits for the polling time, and then it tries again to reach the server as before.

Appendix A – Flash Upgrade

Introduction

The MultiConnect Adapter contains a 2 MB flash wherein the boot image, the firmware and configuration files are stored in a compressed format. The flash can easily be upgraded both locally as well as remotely.

- **Local Upgrade**
  The flash of the MultiConnect can be upgraded locally through serial port using the upload feature of serial applications.
- **Remote Upgrade**
  The flash can be upgraded remotely through the Ethernet using TFTP.

The MultiConnect Adapter flash contains two main files, which are required for an upgrade.

- **Binary File**
  - The binary file contains the firmware of the Adapter
    The name of this binary file would be in the following format
    MTXCSEM-TFTP-v<version>w-<date in ddMmmyyyy format>
- **Gun-zipped .tar File**
  - This contains the HTML pages of the serial device and other files related to it, such as **http-host-param** (**http page configuration file**)
  - The name of this tar file would always be **http.tar.gz**

Prerequisites

Prerequisite 1 – Required Tool (TFTP Client)

A Trivial File Transfer Protocol (TFTP) client must be installed on your PC in order to execute the flash upload procedure.

TFTP for Windows

Though Windows 98 and ME do not come with a TFTP client, the file can be copied from a PC operating Windows NT or 2000 (not XP):

- On a PC operating Windows NT or Windows 2000, locate the TFTP file at C:\WINNT\SYSTEM32\tftp.exe.
- Copy the this file to C:\WINDOWS on your Windows 98 or ME PC.

Downloading TFTP from the Internet

If your operating system does not include a TFTP client program, a TFTP client program is available for Windows users from the Internet. Walusoft's TFTP Suite Pro is recommended. The URL is:

http://www.walusoft.co.uk/download.htm

Prerequisite 2 – Serial Port Configuration

The default serial port parameters should be:

Data length – 8 bits
Parity – None
Stop bits – 1
Baud-rate of the serial port to which the MultiConnect Adapter is connected should be set to 115200 bps for proper operation.

Prerequisite 3 – Enabling TFTP Server

Enable TFTP server on MultiConnect Adapter by issuing the following command:

```
# set ip tftp enable
  OK
```

Serial Flash Upgrade Scenario

Following steps explain the procedure to upgrade a flash using the serial COM port (serial flash upgrade).

Connect the MultiConnect Adapter to a PC COM Port.

- Open an application through which we can access the serial device(e.g., Meterm, zoc, hyperterm).
- Reboot the MultiConnect Adapter.
- Wait for the boot message and prompt “press d to download” to appear.
- Press **d** when prompted.
- Select the **XMODEM** Protocol from the Terminal application.
- Choose a file (MTXCSEM-TFTP-…) file to be uploaded.
- Perform a file upload.

The MultiConnect Adapter reboots and will be up after a few seconds (10-15 secs).

The MultiConnect Adapter reboots after it has been successfully upgraded.

Appendix B – Regulatory Information

Regulatory Information

FCC Part 15 Regulation

This equipment has been tested and found to comply with the limits for a **Class A** digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Plug the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC rules. Operation of this device is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference that may cause undesired operation.

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

Industry Canada

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Reglement Canadien sur le matériel brouilleur.

CE

EMC, Safety, and Directive Compliance

The CE mark is affixed to this product to confirm compliance with the following European Community Directives:

Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of Member States relating to electromagnetic compatibility;

and

Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.

Appendix C – Warranty and Service

Multi-Tech Warranty Statement

Multi-Tech Systems, Inc., (hereafter “MTS”) warrants that its products will be free from defects in material or workmanship for a period of two, five, or ten years (depending on model) from date of purchase, or if proof of purchase is not provided, two, five, or ten years (depending on model) from date of shipment.

MTS MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.

This warranty does not apply to any products which have been damaged by lightning storms, water, or power surges or which have

Repair Procedures for International Distributors

International distributors should contact their MTS International sales representative for information about the repairs for their Multi-Tech product.

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our International Technical Support department at +(763)717-5863. When calling the U.S., please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at +(763) 717-5631 in the U.S.A. or email mtsrepair@multitech.com.

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

Replacement Parts

SupplyNet, Inc., can supply you with replacement power supplies, cables and connectors for selected Multi-Tech products. You can place an order with SupplyNet via mail, phone, fax or the Internet at the following addresses:

Mail:	SupplyNet, Inc. 614 Corporate Way Valley Cottage, NY 10989
Phone:	800 826-0279
Fax:	914 267-2420
Email:	*info@thesupplynet.com*
Internet:	http://www.thesupplynet.com

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