NETWORK TECHNOLOGIES INCORPORATED
1275 Danner Dr Tel:330-562-7070
Aurora, OH 44202 Fax:330-562-1999
www.nti1.com

SERIMUX™ Series

Console Switch

Installation and Operation Manual

Supported by:

Rackit® Technology Corporation
274 Madison Avenue, New York, NY 10016
Tel: (212) 679-0050 • Fax: (212) 679-0040
1 . 8 0 0 . 6 3 6 . 3 4 3 4

www.RackitTechnology.com

MAN075 Rev Date 3/13/2003

Warranty Information

The warranty period on this product (parts and labor) is one (1) year from the date of purchase. Please contact Network Technologies Inc at **(800) 742-8324 (800-RGB-TECH)** or **(330) 562-7070** for information regarding repairs and/or returns. A return authorization number is required for all repairs/returns.

Copyright

Copyright © 2003 by Network Technologies Inc. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written consent of Network Technologies Inc, 1275 Danner Drive, Aurora, Ohio 44202.

Changes

The material in this guide is for information only and is subject to change without notice. Network Technologies Inc reserves the right to make changes in the product design without reservation and without notification to its users.

TABLE OF CONTENTS

TABLE OF FIGURES

APPENDICES

Introduction

The NTI SERIMUX Console Switch is a serial port router that allows links (or connections) between multiple pairs of RS-232 asynchronous serial ports. The main purpose of the switch is to enable users to manage several serial devices from local or remote locations (using external modems). Devices include routers, DSU's, servers, switches or any other equipment allowing serial operation using RS232 interface. Users can work locally (using a VT100 or ANSI serial console or a CPU with a terminal program (i.e. HyperTerminal)) or from remote locations.

Each SERIMUX port has to be configured for serial communication (baud rate, parity, etc) within the specifications of the attached device, but the configurations of the two devices linked by the SERIMUX do not need to match. (I.e. A device configured to communicate at 56K bps will be able to communicate with another device configured to communicate at 128K bps.) Various parameters (hardware and/or software flow control, timeout, etc) can be selected for each SERIMUX port. Devices may be either locally connected or connected through attached modems.

The Console Switch will support 2 operator levels, administrator and user

The administrator has full command access to the SERIMUX Console Switch. The administrator is able to:

- view the status of any port
- connect or disconnect ports
- disconnect as administrator, connect as administrator or link to another port
- inspect buffered data
- restrict port operation modes (e.g. Port “x” is not allowed to enter into administrator/user mode)
- view and/or modify port passwords and parameters
- change users and/or passwords
- disconnect users.
- control modems connected to ports

The users have limited command access. Users are able to:

- view port status
- connect ports
- disconnect as user, connect as user or link to another port
- disconnect port connections

Materials

Materials Supplied with this kit:

SERIMUX Console Switch
120 or 240 Volt , 50 or 60Hz / 9VDC 2.0A AC Adapter

Note: The power socket on the SERIMUX is marked "12VDC". The SERIMUX operating range is 9-12VDC.

Materials Required but not supplied:

RS232 cable with at least one 9D female end for connection to the Console Switch from each device to be connected. See Appendix B on page 34 for cable pinouts.

Serial Interface Specifications

- Numper of ports: 9, 17, 25 or 33 RS232 ports;
- Connectors: 9D male, DTE configuration;
- Data: asynchronous, 5, 6, 7, or 8 bits per character,
- Parity: even, odd, or none
- Stop Bits: 1, 1 ½, 2, or 2 ½ bits
- Flow Control: Xon/Xoff, RTS/CTS, Both, or None
- Baud Rate: 50 bps to 128,000 bps (incl. all standard rates)

Definitions

administrator mode- describes the status of a port with the administrator connected

buffer mode- describes a port in a static, disconnected state, awaiting a connection with a user or another port.

device- equipment that can transmit and/or receive data using RS232 interface

inactivity- when a port is not receiving data from the device connected to it

link- a software connection between two SERIMUX ports

terminal program- a terminal emulation program- computer program that communicates via RS232 interface (i.e. HyperTerminal)

timeout - time period of inactivity after which a port will be forced into buffer mode

user group- group of ports having the same user access password assigned to them

user mode- describes the status of a port with a user connected

+ - (i.e. [Shift] + [<]) press the keys simultaneously

- - (i.e. [P] - [0]) press the P and 0 keys consecutively

SERIMUX Port Modes

The SERIMUX ports can be in the following modes:

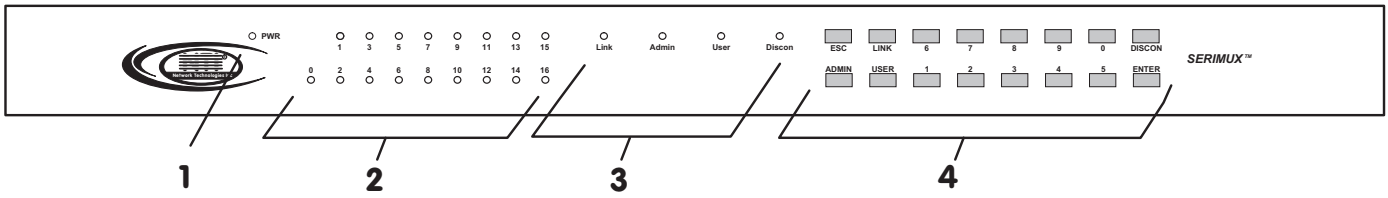
Buffer mode: Port not connected, the port can be configured to accept an administrator password and/or the port password, to enter into administrator mode or user mode

Link mode: Port connected to another port. The serial devices connected (attached) to any two ports can communicate (exchange) data. Each SERIMUX port has to be configured for serial communication (baud rate, parity, etc) within the specifications of the attached device, but the configurations of the two devices linked by the SERIMUX do not need to match. Various parameters (hardware and/or software flow control, timeout, etc) can be selected for each SERIMUX port. Devices may be either locally connected or connected through attached modems.

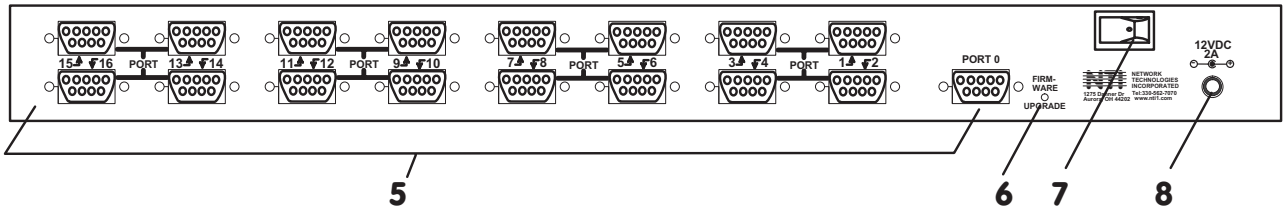
Administrator/User Mode: Administrator mode for full access, or User mode for limited access; Only one administrator can log-in at a time, thus only one port can be in administrator mode at a time. The administrator can login from a locally connected device, or from a remote device connected through an attached modem. Multiple users may be connected, provided multiple user groups have been configured in the SERIMUX by assigning common passwords to multiple port groups.

FEATURES AND FUNCTIONS

Front View of SERIMUX



Rear View of SERIMUX



Features and Functions

1. PWR LED- LED will illuminate to indicate the SERIMUX is ON
2. Port LEDs- LEDs will illuminate to indicate an active administrator port and data traffic; also used to indicate port number when entering commands from the keypad.
3. Command LEDs- LEDs will illuminate to indicate functions being performed
4. Keypad- for manual control of switch functions
5. PORT x- Serial connectors- 9D male DTE connectors- for connecting serial device cables
6. Firmware Upgrade button- for manual control of upgrade process for SERIMUX firmware
7. Power Switch- for turning the SERIMUX ON or OFF
8. 12VDC 2A- connection jack for the AC adapter (acceptable operating voltage is 9-12VDC)

Installation

1. Connect a serial device to PORT 0 on the SERIMUX using a serial cable with a 9D female connector. (See Fig. 1) This will be the default administrator device.
2. Connect each device to be controlled by the SERIMUX to any remaining port (1-16/24/32) using a DTE type serial cable with a 9D female connector.

Note: There are two types of serial devices, data communication equipment (DCE)(i.e. modem) and data terminal equipment (DTE) (i.e. CPU), each having different connector pin assignments. See appendix B on page 34 for pin assignment tables for compatible cables.

3. Follow the "Initial Startup" instructions that follow.

Rear View of SERIMUX

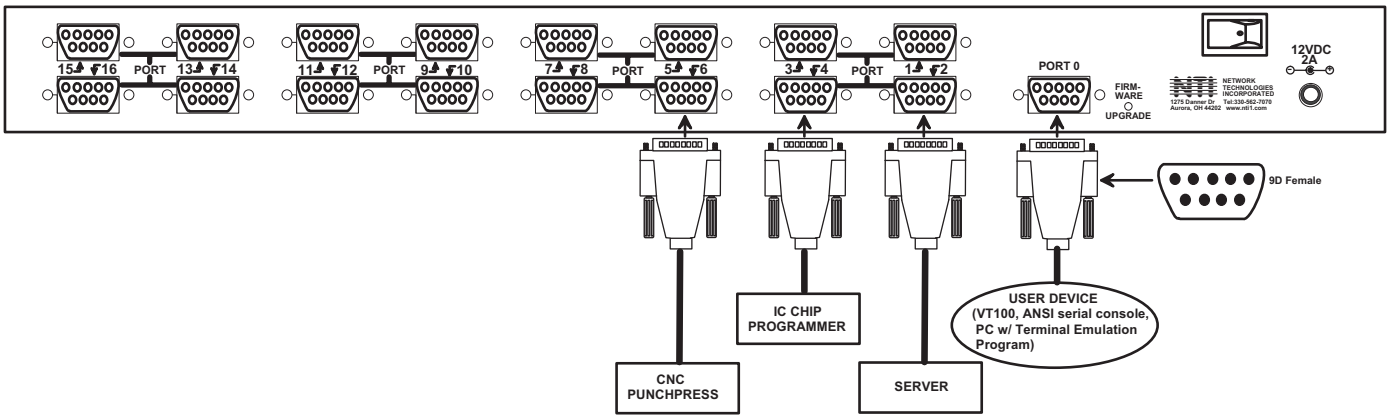


Figure 1- Console Switch Connections to User and Devices

Initial Startup

SERIMUX Quick Start

1. Make sure the SERIMUX is turned OFF.
2. Using the serial device connected to port 0, start the terminal program (e.g. Windows HyperTerminal) and configure it as follows:
   - direct connection (using the appropriate CPU local serial Com port)
   - 9600 bps
   - 8 bits
   - no parity
   - 1 stop bit
   - no flow control
   - ANSI or VT100 terminal mode.
3. Power ON the SERIMUX. Wait 2 seconds.
4. Press [Enter] on the keyboard and wait 3 seconds to be recognized as the SERIMUX administrator. The administrator main menu will be displayed (see Fig 2).

NOTE: If the administrator main menu does not display, an administrator password may have already been defined. If the password is not known, re-initialize the SERIMUX following the "Initialize SERIMUX Console Switch to default settings" instructions on page 30.

```
Network Technologies Inc
SERIMUX/Switch - v.1.5

Port: 0
Port name: Port00

        Administrator Main menu

        1.Links (port connections)
        2.Serial communication settings
        3.Modem settings
        4.Names, passwords, rights
        5.Disconnect ports (at timeout or in-band)
        6.Buffer inspect
        7.Administrator
        8.User groups
        9.Firmware update
        0.Quick commands menu
```

Figure 2- Administrator menu

On the SERIMUX, the LED for port 0 will be illuminated.

Quick Commands Menu

Press [0] or [Q] on the keyboard to enter the Quick Commands menu. From this menu the administrator can quickly perform several of the most frequently used functions of the SERIMUX Console Switch. This menu can also be used for commanding the SERIMUX using external software, rather than a user keyboard interface.

```
Quick commands

Port: 00
Port name: Port00

        Port Connection Status (Pxx<CR>)
        Link (connect) ports (Lxx,yy<CR>)
        Disconnect port (Dxx<CR>)
        Administrator port (Axx<CR>)
        User port (Uxx<CR>)
        Modem connected to port  (Mxx,1/0<CR>)
        Quit quick commands mode (Q<CR>)
```

Figure 3- Quick Commands Menu

Note: In the keystroke commands illustrated below, substitute the desired port number for the keys "xx" and "yy" (i.e. 01,02, etc).

Function:	**Keystrokes**
Check the status of a port connection	P - (0-3) x - (0-9) x - Enter **(Pxx would be P01, P02, etc.)**
Create a link between two ports	L - (0-3) x - (0-9) x - (comma) , - (0-3) y - (0-9) y - Enter
Disconnect port- break the connection between a device and the SERIMUX placing the port in buffer mode	D - (0-3) x - (0-9) x - Enter
Assign port to be the administrator port	A - (0-3) x - (0-9) x - Enter

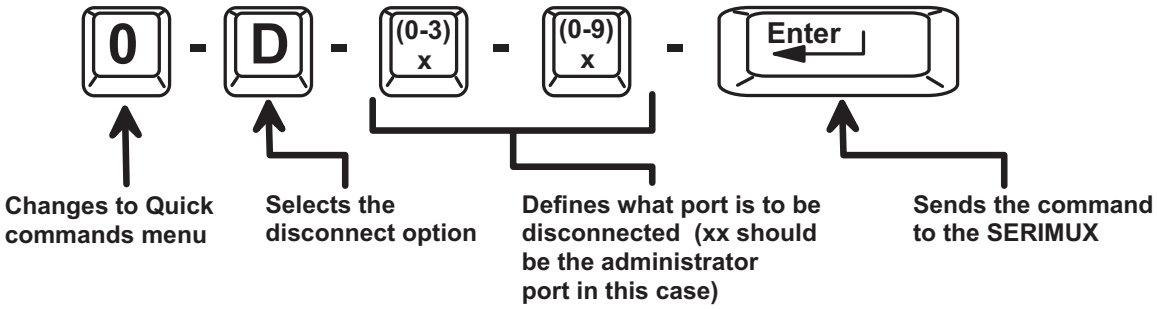
Function:	Keystrokes
Assign eligible port to be a User port forcing the port into User mode	
Configure a port for use with a connected modem and initialize the modem, leaving the port in buffer mode	
Re-Configure a port for use with a CPU after disconnecting a modem	
Exit the quick commands menu and return to administrator main menu	

Note: The port numbers may be entered with or without leading 0's. If no number is entered, the value zero will be entered by default. If a number with more than two digits is entered, the last two digits will be recognized.

- An incorrect or impossible command will generate an error answer: “Err”. Otherwise, the message "Ok" will be displayed.
- Press [Esc] key anytime to cancel the command sequence, and return to the main menu.
- After any quick command, press [Space] key to display again (refresh) the quick commands menu.

To exit (logout from) the Administrator main menu, type 0D00 and press [Enter]. This will open the quick commands menu, choose the disconnect ports option, and place port 00 in buffer mode. The message "Disconnecting administrator now" will appear on the terminal display.

To logout the administrator, from the Administrator main menu type:



NOTE: If the administrator port is port 0, then the above command can be shortened to [0] - [D] - [Enter] .

Administrator Re-Connect

While the administrator port is in buffer mode, the administrator only needs to press the [Enter] key (and password if set) to return to the Administrator menu. However, before linking the administrator port to another port, the administrator should consider how to re-connect to that port (return to the Administrator menu) from the keyboard if the administrator desires to do so. There are two simple ways to do this:

- Configure the disconnect method for the port for an acceptable timeout period. (The default timeout period is 15 minutes.) This would be an acceptable period of time after which the port will disconnect its link with any port connected to it and return to buffer mode. Once in buffer mode the administrator can return to the administrator menu by pressing [Enter] (and the password if set).

- Configure the administrator port of the SERIMUX to respond to an in-band disconnect method of either a 1 character or 3 character string. (The default 1 character string is "[Ctrl] + [X] ", the default 3 character string is " ``` " (three back quotes).) This would enable the administrator to break the link to another port and return to buffer mode by typing the chosen characters in the terminal program window while the port is linked to another port. Once in buffer mode the administrator can return to the administrator menu. . By default, the SERIMUX is not configured to respond to an in-band disconnect string.

To configure the SERIMUX for either a different timeout period or to respond to one of the in-band disconnect methods, follow the instructions on page 17 under "Port settings: Timeout, in-band disconnect".

Links- Port Connections Screen

The Port Connections screen displays the status of all ports on the SERIMUX Console Switch. From this screen the administrator can see the operating status of each port on the SERIMUX and change connections as needed.

1. From the Administrator Main menu , press [L] or [1]. The "Port Connections" screen will be displayed (see Fig. 3).

NOTE: The SERIMUX Console Switch menu accepts both upper and lower case letter commands from the keyboard. Keyboard commands will be denoted by characters surrounded in brackets (i.e. [x]).

```
Port Connections

Port|      Name      |Mode/Disc| To|Alw|Port|      Name      |Mode/Disc| To|Alw
----+----------------+---------+---+---+----+----------------+---------+---+---
  0 | Port00         | Adm /No | - |A U|  1 | Port01         | Buf /No | - |A U
  2 | Port02         | Buf /No | - |A U|  3 | Port03         | Buf /No | - |A U
  4 | Port04         | Buf /No | - |A U|  5 | Port05         | Buf /No | - |A U
  6 | Port06         | Buf /No | - |A U|  7 | Port07         | Buf /No | - |A U
  8 | Port08         | Buf /No | - |A U|  9 | Port09         | Buf /No | - |A U
 10 | Port10         | Buf /No | - |A U| 11 | Port11         | Buf /No | - |A U
 12 | Port12         | Buf /No | - |A U| 13 | Port13         | Buf /No | - |A U
 14 | Port14         | Buf /No | - |A U| 15 | Port15         | Buf /No | - |A U
 16 | Port16         | Buf /No | - |A U| 17 | Port17         | Buf /No | - |- -
 18 | Port18         | Buf /No | - |- -| 19 | Port19         | Buf /No | - |- -
 20 | Port20         | Buf /No | - |- -| 21 | Port21         | Buf /No | - |- -
 22 | Port22         | Buf /No | - |- -| 23 | Port23         | Buf /No | - |- -
 24 | Port24         | Buf /No | - |- -| 25 | Port25         | Buf /No | - |- -
 26 | Port26         | Buf /No | - |- -| 27 | Port27         | Buf /No | - |- -
 28 | Port28         | Buf /No | - |- -| 29 | Port29         | Buf /No | - |- -
 30 | Port30         | Buf /No | - |- -| 31 | Port31         | Buf /No | - |- -
 32 | Port32         | Buf /No | - |- -|

Press 'C' to change a connection, 'R' to refresh this page
```

Figure 4- Port connections displayed

On the screen, the following categories will be displayed in consecutive columns :

- Port- the port number
- Name- the port name
- Mode- the present port mode- either set as administrator, user, link, or buffer (“Adm”, “Usr”, “Lnk”, “Buf” respectively) with the “M” prefix if a modem is attached to a port, and the “W” suffix if the modem is waiting to be connected to a remote terminal
- Disc- the remaining time until port disconnection ("NO" if not connected or not timeout period is set) (see page 17, "Port Settings: Timeout, in-band disconnect for instruction on setting the timeout periods)
- To- if linked, the port connected to
- Alw- port allowance to enter in command mode (“A” or " - " if the administrator is allowed or not, “U” or " - " if a user is allowed or not, (see page 13, "Port settings: names,passwords, rights" for instruction on setting port connection allowances)

From this menu the administrator can:

- press [R] to refresh the information on the screen (to display again the most current information),
- press [C] or the [Enter] key to change a connection,
  Once the [C] is pressed, type the first port number,
  press [Enter],
  enter the second port number,
  press [Enter].
- press [Y] or [Enter] to define another link. The link table is displayed again.
- otherwise, press any other key (except [Esc]). The user will be prompted to "Update & exit".
- press [Y] or [Enter] to save the link modifications, or any other key to abandon the modification, and go to the main menu.

Port 0 and all other valid switch ports (depending upon which SERIMUX model is in use) will be available, as indicated in the “Alw” (allow) column (see Fig 4), after initialization.

Special notes:

Ports 1-32 will be listed, but only those ports supported by the SERIMUX model purchased will have an "A U" in the column with the heading "Alw".

A port in buffer mode is in a static, disconnected state, awaiting a connection with a user or another port.

Connecting one valid port to itself or to an invalid port (port number greater than 32) will force the port into buffer mode (and disconnect if it was connected).

The port numbers are defined as 2-digit decimal numbers. Starting (by default) from "00", the last two-digit keys entered are displayed and validated as the port number after pressing [Enter]. Pressing the [Esc] key or [Spacebar] key on the keyboard cancel the command; any other key is ignored.

When link changes have been made but the changes have not yet been saved, if the user presses [R] to refresh the Port Connections menu, a "*" prefix will appear in the "To" column of ports with pending changes.

2. Press [Esc] or [Spacebar] on the keyboard to return to the administrator main menu.

Using the SERIMUX Console Switch

The SERIMUX Console Switch is controlled using

- Serial Control- via RS232 cable from a "dumb" terminal- locally connected
  - via CPU terminal program that emulates a terminal- locally connected
  - through an external modem from a remote location
- the Keypad (reduced set of commands)

Serial Control

The SERIMUX Console Switch can be easily configured using serial communications with a keyboard controlled menu to modify various parameters and options for each port to be connected to a device. The administrator menu can be accessed by the administrator for full feature control, or the user menu, by any user, for more restricted control of port connections.

Keypad Control

The keypad has direct control over Console Switch functions. The keypad can be used to make changes to port connections regardless of any menu control taking place. Command LEDs on the front panel of the SERIMUX Console Switch indicate the status of the switch and what function is being performed. For more on Keypad Control, see page 28.

Serial Control-The Administrator Menu

NOTE: The SERIMUX Console Switch menu accepts both upper and lower case letter commands from the keyboard. Keyboard commands will be denoted by characters surrounded in brackets (i.e. [x]).

The SERIMUX Console Switch will support 2 operator levels, administrator and user, each with separate password protection for security.

- The administrator logs in using an administrator password (the factory does not set a default password);
- Users log in using a port password (set by the administrator)

Note: If more than one port shares the same password, these ports then belong to a "group". User groups are setup by the administrator to restrict user access to specific ports. Only one user can log into each port group at a time.

Login as the administrator

1. From the CPU connected to any port, open the terminal program (configured as described on page 4 under "SERIMUX Quick Start").
2. Press [Enter] on the keyboard, wait three (3) seconds, and the port will enter into the administrator mode. (See Fig. 2, page 5).

Note: This will only enter the administrator mode if the administrator password has not yet been established. To login as the administrator after a password is established, see "Login as administrator with password" below.

Note: If the administrator was connected before the terminal program was last closed, and the terminal program is re-opened, the administrator will only need to press the [Spacebar] to refresh the connection and return to the administrator main menu.

Administrator port password

The administrator can prevent unauthorized access by establishing an administrator password. Once established, the password is needed to log in from any device, connected to any SERIMUX port in buffer mode.

Note: There is not a factory set default password. Once a password is established using the following procedure, the administrator must login as instructed under "Login as administrator with password" below. If no password will be establilshed, the administrator can login as instructed above under "Login as the administrator".

To establish or change the administrator password, from the Administrator main menu;

- press [7] or [A] to choose Administrator
- press [Y] or [Enter] to change port settings
- press [2] or [P]. to change the password parameter
- enter a password (series of 1 to 31 ASCII characters), using the [Backspace] key to erase any characters entered in error,
- press [Enter] and re-enter the password to confirm it,
- press [Y] to save the password and return to the administrator settings menu.

NOTE: The password entered will be case sensitive so be sure to note what characters are used and what case they are in if any are alphabetical. The password characters are displayed as '*' (asterisk) characters while entering them.

Press [N] to return to the administrator main menu.

Login as administrator with password

The administrator can login from a terminal program connected to any port on the SERIMUX Console Switch.

From the terminal program, open with a blank screen, on a device connected to any port in buffer mode;

- press [Enter],
- enter the administrator password (remember, case sensitive)
- press [Enter],
- wait 3 seconds.

The administrator main menu will appear on the terminal for the CPU on this port.
The former administrator port display will receive the message "Disconnecting administrator now" and will be disconnected.

Notes:

There will not be a prompt to enter the password. The password must simply be entered as described above.

The administrator password must be entered within 3 seconds of pressing [Enter] in order for it to be recognized by the SERIMUX. Otherwise, the administrator must press [Enter] and start the sequence again.

If the administrator password is not known, the administrator must re-initialize the SERIMUX following the "Initialize SERIMUX Console Switch to default settings" instructions on page 30.

Transfer Administrator Access From the Administrator Port

The administrator can transfer from one CPU to another without having to type in the password on the second CPU.

1. From the administrator main menu, press [7] or [A]. The screen will show the current administrator port number, name and password:

```
Port: 00
Port name: Port00

        1.Administrator port:  0
        2.Password: (undefined)

Do you want to change the port settings? (Y/N)
```

Figure 5- Administrator port access configuration

2. Press [Y] or [Enter], then press [1] or [A] to change the administrator port (and disconnect the current administrator).

If the port number to be changed to is not known, open a terminal program (configured as described on page 4 under "SERIMUX Quick Start ") on the connected CPU where administrator access is desired, press [Enter] and note the port number it is connected through.

3. From the current administrator port, press [Shift] + [>] (press simultaneously) until the port number of the other connected CPU appears.
4. Press [Enter], then [Y] to save the new value. The message: “Disconnecting user now” will be displayed by the terminal application running on the former administrator port. The administrator main menu will appear on the terminal application running on the new administrator port .

Link 2 ports

The “Port connections” screen (Page 7, Figure 4) lists all port connections (links), including port name, mode, the remaining time until disconnection and the linked port, if any (for more information on the "Port connections screen", see pages 4 and 5). From this menu, the administrator can link any 2 ports or disconnect any 2 linked ports.

From the Administrator Main menu, press [L] or [1]. The "Port connections" screen will be displayed. Choose two ports that are in buffer mode (disconnected).

- press [C] or [Enter] to change a connection.
- enter the first port number chosen,
- press [Enter],
- enter the second port number to link to,
- press [Enter].
- press [N] or [Spacebar],
- press [Y] or [Enter] to update the link changes.

The main menu will be displayed.

Disconnect 2 Linked Ports

Link two ports, as described in the previous section. From the administrator port, using the terminal program, press [L] or [1]. The “Port connections” screen will be displayed. Verify that two ports are linked.

- press [C] or the [Enter] key to change a connection.
- press xx (the first port number)
- press [Enter]
- press xx again (the same port as the first port number entered) as the second port number,
- press [Enter].
- press [N] or [Spacebar],
- press [Y] or [Enter] to update the link changes.

The main menu will be displayed.

Port settings: Serial Communication

Using the “Serial communication settings” menu, the administrator can adjust the settings of each port to control the communication between devices connected to the SERIMUX Console Switch ports:

Port Setting	Acceptable Values
receiver and transmitter serial baud rate	between 50 bps and 128 Kbps
character size	5, 6, 7 or 8 bits
stop bits	1, 1 ½, 2, 2 ½
Parity	even, odd, none
flow control	RTS/CTS (hardware), Xon/Xoff (software), Both (hardware and software), none
Xon and Xoff	between 0x00 and 0x19
DTR signal generated on disconnection	high, low or pulsed

Note: Some restrictions apply for port 0.

1. From the administrator main menu, press [2] or [S] to view and/or modify the serial communication settings for each port.

```
Port settings (serial communication)

Enter port number: 12
Port name: Port12

        1.Rx baud rate: 1200
        2.Tx baud rate: 300
        3.Character size: 7
        4.Stop bits: 1
        5.Parity: Even
        6.Flow control: Both (Hard+Soft)
        7.Xon character: Ctrl+'Q' [017]
        8.Xoff character: Ctrl+'S' [019]
        9.DTR on disconnect: Low (Inactive)

Press '<' or '>' to change the port
Do you want to change the port settings? (Y/N)
```

Figure 6- Port settings menu- configuring Port 12

2. Enter a port number, then press [Enter]. The screen will show the current port number and name, and the command menu (see Fig. 6).
3. Press [Shift] + [>] to display the serial communication settings for the next higher port (the port number will return to port 0 if [>] is pressed when the highest number port is current)
4. Press [Shift] + [<] for the previous port (the port number will return to the highest possible port number for the switch if [<] is pressed when port 0 is current).
5. Press [Y] or [Enter] to change some settings.
6. Press [1] or [R] to modify the Rx baud rate, between 50 bps and 128 Kbps. (See Fig. 7)

   NOTE: (exception- port 0 has a configuration range of 300 bps - 115.2 Kbps).

7. Press[Shift] + [<] or [Shift] + [>] to change (increase or decrease) the Rx baud rate value.

```
Port: 12
Port name: Port12

        1.Rx baud rate: 115200

Press '<' or '>' to change
or [Enter] to accept the parameter value
or [Space] or [Esc] to cancel
```

Figure 7- Change port receiver baud rate

8. Press [Enter] to accept and then press [Y] to save the value and return to the “Port settings” menu.
9. Press [2] or [T] to modify the Tx baud rate.
10. Select the speed for transmission (the same as it was changed for receiving), following the procedure described before (steps 7 and 8).
11. Repeat this procedure to change other parameters from the “Port settings” menu:
    - press [3] or [C] to modify the character size, from 5 to 8 bits per character, except for port 0 (7 or 8 bits)
    - press [4] or [S] to modify the stop bit number (1, 1 ½, 2, 2 ½), except for port 0 (1 stop bit)
    - press [5] or [P] to modify the parity (even, odd, none)
    - press [6] or [F] to modify the flow control (hand shaking) (none, RTS/CTS – hardware – out-band, Xon/Xoff – software – in-band, both)
    - press [7] or [X] or to modify the Xon character considered in the software flow control
    - press [8] or [O] or to modify the Xoff character used in the software flow control
    - press [9] or [D] to modify the DTR line behavior on port disconnection (when no port modem was declared) The DTR line can be held high (active), low (inactive) or pulsed for 0.5 seconds and then high.

Port settings: Modem settings

Using the “Modem settings” menu, the administrator is able to adjust settings for modem communication:

- the string used to reset the modem (“ATZ” by default)
- the string used to initialize the modem (“AT&F&C1&D2S0=0” by default)
- the string used to disconnect (hang-up) the modem (“ATH” by default)

1. From the administrator main menu, press [3] or [M] to view and/or modify the modem strings for each port.

2. Enter a port number, then press [Enter]. The screen will show the current port number and name, and the command menu:

```
Modem settings

Enter port number: 11
Port name: Port11

        1.Reset modem string: ATZ
        2.Initialize modem string: AT&F&C1&D2S0=0
        3.Hang-up modem string: ATH

Press '<' or '>' to change the port
Do you want to change the port settings? (Y/N)
```

Figure 8- Modem Settings Menu

3. Press [Y] or [Enter] to change some settings.

4. Press [2] or [I] to modify the initialization string.

```
Port: 11
Port name: Port11

        2.Initialize modem string: AT&F&C1&D2S0=0

Enter the new string
Press [Enter] to accept the string
or [Space] or [Esc] to cancel
```

Figure 9- Initialize the modem string

5. Press [Backspace] to remove unnecessary characters. Then type the characters desired.
6. Press [Enter] and [Y] to accept and save the new string.
7. Repeat this procedure to change other parameters from the "Modem settings menu".
   - Press [1] or [R] to modify the modem reset string
   - Press [3] or [H] to modify the modem disconnect (hang-up) string.

Port settings: names, passwords, rights

The administrator can control the access through each port individually, using the “names, passwords, rights” menu to define the following parameters:

- port name and password
- administrator and user access (log in) allowance
- external modem connection or disconnection (hang-up)
- force port into buffer mode or connect as user
- inter-character delay between transmitted characters: from 1 to 60 milliseconds, or none
- line-break receive allowance
- transmitted line-break extra duration: between 1 and 1000 milliseconds, or no break transmitted

1. From the administrator main menu, press [4] or [N].

2. Enter a port number, then press [Enter]. The screen will show the current port number and name, and the command menu:

```
Port settings (names, passwords, rights)

Enter port number: 12
Port name: Port12

        1.Name: Port12
        2.Password:
        3.Admin mode allowed: Yes
        4.User mode allowed: Yes
        5.Modem connected to port: No
        6.Force port mode:
        7.Inter-character delay: No
        8.Break receive allowed: No
        9.Transmitted break extra-duration: No break

Press '<' or '>' to change the port
Do you want to change the port settings? (Y/N)
```

Figure 10- Port names, passwords, and rights menu

- **Change the port name**
  - Press [Y] and then [1] or [N] to modify the port name.
  - Enter some characters (up to 15 characters- default ="Port00" to "Port32"),
  - Press [Enter] and [Y] to save the new name.

- **Modify the port password**
  - Press [Y] and then [2] or [P] to modify the port password.
  - Enter some characters (up to 31 characters- case sensitive),
  - press [Enter] and [Y] to save the new password.
- **Set Administrator access option**
  - Press [Y] and then [3] or [A] to allow or not the administrator to log in from this port. Port 0 is always accessible to the administrator for log in.
  - press [Shift] + [<] or [Shift] + [>] to change the selected parameter value,
  - press [Enter] and [Y] to save this new value.
- **Set User access option**
  - Press [Y] and then press [4] or [U] to allow or not the user to log in from this port. Port 0 can always be used to log in as user.
  - Press[Shift] + [<] or [Shift] + [>] to change the selected parameter value,
  - press [Enter] and [Y] to save this new value.
- **Set modem connection**
  - Press [Y] and then press [5] or [M] to change the modem port connection parameter.
  - Press [Shift] + [<] or [Shift] + [>] to change the selected parameter value to “Yes” to connect (and initialize), or "No" to disconnect (hang-up) an attached modem.
  - Press [Enter] and [Y] to save the value.

If changing to "Yes", after approximately 25 seconds, if no modem was attached to the port, a “Not possible” message will be displayed:

```
Port: 12
Port name: Port12

        5.Modem connected to port: Yes

Press '<' or '>' to change
or [Enter] to accept the parameter value
or [Space] or [Esc] to cancel
Save this value? (Y/N) Y
Please wait...
Not possible

Press any key to return
```

Figure 11- No modem is attached to port 12 yet

If a modem has not yet been attached, attach a modem to the port, via a serial cable (see Appendix B on page 34 for proper cable pinouts), or select a port with attached modem. Repeat steps a) and b) to declare the modem. After approximately 10 seconds a confirmation message will be displayed:

```
Port: 12
Port name: Port12

        5.Modem connected to port: Yes

Press '<' or '>' to change
or [Enter] to accept the parameter value
or [Space] or [Esc] to cancel
Save this value? (Y/N) Y
Please wait...
OK

Press any key to return
```

Figure 12- A modem is now attached to port 12

Open the “Links (port connections)” menu (see page 7). Check for the previously defined modem port mode to be “MBufW” (Modem, Buffer, Wait for remote modem call) (see Fig. 13).

```
Port Connections

Port|      Name       |Mode/Disc| To|Alw|Port|      Name       |Mode/Disc| To|Alw
----+-----------------+---------+---+---+----+-----------------+---------+---+---
  0 | Port00          | Buf /No | - |A U|  1 | Port01          | Buf /No | - |A U
  2 | Port02          | Buf /No | - |A U|  3 | Port03          | Buf /No | - |A U
  4 | Port04          | Buf /No | - |A U|  5 | Port05          | Buf /No | - |A U
  6 | Port06          | Buf /No | - |A U|  7 | Port07          | Buf /No | - |A U
  8 | Port08          | Buf /No | - |A U|  9 | Port09          | Buf /No | - |A U
 10 | Port10          | BuF /No | - |A U| 11 | Port11abc       | Buf /No | - |A U
 12 | Port12          |MbufW/14m| - |A U| 13 | Port13          | Buf /No | - |A U
 14 | Port14          | Buf /No | - |A U| 15 | Port15          | Buf /No | - |A U
 16 | Port16          | Adm /No | - |A U| 17 | Port17          | Buf /No | - |- -
 18 | Port18          | Buf /No | - |- -| 19 | Port19          | Buf /No | - |- -
 20 | Port20          | Buf /No | - |- -| 21 | Port21          | Buf /No | - |- -
 22 | Port22          | Buf /No | - |- -| 23 | Port23          | Buf /No | - |- -
 24 | Port24          | Buf /No | - |- -| 25 | Port25          | Buf /No | - |- -
 26 | Port26          | Buf /No | - |- -| 27 | Port27          | Buf /No | - |- -
 28 | Port28          | Buf /No | - |- -| 29 | Port29          | Buf /No | - |- -
 30 | Port30          | Buf /No | - |- -| 31 | Port31          | Buf /No | - |- -
 32 | Port32          | Buf /No | - |- -|

Press 'C' to change a connection, 'R' to refresh this page
```

Figure 13- Port Connections shows modem on port 12

- **Force port mode (into buffer or user mode)**
  - Press [Y] and then press [6] or [F] to force (change) the current port mode.
  - Press “>” to select the “Buffer” , "User", or "None" (for no-change) value, press [Enter] and then [Y].

Note: Forcing the port mode to buffer will break any established link with this port. Using this command, the administrator port can’t be forced into user mode, however, the administrator port can be forced into buffer mode (if the administrator wants to disconnect himself).

If changing the mode to User mode, and if the selected port has the allowance to enter into user mode (page 14 "Set user access option"), the following are displayed on the monitor connected to the CPU on the user port:

```
Network Technologies Inc
Serial Console/Switch - v.1.2

Port:  9
Port name: Port09

        User Main menu

        1.Links (port connections)
        2.Serial communication settings
        3.Disconnect ports (at timeout or in-band)
        4.Force port mode
```

Figure 14- User mode menu

On the administrator's port a confirmation message will appear:

```
Port: 14
Port name: Port14

        6.Force port mode: User

Press '<' or '>' to change
or [Enter] to accept the parameter value
or [Space] or [Esc] to cancel
Save this value? (Y/N) Y
OK

Press any key to return
```

Figure 15- Successful port mode change by administrator on port 14

If, instead, the user access option had been set to "No", the terminal program would have displayed the error message "Not possible: not allowed in User mode".

- From the administrator main menu, press [L] or [1] to see the port connections table. Verify the mode for port has changed as desired.

➢ **Set Inter-character delay**

- From the "Names, password, rights" menu, press [Y] , then [7] or [I] to define an inter-character delay, each time more characters are transmitted from this port.
- Press [Shift] + [>] or [Shift] + [<] to select the desired delay.
- Press [Enter] and then [Y].

Using this command, a user defined (0,1,2,5,10,15,20,25,30,35,40,45,50,55,60 milliseconds; default = none) pause appears between transmitted characters; for example, certain types of electro-mechanical devices (like teletype equipment) cannot process received characters continuously at their specified baud rate.

➢ **Line-break receive allowance**

- From the "Names, password, rights" menu, press [Y], then [8] or [B] to allow or not to allow the line-break receive. (default = no)
- Press [Shift] + [>] or [Shift] + [<] to select "Yes" or "No"
- Press [Enter] and then [Y].

The break condition is defined as zero data with zero parity and no stop bits.

If the value of the Line-break receive allowance parameter is set to “Yes” (enabled), then the port will accept the breaks received from the attached device. The break is defined as a long zero, or a zero data with zero parity bit and no stop bits. The duration of a break is greater than the received byte time.

When enabled, the received breaks will be passed to the device attached to the transmitting port, linked to the port that received the break, if the “Transmitted Line-break extra duration” parameter (below) is not set to “no break transmitted”, at the transmitting port.

The duration of the transmitted break is equal to a character transmission time (defined by the transmitting port baud rate) plus an extra-duration, defined by the “Transmitted Line-break extra duration” parameter value.

When the value of the “Line-break receive allowance” parameter is “No” (disabled), the received break is not sent to the linked port and hence, not transmitted to the other device.

➢ **Transmitted Line-break extra duration**

- From the "Names, password, rights" menu, press [Y], then press [9] or [T] to allow the transmission and to
- define the transmitted line-break extra-duration (this is added to the 1-character transmission time). Values = no break transmitted, 1, 2, 5,10, 20, 30, 50, 75, 100, 150, 200, 250, 300, 350, 400, 500, 600, 700, 800, 900, 1000 milliseconds (default = no break transmitted).
- Press[Shift] + [>] or [Shift] + [<] to select the parameter value
- Press [Enter] and then [Y].

NOTE: The last three commands (Set Inter-character delay, Line-break receive allowance, and Transmitted Line-break extra duration) are not available for port 0.

NOTE: Each timeout can be defined as 1,2,5,10,15,30 seconds or 1,2,5,10,15,30,60,90 minutes, or never.

Port settings: Timeout, in-band disconnect

Using the “Disconnect ports” menu , the administrator can control the following disconnecting features:

- Each device connected to the SERIMUX can be enabled to disconnect itself from a link, using an in-band 1-character or 3-character sequence
- Each port can be programmed to disconnect itself from its respective mode (administrator, user, link, or modem-buffer) after a period of inactivity (timeout): from 1 second to 90 minutes, or never

- From the Administrator main menu, press [5] or [D].
- Enter a port number , then press [Enter]. The screen will show the current port number and name, and the command menu:

```
Port settings (timeout, in-band disconnect)

Enter port number: 12
Port name: Port12

        1.In-band disconnect sequence: None
        2.1-Char disconnect sequence: Ctrl+'X' [024]
        3.3-cHar disconnect sequence: ```
        4.Administrator mode timeout: Never
        5.User mode timeout: 30 min.
        6.Link mode timeout: 10 min.
        7.Modem-buffer mode timeout: 15 min.
        8.VT100 displaying delay:  Normal

9 min. until disconnect from Link mode

Press '<' or '>' to change the port
Press 'R' to refresh this page
Do you want to change the port settings? (Y/N)
```

Figure 16- Port settings, timeout, in-band disconnect

- Press [R] to refresh the information displayed on the screen, especially the time until disconnect.

- **In-band disconnect sequence**

  - Press [Y] or [Enter] and then [1] to choose the in-band disconnect sequence length.
  - Press [Shift] + [>] to select the appropriate value (none (no disconnection), 1-character, or 3-character)
  - Press [Enter] and [Y] to save.

Choosing a 1-character sequence will enable the default value of [Ctrl] + [X] to disconnect a link from the port configured. Choosing a 3-character sequence will enable the default value of [` ] -[ `]- [`] (3 back quotes) to disconnect a link from the port configured.

Note: The disconnect sequence will only work if sent by the device attached to the SERIMUX port that is configured to respond to the sequence. Once the ports are interrupted, both ports will be placed into Buffer mode.

Note: If the 1-char disconnect sequence is selected, the destination device will not receive the disconnect character. The display on the destination device will simply stop showing the receipt of characters sent.

- **1-Character disconnect sequence**

  - From “Port settings (timeout, in-band disconnect)” menu, press [Y] and then [2] to change the single character used to disconnect linked ports.
  - Press [Shift] + [>] to toggle through the available choices and change the character (see Fig. 17)
  - Press [Enter] and [Y] to save this value.

```
Port: 12
Port name: Port12

        2.1-Char disconnect sequence: Ctrl+'Y' [025]

Press '<' or '>' to change
or [Enter] to accept the parameter value
or [Spacebar] or [Esc] to cancel
```

Figure 17- Change the character used as disconnect sequence

- **3-Character disconnect sequence**

  - From “Port settings (timeout, in-band disconnect)” menu, press [Y] or [Enter] and then [3] or [H] to change the 3-character disconnect sequence.
  - Press [Backspace] 3 times and then enter the new 3-character disconnect sequence. Any ASCII characters will work.
  - Press [Enter] and [Y] to save this option.

Note: If the 3-character disconnect sequence (i.e. ```) is selected, when the device sends the sequence <CR> <LF> ``` <CR> <LF>, the destination device will receive this sequence and then the source and destination ports will be disconnected and put into buffer mode.

- **Administrator mode timeout**

  - From “Port settings (timeout, in-band disconnect)” menu, press “Y” and then [4] or [A] to modify the timeout (time period of inactivity after which the port will be forced into buffer mode) for the administrator mode.
  - Press [Shift] + [>] or [Shift] + [<] until the desired value is shown.
  - Press [Enter] and [Y] to save.

After the timeout period elapses at the administrator port, the disconnect message "Disconnecting administrator now" will be displayed and the port will be put into buffer mode.

Note: If the administrator presses any key during an active administrator control session, the disconnect time counter will start over

- **User mode timeout**

Define current port mode as user (see page 15, "Force port mode")

  - From “Port settings (timeout, in-band disconnect)” menu, press “Y” and then [5] or [U] to modify the timeout for user mode.
  - Press [Shift] + [>] or [Shift] + [<] until the desired value is shown.
  - Press [Enter] and [Y] to save.

If desired, press [R] to check the time remaining until port disconnection. In the example in Figure 18, 29 seconds remains before disconnection.

```
Port settings (timeout, in-band disconnect)

Enter port number: 12
Port name: Port12

        1.In-band disconnect sequence: None
        2.1-Char disconnect sequence: Ctrl+'X' [024]
        3.3-cHar disconnect sequence: ```
        4.Administrator mode timeout: 30 min.
        5.User mode timeout: 30 sec.
        6.Link mode timeout: 10 min.
        7.Modem-buffer mode timeout: 15 min.
        8.VT100 displaying delay:  Normal

29 sec. until disconnect from User mode

Press '<' or '>' to change the port
Press 'R' to refresh this page
Do you want to change the port settings? (Y/N)
```

Figure 18- User mode timeout timer is counting down

Note: If the user connected at port 12 presses any key (significant or not), the disconnect time counter will start over.

After 29 more seconds of inactivity at the user port, from the administrator port press [R] (Refresh) , the screen shown in Figure 19 will be displayed, indicating user mode has timed out and the port is now in buffer mode, which has no timeout period. The message “Disconnecting user now” will be displayed by the terminal application running on the former user port.

```
Port settings (timeout, in-band disconnect)

Enter port number: 12
Port name: Port12

        1.In-band disconnect sequence: None
        2.1-Char disconnect sequence: Ctrl+'X' [024]
        3.3-cHar disconnect sequence: ```
        4.Administrator mode timeout: 30 min.
        5.User mode timeout: 30 sec.
        6.Link mode timeout: 10 min.
        7.Modem-buffer mode timeout: 15 min.
        8.VT100 displaying delay:  Normal

Never disconnect from Buffer mode

Press '<' or '>' to change the port
Press 'R' to refresh this page
Do you want to change the port settings? (Y/N)
```

Figure 19- User at port 12 has timed out, port is in buffer mode

➢ **Link mode timeout**

- From “Port settings (timeout, in-band disconnect)” menu, press [Y] and then [6] or [L]] to modify the timeout for link mode at the current port.
- Press [Shift] + [>] or [Shift] + [<] until the desired value is shown.
- Press [Enter] and [Y] to save.

In Link mode, the timeout is the period of time since the SERIMUX last received data from the device connected to the configured port.

For example: Port 12 is configured with a timeout period of 1 minute, and is linked to port 13 which has no timeout specified. If the device on port 12 stops sending data to the device on port 13, but port 13 is transferring data to the device on port 12, after 1 minute port 12 will disconnect because it is not considered active by the SERIMUX.

After the timeout has elapsed, the linked ports will be disconnected and put into buffer mode.

➢ **Modem-buffer mode timeout**

- Attach a modem to the port, via a serial cable, or select a port with attached modem (see page 14, "Set modem connection").
- From “Port settings (timeout, in-band disconnect)” menu, press [Y] and then [7] or [M] to modify the timeout for modem disconnection (hang-up).
- Press [Shift] + [>] or [Shift] + [<] until the desired timeout value is shown.
- Press [Enter] and [Y] to save.
- Press [R] to check the time remaining until modem disconnect (hang-up):

```
Port settings (timeout, in-band disconnect)

Enter port number: 12
Port name: Port12

        1.In-band disconnect sequence: None
        2.1-Char disconnect sequence: Ctrl+'X' [024]
        3.3-cHar disconnect sequence: ```
        4.Administrator mode timeout: 30 min.
        5.User mode timeout: 30 min.
        6.Link mode timeout: 30 min.
        7.Modem-buffer mode timeout: 30 sec.
        8.VT100 displaying delay:  Normal

25 sec. until disconnect from Modem-buffer mode

Press '<' or '>' to change the port
Press 'R' to refresh this page
Do you want to change the port settings? (Y/N)
```

Figure 20- Modem timer is counting down

After the timeout has elapsed, the modem will be disconnected and hung-up. The port will be placed in buffer mode.

Buffer inspect

Using the Buffer inspect command from the Administrator Main menu, the administrator can see the last 1016 characters received and transmitted to/from any port. This way the administrator can verify that data is transferred properly between ports.

From the Administrator main menu;

- press [6] or [B]
- enter a port number
- press [Enter]. The screen will show the current port number and name, and the last 128 characters received by, and the last 128 characters transmitted from the selected port:

```
Port buffer inspect

Enter port number: 10
Port name: Port10
Received characters:
FF80:  0D 0A 43 4F 4E 4E 45 43  54 20 33 33 36 30 30 20  ..CONNEC T 33600
FF90:  56 34 32 62 69 73 0D 0A  67 67 31 30 74 74 74 0D  V42bis.. gg10ttt.
FFA0:  0A 0D 74 65 73 74 73 0A  0D 0D 0A 53 65 6E 74 20  ..tests. ...Sent
FFB0:  66 72 6F 6D 20 50 6F 72  74 20 31 30 3A 20 74 65  from Por t 10: te
FFC0:  73 74 20 54 65 73 74 20  54 45 53 54 0D 0A 54 54  st Test  TEST..TT
FFD0:  54 54 54 54 54 54 54 54  54 54 54 54 54 54 54 54  TTTTTTTT TTTTTTTT
FFE0:  54 54 0D 0A 74 74 74 74  74 74 74 74 74 74 74 74  TT..tttt tttttttt
FFF0:  74 74 74 74 74 74 74 74  0D 0A 0D 0A 0D 0A 0D 0A  tttttttt ........
Transmitted characters:
FF80:  2E 0D 0A 0D 0A 53 65 6E  74 20 66 72 6F 6D 20 50  .....Sen t from P
FF90:  6F 72 74 20 30 39 3A 20  61 62 63 64 65 66 0D 0A  ort 09:  abcdef..
FFA0:  4F 74 68 65 72 20 74 65  73 74 73 3A 20 41 42 43  Other te sts: ABC
FFB0:  44 45 46 47 48 49 4A 4B  4C 4D 4E 4F 50 51 52 53  DEFGHIJK LMNOPQRS
FFC0:  54 55 56 57 58 59 5A 20  31 32 33 34 35 36 37 38  TUVWXYZ  12345678
FFD0:  39 30 20 61 62 63 64 65  66 67 68 69 6A 6B 6C 6D  90 abcde fghijklm
FFE0:  6E 6F 70 71 72 73 74 75  76 77 78 79 7A 0D 0A 41  nopqrstu vwxyz..A
FFF0:  42 43 44 45 46 47 48 49  4A 4B 4C 4D 4E 4F 0D 0A  BCDEFGHI JKLMNO..

Press '<' or '>' to change port, 'N','P' or 'R' to see next/prev/refresh page
```

Figure 21- Port buffer inspection- view transmitted and received characters

- press [P] to see the previous (older) 128-character page information; or
- press [N] to see the next (newer) 128-character page information;

Up to 1016 received characters and 1016 transmitted characters (8 pages) can be inspected, for each port.

- Press [Shift] + [>] or [Shift] + [<] to change the selected port.
- Press [Spacebar] or [Esc] to return to the main menu.

User groups

The administrator can define user groups to restrict user access to specific ports by establishing a common password for each port in a user group. Each set of ports with a common password will be assigned a group number by the SERIMUX. The “User groups” command lists the ports in a group, including name, mode, the remaining time until self-disconnection and the linked ports, if any (see also the explanations on pages 4 and 5). The administrator can select any group to be displayed on the screen.

From the Administrator main menu, press [8] or [U]. The “User groups” screen will appear:

```
User groups

Group number:  0
Port|      Name      |Mode/Disc| To|Alw|Port|      Name      |Mode/Disc| To|Alw
----+----------------+---------+---+---+----+----------------+---------+---+---
  0 | Port00         | Adm /No | - |A U|  1 | Port01         | Buf /No | - |A U
  2 | Port02         | Buf /No | - |A U|  3 | Port03         | Buf /No | - |A U
  4 | Port04         | Buf /No | - |A U|  5 | Port05         | Buf /No | - |A U
  6 | Port06         | Buf /No | - |A U|  7 | Port07         | Buf /No | - |A U
  8 | Port08         | Buf /No | - |A U|  9 | Port09         | Buf /No | - |A U
 10 | Port10         | Buf /No | - |A U| 11 | Port11         | Buf /No | - |A U
 12 | Port12         | Buf /No | - |A U| 13 | Port13         | Buf /No | - |A U
 14 | Port14         | Buf /No | - |A U| 15 | Port15         | Buf /No | - |A U
 16 | Port16         | Buf /No | - |A U| 17 | Port17         | Buf /No | - |- -
 18 | Port18         | Buf /No | - |- -| 19 | Port19         | Buf /No | - |- -
 20 | Port20         | Buf /No | - |- -| 21 | Port21         | Buf /No | - |- -
 22 | Port22         | Buf /No | - |- -| 23 | Port23         | Buf /No | - |- -
 24 | Port24         | Buf /No | - |- -| 25 | Port25         | Buf /No | - |- -
 26 | Port26         | Buf /No | - |- -| 27 | Port27         | Buf /No | - |- -
 28 | Port28         | Buf /No | - |- -| 29 | Port29         | Buf /No | - |- -
 30 | Port30         | Buf /No | - |- -| 31 | Port31         | Buf /No | - |- -
 32 | Port32         | Buf /No | - |- -|

Press '<' or '>' to change the port group, 'R' to refresh this page
```

Figure 22- User group inspection window

Press [Esc] to return to the main menu.

For example, change the port password to “a” for ports 0, 2, 9, 10, 15 (see page 14, "Modify the port password").
Next, change the port password to “b” for ports: 5 and 6.
Finally, change the port password to “c” for ports: 11 and 12.

Now, having assigned passwords to ports 0, 2,5,6,9,10,11,12, and 15, from the administrator main menu, press [8] or [U]. The “User groups” screen will appear:

```
User groups

Group number:  0
Port|      Name      |Mode/Disc| To|Alw|Port|      Name      |Mode/Disc| To|Alw
----+----------------+---------+---+---+----+----------------+---------+---+---
  0 | Port00         | Adm /No | - |A U|  2 | Port02         | Buf /No | - |- -
  9 | Port09         | Buf /No | - |A U| 10 | Port10         | Buf /No | - |A U
 15 | Port15         | Buf /No | - |A U|

Press '<' or '>' to change the port group, 'R' to refresh this page
```

Figure 23- User group "0" only includes ports 0, 2, 9, 10, and 15 (password "a")

Press [Shift] + [>] to display the next group:

```
User groups

Group number:  1
Port|      Name      |Mode/Disc| To|Alw|Port|      Name      |Mode/Disc| To|Alw
----+----------------+---------+---+---+----+----------------+---------+---+---
  1 | Port01         | Buf /No | - |- -|  3 | Port03         | Buf /No | - |- -
  4 | Port04         | Buf /No | - |- -|  7 | Port07         | Buf /No | - |- -
  8 | Port08         | Buf /No | - |- -| 13 | Port13         | Buf /No | - |A U
 14 | Port14         | Buf /No | - |A U| 18 | Port18         | Buf /No | - |- -
 19 | Port19         | Buf /No | - |- -| 20 | Port20         | Buf /No | - |- -
 21 | Port21         | Buf /No | - |- -| 22 | Port22         | Buf /No | - |- -
 23 | Port23         | Buf /No | - |- -| 24 | Port24         | Buf /No | - |- -
 25 | Port25         | Buf /No | - |- -| 26 | Port26         | Buf /No | - |- -
 27 | Port27         | Buf /No | - |- -| 28 | Port28         | Buf /No | - |- -
 29 | Port29         | Buf /No | - |- -| 30 | Port30         | Buf /No | - |- -
 31 | Port31         | Buf /No | - |- -| 32 | Port32         | Buf /No | - |- -


Press '<' or '>' to change the port group, 'R' to refresh this page
```

Figure 24- User group "1"- different ports included (no password set)

Press [Shift] + [>] to display the next group:

```
User groups

Group number:  2
Port|      Name      |Mode/Disc| To|Alw|Port|      Name      |Mode/Disc| To|Alw
----+----------------+---------+---+---+----+----------------+---------+---+---
  5 | Port05         | Buf /No | - |- -|  6 | Port06         | Buf /No | - |- -


Press '<' or '>' to change the port group, 'R' to refresh this page
```

Figure 25- User group "2" includes ports 5 and 6 (password "b")

Press [Shift] + [>] to display the next group:

```
User groups

Group number:  3
Port|      Name      |Mode/Disc| To|Alw|Port|      Name      |Mode/Disc| To|Alw
----+----------------+---------+---+---+----+----------------+---------+---+---
 11 | Port11         | Buf /No | - |A U| 12 | Port12         | Buf /No | - |A U


Press '<' or '>' to change the port group, 'R' to refresh this page
```

Figure 26- User group "3" includes ports 11 and 12 (password "c")

Each group of ports with a common password will receive a group number.

Press [Esc] to return to the main menu.

Serial Control- The User Menu

A port group includes all ports that have the same password. A user can log in and access a group if the user knows the port password. The user can view status and parameters and connect ports to ports or disconnect ports only if these ports belong to the group. The user is unable to modify port parameters.

Connect as user

From the CPU connected to the chosen port, in buffer mode, if allowed to enter in user mode, a user can log in by sending the following character sequence:

- press [Enter],
- enter port password (remember, case sensitive),
- press [Enter],
- wait 3 seconds.

Note: The port password must be entered within 3 seconds of pressing [Enter] in order for it to be recognized by the SERIMUX. Otherwise, the user must begin the sequence again.

The User Main menu will appear on the terminal connected to this port:

```
Network Technologies Inc
Serial Console/Switch - v.1.2

Port:  5
Port name: Port05

        User Main menu

        1.Links (port connections)
        2.Serial communication settings
        3.Disconnect ports (at timeout or in-band)
        4.Force port mode
```

Figure 27- User Main menu

Note: The administrator can disconnect at anytime a port in User mode, placing that port in Buffer mode; the administrator can also place any port (other than the current administrator port) into User mode from Link or Buffer mode.

Link 2 ports

Using the “Links (port connections)” command, the user can view which ports belong to the user's group and limited information concerning these ports: port name and mode, linked ports, the remaining time until self-disconnection. From this menu, the user can link any 2 ports that belong to the group, or disconnect any linked port that belongs to the group.

- From the User Main menu, press [L] or [1]. The port connections screen will be displayed:

```
Port Connections

Port|      Name      |Mode/Disc| To|Alw|Port|      Name      |Mode/Disc| To|Alw
----+----------------+---------+---+---+----+----------------+---------+---+---
  5 | Port05_Usr32   | Usr /15m| - |A U|  8 | Port08         | Buf /No | - |- -
  9 | Port09         | Buf /No | - |A U| 10 | Port10-Modem_01|MBufW/ 7m| - |A U
 11 | Port11         | Lnk /12m| 16|- U| 15 | Port15         | Adm /No | - |A U
 16 | Port16         | Lnk /12m| 11|- -|

Press 'C' to change a connection, 'R' to refresh this page
```

Figure 28- User Port Connections screen

- Press [C] or [Enter] to change a connection,
- enter the first port number to be linked,
- press [Enter],
- enter the second port number to link to,
- press [Enter].
- press [N] or [Spacebar],
- press [Y] or [Enter] to update the link changes.

The User Main menu will be displayed.

Note: A User can only link 2 ports that are inside the group. Only the administrator can link two ports that are from different groups.

Disconnect 2 Linked Ports

To disconnect two linked ports (provided at least one belongs to the group):

- From the User Main menu, press [L] or [1]. The port connections screen will be displayed.
- press [C] or the [Enter]
- press xx (the first port number)
- press [Enter]
- press xx (the first port number again) as the second port number,
- press [Enter].
- press [N] or [Spacebar],
- press [Y] or [Enter] to update the link changes.

The User Main menu will be displayed.

Serial communication settings

Using the “Serial communication settings” command, the user can view the communication settings for each of the ports the user has access to.

Note: Only the administrator can change the serial communication settings.

From the User Main menu, press [S] or [2]. The serial communication settings screen will be displayed:

```
Serial communication settings

Port|      Name       | Rx baud| Tx baud| Comm  | Flow | Xon char | Xoff char
----+-----------------+--------+--------+-------+------+----------+----------
  0 | Port00          |   9600 |   9600 | 8N1   | None | Ctrl+'Q' | Ctrl+'S'
  1 | Port01          |   9600 |   9600 | 8N1   | None | Ctrl+'Q' | Ctrl+'S'
  2 | Port02          |   9600 |   9600 | 8N1   | None | Ctrl+'Q' | Ctrl+'S'
  3 | Port03          |   9600 |   9600 | 8N1   | None | Ctrl+'Q' | Ctrl+'S'
  4 | Port04          |   9600 |   9600 | 8N1   | None | Ctrl+'Q' | Ctrl+'S'
  5 | Port05          |   9600 |   9600 | 8N1   | None | Ctrl+'Q' | Ctrl+'S'
  6 | Port06          |   9600 |   9600 | 8N1   | None | Ctrl+'Q' | Ctrl+'S'
  7 | Port07          |   9600 |   9600 | 8N1   | None | Ctrl+'Q' | Ctrl+'S'
 12 | Port12          |   9600 |   9600 | 8N1   | None | Ctrl+'Q' | Ctrl+'S'
 13 | Port13          |   9600 |   9600 | 8N1   | None | Ctrl+'Q' | Ctrl+'S'
 14 | Port14          |   9600 |   9600 | 8N1   | None | Ctrl+'Q' | Ctrl+'S'
 17 | Port17          | 115200 | 115200 | 8N1   | Hard | Ctrl+'Q' | Ctrl+'S'
 18 | Port18          |  57600 |  57600 | 8E2.5 | Both | Ctrl+'Q' | Ctrl+'S'
 19 | Port19          |   9600 |   9600 | 8N1   | None | Ctrl+'Q' | Ctrl+'S'
 20 | Port20          |   9600 |   9600 | 8N1   | None | Ctrl+'Q' | Ctrl+'S'
 21 | Port21          |   9600 |   9600 | 8N1   | None | Ctrl+'Q' | Ctrl+'S'
 22 | Port22          |   9600 |   9600 | 8N1   | None | Ctrl+'Q' | Ctrl+'S'


Press '>' or 'N' to see next page
```

Figure 29- User serial communication settings

On consecutive columns, the following are displayed:

- port number;
- port name;
- receiver and transmitter port speed;
- character size, parity and stop bit number ("Comm");
- flow control;
- special characters used as Xon and Xoff, in in-band flow control.

If the user group contains more than 17 ports,

- press [Shift] + [>] or [N] to see the next page;
- press [Shift] + [<] or [P] to see the first page;
- press any other key to return to the main menu.

Disconnect ports (at timeout or in-band) settings

A user can view the disconnect port settings for each port the user has access to.

Note: Only the administrator can change the disconnect port settings.

From the User Main menu, press [D] or [3]. The disconnect settings screen will be displayed:

```
Disconnect port settings

Port|      Name      |In-band|  1 char |3char|Admin| User| Link|Modem| Disc in:
----+----------------+-------+---------+-----+-----+-----+-----+-----+---------
  0 | Port00         |  None | Ctrl+'Y'| `~` |Never|15min|30min| 5min|Adm/Never
  8 | Port08         |  None | Ctrl+'X'| ``` |Never|Never|Never|Never|Buf/Never
  9 | Port09         |  None | Ctrl+'X'| ``` |Never|15min|15min|15min|Lnk/ 7min
 10 | Port10         |  None | Ctrl+'X'| ``` |Never|15min|15min|15min|Lnk/ 7min
 11 | Port11         |  None | Ctrl+'X'| ``` |Never|15min|15min|15min|Usr/15min
 12 | Port12         | 1 char| Ctrl+'X'| ``` |Never|15min|15min|10min|Buf/Never
 13 | Port13         | 3 char| Ctrl+'X'| ``` |Never|15min|15min|10min|Buf/Never
 15 | Port15         |  None | Ctrl+'X'| ``` |Never|15min|15min|15min|Buf/Never
 16 | Port16         |  None | Ctrl+'X'| ``` |Never|15min|15min|15min|Buf/Never

Press 'R' to refresh this page
```

Figure 30- Disconnect port settings

On consecutive columns, the following are displayed:

- port number;
- port name;
- in-band disconnect sequence length;
- 1-character disconnect sequence;
- 3-character disconnect sequence;
- timeout (receiver port inactivity interval) before leaving the administrator mode;
- timeout before leaving the user mode;
- timeout before breaking the link connection;
- timeout prior to the modem disconnect (hang-up);
- time remaining until disconnect from the current mode.

If the user group contains more than 17 ports,

- press [Shift] + [>] or [N] to see the next page;
- press [Shift] + [<] or [P] to see the first page;
- press any other key to return to the main menu.

Force port mode

Using the “Force port mode” command, the user can

- force any port that belongs to the group to enter into buffer mode (unless the port is administrator mode)
- transfer the user access directly to another port (provided the port belongs to the group, and is in buffer mode)
- disconnect himself.

To use Force port mode;

- From the User Main menu, press [F] or [4]. (see Fig. 31)
- Enter port number (only a port number from the current user group will be accepted).
- press [Enter].
- press [Shift] + [<] or [Shift] + [>] to select “None” (no change), “Buffer” or “User”.
- press [Enter] to accept
- press [Y] to save the parameter value and return to the settings menu; **or**
- press [Spacebar] or [Esc] to cancel the command and return to the User Main menu.

```
Port: 15
Port name: Port15

        Force port mode: Buffer

Press '<' or '>' to change
or [Enter] to accept the parameter value
or [Space] or [Esc] to cancel
Save this value? (Y/N)
```

Figure 31- Force port mode screen

Keypad Control

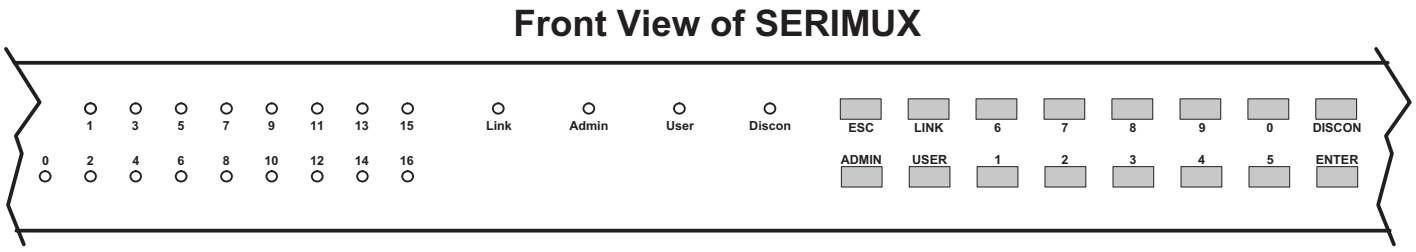


Figure 32- Keypad and LEDs

Functions of the Keypad

During normal operation, the current administrator port number (if any) is displayed on the local front panel. The corresponding port LED will be continuously illuminated. The data traffic on various ports, in link mode, is displayed by the blinking of the corresponding channel LEDs.

Using the keypad, anyone with physical access to the SERIMUX can:

- Select another administrator port
- Disconnect the administrator
- Select a user port
- Disconnect a user
- Link 2 ports
- Disconnect 2 linked ports

Note: Buttons pressed in sequence on the keypad to enter commands must be pressed within 5 seconds of each other for the SERIMUX to respond. Otherwise, the sequence will need to be repeated from the beginning.

➢ Select administrator port

Action (from Keypad)	**Reaction of SERIMUX**
1. Press ADMIN	- The LED "Admin" will illuminate. The port 0 LED will be illuminated, the other port LEDs will be OFF.
2. Enter port number (00 by Default	- The corresponding port LED will illuminate, the other port LEDs will be OFF.
3. Press ENTER	- The administrator port LED will illuminate. The data traffic of other linked ports (if any) will be displayed again by flashing the corresponding port LEDs. - The administrator main menu (Fig. 2, page 5) will be displayed on the terminal application running on the administrator port.

➢ Disconnect the Administrator

Action (from Keypad)	Reaction of SERIMUX
1. Press DISCON	- The LED "Discon" will illuminate. - The port 0 LED will be illuminated, the other port LEDs will be OFF.
2. Enter the administrator port number	- The corresponding port LED will illuminate, the other port LEDs will be OFF.
3. Press ENTER	- The data traffic between any remaining linked ports (if any) will be indicated by the corresponding LEDs. - The message: "Disconnecting administrator now" will be displayed by the terminal application running on the former administrator port.

➢ Select user port

Action (from Keypad)	Reaction of SERIMUX
1. Press USER	- The LED "User" will illuminate. - The port 0 LED will be illuminated, the other port LEDs will be OFF.
2. Enter the port number	- The corresponding port LED will illuminate, the other port LEDs will be OFF.
3. Press ENTER	- The User main menu will be displayed on the terminal application on the user port: (see Fig. 27 on page 24) - The administrator port (if connected) and the data traffic of any linked ports will be indicated by illuminating and flashing corresponding port LEDs respectively.

Note: If another user was previously connected to the group, it will receive the message "Disconnecting user now" and be disconnected

➢ Disconnect a user

Action (from Keypad)	Reaction of SERIMUX
1. Press LINK	- The LED "Link" will illuminate. - The port 0 LED will be illuminated, the other port LEDs will be OFF.
2. Enter the first user port number	- The corresponding port LED will illuminate, the other port LEDs will be OFF
3. Press ENTER	- The LEDs "Link" and "Admin" will illuminate. The port 0 LED will be illuminated, the other port LEDs will be OFF.
4. Enter the second port number (same as first port number)	- The corresponding port LED will illuminate, the other port LEDs will be OFF.
5. Press ENTER	- The message "Disconnecting user now" will be displayed on the selected port. - The administrator port and the data traffic between linked ports (if any) will be indicated by the corresponding LEDs.

➢ Link 2 Ports

Action (from Keypad)	Reaction of SERIMUX
1. Press LINK	- The LED "Link" will illuminate. - The port 0 LED will be illuminated, the other port LEDs will be OFF.
2. Enter the first port number	- The corresponding port LED will illuminate, the other port LEDs will be OFF
3. Press ENTER	- The LEDs "Link" and "Admin" will illuminate. The port 0 LED will be illuminated, the other port LEDs will be OFF.
4. Enter the second port number (to link the first port number to)	- The corresponding port LED will illuminate, the other port LEDs will be OFF.
5. Press ENTER	- The administrator port and the data traffic between linked ports (if any) will be indicated by the corresponding LEDs.

NOTE: If wrong digits are pressed when entering port numbers, simply enter the number for the correct port (01, 02, etc) before pressing ENTER. The Console Switch will acknowledge the last two digits pressed.

➢ Disconnect 2 Linked Ports

Action (from Keypad)	Reaction of SERIMUX
1. Press DISCON	- The LED "Discon" will illuminate. - The port 0 LED will be illuminated, the other port LEDs will be OFF.
2. Enter the port number	- The corresponding port LED will illuminate, the other port LEDs will be OFF.
3. Press ENTER	- The data traffic between any remaining linked ports (if any) will be indicated by the corresponding LEDs.

➢ Alternate Method to Disconnect 2 Linked Ports

Action (from Keypad)	Reaction of SERIMUX
1. Press LINK	- The LED "Link" will illuminate. - The port 0 LED will be illuminated, the other port LEDs will be OFF.
2. Enter port number to be disconnected	- The corresponding port LED will illuminate, the others port LEDs will be OFF.
3. Press ENTER	- The LEDs "Link" and "Admin" will illuminate. - The port LED will be illuminated, the others port LEDs will be OFF.
4. Enter same port number again	- The corresponding port LED will illuminate, the other port LEDs will be OFF.
5. Press ENTER	- The administrator port (if any) will be displayed. - The data traffic of linked ports (if any) will be displayed

The administrator can view any changes in port connections made from the keypad by opening the terminal program on any connected terminal and view the "Port connections" screen (see page 7).

To Initialize SERIMUX Console Switch to default settings

This procedure is only necessary if the administrator is unable to access the administrator main menu. This should only occur if an administrator password has been set and the password is not known.

The SERIMUX should be OFF before beginning this procedure.

1. Press and hold both local keypad "1" and "6" buttons.
2. Turn ON the SERIMUX.
3. Wait 3 seconds.
4. Release the buttons.

***Caution**: During initialization, the customer modified parameter values will be replaced with the factory default values (for default values, see page 33, Appendix A); all ports will be placed in buffer mode; user names and passwords will be erased.*

Firmware upload

It may be desired to upgrade the firmware that controls the Console Switch as soon as improved versions become available. Once the firmware file has been downloaded to a local CPU, follow these instructions to install it.

1. Remove the top of the SERIMUX and move the jumper at JP3 to the 1-2 position, to disable the memory write protection. (See Fig. 33)

Warning! ***Be sure to turn OFF the power and unplug the SERIMUX power cord from the AC adapter before removing the top cover. Do not change any other jumper position.***

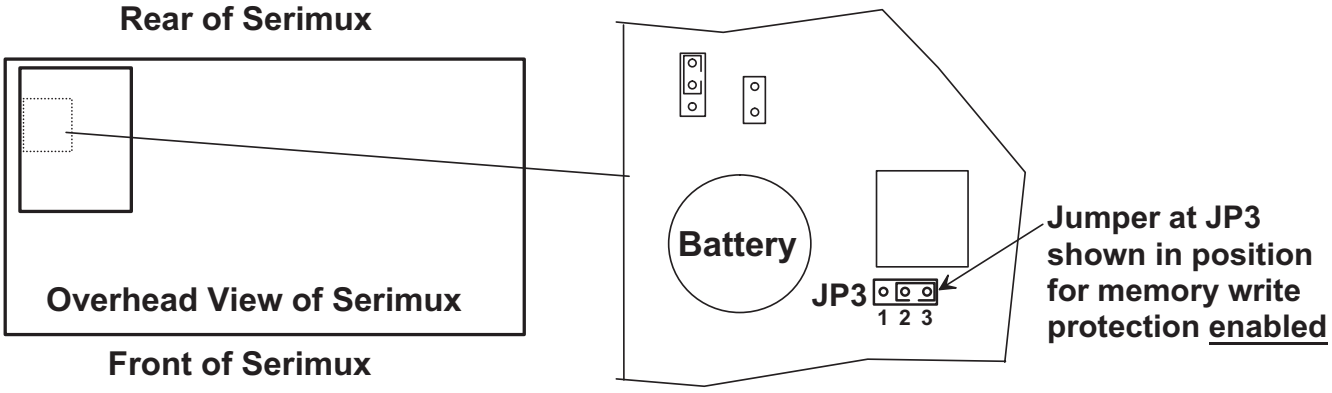


Figure 33- Location of write-protection jumper JP3

2. Log-in as administrator, at port 0 (port 0 configured for 9600 bps, 8-bit, no parity, 1 stop bit).
3. Locate on the local hard disk the firmware file: "**aout.ALL**" containing a valid firmware version (downloaded from the NTI website at www.nti1.com).
4. From the main menu, press [9] or [F]. A confirmation will be required:

```
Do you want to upload a new firmware? (Y/N)
No other confirmation will be required
```

Figure 34- New firmware upload window

5. Press [Y] . All other ports will be disconnected and disabled during the firmware update procedure.

```
Do you want to upload a new firmware? (Y/N)
No other confirmation will be required Y
Please connect Port 00 to the PC
and send the binary file using Xmodem protocol
(9600 baud, 8-N-1, no flow control)


Disconnecting administrator now

§
```

Figure 35- NO ports can be connected during firmware upgrade

6. Using the terminal program, send the binary file “aout.ALL” using Xmodem protocol. After a short time (no more than 10 seconds), the data transfer will be displayed on the SERIMUX front panel. LED's 1-8 will flash during data transfer.

7. When the data transfer is complete, the LEDs will return to OFF. Wait approximately 3 seconds for internal initialization.

8. Press [Enter] to reconnect to the SERIMUX and return to the Administrator main menu.

```
Do you want to upload a new firmware? (Y/N)
No other confirmation will be required Y
Please connect Port 00 to the PC
and send the binary file using Xmodem protocol
(9600 baud, 8-N-1, no flow control)


Disconnecting administrator now

§
File loaded OK! The system will reboot now...
```

Figure 36- Firmware will upgrade automatically and reboot

NOTE: After initialization, all parameter values will be replaced with the default values(for a list of default values, see Appendix A, page 33); all ports will be put into buffer mode; all passwords will be erased.

8. After a successful upload, return the JP3 jumper to the 2-3 position , to re-enable the memory write protection.

Manual firmware upgrade

This command enables the user to upload the console switch management firmware immediately after power-ON. This would be necessary if the firmware in the Console Switch should ever fail to function due to any event that would damage the firmware and render the Console Switch menu inaccessible.

A microswitch on the rear of the Console Switch (labeled "Firmware Upgrade") or 2 local keypad buttons (“1” and “Link” keys-pressed simultaneously) should be kept pressed prior to power-ON and for at least 3 seconds after power-ON, in order to force the Console Switch to enter into firmware upgrade mode. Upgrades can be uploaded via port 0 (configured for 9600 bps, 8-bit, no parity, 1 stop bit), using the Xmodem protocol, from a binary file obtained from NTI. All other ports will be disconnected and disabled during the firmware upgrade procedure.

```
Do you want to upload a new firmware? (Y/N)
```

Figure 37- Manual firmware upgrade window

Press [Y] or "Enter" on the keypad and then send the local file, using the Xmodem protocol, or press any other keyboard key or "ESC" on the keypad to reboot the console without upload. If no confirmation is entered within 5 seconds, the manual firmware upgrade process will be cancelled.

Troubleshooting

If the Console Switch is not working properly, consider the suggestions below to see if a solution can be found.

- Verify that all cables are the proper type (DTE, DCE, etc) and are securely connected.
- Verify that the port configuration matches that of the device connected.
- If the problem persists, power down the CPUs and Console Switch, unplug the serial cables from the Console Switch and reconnect them.
- Power-up the CPUs first, then the Console Switch.
- If the passwords or other important parameters are not available, the console switch can be re-initialized to the default settings (see " To Initialize SERIMUX Console Switch to default settings" on page 30).

Caution: During initialization, the customer modified parameter values will be replaced with the factory default values; all ports will be placed in buffer mode; all passwords will be erased.

If the suggestions above have been tried and the NTI Console Switch is still not functioning properly, a solution to the problem may be found on our website at http://www.nti1.com in our FAQ (Frequently Asked Questions) section, or, please call us directly at **(800) 742-8324 (800-RGB-TECH)** in the US & Canada or **(330) 562-7070** (Worldwide) and we'll be happy to assist in any way we can.

Appendix A - SERIMUX Port Characteristics

Every port is defined through the following parameters:

Description	Acceptable Value	Default Value
Number	0-8/16/24/32	Same (not changeable)
Name	Up to 15 characters	"Port00" to "Port32"
Passwords (administrator and user)	Up to 31 characters- case sensitive	None
Mode	Command, link, buffer	buffer
User Mode Allowance	Yes or No	Yes
Administrator Mode allowance	Yes or No	Yes
Inactivity Period (timeout) to disconnect from command mode	1,2,5,10,15,30,seconds, 1,2,5,15,30,60,90 minutes, never	Never for Administrator 15 minutes for Users
Inactivity period (timeout) to disconnect from link mode	1,2,5,10,15,30,seconds, 1,2,5,15,30,60,90 minutes, never	15 minutes
Timeout to disconnect the attached modem	1,2,5,10,15,30,seconds, 1,2,5,15,30,60,90 minutes, never	15 minutes
Baud rate- ports 01-xx (maximum for configuration)	50, 75, 110, 134, 150, 200, 300, 600, 1200, 1800, 2400, 4800, 7200, 9600, 12000, 14400, 16800, 19200, 21600, 24000, 28800, 33600, 38400, 48000, 56000, 57600, 64000, 76000, 115200, 128000	9600
Baud rate- port 0	300, 600, 1200, 1800, 2400, 4800, 7200, 9600, 12000, 14400, 16800, 19200, 21600, 24000, 28800, 33600, 38400, 48000, 56000, 57600, 64000, 76000, 115200	9600
Bits per character- ports 01-xx (max. for configuration).	5,6,7,8	8
Bits per character- port 0	7,8	8
Parity	No parity, even, odd	No parity
Stop bits	1, 1-1/2, 2, 2-1/2	1
Handshake mode (flow control)	Xon / Xoff RTS/CTS Both None	none
Xon character	any ASCII nonprintable character (0-31)	Ctrl-Q
Xoff character	any ASCII nonprintable character (0-31)	Ctrl-S
Inter-character delay- ports 1- max. only (no delay allowed on port 0)	1,2,5,10,15,20,25,30,35,40,45,50,55,60 milliseconds, none	none
Line break receive allowance- port 01-max. (no allowance for port 0)	Yes or No	No
Transmitted line-break extra duration (added to 1 character transmission time)- ports 1-max. only (no extra duration for port 0)	No break transmitted, 1,2,5,10,20,30,50,75, 100, 150, 200, 250, 300, 350, 400, 500, 600, 700, 800, 900, 1000 milliseconds	No break transmitted

Appendix A- SERIMUX Port Characteristics (Continued)

Description	Acceptable Value	Default Value
Disconnect sequence	0 (disabled), 1, or 3	0 (disabled)
1 character disconnect sequence	Any ASCII character	Ctrl-X
3 character disconnect sequence	Any 3 ASCII characters	``` (3 back quotes)
DTR output upon disconnect	Low, high, or pulsed for 0.5 seconds and then held high	pulse
Modem Reset string	Up to 41 characters	ATZ
Modem Initialization string	Up to 41 characters	AT&F&C1&D2S0=0
Modem Disconnect string	Up to 41 characters	ATH

Appendix B- Asynchronous RS232 SERIMUX Port Interface

Pinouts of ports on SERIMUX

The SERIMUX serial ports are DB-9M (male) connectors configured as DTE (data terminal equipment) ports (like the 9 pin serial port on a CPU). The RS232 port interface signals are listed below, including equivalent CCITT V.24 identification, and signal direction:

DB-9M pin #	Common name	EIA name	CCITT name	Function	Direction
1	DCD	CF	109	Data Carrier Detect	Input
2	RxD	BB	104	Receive Data	Input
3	TxD	BA	103	Transmit Data	Output
4	DTR	CD	108.2	Data Terminal Ready	Output
5	SG	AB	102	Signal Ground	–
6	DSR	CC	107	Data Set Ready	Input
7	RTS	CA	105	Request To Send	Output
8	CTS	CB	106	Clear To Send	Input
9	RI	CE	125	Ring Indicator	Input

There are two types of serial device: data communication equipment (DCE) (e.g. modem) and data terminal equipment (DTE) (e.g. CPU), having different connector pin assignments.

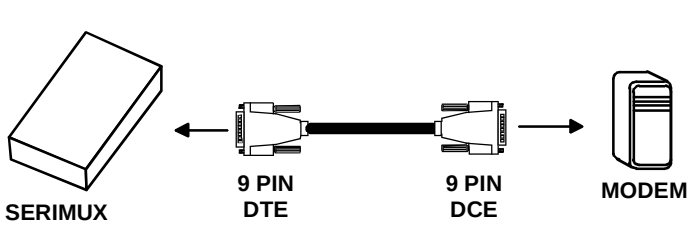
Pinouts for typical DTE to DCE cable (for modem connection) and DTE to DTE null modem cable (for CPU connection)

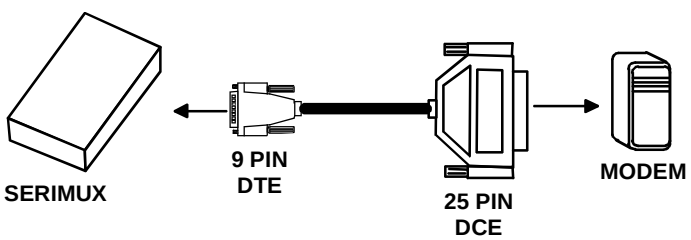
SERIMUX (DTE) to 9 PIN DCE cable
(for modem)

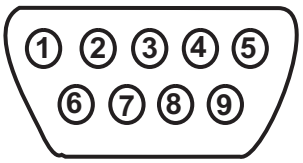
SERIMUX			DCE DEVICE	
9 pin		Signal	9 pin	
Function	Pin #	Direction	Pin #	Function
RxD	2	←	2	TxD
TxD	3	→	3	RxD
CTS	8	←	8	RTS
RTS	7	→	7	CTS
DSR	6	←	6	DTR
DTR	4	→	4	DSR
SG	5	—	5	SG

SERIMUX (DTE) to 25 PIN DCE cable
(for modem)

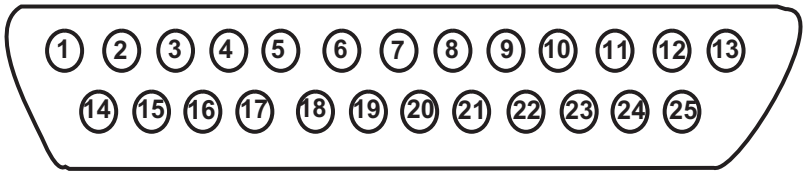
SERIMUX			DCE DEVICE	
9 pin		Signal	25 pin	
Function	Pin #	Direction	Pin #	Function
RxD	2	←	3	TxD
TxD	3	→	2	RxD
CTS	8	←	5	RTS
RTS	7	→	4	CTS
DSR	6	←	6	DTR
DTR	4	→	20	DSR
SG	5	—	7	SG







Mating Face of a 9D Male



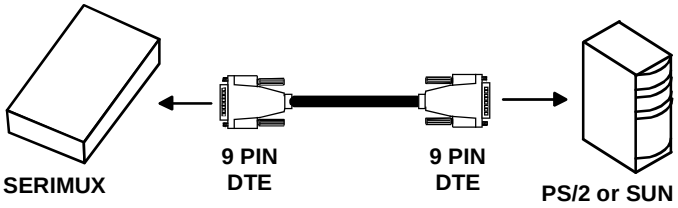
Mating Face of DB25 Male

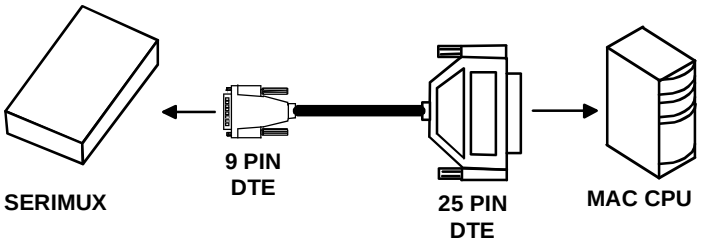
SERIMUX (DTE) to 9 PIN DTE null modem cable
(for PS/2 or SUN CPU)

SERIMUX			DTE DEVICE	
9 pin		Signal	9 pin	
Function	Pin #	Direction	Pin #	Function
RxD	2	←	3	TxD
TxD	3	→	2	RxD
CTS	8	←	7	RTS
RTS	7	→	8	CTS
DSR	6	←	4	DTR
DTR	4	→	6	DSR
SG	5	—	5	SG

SERIMUX (DTE) to 25 PIN DTE null modem cable
(for MAC CPU)

SERIMUX			DTE DEVICE	
9 pin		Signal	25 pin	
Function	Pin #	Direction	Pin #	Function
RxD	2	←	2	TxD
TxD	3	→	3	RxD
CTS	8	←	4	RTS
RTS	7	→	5	CTS
DSR	6	←	20	DTR
DTR	4	→	6	DSR
SG	5	—	7	SG





Note : The DSR and DTR signals may be used in various modes by some serial devices. Do not configure devices to use DTR and DSR to control the data flow, configure them to use RTS/CTS hardware flow control instead.

<u>If the serial device uses CTS/RTS for hardware flow control and the application does not require the use of cables with DTR, DSR, and DCD thru-connections (end -to- end), cables with the following pinouts may be used:</u>

SERIMUX (DTE) to 9 PIN DCE cable
(for modem)

SERIMUX			DCE DEVICE	
9 pin		Signal	9 pin	
Function	Pin #	Direction	Pin #	Function
RxD	2	←	2	TxD
TxD	3	→	3	RxD
CTS	8	←	8	RTS
RTS	7	→	7	CTS
DSR	6	N/c	6	DTR
DTR	4	N/c	4	DSR
DCD	1	N/c	1	DCD
SG	5	—	5	SG

SERIMUX (DTE) to 25 PIN DCE cable
(for modem)

SERIMUX			DCE DEVICE	
9 pin		Signal	25 pin	
Function	Pin #	Direction	Pin #	Function
RxD	2	←	3	TxD
TxD	3	→	2	RxD
CTS	8	←	5	RTS
RTS	7	→	4	CTS
DSR	6	N/c	6	DTR
DTR	4	N/c	20	DSR
DCD	1	N/c	8	DCD
SG	5	—	7	SG

N/c= not connected (no cable wire)
In this cable signals DSR, DTR, and DCD are connected to each other at the connector ends.

SERIMUX (DTE) to 9 PIN DTE null modem cable
(for PS/2 or SUN CPU)

SERIMUX			DTE DEVICE	
9 pin		Signal	9 pin	
Function	Pin #	Direction	Pin #	Function
RxD	2	←	3	TxD
TxD	3	→	2	RxD
CTS	8	←	7	RTS
RTS	7	→	8	CTS
DSR	6	N/c	4	DTR
DTR	4	N/c	6	DSR
DCD	1	N/c	1	DCD
SG	5	—	5	SG

SERIMUX (DTE) to 25 PIN DTE null modem cable
(for MAC CPU)

SERIMUX			DTE DEVICE	
9 pin		Signal	25 pin	
Function	Pin #	Direction	Pin #	Function
RxD	2	←	2	TxD
TxD	3	→	3	RxD
CTS	8	←	4	RTS
RTS	7	→	5	CTS
DSR	6	N/c	20	DTR
DTR	4	N/c	6	DSR
DCD	1	N/c	8	DCD
SG	5	—	7	SG

N/c= not connected (no cable wire)
In this cable signals DSR, DTR, and DCD are connected to each other at the connector ends.

If the serial device does not support hardware flow control, or the hardware flow control is not intended to be used, pins RTS and CTS must be locally tied together, cables with the following pinouts should be used:

SERIMUX (DTE) to 9 PIN DCE cable
(for modem)

SERIMUX			DCE DEVICE	
9 pin		Signal	9 pin	
Function	Pin #	Direction	Pin #	Function
RxD	2	←	2	TxD
TxD	3	→	3	RxD
CTS	8	N/c	8	RTS
RTS	7	N/c	7	CTS
DSR	6	N/c	6	DTR
DTR	4	N/c	4	DSR
DCD	1	N/c	1	DCD
SG	5	—	5	SG

SERIMUX (DTE) to 25 PIN DCE cable
(for modem)

SERIMUX			DCE DEVICE	
9 pin		Signal	25 pin	
Function	Pin #	Direction	Pin #	Function
RxD	2	←	3	TxD
TxD	3	→	2	RxD
CTS	8	N/c	5	RTS
RTS	7	N/c	4	CTS
DSR	6	N/c	6	DTR
DTR	4	N/c	20	DSR
DCD	1	N/c	8	DCD
SG	5	—	7	SG

N/c= not connected (no cable wire)
In this cable signals CTS and RTS are connected to each other at the connector ends, and signals DSR, DTR, and DCD are connected to each other at the connector ends.

SERIMUX (DTE) to 9 PIN DTE null modem cable
(for PS/2 or SUN CPU)

SERIMUX			DTE DEVICE	
9 pin		Signal	9 pin	
Function	Pin #	Direction	Pin #	Function
RxD	2	←	3	TxD
TxD	3	→	2	RxD
CTS	8	N/c	7	RTS
RTS	7	N/c	8	CTS
DSR	6	N/c	4	DTR
DTR	4	N/c	6	DSR
DCD	1	N/c	1	DCD
SG	5	—	5	SG

SERIMUX (DTE) to 25 PIN DTE null modem cable
(for MAC CPU)

SERIMUX			DTE DEVICE	
9 pin		Signal	25 pin	
Function	Pin #	Direction	Pin #	Function
RxD	2	←	2	TxD
TxD	3	→	3	RxD
CTS	8	N/c	4	RTS
RTS	7	N/c	5	CTS
DSR	6	N/c	20	DTR
DTR	4	N/c	6	DSR
DCD	1	N/c	8	DCD
SG	5	—	7	SG

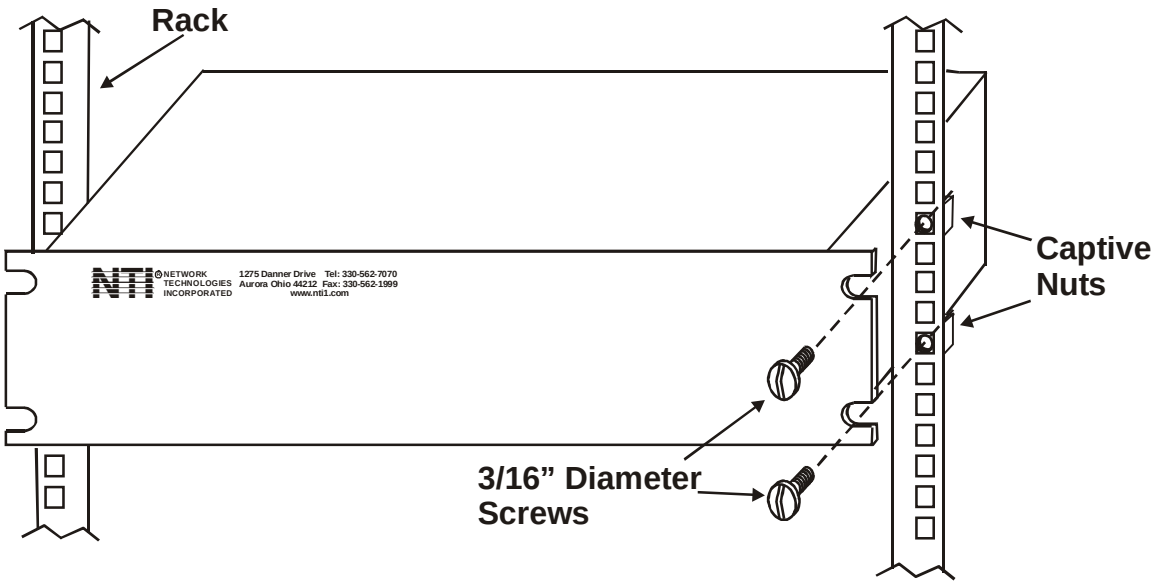
N/c= not connected (no cable wire)
In this cable signals CTS and RTS are connected to each other at the connector ends, and signals DSR, DTR, and DCD are connected to each other at the connector ends.

Appendix C- Rack mounting Instructions

The NTI switch was designed to be directly mounted to a rack and includes a mounting flange to make attachment easy. Secure the NTI switch to a rack using 3/16" diameter screws. Each screw should be of sufficient length to go completely through the NTI mounting flange and rack frame and fully engage all threads in the captive nut. Be sure to tighten all mounting screws securely.

Do not block power supply vents in the NTI switch chassis (if provided) . Be sure to enable adequate airflow in front of and behind the NTI switch.

Attach all cables securely to the switch and where necessary supply adequate means of strain relief for cables.



SERIMUX Console Switch

SERIAL NO.: _____

DATE: _____

INSPECTED BY: _____

☐ **SE-RS-8**

☐ **SE-RS-16**

☐ **SE-RS-24**

☐ **SE-RS-32**