

Smart Switch

Model 232SS2

Document No. 232SS21600

*This product Designed and Manufactured
of domestic and imported parts by*

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Chapter 1: INTRODUCTION

The RS-232 Four Port Smart Switch/Port Combiner, Model 232SS2, allows one RS-232 host device to connect to as many as four RS-232 devices. The switch can be controlled in two different ways. The first way is referred to as smart switch mode. In this mode, the switch is controlled by sending a programmable preamble code to the "Master" port of the 232SS2. The other way the switch can be controlled is referred to as port combiner mode. In port combiner mode, a slave port can gain access to the master port by asserting a handshake line. If none of the slave ports have their handshake line asserted, the switch can be controlled using the preamble code.

The master port can be configured as a DTE or DCE port by an internal switch setting. If the master port is configured as a DTE port, the four slave ports will become DCE ports. The 232SS2 supports the following signals: TD, RD, RTS, CTS, DSR, DCD, and DTR.

The 232SS2 has an enhanced mode which offers special timer features. The timer features can be used to prevent slave devices from receiving preamble commands, inadvertently switching from binary/graphic file transfers, and inactive slave devices from holding control of the master port.

The 232SS2 will work with baud rates from 1200 to 115,200 bps; 7 or 8 data bits; even, odd or no parity; and 1 or 2 stop bits (7,N,1 is not allowed).

NOTE: The data format and rates mentioned are used to switch the 232SS2. The communication between the devices can use any format or data rate.

There are four LED's on the 232SS2 to indicate which port is connected to the master port. The master port has a DB-25S female connector and the slave ports have DB-25S female connectors. The 232SS2 requires 12Vdc at 100ma. which is provided through a 2.5mm power jack.

Checklist

Examine the shipping carton and contents for physical damage. If damage is found, file a claim with the shipper immediately.

The following equipment should be in the shipping carton:

1. RS-232 Smart Switch
2. Instruction Manual
3. (2) 3.5" floppy disks

If any of the items above are not in the shipping carton contact the shipper immediately.

Chapter 2: SETUP

The 232SS2 is set up using an eight-position dipswitch. This dipswitch is used to set the communication format, port configuration, smart switch/port combiner mode and to enable/disable the enhanced features. To change the settings on the switch, remove the power from the unit, and remove the screws (2) from the bottom of the 232SS2. The dipswitch is located on the top of the PC board (side with LEDs) and is labeled "SW1." The other dipswitch, labeled "SW2" is used to set the second character of the preamble. After the switches have been set to match your requirements, you can put the unit back together. Table 1 shows the settings for dipswitch "SW1".

Table 1. Communication & Port Setup

Dipswitch SW1								Setting
1	2	3	4	5	6	7	8	
0	0	0	X	X	X	X	X	1200 Baud
1	0	0	X	X	X	X	X	2400 Baud
0	1	0	X	X	X	X	X	4800 Baud
1	1	0	X	X	X	X	X	9600 Baud *
0	0	1	X	X	X	X	X	19.2K Baud
1	0	1	X	X	X	X	X	38.4K Baud
0	1	1	X	X	X	X	X	57.6K Baud
1	1	1	X	X	X	X	X	115.2K Baud
X	X	X	0	X	X	X	X	Enhanced Disabled *
X	X	X	1	X	X	X	X	Enhanced Enable
X	X	X	X	0	X	X	X	8 Data Bits *
X	X	X	X	1	X	X	X	7 Data Bits
X	X	X	X	X	0	X	X	Parity Disabled *
X	X	X	X	X	1	X	X	Parity Enabled
X	X	X	X	X	X	0	X	Smart Switch Mode*
X	X	X	X	X	X	1	X	Port Combiner Mode
X	X	X	X	X	X	X	0	DCE master port *
X	X	X	X	X	X	X	1	DTE master port

0 = OFF 1 = ON X = DON'T CARE

* = FACTORY DEFAULT

Port Configuration

In order to determine the proper port configuration of the 232SS2, it is necessary to have a basic understanding of the terms DCE and DTE. RS-232 was designed, using DB-25 connectors, for connecting a DTE (**Data Terminal Equipment**) device to a DCE (**Data Communication Equipment**) device. Each device will have inputs on pins that correspond to outputs on the same pins of the other device. For example, a DTE device will transmit data out on pin 2 (on a DB-25) and a DCE device will receive data in on pin 2 (on a DB-25). IBM PCs and serial printers are DTE devices, modems are DCE devices.

If an IBM PC (DTE device) is going to be connected to the 232SS2 master port, the master port should be configured as a DCE port. If a modem (DCE device) is going to be connected to the master port, it should be configured as a DTE port.

The master port can be configured as a DCE port (data received on pin 2) or a DTE port (data received on pin 3) by setting dipswitch "SW1", position 8. To configure the master port as a DCE port, move dipswitch "SW1", position 8, to the "OFF" position. When the master port is configured as a DCE port, ports A, B, C, & D will become DTE ports (Refer to Table 2). To configure the master port as a DTE port move dipswitch "SW1", position 8, to the "ON" position. When the master port is configured as a DTE port, ports A, B, C, & D will become DCE ports (Refer to Table 3). **Always** power down the smart switch when changing switch settings.

Table 2. DCE MASTER PORT CHART

Master Port (DCE)		Signal Description	A,B,C & D Ports (DTE)	
Pin#	Direction		Pin#	Direction
2	Input	Transmit Data (TD)	2	Output
3	Output	Receive Data (RD)	3	Input
4	Input	Request to Send (RTS)	4	Output
5	Output	Clear to Send (CTS)	5	Input
6	Input	DCE Ready (DSR)	6	Output
7	GROUND	Signal Ground (SG)	7	GROUND
8	Output	Recv. Line Detect (DCD)	8	Input
20	Input	DTE Ready (DTR)	20	Output

Table 3. DTE MASTER PORT CHART

Master Port (DTE)		Signal Description	A,B,C & D Ports (DCE)	
Pin#	Direction		Pin#	Direction
2	Output	Transmit Data (TD)	2	Input
3	Input	Receive Data (RD)	3	Output
4	Output	Request to Send (RTS)	4	Input
5	Input	Clear to Send (CTS)	5	Output
6	Output	DCE Ready (DSR)	6	Input
7	GROUND	Signal Ground (SG)	7	GROUND
8	Input	Recv. Line Detect (DCD)	8	Output
20	Output	DTE Ready (DTR)	20	Input

The 232SS2 supports the following RS-232 signals: TD, RD, SG, RTS, CTS, DSR, DCD, and DTR.

The Smart Switch selects port A as the default port at power up.

Serial Data Configuration

In order for the host device that is connected to the master port to select any of the four ports, the Smart Switch must be set to match the host's communication format. Dipswitch "SW1" is used to select the communication format of the Smart Switch. Switch positions 1 through 3 select the baud rate. Switch position 5 selects 7 or 8 data bits. Switch position 6 determines if parity is enabled or disabled.

NOTE: A data format of 7 data bits, no parity and one stop is not allowed.

Switch position 8 selects the port configuration, see section titled "Port Configuration". Refer to Table 1. Always power down the smart switch when changing switch settings.

Smart Switch Operation

Smart Switch mode is selected when dipswitch "SW1" position 7 is "Off." In Smart Switch mode, the 232SS2 is constantly looking for the three character preamble code by monitoring the data that is being received on the master port from the host device. The 232SS2 requires a three character preamble code to turn on and off a port. The first character must be the ASCII escape character (decimal 27). The second character is user programmable by setting dipswitch "SW2". "SW2" comes from the factory programmed to the ASCII character STX (decimal 2). The third character should be the ASCII upper case letters "A", "B", "C" or "D" (decimal 65, 66, 67, or 68 respectively) to select those ports. To turn off the selected port the third character should be the ASCII EOT character (decimal 4). For instance, to turn on port B you would send:

ESC STX B

If you were writing a program in BASIC to control the Smart Switch you would form a string like this:

SWB\$ = CHR\$(27) + CHR\$(2) + "B"

You could then send SWB\$ to select port B. Similar strings could be used for turning on the other ports. To turn off the ports the string might look like this:

TOFF\$ = CHR\$(27) + CHR\$(2) + CHR\$(4)

When you are done with a port you can either select a new one directly or turn off the selected port and then turn on the next one. We recommend that you turn off the selected port before selecting the next one. The turn off command consists of three characters that are non-printing (ESC STX EOT). If port A is selected and you send the command to select port B, all three characters (ESC STX B) will pass through the A port since it is still selected and the letter B will show up on your port A device. For information on preventing command codes from being received by slave devices, refer to the Enhance Mode section.

NOTE: There is no delay through the Smart Switch and the data is not buffered.

Programming the Second Character

The second character comes programmed as the ASCII STX character (decimal 2). You can change this to any 8-bit character you wish by reprogramming dipswitch "SW2". "SW2" is an eight-position switch with each position equal to a certain weight. Refer to "Setup" for instructions on removing the cover to access "SW2". Table 4 shows the weight chart for "SW2".

Table 4. Programmable Character Setting

Dipswitch SW2*	WEIGHT
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128

*Factory Default -- ASCII "STX" character (decimal 2), SW2 position 2 is only one ON.

If you wish to use the letter "U" as the second character, which has a decimal value of 85, you would turn on switches 1, 3, 5, and 7 ($1 + 4 + 16 + 64 = 85$). Caution should be used when selecting the second character, so that by itself, or with the ESC character in front of it, it is not a valid command to any of the devices on the port. For instance, on some printers ESC @ is the reset command. If you tried to use the @ symbol (decimal 64) for the second character you could reset your printer every time the preamble code was sent. Note also that if your communication configuration is set for 7 data bits you cannot use the eighth bit of SW2. For a list of the ASCII character codes and their decimal values refer to Appendix A.

Binary File Transfer

A simple method of using the Smart Switch to transfer binary files without the concern of it accidentally disconnecting, is to set the file transfer at a baud rate different from the baud rate of the Smart Switch. When transferring files at a different baud rate, the Smart Switch will stay connected from the last preamble code.

Smart Switch/Port Combiner Mode

This mode allow Ports A-D to select the master port using a handshake line. It also allows selection from the master port via the preamble code described in the Smart Switch Only Mode section. Position 7 of "SW1" must be ON to be in port combiner mode. When a handshake line goes high on any of the four ports, it will establish a connection from that port to the master port. This works on first-come-first-serve basis. If multiple ports have their handshake lines high, the port that has been waiting the longest will be next to be connected to the master port. For example, (Initial conditions -- no slave ports with handshake lines asserted.) in chronological order, Port C asserts its handshake line, Port A asserts its handshake line, Port D asserts its handshake line and then Port C disasserts its handshake line. When Port C asserts its handshake line, a connection will be made between the master port and Port C. When Port C disasserts its handshake line, Port C will be disconnected and Port A will be connected to the master port. When Port A disasserts its handshake, Port A will be disconnected and Port D will be connected to the master port.

The handshake line that is used to connect to the master port depends on the configuration of the master port (which in turn determines the configuration of the slave ports). If the master port is configured as a DTE port, then the slave ports are configured as DCE, and RTS must be raised by the device (which is DTE) to connect to the master port. If the master port is configured as a DCE port, then the slave ports are configured as DTE and CTS must be raised by the device (which is DCE) to connect to the master port.

For example, port A is configured as a DCE port (slave device is DTE), in order to establish a connection to the master port, the device must set RTS high (assert). The 232SS2 would recognize this as a prompt for connection to the master port. The connection would be dropped as soon as RTS from the device is lowered. The devices on ports B-D may raise RTS at any time to request a connection. However, if port A is connected to the master port, any data sent from the devices on ports B-D to the 232SS2 will be lost. The 232SS2 does not have any buffering.

NOTE: When a port is selected via the Master Port, the handshake lines will be ignored until the Master Port sends the turn off code. When the Master Port is selected by a handshake line, all preamble codes will be ignored.

A typical application would be to have RTS and CTS tied together on the master port. When RTS (assuming DTE slave device) on port A (configured as DCE) is asserted, CTS on port A will be asserted when a connection is established. If a port is not connected to the master port, then CTS on that port will remain low. Therefore, a port can monitor the handshake line to determine if a connection has been established.

Enhanced Mode -- Timer Features

The 232SS2 has an enhanced mode, which offers special timer features. The timer features can be used to prevent slave devices from receiving preamble commands, inadvertent switching from binary/graphic file transfers, and inactive slave devices from holding control of the master port. The timer has two different modes: an inactivity mode and an inadvertent switch mode. When in inactivity mode, the 232SS2 will monitor the data lines. If there is no activity for the specified time, the selected slave port will be disconnected from the master port. When in inadvertent switch mode, the 232SS2 will ignore switching commands for the specified period of time. After this time has expired, the selected slave port will be disconnected from the master port.

The timer functions are enabled via a dipswitch setting and through software commands. **Dipswitch SW1 position 4 must be ON for the 232SS2 to be in enhanced mode.** The software commands follow the same format as preamble codes used for switching. There are two commands used to set the timer functions: Set Timer Mode and Set Timer Value. These commands require an additional byte for data. The Set Timer Value command requires the third byte to be an ASCII "T" character. The data byte (fourth byte) must be a value between ASCII "0" and ASCII "9". A value of "0" is used to disable the timer. Refer to Table 3 for timer values. For example, sending the following string to the 232SS2 will set the timer value to 5 seconds (assuming programmable character is the factory default of 2).

SetTV\$ = CHR\$(27) + CHR\$(2) + "T" + "6"

The "T" tells the 232SS2 it is the set timer value command and the "6" indicates which timer value to use.

Table 3 - Timer Values

Data Byte	Value
0	timer disabled
1	10ms
2	25ms
3	100ms
4	500ms
5	1 s
6	5 s
7	30 s
8	1 min.
9	5 min.

The Set Timer Mode command requires the third byte to be an ASCII "M". If the data byte (fourth byte) is an ASCII "0", zero (default), the timer will be setup as an inactivity timer. For example: Sending the following string to the 232SS2 will set up the timer as an inactivity timer (assuming programmable character is the factory default of 2).

$$\text{SetTM\$} = \text{CHR}\$(27) + \text{CHR}\$(2) + \text{"M"} + \text{"0"}$$

The "M" tells the 232SS2 it is the set timer mode command and the "0" indicates to set up the timer as a inactivity timer. When the timer is configured as an inactivity timer, the 232SS2 will monitor the data lines (TD & RD) for data. If there is no activity for the specified timer value, the slave port that is connected to the master port will be disconnected. In smart switch mode, the inactivity timer can be used to prevent the preamble codes from being received by the slave devices. In port combiner mode, the inactivity timer can be used to prevent devices from tying up the master port. For example (port combiner mode), all the slave ports have their handshake lines asserted. The device on Port C has its handshake line asserted and is currently connected to the master port, but has not been transmitting or receiving data. When the inactivity timer expires, Port C will be disconnected and the next slave port will then be connected to the master port (following the first-come-first-serve rule). Port C will then be placed at the "end of the line".

If the data byte of the Set Timer Mode command is an ASCII "1", the timer will be setup to ignore switching commands. Sending the following string to the 232SS2 will set up the timer to ignore switching commands. (Assuming programmable character is the factory default of 2).

$$\text{SetTM\$} = \text{CHR}\$(27) + \text{CHR}\$(2) + \text{"M"} + \text{"1"}$$

The "M" tells the 232SS2 it is the set timer mode command and the "1" indicates to set up the timer to ignore switching commands. When the timer is configured in this mode, the 232SS2 will not accept any switching commands ("A", "B", "C", "D", or "EOT") for the specified timer value. After the timer has expired, the slave port that is connected to the master port will be disconnected. This feature is useful to prevent inadvertent switching during binary/graphic type file transfers. For example (smart switch mode): The timer is configured to ignore switching commands for 5 seconds. The select Port D command is sent to the 232SS2. Once Port D is connected a file of unknown data type (so file may or may not contain a switching command sequence) is to be transferred through the 232SS2. For a period of 5 seconds after Port D is connected, no switching commands will be accepted. As long as the file transfer takes less than 5 seconds, there is no chance the 232SS2 will inadvertently switch ports.

Table 4 - 232SS2 Commands

Function	Command Characters				Comments
	1st	2nd	3rd	4th	
Select Port A	ESC	X*	"A"	NU**	Switching Command
Select Port B	ESC	X*	"B"	NU**	Switching Command
Select Port C	ESC	X*	"C"	NU**	Switching Command
Select Port D	ESC	X*	"D"	NU**	Switching Command
Deselect Port	ESC	X*	EOT	NU**	Switching Command
Set Timer Value	ESC	X*	"T"	"0"- "9"	Enhanced Mode
Set Timer Mode	ESC	X*	"M"	"0", "1"	Enhanced Mode

*X represents the programmable character set by dipswitch SW2

**NU = Not Used

Specifications

Model: 232SS2

Size: 6.2 x 8.0 x 2.5in

Power: 12Vdc to 16Vdc @ 100mA

Chapter 3: SOFTWARE

Introduction

The 232M`SS2 comes with two application programs that can be used to switch between ports. Each comes on a separate floppy disk. Either can be used independently as the final application or for testing the functionality of the hardware.

The **SSwitch** program is a Windows program that allows you to switch ports with buttons on a Windows interface, or from the DOS command line. It will run on Windows 95, 98, or Windows NT 4.0 with service pack 3 installed. When the software is installed, an example file, SSWVb6.txt, is also placed in the same directory. This is a text file with Visual Basic sample code. It gives examples on how to open the port, assemble switching commands, and send them out the port. It can be accessed by selecting START/PROGRAMS/B&B Electronics/SSWITCH/Sample Code.

The Smart Switch, Terminate and Stay Resident (**SSTSR**) Program (IBM PC or Compatible), is a DOS only application which allows the user to change Smart Switch ports either through the command line or by hitting a sequence of keys at the same time, referred to as hot keys. SSTSR program requires 1K of memory.

Windows SSwitch

Installation

To install the SSwitch Program (Windows 95/98 & NT)

- From START/ SETTINGS/ CONTROL PANEL
- Select **Add/Remove Programs**
- Insert the Smart Switch for Windows disk and select **Install**
- Follow the Installation prompts to complete the installation

Running SSwitch

The SSwitch program can be launched from the desktop shortcut or from the Start/Programs/B&B Electronics/SSwitch directory if the default directory was selected during installation.

The Smart Switch software configuration can be changed in the SSwitch program by selecting Ports/Configuration from the menu. You change port selection by clicking on the option box or by using the up/down arrow keys. The port selection can also be changed at the command line by typing SSwitch and the letter representing that port. For example, to change to port B you would enter SSwitch B at the command line. The letter N (none) is used to close all the ports.

To **Uninstall** SSwitch.exe

- From START/ SETTINGS/ CONTROL PANEL
- Select Add/ Remove Programs
- Select SSwitch from the list of programs
- Click on the Add/Remove button

DOS SSTSR

Installation

To **Install** the SSTSR Program (DOS)

If A drive is your floppy drive:

- Place the Smart Switch for DOS disk in drive A
- At the DOS prompt
- Type a:**INSTALL.exe** and press the **ENTER** key.

The following files will be located on your hard drive:

- 1)SSTSR.EXE - The executable file for the Smart Switch.
- 2)SETUP.EXE - Configuration program for the SSTSR.

There are two methods to begin the SSTSR program. The first and preferred way is to use the SETUP.EXE program and the second is through the SSTSR.COM file.

1) **SETUP.EXE Method (preferred)**

If the software was installed on your hard drive follow these steps:

- Type **C:** and press the **ENTER** key.
- Type **CD\SS** and press the **ENTER** key.

To begin the SSTSR program follow these steps:

- Type **SETUP** and press the **ENTER** key. You will be prompted for parameters (for a description refer to the Parameters section) that are necessary for the SSTSR to communicate with the Smart Switch. The value in [] are the default values. If this value is desired, just press the **ENTER** key.

Enter Port Address [02F8]:

Enter Baud Rate (1 = 150 2 = 300 3 = 600
4 = 1200 5 = 2400 6 = 4800
7 = 9600 8 = 19200) [7]:

Enter Parity (0 = No 1 = Odd 2 = Even) [0]:

Enter Number of Data Bits (7 = Seven Data Bits
8 = Eight Data Bits) [8]:

Enter Smart Switch Second Char (Decimal Value) [2]:

Enter Hot Key Sequence (1 = <LftShift><Alt><A|B|C|D|N>
2 = <Rht Shift><Alt><A|B|C|D|N>
3 = <Lft Shift><Alt><1|2|3|4|N>
4 = <Rht Shift><Alt><1|2|3|4|N>
5 = <CTRL><ALT><A|B|C|D|N>
6 = <CTRL><ALT><1|2|3|4|N>)[1]:

At this point a file called GO.BAT will be created.

- Type **GO** and press the **ENTER** key.

Once the GO.BAT file is created, every time you wish to begin the SSTSR all that you need to do is type **GO** and press the **ENTER** key. If you need to change any of the settings of the SSTSR simply run the SETUP.EXE program again to create a new GO.BAT file.

2) SSTSR.EXE Method

The SSTSR.EXE method requires the same parameters (for a description refer to the Parameters section) as the SETUP.EXE method, except that they are all specified through the command line. Each of these parameters begins with a command symbol followed by an option as defined in the following table.

Command	Description	Options
A or a	Port Address	Hexadecimal Address (0 - FFFFh)
B or b	Baud Rate	1 = 150 2 = 300 3 = 600 4 = 1200 5 = 2400 6 = 4800 7 = 9600 8 = 19200
D or d	Number of Data Bits	7 = 7 Data Bits 8 = 8 Data Bits
P or p	Parity	0 = No 1 = Odd 2 = Even
U or u	User Defined Char.	Decimal (0 - 255)
H or h	Hot Key	1 = <Left Shift><ALT><A|B|C|D|N> 2 = <Right Shift><ALT><A|B|C|D|N> 3 = <Left Shift><ALT><1|2|3|4|N> 4 = <Right Shift><ALT><1|2|3|4|N> 5 = <CTRL><ALT><A|B|C|D|N> 6 = <CTRL><ALT><1|2|3|4|N>

If the software was installed in the default directory:

- At the DOS prompt Type **C:** and press the **ENTER** key.
- Type **CD\232MSS2** and press the **ENTER** key.

To begin the SSTS program (the following will be used as an example):

Port Address = 03F8 Parity = Odd
Baud = 9600 User Defined Char. = 8
Data Bits = 8 Hot Key Sequence = 4

- Type **SSTS A03F8 B7 D8 P1 U8 H6** and press the **ENTER** key.

Using this method, every time you want to install the SSTS with different parameter settings than the default (refer to the Default Values section), the missing parameter must be specified.

Parameters

The Port Address is the address where the serial communications port is located.

Some of the typical port addresses are as follows:

Port	Address
COM 1	03F8h
COM 2	02F8h
COM 3	03E8h
COM 4	02E8h

The Baud Rate is the speed at which communication takes place between the SSTS and the Smart Switch. It must be specified so that it is equal to SW1 on the Smart Switch.

The Number of Data Bits is the length of each character that gets sent from the SSTS to the Smart Switch. This value must be specified so that it is equal to SW2 on the Smart Switch.

The Parity is a method of error detection that takes place during the transmission of data between the SSTS and the Smart Switch. This value must be specified so that it is equal to SW2 on the Smart Switch.

The User Defined Character must be set so that it is equal to SW3 on the Smart Switch.

The Hot Key is a sequence of three keys that must be pressed simultaneously to switch from one Smart Switch Port to another. For example, the hot key sequence, <Left Shift> <ALT> <A|B|C|D|N> states that the left shift, Alt, and either A, B, C, D, or N must be pressed at the same time to select the corresponding Smart Switch Port. N turns off all Smart Switch ports.

Default Values

If you type SSTSRS on the command line with no parameters, or omit any parameters, the default value of the missing parameter will be used. The default values are:

Description	Default Value
Port Address	02F8h (COM 2)
Baud Rate	7 = 9600
Parity	0 = No Parity
Data Bits	8 = 8 Data Bits
Second Character	2 = STX (CTRL B)
Hot Key Sequence	1 = <Left Shift><ALT><A|B|C|D|N>

Help Screen

If you are installing the SSTSRS using the SSTSRS.COM method, you can type **SSTSRS ?** and press the **ENTER** key to obtain a list of the commands and their options.

Un-Install

The SSTSRS may be un-installed easily by typing **SSTSRS -** and pressing the **ENTER** key. In some cases the SSTSRS will not un-install. This may be caused by another terminate and stay resident (TSR) being installed after it. To un-install the **SSTSRS** when this occurs, the other TSR must first be un-installed, then the **SSTSRS** can be un-installed normally.

Selecting Ports

There are two different ways in which a Smart Switch port is selected, either through the command line or by pressing the predefined hot key sequence after the SSTSRS was installed. When a request to change ports is made, using either method, first the current port is turned off, then the port selected is turned on. The two methods are described as follows:

Hot Key Method

This method enables the user to select any Smart Switch port by pressing a predefined sequence of keys at the same time after the SSTSR is installed (refer to Program Installation).

Example:

If Hot Key sequence <Lft Shift><Alt><A|B|C|D|N> was selected, to change ports you would press at the same time:

- Left Shift - Alt - A** to select port A
- Left Shift - Alt - B** to select port B
- Left Shift - Alt - C** to select port C
- Left Shift - Alt - D** to select port D
- Left Shift - Alt - N** to turn off all ports

Command Line Method

This method enables the user to select any Smart Switch port through the command line. To specify a Smart Switch port through the command line, you would type **SSTSR** followed by the **X** command symbol and the letter of the port.

Example:

To change to Smart Switch port "C" you would type **SSTSR XC** at the Dos prompt and press the **ENTER** key.

Before a Smart Switch port is changed, a check is made to determine if the port is busy transmitting. If the port is busy the STSR will generate a tone to notify you that the port is busy and that a port change cannot be made.

CAUTION: If the software package you are using for transmission is running at a fast baud rate (57600), the SSTSR may not detect the Smart Switch port as busy and the transmission could be interrupted.

The SSTSR does not detect when the Smart Switch port is receiving data. Therefore, if data is being received, the Smart Switch port may still be changed.

APPENDIX A: ASCII Character Codes

DECIMAL to HEX to ASCII CONVERSION TABLE												
DEC	HEX	ASCII	KEY	DEC	HEX	ASCII	DEC	HEX	ASCII	DEC	HEX	ASCII
0	0	NUL	ctrl @	32	20	SP	64	40	@	96	60	`
1	1	SOH	ctrl A	33	21	!	65	41	A	97	61	a
2	2	STX	ctrl B	34	22	"	66	42	B	98	62	b
3	3	ETX	ctrl C	35	23	#	67	43	C	99	63	c
4	4	EOT	ctrl D	36	24	\$	68	44	D	100	64	d
5	5	ENQ	ctrl E	37	25	%	69	45	E	101	65	e
6	6	ACK	ctrl F	38	26	&	70	46	F	102	66	f
7	7	BEL	ctrl G	39	27	'	71	47	G	103	67	g
8	8	BS	ctrl H	40	28	(	72	48	H	104	68	h
9	9	HT	ctrl I	41	29	)	73	49	I	105	69	i
10	A	LF	ctrl J	42	2A	*	74	4A	J	106	6A	j
11	B	VT	ctrl K	43	2B	+	75	4B	K	107	6B	k
12	C	FF	ctrl L	44	2C	,	76	4C	L	108	6C	l
13	D	CR	ctrl M	45	2D	-	77	4D	M	109	6D	m
14	E	SO	ctrl N	46	2E	.	78	4E	N	110	6E	n
15	F	SI	ctrl O	47	2F	/	79	4F	O	111	6F	o
16	10	DLE	ctrl P	48	30	0	80	50	P	112	70	p
17	11	DC1	ctrl Q	49	31	1	81	51	Q	113	71	q
18	12	DC2	ctrl R	50	32	2	82	52	R	114	72	r
19	13	DC3	ctrl S	51	33	3	83	53	S	115	73	s
20	14	DC4	ctrl T	52	34	4	84	54	T	116	74	t
21	15	NAK	ctrl U	53	35	5	85	55	U	117	75	u
22	16	SYN	ctrl V	54	36	6	86	56	V	118	76	v
23	17	ETB	ctrl W	55	37	7	87	57	W	119	77	w
24	18	CAN	ctrl X	56	38	8	88	58	X	120	78	x
25	19	EM	ctrl Y	57	39	9	89	59	Y	121	79	y
26	1A	SUB	ctrl Z	58	3A	:	90	5A	Z	122	7A	z
27	1B	ESC	ctrl [	59	3B	;	91	5B	[	123	7B	{
28	1C	FS	ctrl \	60	3C	<	92	5C	\	124	7C	|
29	1D	GS	ctrl]	61	3D	=	93	5D	]	125	7D	}
30	1E	RS	ctrl ^	62	3E	>	94	5E	^	126	7E	~
31	1F	US	ctrl _	63	3F	?	95	5F	_	127	7F	DEL

APPENDIX B: Cable Charts

All charts will indicate if the Master Port of the 232SS2 should be configured as a DCE port or a DTE port. Refer to the Port Configuration section of the manual for information on Master Port configurations.

Chart 1. IBM PC DB25 Connector to Master Port

Straight Through Connection

IBM PC Serial Port DB25 Connector	Signal Direction	232SS2 Master Port (DCE) DB25 Connector
2	----->	2
3	<-----	3
4	----->	4
5	<-----	5
6	<-----	6
7	GROUND	7
8	<-----	8
20	----->	20

Chart 2. IBM PC DB9 Connector to Master Port

Straight Through Connection

IBM PC Serial Port DB9 Connector	Signal Direction	232SS2 Master Port (DCE) DB25 Connector
1	<-----	8
2	<-----	3
3	----->	2
4	----->	20
5	GROUND	7
6	<-----	6
7	----->	4
8	<-----	5

**Chart 3. Modem DB25 Connector to Master Port
Straight Through Connection**

Async Modem Serial Port DB25 Connector	Signal Direction	232SS2 Master Port (DTE) DB25 Connector
2	<-----	2
3	----->	3
4	<-----	4
5	----->	5
7	GROUND	7
8	----->	8
20	<-----	20

Chart 4. IBM PC DB25 Connector to Ports A - D (DTE)
Master port DCE, Slave port DTE.
Null Modem Connection

IBM PC Serial Port DB25 Connector	Signal Direction	232SS2 Ports A - D (DTE) DB25 Connector
2	----->	3
3	<-----	2
4	----->	5
5	<-----	4
6 & 8	<-----	20
7	GROUND	7
20	----->	6 & 8

Chart 5. IBM PC DB25 Connector to Ports A - D (DCE)

Master port DTE, Slave ports DCE.

Straight Through Connection

IBM PC Serial Port DB25 Connector	Signal Direction	232SS2 Ports A - D (DCE) DB25 Connector
2	----->	2
3	<-----	3
4	----->	4
5	<-----	5
6	<-----	6
7	GROUND	7
8	<-----	8
20	----->	20

Chart 6. IBM PC DB9 Connector to Ports A - D (DTE)

Master port DCE, Slave port DTE.

Null Modem Connection

IBM PC Serial Port DB9 Connector	Signal Direction	232SS2 Ports A - D (DTE) DB25 Connector
1 & 6	<-----	20
2	<-----	2
3	----->	3
4	----->	6 & 8
5	GROUND	7
7	----->	5
8	<-----	4

Chart 7. IBM PC DB9 Connector to Ports A - D (DCE)
 Master port DTE, Slave port DCE.
Straight Through Connection

IBM PC Serial Port DB9 Connector	Signal Direction	232SS2 Ports A – D (DCE) DB25 Connector
1	<-----	8
2	<-----	3
3	----->	2
4	----->	20
5	GROUND	7
6	<-----	6
7	----->	4
8	<-----	5

FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFACE STATEMENT

Class A Equipment

This equipment has been tested and found to comply with the limits for Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. 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. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.