Smart Buffer Series
User's Manual

Technologic
SYSTEMS

Technologic Systems Support Services

The following resources are available for updated documentation, software, and support:

- Updates and technical information on the Smart Buffer can be found in the README.TXT file included on the SB utility diskette. Please see the section **Printing / Viewing the README File** on page 16 for further details.

- Current versions of utility software for the Smart Buffer can be found at the Technologic Systems web site, located at **http://www.t-systems.com/**

- For technical support questions, you can contact Technologic Systems by:

Telephone:	**602-837-5200**
Fax:	**602-837-5300**
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Postal Address:	**16610 East Laser Drive Suite 10**
	Fountain Hills, AZ 85268

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General Description

The Smart Buffer (**SB**) family of printer sharing devices can be used to share one or more printers between several computers. Available in serial, parallel, and mixed models, they can satisfy nearly any printer sharing application. Printer selection can be controlled by using the supplied pop-up programs. All serial and most parallel ports are input/output configurable. A TURBO option is also available which provides both higher throughput and socketed memory. The entire family of Smart Buffers is listed in the table below.

Model Number	Parallel Ports		Serial Ports	
	Total	Outputs	Total	Outputs
SB-200	6	1 to 3	0	0
SB-300	9	1 to 5	0	0
SB-400	12	1 to 7	0	0
SB-500	15	1 to 9	0	0
SB-210	5	1 to 3	4	0 to 4
SB-310	8	1 to 4	4	0 to 4
SB-410	11	1 to 5	4	0 to 4
SB-201	3	1	8	0 to 8
SB-301	6	1 to 3	8	0 to 8
SB-302	3	1	16	0 to 16

Getting Started

For the most up-to-date information about your new Smart Buffer, please see the README.TXT file included on the utility disk shipped with the unit.

The shipping container should contain the following items:

- Smart Buffer
- Power Supply
- Cables and/or Adapters (if purchased separately)
- User's Manual
- Utility Diskette

To install your new buffer   **See Page**

1. Connect an IBM-compatible PC to the buffer, then apply power.   2

2. Run SB-SETUP to ensure that cabling is correctly installed.   4

3. If you intend to connect more than one printer or use a non-standard baud   4
   rate on a serial port, use SB-SETUP to configure the buffer.

4. Connect remaining computers to the buffer.   2

5. If you have more than one printer connected to the buffer, install SB-POP   6
   and /or SB-WIN on each PC using DOS-INST and SETUP respectively.

6. Connect printers / plotters to the output ports of the buffer.   9

7. Send test messages to each output device using SB-SETUP.   9

Connecting Computers to the Buffer

Numbering for all ports on the SB is depicted on a sticker on the bottom of the unit. Parallel ports have a **P** prefix, serial ports an **S**. Ports are numbered from left to right, bottom to top, when looking at the rear of the unit.

Each port on the SB is either an **input** or an **output**. Data is received from computers connected to input ports and then sent to printers, plotters or other devices connected to output ports. When you first receive the buffer, all ports will be configured as inputs except port P1, which is always an output. Most parallel and all serial ports can be configured as outputs using SB-SETUP.

You will need a Male-to-Male DB-25 straight-through cable for each computer using a parallel interface to the SB. The maximum recommended length of a parallel cable is 100 feet, although some laptop computers may be restricted to 25 feet or less. Parallel line extenders raise this limit to hundreds of feet, but cannot be used with some SB utilities. See the README file for details.

Serial ports on the buffer use RJ-12 female connectors (which resemble telephone jacks). Thus, serial ports require special cables and adapters, available from your dealer. If you purchased these adapters with the unit, you should take one end of the flat silver cable and plug it into a serial port on the buffer. Next, attach the Serial Port Adapter to the COM port of the PC and plug the other end of the flat silver cable into it.

If you wish to make the serial cables and adapters yourself, refer to Serial Ports & Cabling on Page 18 of this manual for instructions.

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Running SB-SETUP

All software configuration of the Smart Buffer is done using SB-SETUP.EXE. This program allows you to verify cabling to the SB, switch ports between input and output mode, configure serial parameters, and configure options built into the Smart Buffer.

Before running SB-SETUP, please review the README file on the diskette. This file contains tips, warnings, and updates which you may find helpful.

You do not need to run SB-SETUP on each PC you connect to the Smart Buffer; just run it once from any connected PC. The changes made will be global and will affect all ports on the SB.

To run the configuration program, place the utility diskette in drive A. From a DOS prompt or the Windows **Run** dialog, type "A:SB-SETUP" and press Enter. You will be asked to select the PC port connected to the buffer, after which you will see the main menu of SB-SETUP.

At this point, proper communications with the buffer has been verified. If the SB will be used with only one output device and you are only using parallel ports, or you are using the standard data format (9600, N, 8, 1) with serial ports, you can exit SB-SETUP now by pressing '**X**'.

To select additional output ports and modify serial data formats, select the 'Modify Existing Setup' option from the main menu screen. A chart of options (briefly described below) for each port on the SB is then displayed. Use the arrow keys to move the cursor. Not all displayed options are available for

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every port; the cursor will simply skip over those that cannot be modified. Pressing the *F10* key will display context sensitive help for the option currently selected.

- **Direction** - Switch the port between input and output modes. Inputs are connected to computers, Outputs to printers and plotters. All serial ports and most parallel ports can be switched.

- **Dest**ination - The default output for each input port. The buffer will revert to these each time it is turned on or reset.

- **Label** - Allows simple identification of outputs in SB-POP and SB-WIN.

- **Time-out** - The length of inactivity on an input port before the SB will close a print job.

- **Serial Format** - Sets the baud rate, parity, data bits, stop bits, and software flow control options for each serial port.

When finished configuring the SB, press *F1* to write the new settings into non-volatile memory in the buffer. SB-SETUP should only have to be run once (when you first receive the unit). However, should you decide to change something in the future, you may need to run SB-SETUP again.

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The SB-POP and SB-WIN Pop-Up Menu Utilities

The installation of SB-POP and/or SB-WIN is not required for the proper operation of the buffer. Their main purpose is to allow the user to switch between multiple output devices connected to the SB. They can be summoned with a single keystroke (that you specify), even while you are within another application program. SB-POP is for use in a DOS environment, SB-WIN is for use in Windows 3.1 through Windows 95. Some of the capabilities of the programs are listed below:

- Change which printer your files are sent to.
- Print multiple copies of the next file you send to the buffer.
- Display information about the current status of the buffer.
- Clear all of your print files from the buffer.

Each time the program pops up, it tests to make sure that the buffer is present. If it cannot communicate with the buffer, it will display an error message to that effect.

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Pop-Up Menu Installation   (for Windows)

To install SB-WIN, run the SETUP.EXE program from the utility disk. This procedure is detailed below:

Windows 3.11 and below: select the Run command from the File menu in Program Manager. Enter 'a:\setup.exe' in the run: box, and press enter.

Windows95: select the Run command from the Start menu on the Task Bar. Enter 'a:\setup.exe' in the run: box, and press enter.

Once the SETUP program begins, you will be prompted for any necessary information. On-line help is available if you need more information.

The installation procedure will include the SB-WIN program in your start-up program group. If you don't want the utility to run every time Windows is started, simply move it to a different program group.

The README file contains some tips on optimizing your Windows environment for maximum printing speed.

Pop-Up Menu Installation   (for DOS)

If you want to switch between more than one printer attached to the buffer, you will need to install SB-POP on each PC connected to the buffer. A simple installation program, DOS-INST, will perform this task for you.

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Place the utility diskette in drive A and type "A:DOS-INST" at the DOS prompt. DOS-INST will prompt you to provide the following information:

1) **"Hot-key" Keystroke Combination** - is a single keystroke and must contain the *CTRL* and/or *ALT* keys as well as one alphanumeric key [A...Z, 0...9]. You should choose a keystroke combination that does not conflict with any of your application programs' special purpose keys. *CTRL+ALT+Z* seems to be a fairly reliable choice.

2) **PC Communications Port** - specifies which of the computer's communications ports will be connected to the buffer. This port should be the same as the one you selected when you ran SB-SETUP to check cabling.

3) **Load High** - determines whether the program is loaded into the high memory area above the 640 kB DOS boundary. This option is only available if you are using DOS version 5.0 or later.

The DOS-INST program will add one or two lines of text to your AUTOEXEC.BAT file (it will not alter the existing contents of the file) resembling the following:

```
SB-POP   -h Ctrl+Alt+Z   -p COM1
mode COM1:9600,n,8,1,p
```

When the installation program finishes, it will return you to the DOS prompt.

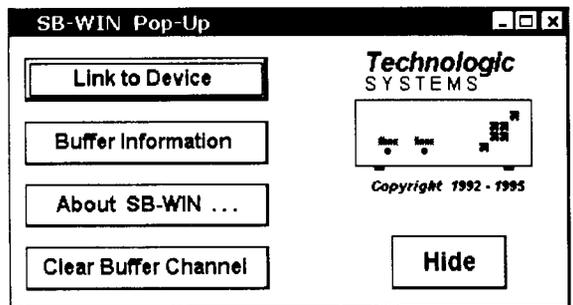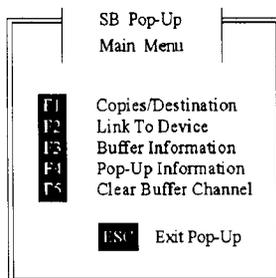8   *You must re-boot your computer for these changes to take effect.*

After you have re-booted your computer, you should be able to summon the pop-up menu by hitting the "hot-key" you specified. Be sure that you are in a text screen, or SB-POP will refuse to appear. If you still cannot summon SB-POP, refer to the README file on the utility diskette for tips on getting SB-POP to work. The section entitled "Notes on SB-POP" will explain how to manually edit your AUTOEXEC.BAT file, which programs have been known to cause problems with SB-POP, and what steps are necessary to make them live happily together on your PC.

Using the Pop-Up Menu Programs

To use the pop-up menu programs, you need merely hit the "hot-key" combination you specified at installation. The program will appear in a small window near the center of the screen. Under DOS, you will see SB-POP; under *Windows*, you will see SB-WIN. They are essentially identical in the way they operate, and are discussed together on the following pages.

The main menu screens, which list all possible choices, look like this:

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SB Pop-Up
Main Menu

F1 Copies/Destination
F2 Link To Device
F3 Buffer Information
F4 Pop-Up Information
F5 Clear Buffer Channel

ESC Exit Pop-Up

SB-WIN Pop-Up   _ □ ✕

Link to Device   *Technologic*
                                 SYSTEMS

Buffer Information

                                 Copyright 1992 - 1995
About SB-WIN ...

Clear Buffer Channel   Hide

To select an option from the list, press the appropriate function key (DOS) or click on the appropriate button (*Windows*). Doing so will take you to another display screen, where you can perform the actions desired.

Copies / Destination   *(SB-POP)*

This selection allows you to specify the number of copies and printer

SB Pop-Up
Copies/Dest.

Copies: 04
Destination: LaserJet

1 Change Copies
   Change Destination

2 Send Changes

   Abort

destination for the next print job you send. It will not affect any print jobs after that one. If you wish to re-route all subsequent print jobs to a different output device, you should use the 'Link to Device' option. In general, only use 'Copies / Destination' to specify multiple copies, and only if you cannot do so from within the application program itself.

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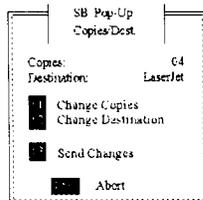
To change the number of copies, press *F1* and then enter two digits to specify the number of copies. When you are satisfied with what is displayed press *ENTER*.

To change the destination of the print job, press *F2* repeatedly until the device you want is displayed.

Once both parameters are correct, press *F3* to issue the appropriate commands to the buffer.

You may press the *ESC* key at any point to exit this screen without making any changes to the buffer settings.

Because *Windows* application programs give you the option of printing multiple copies of a print job, SB-WIN does not support the 'Copies / Destination' option.

Link to Device   (SB-POP and SB-WIN)

This option allows you to change the default destination for all of your subsequent print jobs. These changes will remain in effect until changed again or until the buffer is turned off.
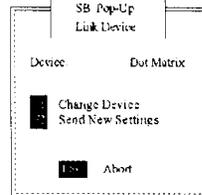
Press *F1* to traverse the list of output ports available. In SB-WIN, click on the list box arrow button and select the device you want from the list displayed.

Press *F2* when you wish to send your changes to the

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buffer. In SB-WIN, click on the Send New Settings button.

Press *ESC* if you don't want to make any changes to the buffer settings.

Please note that the device names displayed will be the ones you specified for that particular output port when you ran SB-SETUP. If you fail to specify a name for these output ports, the port number itself will be used (i.e. "P1" or "S12"). Labeling your output ports can make it much simpler to remember where your print jobs are going.
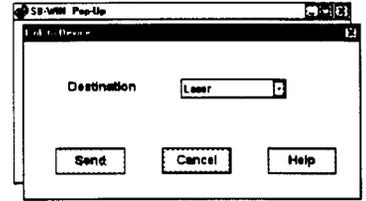
Buffer Information   *(SB-POP and SB-WIN)*

This selection will display relevant information about the current operating status of the buffer. This screen will display the amount of memory still available in the buffer, how much of the buffer memory your print jobs are consuming, and the total number of print jobs pending in the buffer. In addition, the model number and ROM version of the buffer are displayed. Press *ESC* when you wish to return to the Main Menu.

Pop-Up Information   *(SB-POP and SB-WIN)*

This selection will display information about the pop-up menu program settings. The screen will display which PC communications port is in use, which buffer port it is connected to, and the pop-up menu program's version

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number. Press *ESC* when you wish to return to the Main Menu.

Clear Buffer Channel   *(SB-POP and SB-WIN)*

This allows you to clear all of your print jobs which still remain in the buffer. It will not affect any other user's print jobs. Print jobs in the process of printing will cease printing immediately and a short termination message will appear at the end of them. You should halt the printing process on the computer before using this option, since any data the computer sends after this option is executed will be treated as a new print job.

Connecting Printers & Plotters

Printers and plotters are connected to the output ports of the buffer. Port P1 is always an output, but you *must* run SB-SETUP to set any other outputs.

To connect a parallel output device to the buffer, you can simply use a standard parallel printer cable. This will most likely be the same cable you were using on the printer before installing the buffer.

For serial printers, you should be using a special serial cable and adapter. Many plotters will also work with the standard cable and adapter, but some may require a null-modem adapter as well. There are essentially two ways of wiring serial ports on plotters; the null modem adapter will convert the wiring from one type to the other.

> *Be sure that the serial output device and the buffer port to which it is connected are using the same serial format.*

Printing

Once installation is complete, you will print in the same manner as before the buffer was installed. Your print jobs will automatically be routed to the default output port you specified when you ran SB-SETUP (or to P1 if you only have one printer hooked up). If you would like to change where they are sent, you can use SB-POP or SB-WIN to do so. The following section describes the process of switching to a different printer.

Switching Printers

There are a few simple steps to follow when you want to change which printer your data will be sent to:

1) Summon SB-POP or SB-WIN by striking the "hot-key".

2) Select the 'Link to Device' option from the main menu screen.

3) Choose the appropriate printer from the list provided. The name displayed first is the printer you are currently routed to.

4) Send any changes to the buffer and exit the pop-up utility.

5) Before you issue the next print command from your application, select a printer driver which corresponds to the printer chosen in the previous steps via SB-POP or SB-WIN. If you begin using another application later, you may need to change its printer driver as well.

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All of your subsequent print files will be routed to the printer you just selected. Your selection will remain in effect until the buffer is turned off. When the buffer is turned on again, you will be routed to the default output port.

If for some reason you are unable to make use of the pop-up utility programs, you may use the program SB-LINK to switch printers (see the section "Notes on SB-LINK" in the README file for details). If you are using a non-PC, there are character sequences which will effect printer switching as well (see "Soft-Codes" in the README file for details).

LED Indicators

The two LEDs, located in the lower left corner of the front panel, display information about the current operating status of the buffer. The Power LED shows the general state of activity in the buffer. When the buffer is idle, the Power LED is green blinking off briefly. If the buffer is receiving data it will blink red and green very rapidly. The Status LED displays how much of the memory in the buffer is being used to store print data. It blinks once if data is present in the buffer; each additional blink means that another 10% of the buffer has been used. The LEDs follow a short cycle which repeats every 2 to 5 seconds, depending on how many Status LED blinks occur.

Printing / Viewing the README File

DOS: Place the utility diskette in drive A. To print this file out the parallel port of your computer, type "PRINT A:README.TXT" at the DOS prompt and press *ENTER*. To view the file, type "A:README" and press *ENTER*.

Windows: You can use Notepad to view or print the README file. Invoke Notepad by double-clicking on its icon (normally found in the Accessories program group). Open the README.TXT file by selecting the "Open" option from the "File" menu and supplying it with the correct path and filename. If you want to print the README file, select "Print" from the "File" menu.

Notes for Other Operating Systems

The Smart Buffer is fully compatible with any type of computing equipment adhering to the Centronics parallel or RS-232 serial communications protocols. However, all of the supplied utility programs (like SB-TEST, SB-SETUP, SB-POP and SB-WIN) have been written for either the MS-DOS or *Windows 3.1/95* environments.

Regardless of the equipment you will eventually be connecting to the buffer, you will need access to an IBM-compatible PC running DOS for the initial configuration of the unit.

For further information on using the SB with other operating systems, including **Windows NT**, **OS/2**, and **UNIX**, please see the README file.

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Parallel Ports & Cabling

All parallel ports on the buffer use DB-25 female connectors (pictured below). Parallel port pin assignments on the buffer are the same as those found on an IBM PC-compatible computer's parallel port.

To connect nearly all types of computers to the buffer, a straight through cable with 25 pin male connectors on each end is required. We recommend that the length of this cable be kept to 100 feet or less.

A standard parallel printer cable can be used to connect the buffer to a parallel printer. Here, we recommend a cable length of 25 feet or less (see your printer manual).

For parallel connections longer than those specified above, a parallel line extender can be used. These devices consist of two small adapters that plug directly onto the smart buffer and computer (or printer) with simple telephone wiring strung between them. Powered line extenders are capable of distances as great as 1000 feet.

Most parallel line extenders only pass data in one direction, so many of the bi-directional utilities (SB-TEST, SB-SETUP, SB-POP and SB-WIN) we supply do not work with them. The section "Parallel Line Extenders" in the README file contains instructions on how to get around these handicaps.

Bi-Directional Printer Support in Microsoft Windows

Many newer printer models feature a "bi-directional" parallel port, which is capable of relaying information about the printer's status back to the PC. Because of the multi-user nature of the Smart-Buffer, and the proprietary nature of the bi-directional communications, our buffer cannot support this feature.

Please note that no loss of print quality is involved -- you will simply be unable to run the "status monitor" program shipped with your printer which displays information (such as "out of paper" or "paper jam") on your computer.

For further information on bi-directional parallel communications, please see section <2.1> of the README file.

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Serial Ports & Cabling

All serial ports on the Smart Buffer use RJ-12 female connectors, which resemble phone jack receptacles except that they use six conductors instead of four. To connect serial devices to the Smart Buffer, refer to the diagram at the bottom of this page. The maximum recommended distance for a serial connection to the buffer is 500 feet.

The basic requirements are a six-conductor RJ-12 cable and a serial port adapter. The RJ-12 cable should have both connectors crimped such that the same colored wire is one the right-hand side of the male RJ-12 connector at each end (commonly referred to as a straight-through cable). The serial port adapters are best purchased through your dealer. When ordering, simply specify what type of equipment you are connecting to the buffer and what connector (type and gender) used for its serial port.

6 Conductor Straight-Through Cable

Smart Buffer (serial port)

Serial Device (PC, printer, plotter, mainframe, etc.)

Serial Port Adapter

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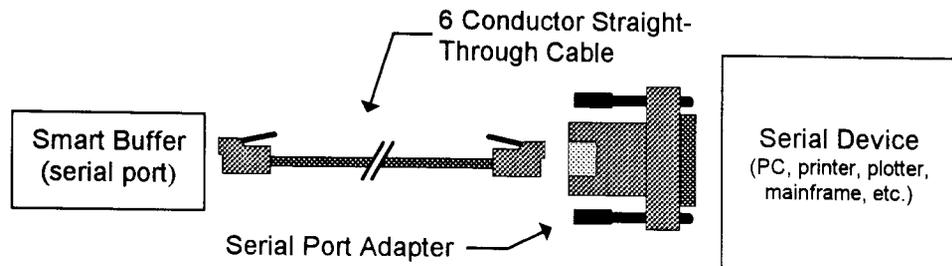
Making your own Cables and Adapters

As making your own serial cabling can be tedious and full of pitfalls, please remember that *these cables and adapters are available from your retailer* at reasonable prices.

Wiring specifications to some common devices are detailed in the table below. The female RJ-12 connector (**depicted as though you were looking at the rear panel of the SB**) shown on the right contains the pin assignments for the serial ports of the buffer. See the README file section titled "Serial Cabling" for a detailed description of signal function.

123456
serial
connector on
SB rear panel
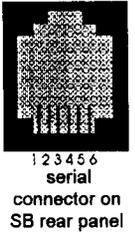
SB Pin No	SB Signal Name	DB-9 Female (to PC)	DB-25 Female (to PC)	DB-25 Male (to printer)	Signal Name
1	Logic High	8	5	5	CTS
2	Data Out	2	3	3	RxD$_{ATA}$
3	Data In	3	2	2	TxD$_{ATA}$
4	Ground	5	7	7	GND
5	H H* In	4	20	20	DTR
6	H H* Out	6	6	6	DSR

* H H = Hardware Handshake

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Performance Specifications

Serial transfer rates are inherently limited by the baud rates employed. Parallel transfer rates are limited solely by the hardware (PC and buffer) involved.

All serial ports on the Smart Buffer can transfer data at 115,200 baud. This is about 11,000 bytes (characters) per second. At 9600 baud (the standard baud rate used by MS-DOS based computers) a maximum data transfer rate of only 1000 bytes per second can be achieved.

The standard Smart Buffer parallel port can transfer data at rates of 10,000 bytes per second. The *TURBO* version can transfer data at much higher rates; all parallel ports are capable of at least 20,000 bytes per second and ports **P2** and **P3** have been optimized to sustain data rates as high as 100,000 bytes per second. The README file contains details about how to configure your installation to take maximum advantage of them.

Actual performance results can vary a great deal depending on the particular application and Smart Buffer model involved. As more computers send print jobs to the buffer simultaneously, the individual computers' data transfer rates will decrease. For instance, if two computers are sending print jobs to the buffer at the same time, they may only be able to send data at 80% of the maximum (parallel) rates specified above. With four computers sending simultaneously, the individual rates may drop to 50%. Serial ports are not generally affected by other ports on the buffer being active.

Speed Limitations of PCs

Your new buffer is very fast. If your computer still seems to be tied-up when printing, the most likely culprit is the speed of your computer or application program.

Applications which generate graphics are often slow to print because they perform many complex calculations in addition to sending the print data itself. Many applications also send much more data to the printer than you think. The inclusion of soft-fonts, printer-control codes, and graphics images can lead to very large print jobs. The size of the print job can be several times larger than the data file (stored by the application program on your hard drive) it originated from.

Another very common limitation in PCs is the use of low baud rates on the serial port. Unfortunately, MS-DOS traditionally supports baud rates no higher than 9600 (19200 if your serial port card uses a special chip). At 9600 baud, a one megabyte (1 MB) file will take over sixteen minutes to send ! This will be true regardless of the speed of your PC. The README file contains several methods for improving the performance of serial ports on the PC.

As a general rule, the standard version of the Smart Buffer can handle a moderate load of 2 to 3 simultaneous printing jobs to a single printer. The *TURBO* version of the Smart Buffer would be recommended for heavier use. This would include very large print jobs, multiple printers, or several simultaneous print jobs.

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Physical Specifications

Size	(SB-2xx)	:	8.4 x 4.3 x 2.3 inches
	(SB-3xx)	:	8.4 x 4.3 x 3.1 inches
	(SB-4xx)	:	8.4 x 4.3 x 3.9 inches
	(SB-5xx)	:	8.4 x 4.3 x 4.7 inches
Operating Temperature		:	32 to 125 F
Operating Humidity		:	5 to 95% R.H.
Power Usage	(SB-x00)	:	0.45 A @ 9 V_{DC} (max.)
	(SB-x10)	:	0.70 A @ 9 V_{DC} (max.)
	(SB-201)	:	1.00 A @ 9 V_{AC} (max.)
	(SB-302)	:	1.00 A @ 9 V_{AC} (max.)
Weight *	(SB-2xx)	:	2.7 lb.
	(SB-3xx)	:	3.3 lb.
	(SB-4xx)	:	3.9 lb.
	(SB-500)	:	4.4 lb.

*Shipping weight may be higher due to the inclusion of power modules, accessories, packaging materials, etc.

Limited Warranty

The manufacturer warrants this product to be in good working order for a period of one year from date of purchase from an authorized dealer. If at any time within the one year warranty period this product should fail, the manufacturer will repair or replace the product, at its option. This limited warranty does not cover damages resulting from lightning or other power surges, abuse, or unauthorized modifications.

Limited warranty service may be obtained by shipping or delivering this unit to the point of sale during the one year warranty period. Prior to shipping the unit, a return authorization number must be obtained. Proof of purchase date and a short description of the problems noticed must be included with the unit.

This warranty is limited to repairing or replacing the defective unit. In no event shall the manufacturer or dealer be liable for any damages, including any lost profits or incidental or consequential damages arising form the use or inability to use this product.

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FCC Advisory Statement

Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly (that is, in strict accordance with the manufacturer's instructions), may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the owner at his own expense will be required to correct the interference.

If this equipment does cause interference, which can be determined by turning the unit on and off, the user is encouraged to try the following measures to correct the interference:

1) Reorient the receiving antenna.

2) Relocate the unit with respect to the receiver.

3) Plug the unit into a different outlet so that the unit and receiver are on different branch circuits.

4) Ensure that mounting screws and connector attachment screws are tightly secured.

5) Ensure that good quality, shielded and grounded cables are used for all data communications.

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If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The following booklets prepared by the Federal Communications Commission may also prove helpful:

"How to Identify and Resolve Radio-TV Interference Problems"   Stock No. 004-000-000345-4

"Interface Handbook" Stock No. 004-000-004505-7

These booklets may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

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