

**Focus 44, 70, 84
Refreshable Braille Display
User's Guide**

Freedom Scientific BLV Group, LLC
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- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

ATTENTION:

This unit has been shipped with cables that allow compliance with FCC Regulations. If printer, telephone or alternate serial cables are needed in the future, please contact Freedom Scientific to obtain the appropriately filtered cables.

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Introduction

The Focus 44, 70, and 84 refreshable Braille displays provide a tactile interface to your computer. Used together with screen access software such as JAWS for Windows versions 4.02 and later, the Focus displays enhance your computing experience.

Features

The Focus Braille displays include the following features:

- 44, 70, or 84 Braille cells.
- A cursor routing key above each Braille cell.
- 9 key Perkins style Braille keyboard, with the addition of two SHIFT keys.
- Two advance bars and two programmable General Display Buttons.
- Two Whiz Wheels, one at each end of the display, for quick navigation of lists and menus.
- VariBraille adjustable Braille dot firmness.
- Status cells configurable to either end of the display.
- Rapid Reading mode for quick review of files.
- Serial or USB connection to PC.
- Removable handle that doubles as a keyboard stand/height adjustor for easy ergonomic positioning of a computer keyboard or portable computer.

Ship List

The Focus Braille displays ship with the following items:

- Keyboard Accessory
- USB Cable
- 9 Pin Serial Cable
- Power Supply/AC Adapter
- Fitted Case
- Manual in Print and Braille (only in the United States and other English speaking countries)
- Manual on diskette for easy review on your PC
- 30 month warranty

Physical Layout

The Focus displays are designed with the Braille cells near the back of the unit so they are as close as possible to the keyboard. There is a cursor routing key above each Braille cell. There are two advance bars and two General Display Buttons (GDB) between the Braille cells and the back of each unit.

Between the Braille cells and the front of each unit, there are eight keys similar to those on a Perkins style Braille keyboard. These keys are used to enter

commands. To either side of these keys, at either end of the display, there are Whiz Wheels used for easy navigation. Along the front edge of the display are three buttons, LEFT SHIFT, SPACEBAR, and RIGHT SHIFT. These three keys are used together with the Braille keys when entering commands.

On the left end of the display, there is a nine pin serial port, AC adapter jack, and a USB port. The AC adapter is required when connecting the Focus display to your computer via the serial port, but is not needed with a USB connection.

On the right end of the display, there are four audio jacks: the two near the front are audio out jacks, and the two near the back are audio in jacks. The audio out jacks are further designated with the front jack marked as speaker and the other marked as headphones. On this side, there is also another USB port.

Note: You can only use one USB port at a time. The second USB port does not function as a pass through port.

Connecting the Focus

The Focus Braille displays can be connected to your PC using either the USB port or the nine pin serial port. When using a USB connection, the Focus Braille display is powered from the PC through the USB cable. When using a serial port connection, you must also attach the AC adapter.

Note: Not all USB ports provide enough power to run the Focus Braille displays. If your USB connection does not provide sufficient power, the Focus display will beep every five seconds. This occurs most frequently with non-powered USB hubs and smaller portable computers.

The Focus Braille display has two USB ports, one on either end of the display. Both ports are present for convenience in connecting the display. The second USB port cannot be used as a USB hub for another device.

When using the USB connection, we recommend you do not connect the AC adapter unless your USB connection does not provide sufficient power. If you are using the AC adapter with a USB connection, disconnect the AC adapter before switching the USB connection from one end of the Focus to the other.

The Adjustable Keyboard Accessory

The adjustable keyboard accessory is used to position and angle your keyboard or portable computer for ease of use with the Focus Braille display. The keyboard accessory is part of the Focus Braille display's handle. Flip the back edge of the handle down away from the display. (This would be the top if you are holding the Focus up by the handle.) Pull out the legs and position the feet. The legs and feet are adjustable to provide you the support you need and angle you desire for your keyboard or portable computer.

Attaching the Keyboard Accessory

1. Position the Focus display on its front edge, with the buttons and Braille cells towards you. In this position, the grooved back of the unit is straight up.
2. Hold the Keyboard Accessory so its back is also straight up, with the hinges away from you. The back of the Keyboard Accessory has "Freedom Scientific" printed on it in raised lettering.
3. Slide the Keyboard Accessory into the right end of the groove on the back of the Focus display while pressing up on the button on the left end of the keyboard accessory.
4. The Keyboard Accessory will click when it is in place.

Tip: The button on the left edge of the keyboard accessory functions as a lever that releases the catch that holds the Keyboard Accessory in place. It does not take much pressure to release this catch, but that pressure must be upward pressure, not inward pressure as you might expect with a button.

Removing the Keyboard Accessory

1. If you are using the keyboard accessory, fold up the feet, collapse the legs if they are extended, and rotate the legs into the handle.
2. Flip up the back of the Keyboard Accessory, ensuring that it clicks into place.
3. Position the Focus display on its front edge, with the buttons and Braille cells towards you.
4. Grasp the Focus display firmly with your left hand, press up on the button on the left end of the Keyboard Accessory, and while holding the button in that position, use your right hand to slide the Keyboard Accessory to the right, off the right edge of the Focus.

JAWS and the Focus 44, 70, 84

The following sections discuss use of the Focus 44, 70, and 84 refreshable Braille displays with JAWS 4.02 and 4.5 for Windows.

Installation

JAWS support for the Focus Braille displays can be added when JAWS is first installed, or after JAWS is installed.

Adding Support During JAWS Installation

To add support for the Focus displays during JAWS installation, select either the Guided or Advanced setup option. On the Select Braille Components page, or on the Select Components page of setup, check the "Focus 44, 70, or 84" item. On the Set Options for the Focus Braille Display page, select the Com port or the USB port to which the Focus display is attached. On all other pages of setup, select the options you need and/or desire. With JAWS 4.5, your Focus display is ready to use once the setup is complete. If you are installing JAWS 4.02, you will

need to update the Focus driver. For more information, please see “Updating the JAWS 4.02 Focus Driver.”

Adding Support After JAWS Installation

To add support for a Focus display after JAWS is already installed:

1. Press **INSERT+J** to make the JAWS application window active.
2. Press **ALT+O, L** to open the Braille Basic Settings dialog.
3. Move to the Add Braille Display button and press **SPACEBAR**.
4. Once JAWS setup is open to the Select Braille Components dialog, check the "Focus 44, 70, or 84" item, and then press **ENTER**.
5. On the Set Options for the Focus Braille Display page, select the Com port or the USB port to which the Focus display is attached, and press **ENTER**.

Once setup has installed support for the Focus display, JAWS is restarted and you are ready to use your Focus Braille display. If you currently have JAWS 4.02.52, please proceed with the instructions below to update to the newer driver. If you currently have a version of JAWS later than 4.02.52, you do not need to update the Focus driver.

Updating the JAWS 4.02 Focus Driver

1. Open the Braille Basic Settings dialog box.
2. Select No Display in the Default Braille Display combo box.
3. Restart JAWS.
4. Copy the new FOCUS.JLB file to the JAWS directory. The JAWS install directory is usually C:\JAWS402.
5. Select yes when prompted to overwrite the existing FOCUS.JLB file.
6. Re-open the Braille Basic Settings dialog box (Options->Braille).
7. Select Focus 44, 70, or 84 Cells in the Default Braille Display combo box.
8. Use the Modify Settings button if you need to modify any of the Port information.
9. Connect your Focus to the appropriate port.
10. Restart JAWS.

Focus Commands Overview

This section describes the method behind the command assignments for JAWS and the Focus Braille displays. Once you understand this methodology, there is no need to memorize a long list of commands. The commands are separated into Convenience commands, JAWS commands, Windows commands, and Braille commands. There is only one assignment pattern for each. Focus commands are consistently based on JAWS and Windows commands. If you are familiar with JAWS and Windows keyboard commands, Focus commands are very easy to learn. If you become familiar with Focus commands, JAWS and Windows keyboard commands are also easy to learn.

Convenience Commands

These commands are the most common functions and are performed right from the Braille display. They do not require any chording or use of the **SHIFT** keys.

JAWS Commands

These commands are easy to learn if you are familiar with JAWS. And if you are just beginning to learn your Focus display and JAWS, these commands should help you learn JAWS keyboard commands as well.

The **RIGHT SHIFT** key on your Focus display corresponds to your **INSERT** key on the keyboard. The JAWS keyboard command to make the JAWS window active is **INSERT+J**, so the corresponding Focus command is **RIGHT SHIFT+J (RIGHT SHIFT+DOTS 2-4-5)**.

Many JAWS keyboard commands use **INSERT** together with the function keys, **F1** through **F12**. For keyboard commands that use **INSERT+F1** through **F9**, just press and hold down the **RIGHT SHIFT** on the Focus and press the computer Braille number of the function key. For example, the JAWS keyboard command for screen sensitive help is **INSERT+F1**, so the Focus command is **RIGHT SHIFT+1 (RIGHT SHIFT+DOT 2)**.

Windows Commands

Windows commands follow a similar convention. Many Windows commands use **CTRL**, **ALT**, or **SHIFT** as part of the command. On the Focus, the **LEFT SHIFT** key is used in these commands. The Windows keyboard command to copy selected text to the clipboard is **CTRL+C**, so the Focus command is **LEFT SHIFT+C (LEFT SHIFT+DOTS 1-4)**.

The same letter assignments that are used with Windows commands are used for the equivalent Focus commands to make it as easy as possible to learn to use the Focus displays or to learn Windows.

Braille Commands

These commands primarily change settings for your Braille display. They are key combinations with the **SPACEBAR**, referred to as chord commands. Use the **SPACEBAR** like other modifiers (**SHIFT**, **CTRL**, **ALT**, etc.). Press **SPACEBAR** first, hold it down, and then press the other key or keys that are part of the command. These commands all change the settings used to format, translate, or present information on your display.

Exceptions

The computer Braille number and function key relationship does not apply to the List System Tray Icons command, **INSERT+F11** on the keyboard. We have assigned **RIGHT SHIFT+K (RIGHT SHIFT+DOTS 1-3)** to this command.

The command to open the Window List dialog, **INSERT+F10**, is **RIGHT SHIFT+0 (RIGHT SHIFT+DOTS 3-5-6)**.

Commands that have been assigned using the Convenience Commands convention are not duplicated using the JAWS/Windows assignment convention.

There are other exceptions based on availability of keys, however we have attempted to retain the logic of consistency with the JAWS or Windows commands wherever possible.

Convenience Commands

All convenience commands use only the Braille keys. These commands do not use the **SHIFT** keys or **SPACEBAR**.

Note: For your convenience, we have provided both the Braille signs for each command and the dot pattern equivalents. If there is no Braille sign corresponding to the dot patterns, the dot patterns are listed in both columns.

Convenient JAWS and Windows Commands

Description	Braille Sign	Braille Dot Positions
Start Menu	ST Sign	DOTS 3-4
Minimize All Apps	D	DOTS 1-4-5
Keyboard Help	TH Sign (Computer Braille Question Mark)	DOTS 1-4-5-6
ENTER	DOT 8	DOT 8
BACKSPACE	DOT 7	DOT 7
ESC	Z	DOTS 1-3-5-6

Convenient Navigation Commands

Description	Braille Sign	Braille Dot Positions
TAB	DOTS 4-5	DOTS 4-5
SHIFT+TAB	B	DOTS 1-2
PAGE UP	K	DOTS 1-3
PAGE DOWN	DOTS 4-6	DOTS 4-6
HOME	Comma	DOT 2
END	DOT 5	DOT 5
Top Of File	L	DOTS 1-2-3
Bottom of File	DOTS 4-5-6	DOTS 4-5-6
Next Document Window (CTRL+TAB)	W	DOTS 2-4-5-6
Braille Next Line	DOT 4	DOT 4
Braille Prior Line	A	DOT 1
Move Left on Current Line	DOT 3	DOT 3
Move Right on Current Line	Capital Sign	DOT 6

Convenient Cursor Commands

Description	Braille Sign	Braille Dot Positions
PC Cursor	P	DOTS 1-2-3-4
JAWS Cursor	J	DOTS 2-4-5
Route Braille to Active Cursor	R	DOTS 1-2-3-5

Convenient Braille Commands

Description	Braille Sign	Braille Dot Positions
Tether Braille to Active	T	DOTS 2-3-4-5
Braille Follows Active	F	DOTS 1-2-4
Braille Toggle Mode (Line, Structured, Speech Box)	M	DOTS 1-3-4

Braille Commands

These commands all use the Focus **SPACEBAR**. We use the term Chord to indicate this. A Chord is just a key sequence pressed together with the **SPACEBAR**.

Note: For your convenience, we have provided both the Braille signs for each command and the dot pattern equivalents. If there is no Braille sign corresponding to the dot patterns, the dot patterns are listed in both columns. Use computer Braille for numbers noted in the Braille Sign column.

Description	Braille Sign	Braille Dot Positions
Braille Top of Window	L CHORD	DOTS 1-2-3 CHORD
Braille Bottom of Window	DOTS 4-5-6 CHORD	DOTS 4-5-6 CHORD
Adjust Braille Options	B CHORD	DOTS 1-2 CHORD
Grade 2 Expand Current Word	T CHORD	DOTS 2-3-4-5 CHORD
Grade 2 Translation	G CHORD	DOTS 1-2-4-5 CHORD
Toggle Characters and Attributes	CH Sign CHORD	DOTS 1-6 CHORD
Toggle Marking	M CHORD	DOTS 1-3-4 CHORD
Toggle 8 Pixels per Space	P CHORD	DOTS 1-2-3-4 CHORD
Toggle 8/6 Dot Braille	8 CHORD	DOTS 2-3-6 CHORD
Color Marking Assign	C CHORD	DOTS 1-4 CHORD
Change Cursor Shape	SH Sign CHORD	DOTS 1-4-6 CHORD
Restrict Braille Cursor	R CHORD	DOTS 1-2-3-5 CHORD

Windows Commands

All Windows commands use the **LEFT SHIFT** key as part of the command.

Note: For your convenience, we have provided both the Braille signs for each command and the dot pattern equivalents. If there is no Braille sign corresponding to the dot patterns, the dot patterns are listed in both columns.

Navigation and Editing Commands

Description	Braille Sign	Braille Dot Patterns
ALT+TAB	LEFT SHIFT+DOTS 4-5	LEFT SHIFT+DOTS 4-5
Paste from Clipboard	LEFT SHIFT+V	LEFT SHIFT+DOTS 1-2-3-6
Copy to Clipboard	LEFT SHIFT+C	LEFT SHIFT+DOTS 1-4
Cut to Clipboard	LEFT SHIFT+X	LEFT SHIFT+DOTS 1-3-4-6
Undo	LEFT SHIFT+Z	LEFT SHIFT+DOTS 1-3-5-6
Delete	LEFT SHIFT+D	LEFT SHIFT+DOTS 1-4-5

Selection Commands

Description	Braille Sign	Braille Dot Patterns
Select Next Character	LEFT SHIFT+DOT 6	LEFT SHIFT+DOT 6
Select Prior Character	LEFT SHIFT+DOT 3	LEFT SHIFT+DOT 3
Select Next Line	LEFT SHIFT+DOT 4	LEFT SHIFT+DOT 4
Select Prior Line	LEFT SHIFT+DOT 1	LEFT SHIFT+DOT 1
Select to End of Line	LEFT SHIFT+DOT 5	LEFT SHIFT+DOT 5
Select from Start of Line	LEFT SHIFT+DOT 2	LEFT SHIFT+DOT 2
Select from Top	LEFT SHIFT+L	LEFT SHIFT+ DOTS 1-2-3
Select to Bottom	LEFT SHIFT+DOTS 4-5-6	LEFT SHIFT+ DOTS 4-5-6
Select Next Screen	LEFT SHIFT+DOTS 4-6	LEFT SHIFT+DOTS 4-6
Select Prior Screen	LEFT SHIFT+K	LEFT SHIFT+DOTS 1-3
Select All	LEFT SHIFT+FOR Sign	LEFT SHIFT+ DOTS 1-2-3-4-5-6

Selecting with the Cursor Routing keys

To select with the cursor routing keys, press and hold down **LEFT SHIFT**, then press the cursor routing key above the text where you wish to begin the selection. Release both keys. Move to where you wish to end the selection, and

press **LEFT SHIFT** plus the cursor routing key at that location. Use any navigation commands to move from the begin point to the end point of the text you are selecting, even the Whiz Wheels, but if the window containing the text scrolls, this affects what information is selected.

JAWS Commands

All JAWS commands use the **RIGHT SHIFT** key as part of the command.

Note: For your convenience, we have provided both the Braille signs for each command and the dot pattern equivalents. If there is no Braille sign corresponding to the dot patterns, the dot patterns are listed in both columns. Use computer Braille for numbers noted in the Braille Sign column.

General Commands

Description	Braille Sign	Braille Dot Patterns
Screen Sensitive Help	RIGHT SHIFT+1	RIGHT SHIFT+DOT 2
JAWS Window	RIGHT SHIFT+J	RIGHT SHIFT+DOTS 2-4-5
Adjust JAWS Verbosity	RIGHT SHIFT+V	RIGHT SHIFT+DOTS 1-2-3-6
Open Window List	RIGHT SHIFT+0	RIGHT SHIFT+DOTS 3-5-6
List System Tray Icons	RIGHT SHIFT+K	RIGHT SHIFT+DOTS 1-3
Refresh Screen	RIGHT SHIFT+Z	RIGHT SHIFT+DOTS 1-3-5-6
Say Font	RIGHT SHIFT+F	RIGHT SHIFT+DOTS 1-2-4
Window Keys Help	RIGHT SHIFT+W	RIGHT SHIFT+DOTS 2-4-5-6
Read Current Window	RIGHT SHIFT+B	RIGHT SHIFT+DOTS 1-2
Default Button in Dialog	RIGHT SHIFT+E	RIGHT SHIFT+DOTS 1-5
Shut Down JAWS	RIGHT SHIFT+4	RIGHT SHIFT+DOTS 2-5-6
Select a Synthesizer	RIGHT SHIFT+S	RIGHT SHIFT+DOTS 2-3-4

Cursors

Description	Braille Sign	Braille Dot Patterns
Route JAWS to PC	RIGHT SHIFT+DOTS 3-6 (MINUS Sign)	RIGHT SHIFT+DOTS 3-6
Route PC to JAWS	RIGHT SHIFT+ING Sign (PLUS Sign)	RIGHT SHIFT+DOTS 3-4-6

Utilities

Description	Braille Sign	Braille Dot Patterns
Run JAWS Manager	RIGHT SHIFT+2	RIGHT SHIFT+DOTS 2-3
Set Frame Top Left	RIGHT SHIFT+OW Sign	RIGHT SHIFT+DOTS 2-4-6
Set Frame Bottom Right	RIGHT SHIFT+ER Sign	RIGHT SHIFT+ DOTS 1-2-4-5-6
Graphics Labeler	RIGHT SHIFT+G	RIGHT SHIFT+ DOTS 1-2-4-5
JAWS Find	RIGHT SHIFT+F CHORD	RIGHT SHIFT+ DOTS 1-2-4 CHORD
JAWS Find Next	RIGHT SHIFT+ DOTS 2-5	RIGHT SHIFT+DOTS 2-5

Whiz Wheels, Advance Bars, and Cursor Routing Keys

The Focus Braille displays provide two Whiz Wheels, two advance bars, and cursor routing keys above each Braille cell. There are also two General Display Buttons between the advance bars.

Whiz Wheels

The Focus Whiz Wheels are used to quickly move through files, lists, and menus. The two Whiz Wheels, one at either end of the Focus displays, can be set independently. Press straight down on a Whiz Wheel to toggle it between line, sentence, or paragraph. Roll the Whiz Wheel toward you to move down through a file, menu or list. Roll the Whiz Wheel away from you to move up through a file, menu, or list.

Advance Bars

The Focus advance bars are used to move forward or back through a file or while in line mode. Press the Left Advance bar to move left on a line or back through a document. Press the Right Advance bar to move right on a line or forward through a document.

Cursor Routing Keys

The Focus displays provide cursor routing keys above each Braille cell. Press a cursor routing key to move the cursor to that point, or to select a link in a web page or email message. In line mode, press a cursor routing key to open a menu or select menu items.

Press the RIGHT General Display Button with a cursor routing key to simulate a right mouse click at that location.

Configuring the Focus Displays

The Focus Braille displays provide several features that you can customize to suit your needs. You can adjust the location of the status cells, vary the firmness of the Braille dots, and enable a Rapid Reading mode.

These settings are all adjusted under Configuration Manager, Set Options, Braille Options, Focus Braille Display Options. Open Default.jcf to adjust these settings for all applications, or open an application specific .jcf file to adjust these settings for that application. For more information, refer to JAWS Configuration Manager help.

Placement of Status Cells

Specify if the informational Status Cells are located on the left or right end of the display, or choose to not display them at all. The status cells are located at the left end of the display by default.

Reading Line

Specify the start and end cell for display of information. Use the Reading Line edit spin boxes to only display information within the portion of the display you wish to use. The default settings are determined by the location of the Status Cells and the length of the display.

Variable Braille Dot Firmness

Specify the firmness of the Braille dots on the Focus display. There are five levels of firmness. Adjust the display to the level of firmness most suited to the sensitivity of your fingers.

Rapid Reading

Set the Focus display to use only 20 Braille cells. Limiting the Braille display to 20 cells may increase your reading speed. When the Rapid Reading check box is checked in the Focus Braille Options dialog, the Placement of Status Cells radio buttons and Reading Line edit spin boxes are disabled.

Environmental Considerations

Storage

Temperature 0 to 60 C (0 to 140 F)

Humidity 98% RH

Operating

Temperature 5 to 40 C (41 to 104 F)

Humidity 95% RH non-condensing

Diagnostics Mode

The Focus Braille displays have built in diagnostic tests for the routing keys, Braille display, Whiz Wheels, Braille keys, advance bars, and General Display Buttons.

Before entering diagnostics mode, disconnect the Focus from your computer and unplug the AC adapter. To perform these diagnostic tests, you only need the Focus refreshable Braille display and the AC Adapter.

Entering Diagnostics Mode

Attach the AC Adapter to the Focus. The Focus displays the focus model number followed by the firmware version.

Press **LEFT SHIFT+SPACEBAR+RIGHT SHIFT**. The Focus displays “diag” after the firmware version.

Routing Key Test

The routing key test ensures that each of the routing keys and the Braille display work properly. Enter the routing key test by pressing dots 1 4 on the Braille keyboard. The Focus displays “cursor test e to end” when the Focus is ready to start the test. The pins on the Braille display cell are raised when the cursor routing key above that cell is pressed. Press each of the cursor routing keys and verify that the appropriate Braille cell is activated. Press Dots 1-5 (E) to exit the routing key test and return to the other diagnostic functions.

Display Test/Clean

The display test is used to ensure that each pin on the Braille display can be activated. The display test also allows you to clean the Braille display. Press Dots 1-4-5 (D) to enter the display test. The Braille display toggles all the pins up and down for approximately 20 seconds. The display test automatically returns to the other diagnostic functions at the end of the test. The Display test returns the display to the "diag" message when complete.

Key Test

The key test ensures that each of the keys and Whiz Wheels work properly. Press Dots 1-3 (K) to enter the key test. The Focus displays “key test press key” when the Focus is ready to start the test. The Braille display shows each key that is pressed. Refer to the table below for the exact dot position for each of the keys. Press each of the keys and verify that the appropriate Braille data is displayed. To exit the key test, disconnect the AC adapter.

Key	Braille Sign
Dot 1	1
Dot 2	2
Dot 3	3
Dot 4	4

Dot 5	5
Dot 6	6
Dot 7	7
Dot 8	8
Left shift	ls
Right shift	rs
Left advance bar	la
Right advance bar	ra
Space	s
Left General Display Button	lg
Right General Display Button	rg
Left Whiz Wheel Press Down	lw
Left Whiz Wheel Roll up	lu
Left Whiz Wheel Roll Down	ld
Right Whiz Wheel Press Down	rw
Right Whiz Wheel Roll Up	ru
Right Whiz Wheel Roll Down	rd