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Everything You Wanted To Know About USB Embossers*

*but were afraid to ask...

This article is written as non-technical as possible when trying to explain a totally technical totally arbitrary computer-gizmo kind of thing. It is for the Windows user who wants to connect an embosser using a USB cable. Windows is not usually kind to such endeavors, unless you know some secrets.

Background: Embossers are Printers

To Windows, your embosser is a printer. Makes sense.

About Ports. "Port" is computer speak for "socket" i.e., where you plug in a data cable. Way back when, printers connected to standard ports of which there used to be only two kinds: serial (typically two, named COM1 and COM2) and parallel (typically one, named LPT1). Ports were manifest by odd-shaped sockets on the back of the computer and via the manufacturer's configuration, they had fixed pre-assigned names in Windows: a name indicated a particular socket. Things are not so simple with USB.

About Printing. For ink printing, you can print text, photos, drawings, all kinds of things and onto a variety of printers with varying features and qualities. Printing is an abstract general-purpose mechanism that makes it all possible (terms for these abstractions are shown in italics, don't sweat them). The *document* is managed by an application program (think of MS Word or Corel Draw). The application *draws* text/lines/shapes/pictures onto a *canvas* (note: the screen is a canvas; each page of printed output is a canvas). When the application is printing, the canvas is provided by the printer's driver software, and each printer icon in the printers folder represents some particular driver software paired with an output port (where the printer attaches). If you choose the "HP Laserjet" icon, that means that the application draws onto a canvas that the HP driver software understands, and it is the driver software's job to convert the abstract drawing to a printer-specific data stream that when transmitted through the given port into the printer will cause the real image to appear, one that matches the abstraction drawn to the canvas. It usually works beautifully.

About USB. Each printer icon has (1) a name, (2) driver software, and (3) a designated output port. For example when you see "HP LaserJet" in the printers folder, that is its name, it uses the HP driver software, and it directs the data (for example) to LPT1 (an old-fashioned parallel port). In the conventional Windows printing scheme, all ports have names. The USB subsystem begins with an internal *hub* (group of sockets). That hub is built into the computer and may offer one to eight sockets. Then each of those sockets could connect to a user-supplied external hub with from one to eight more sockets, and on and on. The topology (arrangement) of USB sockets is user-adjustable and tiered. It is thus impossible to pre-enumerate and pre-name all USB sockets: the user can add more at any time. So only those (few) USB sockets that talk to printers have names, and Windows assigns a name to a USB socket only at the moment it needs a name, when it discovers you have plugged in a printer type of USB device and the socket has not yet been given a name. USB socket names are of the form USBnnn where nnn is a three-digit number. The first name concocted by Windows is USB001 and it doesn't exist until you plug in your first USB printer, and then USB001 designates that socket. If you unplug the cable the name endures. If you plug the cable into a different socket, Windows will instantly define USB002 for that different socket and will assume you have two printers (Windows cannot know that you merely moved the cable for the same printer to another socket; you can get Windows totally confused by moving USB cables for printers from socket to socket. Other categories of

USB devices, such as mice, keyboards, flash drives do not have port names and you can move them around as much as you wish.)

Rules of the Road

For less grief, you need to know the rules.

Rule 1. Power. For Windows to know about your USB printer, the interface must be active and that means with the embosser turned on, online, and the USB cable attached to the embosser. Then when you plug it into your computer, Windows can talk to it and find out that it is a printer type of device and that tells Windows it needs a port name.

Rule 2. Auto Discovery. For many types of USB devices, Windows has a "Plug and Play" subsystem that uses manufacturer codes provided by the USB device to guide windows to make the proper links to device driver software. For this to work, Windows must already have the software it needs (Windows ships with hundreds of device drivers pre-installed, but not for embossers.) When the manufacturer instructions tell you to install software **before** connecting the USB cable, it is to prepare Windows with the software it will need to perform Plug and Play, and without that software, Windows will be lost (it won't understand what you plugged in and will probably make bad assumptions that will leave things in a mess). Even without Plug and Play to discover what device driver software to use, when the device says it is a printer type, a USB port name will be assigned to the socket. Unfortunately Windows doesn't tell you what name it has assigned or even that it did anything. If your USB embosser came with manufacturer's instructions, follow them. For Braille2000 additional steps are needed and are detailed below.

Rule 3. Label The Socket. For all printers (but especially for embossers), stick a small adhesive label to the computer next to the USB socket so you know which socket is for which printer. The USB port name is assigned to the socket (and many sockets don't have any port name at all, just those that have had printer devices plugged into them have port names) and a given printer icon in the printers folder talks to a specific port name. If you move cables around, those relationships will be broken and it won't work until adjustments are made (sometimes the adjustments are not obvious; don't provoke it, use the same sockets all the time). You can safely disconnect and reconnect USB cables, just make sure each printer or embosser is always reconnected to its proper socket.

Rule 4. Restart Windows. Most of the time printer configuration changes do not require restarting Windows. But if you are having trouble (no data to the printer), don't forget to restart Windows—there are some hang-ups that a restart will cure. By "restart" we mean the restart function or a shutdown and power-up. Do not just push the power button unless you know it will do a complete shutdown: hibernation or sleeping is not enough, the system needs to do a full boot-up.

Strategy for Success

The following sequence should get you gracefully to a successful outcome when installing a USB embosser. These instructions are designed for Braille2000 users and include installing the Braille2000 printer driver. When not using Braille2000, the Braille2000-specific steps can be omitted.

Step 1. Assess Your System. Does your computer have a printer already? Find out how to display your printers folder (see the Appendix at the end for how to do this) and look to see if you have any ink printers. If so, one of them should be designated as the "system default printer" which shows with a checkmark overlay on the icon. Adjust things so you have a system default printer that is **not** an embosser. If you don't have any physical printers, use the fax virtual printer icon to be the system default printer.

If you have at least one printer icon, select one of them and display its properties (point the mouse at it, click the right-hand mouse button, select Properties from the pop-up menu). Click the Ports tab and scroll down in the alphabetical list of port names to see if you have any USBnnn port names listed. Make a note of which names are listed (when you plug in your embosser for the first time, Windows is likely to create a new USB port name, and we want to know which one is new, by knowing which names are old). Close the dialog box(es).

Step 2. Install Software. If you have not done so already, install Braille2000. If your embosser manufacturer tells you to install embosser driver software, follow the manufacturer's instructions.

Step 3. Connect the Embosser. (If you have manufacturer's instructions to follow, you may have already connected the embosser during Step 2 above.) Turn on the embosser. Select the proper interface on the embosser.

Follow the manufacturer's instructions for selecting the USB interface (it is often the out-of-the-box default). If you are using a USB-to-parallel adapter cable to connect an older embosser, be sure to select the embosser's parallel interface. The proper interface on the embosser must be active (selected, embosser powered up, and online) for the following to work properly.

Connect the USB cable to the embosser. Plug the USB connector into your computer. Your system may or may not announce finding new hardware. If you see dialog boxes appear spontaneously on the screen asking for permission to complete driver installation, go through those steps until it is finished. If you impetuously already connected your embosser before now, try your best to make sure it is reconnected to the same USB socket.

Step 4. See What Happened. At this point, you need to know what has been configured automatically (it varies). Redisplay the printers folder (see the Appendix at the end for how to do this). Look for any new printer icon. If you find the icon for the embosser (it was generated by Plug and Play), point the mouse at it, click the right-hand mouse button, and select Properties in the pop-up menu. Click the Ports tab and make a note of the port name that is selected (find the checkmark in the list of port names). Make a note of the assigned port name and close the dialog box.

If you don't see any new icon in the printers folder, pick another printer icon, point the mouse at it, click the right-hand mouse button, and select Properties. Click the Ports tab and scroll down in the alphabetical list of port names to find the USBnnn names. Compare the list of names to the names that existed in Step 1 to discover which USB port name is new. Close the dialog box without changing anything.

Step 5. Install The Printer Icon Braille2000 Will Use. The task of the printer driver software is to convert abstract canvas drawing to printer-specific data. Although Braille2000 does not currently draw pictures to a braille canvas, it does draw each braille page abstractly and depends on driver software to generate proper embosser-specific data. Because most embosser manufacturer's drivers are not abstract in all the right ways, Braille2000 comes with its own driver software. Even if an icon for the embosser was created in step 3, it doesn't use the driver software Braille2000 wants: you need to install another printer icon, with a new name, that uses the same port name, but which uses the Braille2000 printer driver (a driver specially formulated for embossers). If you reach this step without any other icon having been created, then the one created here will be the only icon for the embosser. When using the Braille2000 *emboss* function, only those printer icons associated with the Braille2000 driver will be listed as embossers (all other printer icons will be listed as ink printers). In Braille2000 the *emboss* function works only with embossers while the *print* function works only with ink printers. Windows treats them all as printers, but Braille2000 knows which is which. How to create a Braille2000 embosser (printer) icon is covered next.

Start the Braille2000 application (this task does not require a license; if you do not have a license, click "Evaluate Only" and select the Edition you are likely to use). Close any "welcome" popup window. Point the mouse at the Emboss button and click the right-hand mouse button and then select Setup. A dialog box appears. Click on "Install New Embosser". Another dialog box appears soliciting (1) Name (default is "Embosser" this is the name for a new printer icon, it must not match any existing printer icon's name), (2) Model (the type of embosser you have), (3) Port (the proper USBnnn port name).

Depending on Step 4, you may have gotten the USB port name from an icon created automatically by Plug and Play, if so, use that name. If no icon was created earlier, you may have a good clue about port name by noting which USB name is newly added to the list, if so, use that name. Otherwise, select the USBnnn port name with the highest number, as that one is the name most recently added (by Windows) to the list. If the port selection box has no USB names, then select the default port name (LPT1) and proceed (you will correct the port name later).

Click the OK button and wait for confirmation of installation. You may or may not be asked to confirm the installation of the software, and if asked, proceed until software installation is finished.

Step 6. Tidy-up Loose Ends. If in Step 5 you were able to know and select the USB port name, installation of the Braille2000 embosser icon is probably complete. You can enter a bit of braille and try to emboss it (left-click the Emboss button to emboss).

If in Step 5 you could not find any USB port names (and used LPT1) or if you think the USB port name was probably not the correct one, then proceed as follows.

Close Braille2000. Display the printers folder (see the Appendix at the end for how to do this) and locate the icon that was created in step 5. Point the mouse at that icon, click the right-hand mouse button and select Properties. Click the Ports tab and scroll down in the alphabetical list to the USBnnn port names. Find the name of highest number and click to put a checkmark next to that name. Click OK. Then start Braille2000 and try to emboss.

If embossing does not happen, then repeat the above paragraph and select the next numerically lower USB port name and try it again. Continue guessing until you have tried all USBnnn names.

If still no success, remember to (a) tell windows not to work offline (see appendix ii below) and (b) restart Windows.

Troubleshooting

USB connections normally either work perfectly or do nothing. If yours does nothing, all of the following must be good:

1. You need a good USB cable
2. The embosser must be powered on, paper properly loaded, and online (ready for embossing)
3. The proper interface must be selected on the embosser (USB or perhaps parallel for an adapter cable)
4. A printer icon for the embosser must exist in the printers folder and must use the Braille2000 driver software (to confirm, right-click and choose Properties, then find the "Model" tab: that tab is unique to the Braille2000 driver and if not there, the wrong driver is being used)
5. The model setting must agree with the embosser you have (as mentioned above, find the "Model" tab in the properties dialog box; click that tab and look at the model setting and adjust if necessary)
6. The embosser's job queue must not be set to "Use printer offline" (see above for the discussion)
7. If you have multiple embossers, be sure the proper name is selected in the Braille2000 emboss dialog box (else you are sending data to another device)
8. When in doubt, restart Windows

If you can emboss but get a blank page added after each good page, do the following:

1. Set an interpoint embosser to interpoint mode
2. Turn off the embosser's automatic form feed (don't have the embosser count lines) OR set the embosser's page height to more lines per page (such as 26, a little white lie)

If you can emboss properly paginated braille but the horizontal position is wrong, do the following:

1. Move the tractors
2. Use the embosser's control panel to re-specify left/right margin and/or paper width (see the user guide for your embosser)

Appendix I: How to Display the Printers Folder

For Windows systems prior to Windows-XT, you can display the printers folder via the Control Panel: click the Start button, select Control Panel, click the Printers icon in the Control Panel window.

For Windows systems from Windows-XT on (including Windows 7 and 8), click the start button and locate the "search" or "run" box just above the start button. Into that box type

shell:printersfolder

and press Enter. Although the printers folder can be displayed through the control panel, that display in Windows 7 and Windows 8 is fraught with inconsistencies. The directive shown above will display the traditional printers folder and is the easiest to manage.

Appendix II: Printer Print Queue Settings

For each printer icon, Windows manages a queue of print jobs. The job queue has a setting known as "Use printer offline" that causes jobs to be held until a later time, for example when your laptop is away from the office printer. After a number of port errors (i.e., failure to communicate), the Windows system can automatically set "Use printer offline" so that it stops trying to send data to the port. If you are having trouble embossing, one possibility is that the queue is suspended in this way.

Display the printers folder (Appendix I above). Find the icon for the embosser and double-left-click to display the job queue window. Listed in the window will be any pending embossing jobs. You can cancel the jobs if you wish, but if you leave them, once communications is reestablished, they should emboss (sometimes you need to restart Windows for this to happen).

Locate the main menu for the job queue. It reads "Printer Document View Help". Click the Printer menu entry. Then without further clicking, note whether the "User Printer Offline" menu item shows a checkmark at its left or not. If no checkmark shows, everything is fine (don't click anything). If a checkmark shows, the queue is suspended: click Use Printer Offline to toggle the checkmark. Windows will attempt communication; the embosser may start if there are jobs in the queue. If nothing happens, restart Windows. If still nothing, the problem is something else.