

## Using a Palm Vx\* to Store/Play MIDI files



This article was originally written to explain how a Palm Vx can be used to play music on John Smith's Topsy organs, but the same setup can be used for any system needing to run MIDI files. The Palm Vx is a PDA - or Personal Data Assistant - normally used for storing an appointments diary, notes, addresses and the like.

It has now been overtaken in the PDA world by much more up-to-date and sophisticated devices such as the BlackBerry, and even by mobile 'phones. As a result, fully-working second-hand items are freely available - at very cheap prices - on E-Bay. The Vx has 8Mb of memory installed, but as the MIDI file for a single piece might be only 20kb, it can store hundreds of tunes.

**\*Although the details refer to the Palm Vx, the Palm V can also be used,  
- but as it has just 1 Mb of memory, it can store only around 60 tunes.**

**The Palm M505 can also be used, but a Serial connection cable will be needed  
for 'playing' in addition to the standard USB cable for 'loading' supplied with the unit  
- unless you can find a USB/MIDI converter to use as a  
replacement for the simple Serial/MIDI unit described below!  
I tried to find a way to use the card on the M505 to store more tunes  
and the details are here, at the bottom of the page**

The Palm series of PDAs was very popular in its heyday, and lots of specialised software became available to run all sorts of functions on the devices. One of these enabled MIDI files to be stored, and played back through the serial interface connector. This interface is part of the cradle system that is used to charge the Vx, and to enable it to connect to a PC for up/down-loading the normal PDA data to an office computer. The software that I use is called 'ittyMIDI Player', and was previously available from Micro Tools, [but they have now closed their ittyMIDI website](#). Please contact me for the latest information about obtaining a copy at [don@donjohnson24.co.uk](mailto:don@donjohnson24.co.uk).



## Loader Screen



Prior to sending the MIDI files to the Vx, the Player program is also sent from the PC to the Vx sitting in its cradle. This is done automatically by the ittyMIDI software the first time a 'sync' is initiated after the software is loaded onto the PC \*\*\*. The Player program remains permanently on the Vx, and is quite comprehensive, enabling the touch-screen on the Vx to be used to select MIDI tunes by name from the *Books* of stored files that have been sent from the PC. It can make changes to Pitch, Tempo, etc., and can be set to play a tune repeatedly, play a sequence of tunes, or even a selection of 'measures' within a tune. You can also generate Playlists from the tunes stored in one or more Books, so that particular programs of music can be stored, and played as desired. (Books cannot be *edited* on the Vx, but Playlists can).

**\*\*\* If the Player program fails to appear on the Palm, it may be necessary to uninstall ittyMIDI from your PC, DELETE THE FOLDER in which it was stored (. . . Program Files/ittyMIDI e.g), and then re-install it so that the program is not confused as to whether the Player has been installed already despite a previous installation not having worked correctly.**

## Some of the Player Screens

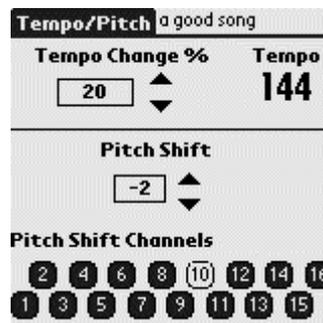
### Song Selection



### Play Screen



### Change Pitch/tempo



## Registration Code

The first time that the Player is started after the initial Hotsync is run after installation of ittyMIDI on the associated PC, the program will ask for a Registration Code. It should also display the name that is to be used when the code is/was obtained. If no name appears, and you are going to use the Palm solely for organ playing, it may be worth trying a cold reset of the Palm, then open Palm Desktop, add a new user (eg Fred) and delete Don Johnson. After confirming that all data will be lost, add user Don Johnson again and delete Fred. Then try another Hotsync operation. Until a correct Registration code is entered, Player will keep asking for one, and if one is not entered, tunes will play for only 15 seconds!

## MIDI Interface

To enable the Vx to communicate with the MIDI Interface Board in Topsy (typically, the MTP-8 board obtainable from jw Electronics at <http://www.j-omega.co.uk/>), a Serial/MIDI converter is required. This is a very simple circuit, with just a few components and a serial connector on one side and a DIN connector on the other. It can be made from the diagram at Elby Designs at <http://www.elby-designs.com/midi-interfaces/midi-ifd-cct.pdf>. A pcb to make up the circuit may be had from Ian Jeffreries: e-mail to: [greatwestern99@aol.com](mailto:greatwestern99@aol.com). There are also Serial/MIDI converter cables available if you search the Internet.

As the Palm M505 comes with a USB connector as standard, it might seem sensible to obtain a USB/MIDI adapter, but the only items I could find seemed to be for connecting a PC to a MIDI device. Whether these would work with the M505 providing the output I have not tried, but certainly the USB connector would be the wrong type - a female/socket would be needed for the M505 cable to plug into. Other USB/MIDI converters seem either very complicated or more expensive. I ended up by obtaining a Serial interface cable for the M505, which I used in place of the cradle, and connected it via the MIDI converter as for the Vx. I did also make a Serial interface cable myself, by adapting an M505 charger cable, using the details in the Connector Pin Outs section.

## What is needed

A Palm Vx, the ittyMIDI software, the Palm Desktop/Hotsync Manager software, the Serial/MIDI interface, and the Vx mounting cradle. I actually have one Vx cradle permanently connected to the serial port on my PC, and another permanently mounted in Topsy. I could have purchased the second cradle as a separate item, but the Vx's are so cheap, I purchased TWO complete packages. I got not only two cradles, but also a spare Vx in case one failed - or its battery ran out during a performance.

I removed the base and its metal stabilising weight from one of the cradles, before mounting it inside Topsy, in a position where it is accessible through a window in the back of the organ. The serial connector lead from the cradle is connected to the serial/MIDI interface - with its DIN connector connected in turn to the input of the MIDI Interface Board.

After tunes have been loaded onto the Vx from the PC, the Vx is transferred to the cradle mounted in Topsy. I try to remember to put it position *before* I switch on the 12V power in Topsy - but I don't always remember (nothing nasty has happened as yet!) Tunes can be picked using the Vx's stylus. I actually made the organ back from clear plastic sheet, as sold in B&Q, so people can see some of the inside working parts. The window on the accompaniment windchest is also transparent for the same reason, so the pallets inside can be seen operating. Using the Palm Vx is very easy, and tunes can be selected quickly and played without fuss. I have not used other systems, but they would have to be very good for me to swap from the simplicity of use of the Vx. With around 200 tunes stored, I have used 3.1M of an available 7.7M on the Palm, so I think I would have room for around 500 tunes in all.

## Finding Tunes

I created a table in Word, which for each tune contained the full title, the Book in which it was stored, its number in the Book list, and the abbreviated tune title. After sorting by the first column, I printed the table to give myself an alphabetical list the tunes, which would enable me to find a particular title quickly, and locate it on the Palm. But this meant that I had to remember to keep the printed list handy. I then had the startling revelation that I had a means of storing the list electronically, by using the Palm - Doh! Obviously it would be rather time-consuming to try to enter all the tunes using *Graffiti*, but I still had the Palm Desktop Manager available on my PC to ease the entry of data.

It appeared that the 'Memo Pad' would be the most suitable function, so I created some new 'Categories' - giving them the names of the Books in which the tunes were stored. I played around with the layout of my Word table, and converted it into comma-separated text before saving it as a .txt file which could be imported into the Palm Desktop Manager 'Memo Pad' (I struggled with this a bit, so it would probably have taken less time if I had just typed the details straight in). I ended up with Memo Pad entries where the title was the full tune name, the category was the Book name, and the memo text was the tune's number in the Book plus the actual tune file name. A *HotSync* transferred this data to my Palm.

If I need to find a particular tune, even if I am running 'Player' on the Palm, I use the 'Search' function (magnifying glass icon on the touch screen) to look for a keyword in the tune title, and then tap on the appropriate entry that appears under Memo Pad. I then see the Book details, so can return to 'Player' to select the tune - simple and extremely efficient! I felt very pleased with myself - so immediately added the 'Finding Tunes' section to this page, so that others might share my system. I have around 200 tunes, but the Memo Pad entries only take up 16Kb of memory on the Palm. I understand that a facility like this is NOT available on SD Card Players - another good reason for using the Palm!

## Addenda

### Palm Vx Digitizer problem

On one of my Vx's, I did have occasional problems with the touch screen digitizer going out of alignment. To correct the problem requires the 'Digitizer' function to be called from the drop-down menu in 'Prefs'. However, if the digitizer setting is 'off' by a large amount, it is sometimes impossible to get to the 'Digitizer' function! Catch 22! Using the Reset function *can* solve the problem, but the Player software then has to be reloaded afterwards.

My solution to this problem is to program one of the physical buttons on the Vx to call the 'Welcome' function - which prompts the setting up of the digitizer. Obviously this was set up when the digitizer was working correctly, by selecting 'Buttons' from the drop-down menu in 'Prefs'. The top right-hand button on the screen then shown is usually set to access 'Notes', but I changed this by scrolling the selection box down to 'Welcome'. Thus if I ever have digitizer problems, I click the physical right-hand button at the bottom of the Vx, and the digitizer set-up function runs as part of 'Welcome', and sanity is restored!

As the Player program uses the physical buttons for its own purposes, the 'Welcome' function is not available from within Player. Since the Palm usually restores itself to the function running when it was switched off when switched on again, it is sensible to make a habit of *leaving* Player before switching off. This ensures that if the Digitizer has gone mad whilst the Palm was inactive, the physical button will be able to restore sanity.

### **In-situ Battery Charging**

Vx - Since there is a possibility of the Vx battery running out, I added another item later to prevent this happening during a performance. The Vx is normally charged when it is sitting in its cradle, from a mains adaptor that plugs into the serial connector connecting the cradle to the PC. (It looks like a permanent connection on the serial connector, but is actually a small plastic connector plug). However, there is normally no mains supply available when performing - but there is a 12V supply! Therefore, I obtained a charger for L-ion batteries in digital cameras - a particular version which can be supplied from 12 / 24V as well as 230V ac mains, and which is for the same voltage battery as that fitted in the Vx.

This is the INOV8 LPE5 Charger, available from Picstop at <http://www.picstop.co.uk/inov8-canon-lpe5-digital-camera-battery-charger-1/>,

and having a nominal output of 4.2V - which is suitable for the 3.7V battery in the Vx. I chopped the Vx mains adaptor off the cable joined to the little plastic plug on the Serial connector, and reconnected the cable to the innards of the battery charger. (Red wire to OUTPUT +). Opening the charger case requires some force to break internal glue joints - even after the case screw is removed! I left off the 13A mains connector plug insert, and fitted the battery charger permanently inside Topsy. (Some of these chargers don't have inserts, they have a permanently-connected 13A plug on a mains lead - this lead should be disconnected inside the unit, and removed).



The small 12V input socket on the charger accepts a 3.25mm od/1.3mm id connector plug, one of which was on the car lighter socket cable supplied with the charger. I removed the big lighter connector, and connected the cable to Topsy's 12V supply. The LED that normally indicates charging does NOT illuminate under these conditions, but the Vx battery *is* being charged. The current drain for charging the Vx is minimal, and will not affect Topsy's 12V battery life. This charger is perhaps a luxury, and probably *not* really required - so long as a Vx is fully charged before use in Topsy, but it is a comfort to know that the Vx will not die unexpectedly!

M505 - The battery control circuits in the M505 are built into the Palm, so there is no need for a separate battery charger - all that is required is a STABILISED 5V supply (+ve to pin 16, -ve to pin 1 on the connector) which can be derived from the 12V supply in the organ.

## Replacing a V/Vx battery

It is true that some of the rechargeable L-ion batteries in Vx's do not last for ever, but replacements are available on the Internet - search for 'Palm Vx battery'. Fitting them, however, seems to be impossible as there appears to be no way to open the case. Actually, it *can* be done, using the instructions detailed at [Directfix](http://www.directfix.com/category/_P5TAKE.html) [http://www.directfix.com/category/\\_P5TAKE.html](http://www.directfix.com/category/_P5TAKE.html). (You will only need the instructions in steps 1 - 4, 13 and 14 for just replacing the battery)

At first sight, it all appears quite daunting, but only the back has to be removed to be able to swap the battery - removing the screen is not necessary. However, it was with some trepidation that I approached the task myself. However, by following the - very clear - instructions, I managed to complete the battery change without any major problems, apart from with my blood pressure. Knowing I had the other Vx as a spare was my only comfort during the process, but afterwards I realised that I should not have been so worried.

## Replacing an M505 battery

The battery for the M505 is larger than that for the V series, but is more easily accessible - providing you have the right tool - a T5 sized Torx screwdriver. Don't try to open the case without the correct tool, you will probably damage one or all of the four screws and make it impossible to open at all. After removing the four screws, the back still has to be 'popped' open with a thin blade around the top and sides of the join, and it does take some effort to get it to open. After replacing the battery, the back has to be snapped closed - again with some conviction - before inserting the four screws. I found an '8 in 1 Torx screwdriver' on e-Bay (item 380118497364) for only £2.40 post free!

## Upgrading Palm O/S for III and V versions to 4.1

### NOTE

The Upgrade software (PalmOS4-1.zip 42Mb) can be downloaded from <http://www.donjohnson24.co.uk/PalmDocs/PalmOS4-1>. (I must apologise to anyone who has tried this before and got a 'corrupt file' message - the file had not been fully uploaded previously) When run, it begins by installing a version of Palm Desktop on your PC, in the directory C:\Palm. The 'normal' software for Palm Desktop (PalmDesktopWin414EN) installs into C:\Program Files\palmOne.

If you have an alternative PC or laptop available it may be best to install the upgrade version software on that machine - after removing any existing Palm desktop program - so that there can be no conflict. If you have any data on the Palm that you want to keep, then whatever you do, *before anything else*, perform a full Hotsync backup of your data onto your PC with your existing setup. If it is only MIDI tunes that are to go on the Palm, then these can be re-installed later by the Loader, so no backup is necessary.

If no other machine is available, then try using the upgrade software whilst retaining the 'existing' Palm Desktop, following the method described below. If this fails to work, then uninstall both the 'existing' program and the upgrade, and then install the upgrade software alone. This method means that a user name has to be entered - so there are no conflicts

when starting the actual upgrade process. When the OS upgrade is complete, uninstall the upgrade software and reinstall the 'existing' Desktop.  
Clear ?

### **Installing the Upgrade**

After unpacking the upgrade software, run 'autorun.exe' file from the folder into which the files were unpacked. Select 'Palm OS 4.1 Upgrade', and your particular palm device on the next screen. You can now follow the on-screen instructions to install the Desktop software. At the end, when you click 'Finish', you will go into the start of the Flash Update routine.

**Before** following the on-screen instructions, you will need to ensure that Hotsync Manager (C:\Palm\HOTSYNC.EXE) is set up correctly. Start Hotsync, then right click on the icon in the Taskbar when it appears, and, whichever you are using, select 'Local USB' and 'Local Serial'. It is OK to have both ticked, and if you are using a USB/Serial converter for the connection, then Hotsync seems to like it that way. Also, right click on the icon again and click Setup, then General/'Always available' and Local/*your serial com port* and 'As fast as possible'. One more right click on the icon, and select 'Exit' - the Flash update software should start and stop Hotsync as it is needed.

Going back to the Flash update window, you are prompted to do a Hotsync to create a backup of the data on the Palm, and to watch the palm screen for the eventual 'Reset' instruction. After doing this, 'next' should become available on the PC. Clicking on 'next' should start the Operating System download, and - after accepting that all data will be destroyed - you will get some strange screen displays - which are quite normal. At the end of the update, you will be prompted to Restore the backed up data - I found I sometimes had to retry this to get it to work, but it is not really needed so if it fails to work, skip it, and exit the Flash update program.

If the above has worked as expected, remove the Update Desktop software from the PC (and re-install the 'existing' Desktop if it had been removed). You may now need to start Hotsync manually (from C:\Program Files\palmOne\HOTSYNC.EXE), and set it up as described above. I now recommend performing a 'cold' restart on the Palm (hold the start button down whilst pressing in the reset hole with the tool from the end of the stylus - or a paper clip), to clear all data stored. Performing a Hotsync should now restore all the data in the backup made at the beginning, and the Palm should be running as normal but with the 4.1 Operating System.

### **Normal Settings for Hotsync**

The basic settings are given in an earlier paragraph, but if you are just using the Palm for MIDI files, then there are some other settings worth adjusting. Right-clicking on the Taskbar Hotsync icon, and selecting 'Custom', opens a screen where the actions for each of the normal Palm functions can be set. Click on each one in turn, and then 'Change'. Set the radio buttons to 'Do Nothing' and tick the box 'Set as default'. This can be done for ALL the functions, except 'Install' - which should be set to 'Enabled' - and 'Memo Pad' - if you

are using this to store a searchable list of your tunes, set it to 'Desktop overwrites handheld'. When all functions are set, click on 'Done'.

You may have chosen to set one of the handheld's buttons to the 'Welcome' function (using Prefs/Buttons) so that you have a means to rest the Digitizer even if it has gone too far 'off' for normal selections. If so, you may want to use the 'Custom' function mentioned above to set 'System' to 'Handheld overwrites Desktop' for the first Hotsync after setting the button, and to 'Desktop overwrites handheld' thereafter.

**If you wait patiently, you can see a video about setting up Hotsync Manager at <http://screencast.com/t/Vrrm56WR>**

### Connector Pin Outs

I found the following pin outs on 'Peter's Pilot Pages' - [www.pspilot.de](http://www.pspilot.de) - which contain loads of very useful background information on the Vx, M505 and other palm devices. The Vx has the 10-pin connector, and the M505 the larger 16-pin version.

Pin Number on cradle from left to right	Pin Number 9-pin SUB-D	Signal description
1	6	DTR (RS-232)
2	-	+3.6 - 4.0V and charging input from power supply
3	3	RxD (RS-232)
4	8	RTS (RS-232)
5	2	TxD (RS-232)
6	7	CTS (RS-232)
7	-	Hotsync button
8	-	Sense for 'unit in cradle' (activates green 'charging' light)
9	-	not connected
10	5	Common signal- and supply ground

Cradle Pin # from left to right	Signal name	Signal description
1	GND	signal- and charge ground (connected to pin 7)
2	USB_D+	positive USB data signal
3	USB_D-	negative USB data signal
4	VBUS	USB VBUS signal
5	HOTSYNC	hotsync button - connected to +3.3V triggers a hotsync
6	-	not connected
7	GND	signal- and charge ground (connected to pin 1)
8	ID	identification for peripherals
9	VOOUT	+3.2V supply output, 100mA max.
10	RxD	RS-232 RxD signal (input)
11	TxD	RS-232 TxD signal (output)
12	DETECT	peripheral detect - tied to ground by peripherals
13	CTS	RS-232 CTS signal (input)
14	RTS	RS-232 RTS signal (output)
15	DTR	RS-232 DTR signal (output)
16	CHARGE	+5V charge supply input, 500-700mA min.

### Using a memory card on the M505

To enable the ittyMIDI Loader to put 'books' of song files onto a Digital card plugged into an M505 instead of into its normal memory, it has to be 'advised' *before* a Hotsync is performed *after* 'books' have been created in the Loader.

This requires the use of the Instapp.exe program that is part of the Palm Desktop software package. When this is started, and the User has been selected, the files that are 'due' to be installed during at the next Hotsync are listed in a table.

The ones to go on the card should be highlighted, and then 'Change Destination' clicked. A further window opens, which has columns for the 'Handheld' and the 'Secure Data Card' (or whatever) destinations, and highlighting the appropriate files and clicking the >> or << arrows in the middle enables them to be located appropriately. Clicking OK and Done completes the process, ready for the following Hotsync.

When the Player is started on the Palm, if it finds books with the same name in internal memory *and* on the card, it declares that it will ignore one of them.

The files from the Loader are usually located in a folder in the . . . . /Program Files/ittyMIDI/player directory, and it is these that are redirected as above. However, if - like me - you occasionally let your Palm die from battery exhaustion,

your Player program and books will be reloaded from a previous 'handheld backup' when you recharge and do the next Hotsync.

Under those circumstances, the files for the books will be taken from . . . Palm/User\_name/Backup, so if you want these to go onto the card, you will have to 'Add' them manually in the Instapp program by browsing to find them.

Obviously, if all your books were on the card, they would probably still be there even though the Palm had 'died'.