CarPC Basics

You want to build a CarPC ? – Well you need to know the basics first.

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An Overview

First of all for those that have never heard of a CarPC (or CarPuter) let me explain what one is. You know those great looking interactive car systems (or Telematics) that you get with new high end cars or even from an OEM – well that it in a nut shell but…… a CarPC does all this and more. Because it is PC (or even MAC) based it can be expanded, programmed and customised in a way that an original system can be. It can be so tailored that it works and looks exactly how you would want it to and typically can cost less than a bought system. There is one element I have failed to mention here – the fun aspect and with growing communities around the world the fun is never ending.

A CarPC Installed

In this article I will assume you have at least a basic knowledge of PCs (and MACs) but if you feel you need to know more why not visit one of the many forums that are about – more on this later.

Planning

First of all plan then recheck your plan. Know exactly what you want your system to do, even draw it on paper if that helps – this above all will help you stay focused as there are so many ways to do a job and so many options to add on.
Review what others have done – search on how they did it and if you cant find it that way ask – most of those in the community help each other.
Know your car. Size up screens and locations, looks for install places and gaps, cable runs, power locations etc. Basically know your car so well that even before you do install your systems you know where exactly each bit will go.

<u>Hardware</u>

The CPU and Power Supply

Look at the functions you intend to use make sure that the front end (the bit you will see on the screen) supports that hardware (such as a TV Card). Most of the hardware used in the community is typically common place but now and again oddities to turn up.

Keep in mind that adding hardware also increases the need for power, but more about this shortly.

For mother boards there are two ways to go, the first is using a Mini ITX form factor which although more expensive is also smaller and uses a lot less power to run than a traditional ATX system.

A Mini ITX Screen

The ATX system is not ruled out though if you have an ample power supply such as 150W or more. This does give you a lighting fast system and unlike the Via Mini ITX boards most you can simply upgrade the processor at a later date to get even more speed out of it.

Its also worth pointing out that if you are able to use the same ground point for each of your devices (CarPC or Amp alike) then you will reduce the chance for interference greatly.

The Screen

At the very least consider a VGA compatible screen for the driver should you be planning to install more than one screen. This is because running a PC across a composite connection (the little yellow phone plug) which is a combined video signal is not as higher quality as direct VGA due to its restricted bandwidth. Because of this you will more than likely find that the screen is unreadable and unusable as a result and although you have saved money you will be worse off.

A VGA Screen

How ever I would suggest that if you are planning screens for passenger that a composite screen would be suitable enough for them should you need to save money as they will not need to see as much detail. That been said more than likely they will be using the extra screens to watch TV or DVD's so they will not be any the worst off.

Software

There are three parts to this…

The Operating System

Ok this is not the hardest one in the world if your using a PC and that is to say that XP is your weapon of choice mostly. How ever if you feel that takes up too much resource in terms of memory and CPU then you may want to consider Windows ME or even Windows 98 as a lot of front ends that will still work with it.

The Front End

There are so many front ends out there now – some free, some open source and some you have to pay for so this is where your planning comes in handy.
Typically those that you pay for are very stable and have few bus if any as well as supporting some of the more un-usual hardware such as CNS's custom car interface how ever for the most part you may find that the more community driven packages are better. Front ends such as Roadrunner and Frodoplayer may have more bugs and therefore more releases but this does not mean they are any the less stable, in fact I believe that they actually bring more to the tables as they push the boundaries in functionality.

An Example of an Interface

The are also supported by the community with the community helping debug and make further suggestions as to additional functions – so in affect you have a Front end for a CarPC, designed by the CarPC community created by CarPC programmers.
The trick is to play with each and every one of them while at the same time remembering two things – you don't need to use all the functions – just the ones you want and that if the interface does not look how you want it then you can simply download a skin or design one that does.

The Supporting Software

While some functions can be performed within the Front end its self many rely on external supporting programs to actually do the task – hence the term front end. An example of the simplest function would be the playing of MP3s. Most of the Front ends use either Winamp or Windows Media Player to do this, the front end simply controls the program in the background.

Some other typical programs to look at (although there are more) are GPS programmes such as Destinator and even MS Map Point (see the GPS Review) or even Phonecontol.net (see the Supporting Software tutorial) which allows you to access you mobile phone and even use your PC as a hands free kit.

Again planning comes in here because the choice of functions to add is so large you can end up having lots of 'widgets' on your machine simply because you can rather than if you need them.

Phonecontrol.net

Power

I won't cover home made power supplies here because I think unless you really are in to micro electronics that this is a very complicated subject. Needless to say there are number of self build 'tank', 'shutdown' and 'power' kits out there – the most notable is the Maestro.

How ever, in the field of OEM Power Supply Units (or PSU's) the are two main players the moment.

The longest serving one is the Opus series from 'Opus Solutions'. They can provide a multitude of boards from small 80 watt units to larger 150 watt units which all contain a start-up and shut down controller and a CPU to intelligently watch your vehicles voltage.

An Opus 90 With Cables

Most of these boards connect via a standards ATX connection making it very easy on that side for a novice to install. The more difficult side is the connection to the car and the setting of the pins to control shut downs times etc but the manual that you can download is very comprehensive as is the after sales support.

The second major player at the moment is Carnetix. Now they have a slightly different approach of providing separate units for the shut down controller and the power supply which does mean you may still require a PSU board but they do provide a little more control over their function as well as some extra features on some models such as up to three separate supplies for items like USB hubs or other devices.

Graphics

This may sound trivial but even using a basic 16mb external card will improve your systems performance. The reason for this is that that CPU its self does not need to control the graphics function nor is any memory shared, both of which occur when using an on board controller.

An Old PCI Card

A pay off from this is that if you use the right card (e.g. a NVidia based TNT card) you may find that you can construct custom resolutions such as 840x480 which is a wide screen 16:9 ratio.

Putting it Together

Now comes the fun bit. My suggestion is make sure you have a nice dry day to do this – you don't want to be rushing in between showers as this is when mistakes and potential accidents happen.
Start by laying your cabling out even down the side of the car if it helps, either way make sure the measurements are right by doing this. Once this is done start placing the cables in to your car making sure where possible you follow existing cable runs as well as making sure that data and power cables are separate.

Look For Existing Cable Runs

The main reason for this is to ensure that where possible you do not receive any interference on your system from your engine. Again while we are talking interference it is more than ideal to use the same ground point for all your devices for this reason.
While installing your screen it is important to observe you local laws, e.g. in the UK its find to have a TFT GPS system in view of the driver but not a TV showing movies – I believe other countries can have tighter laws.
So once you have that covered I would suggest that you use a custom bracket from a company such as dashmount.co.uk that leave no holes. If you're more adventurous you may consider fabricating your self a mount but that's not for discussion here.
Companies such as http://www.car-tech-uk.com/ who fabricate to your design but it can be costly.
The last part of your install is to secure and install the actual CPU unit; my big suggestion here is Velcro. If it get very strong and wide Velcro you can easily secure the unit to the boot of your car which is very key as you don't want it flying around while driving.

Websites and Forums & Other Sources of Information

There are a number of web sites out on the web where you can get further information from, http://www.digital-car.co.uk/ for local UK members and for the international scene http://www.mp3car.com. Most are ideal but if you are a 'newbie' would defiantly suggest looking for the answer and at other people installs before asking what may be an obvious question. That said on the whole it is a big friendly community so the more the merrier.

The is also a recent book that has been launched which I also contributed to called CarPC Hacks which can be found here and is ideal for beginners.

My Conclusions

A CarPC is an easy thing to do if planned out right even for the novice only a little research in to how to do it may be required. When it comes down to it you are only using the basic electronics of your car with a special power supply and a PC pre-loaded with Windows XP and a program to work it all with. This coupled with a touch screen which just emulates a mouse makes it all easy to work with. Ok its not 'that' simple but it is not that much more complicated either.
Take the time to look at what you want to do in the end and you will not go that far wrong.

An Example Donor Car

Terran Brown – Biography

Terran has worked in the IT industry for 'Blue Chip' companies since the early 90's on various technical roles from wide area networking, to PC build and server support. Currently he works as a Project Manager for a leading international outsourcing company still working with large 'Blue Chip' customers. It was a result of his technical background that his interest in the CarPC technology grew to the point where he is now of the more recognised enthusiasts from the UK.

His project home site can be found at http://www.letscommunicate.co.uk/carpc/

About CarTFT.com

CarTFT.com was founded in spring 2003 with the goal to offer people a cheap way to integrate computers into cars. As we do a lot of cross-border selling we know that trustworthiness is everything in online business. That's why we try to support the community, offer external insurance for every order, and try to have large stocks to enable shipping of orders as fast as possible. We also try to resolve RMA cases within only days instead of weeks / months where possible.

Our "technical" goal is to offer products which allow the customer to have an open platform and no propitiatory system, where he / she can't change anything.

- Additional Photos curtsy of http://www.stevieg.org/
- Additional Images curtsy of Stuart McLernon @ http://www.inside-guide.co.uk/CarPC
- Additional Photos curtsy of http://www.cartft.com/
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You are strongly recommended to take a backup of your system before major installation and backups at regular intervals.

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