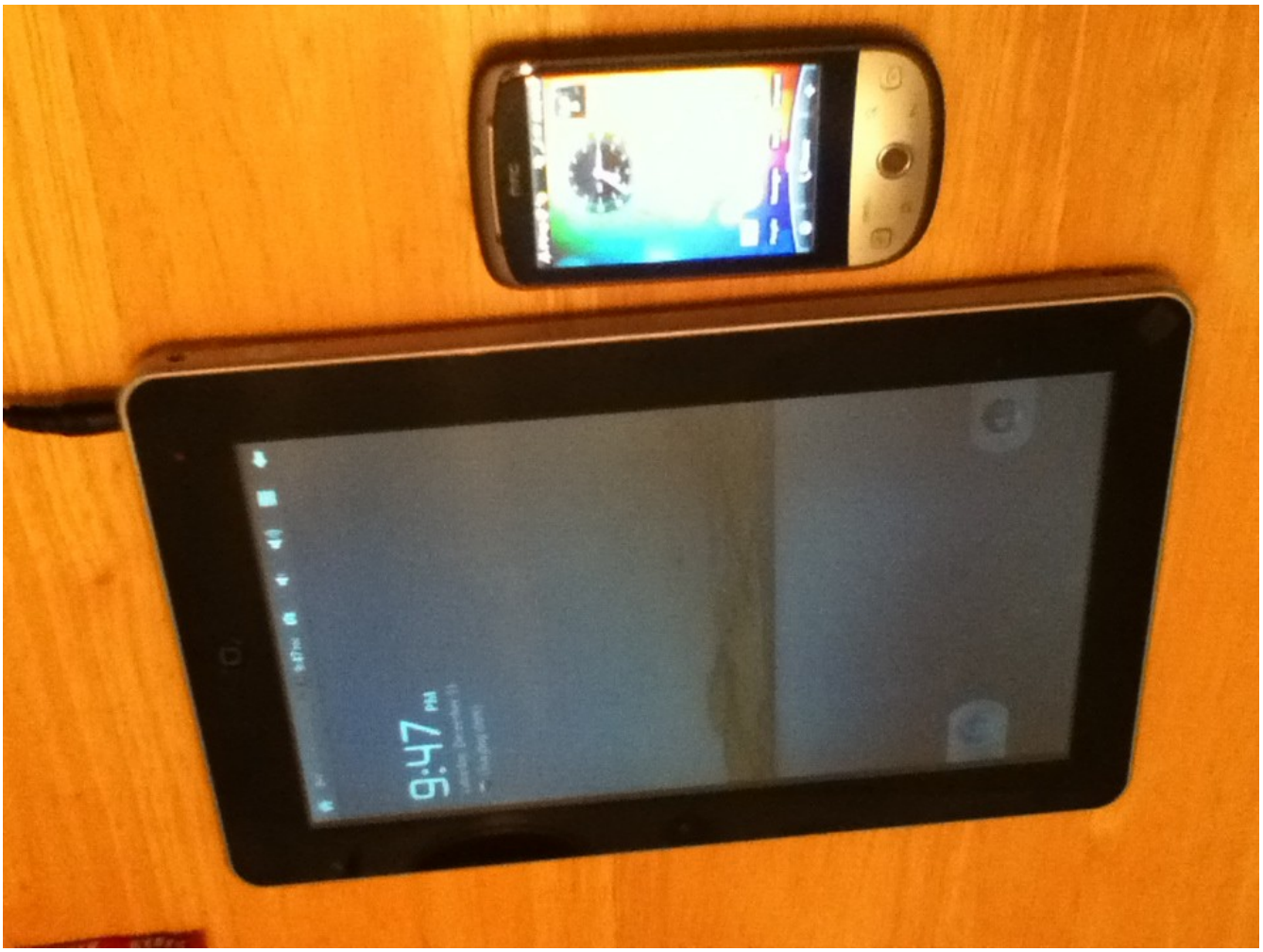
How easy it is to support external hardware on Android platform?

By - Paul Arssov

ARS Technologies Inc. , San Diego

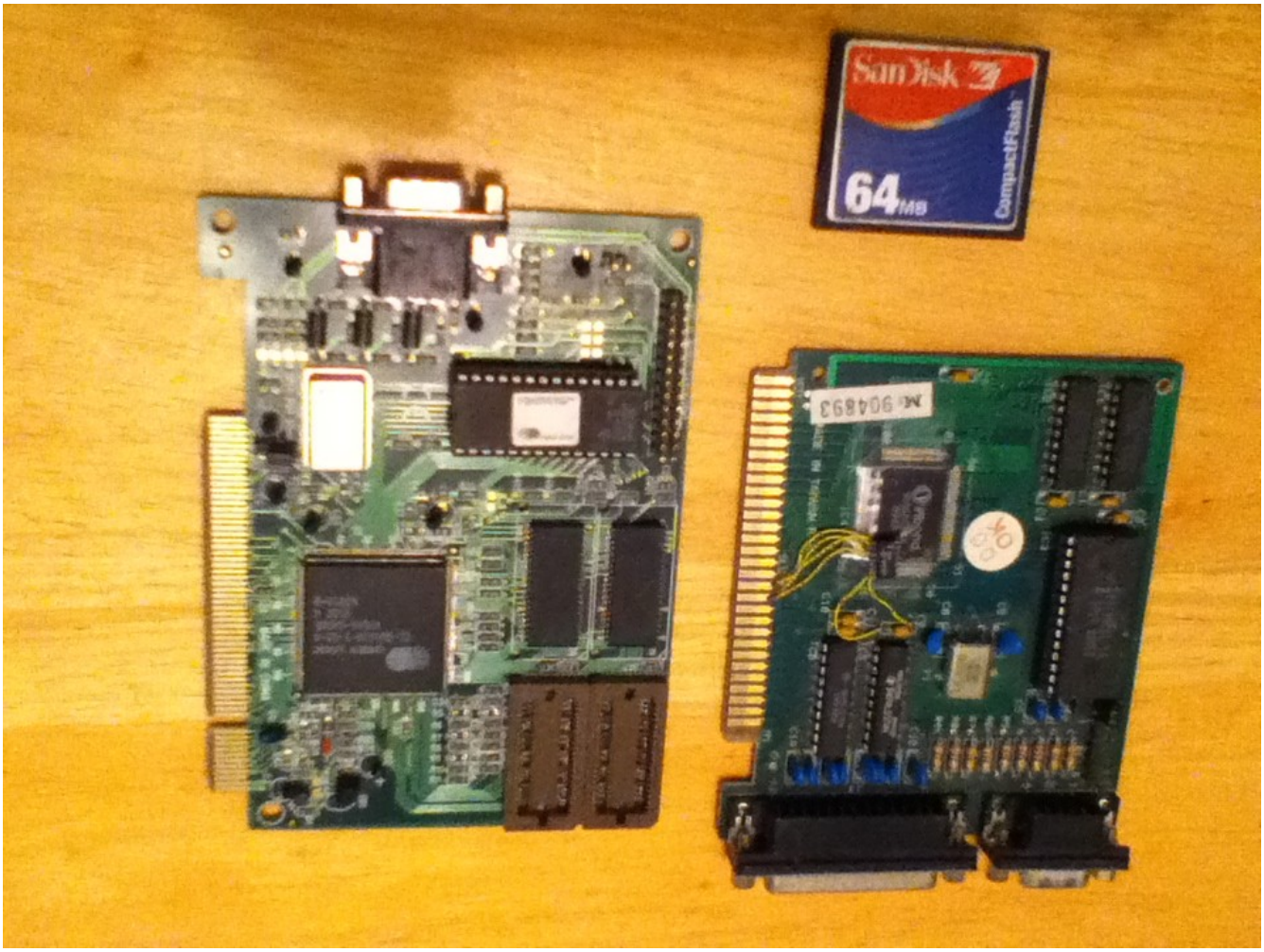
www.arstech.com

Examples of Android devices -



Notes: The most popular formats for Android devices are - the 'chocolate bar' phone format, and the tablet format with a variety of sizes; the tablet on the image is 10” size;

Examples of peripheral cards hardware -



Notes: Peripheral cards provide a way of adding capabilities to the system; There is a variety of busses for peripheral cards, the image shows – ISA, PCI and Compact Flash cards

Example1 - Connecting a peripheral card to a tablet

Notes: USB is a popular interface for peripheral products; the image show connecting an ISA card to Android tablet, through USB; featured is our USB2ISA product

Example2 – Connecting a peripheral card to a phone

Notes: the image shows connecting a compact flash card to Android phone, through USB; Featured is our USB2PCMCIA product;

Initial state of Android devices :

- no 'root' access
- no 'superuser' program
- kernel may or may not allow loading modules

Information on the hardware :

- often limited or missing info on SoC (system on chip), and major hardware components for popular devices

Notes: considering we can connect the hardware together, what do we do to have the software support for the interfacing products?
The Android devices come with lots of limitations; in addition information on the inside components is limited or missing;
This make very difficult building of software support for interfacing products;

Google Android developers forum

Question

>> hello team,
>> any one have idea how can access Super user permission at Application
>> level?

>> thanks

Answer

You understand, that if this were (in general) possible, it would be a
huge security violation?

So, let's say for all intents (har har) and purposes, it's impossible.

Why do you want this anyway?

Notes: Similar questions come again and again – they are getting similar answers;
Most likely the person answering did deal with user (application) level and not deal with kernel (driver) level software;
In order to get full access to a system, a developer has to go to the hackers community and look for solutions for individual products;

Why do we need 'root' access and Super user permission?

- doing –
  open() / read() / write() / ioctl() / close()
  with built-in drivers in the kernel
- 'inserting' loadable drivers in the kernel

Notes: A driver for a hardware device may be already built-in the kernel or loadable;
When writing software which actually 'touches' hardware, the developer works in kernel level, and needs root/superuser access to 'insert' a driver in the kernel;
An application calling a driver also needs root/superuser access to be able to communicate with a driver;

Current solution

android.hardware.usb

Since: API Level 12 , Android 3.1.x , HONEYCOMB_MR1

Usage share (3.x.x and later) – 2.4% (wikipedia)

Notes: In the specific example of having a device connected through USB , a developer will find this Android class; while this class is very convenient to use, it has been implemented on only 2.4% of the Android devices;
It may take years for a solution using this Android class to reach a real device;
In addition, Java level class may have performance issues;

Homework: Proposing solutions

Majority (95%) of current devices – 2.1/2.2/2.3.x

Question

How do we support the majority of the current android devices – right now?

Notes: from wikipedia – 2.1/10%, 2.2/35%, 2.3.x/50%
While the issue is not addressed, the developer has to use hacking solutions in order to get full access to an Android device;
Most likely a custom build of Android will be required;

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contact: paul@arstech.com

Product lines :

- 'USB2' – supports ISA and PCMCIA cards
- 'SSI2' – supports ISA, PCMCIA and PCI cards
- 'XPRS' – supports PCI, PCI express -x1 and -x16, ExpressCard, CardBus, and cPCIe/PXIe cards

Notes: Currently we have 3 lines of products, allowing connecting and using of a variety of peripheral cards, to variety of computer systems; the products have been working on Windows, Linux, Max OS X platforms;