

Abstract: Video has been one of the most dynamic growth areas in electronics for a long time and now more and more video is moving to mobile and hand held platforms. Many trends are driving the accelerating growth of mobile video and semiconductor companies are addressing the needs for lower power, smaller size packages, and higher video definition with innovative new products. This paper will illustrate this by focusing on mobile video filters as an example.

Video Filter Drivers: Going Mobile

Video has been one of the most dynamic growth areas in electronics for a long time and now more and more video is moving to mobile and hand held platforms. Developments such as YouTube® video community, increased mobile capacity for movie storage, and now mobile TV (particularly in Asia) are driving the accelerating growth of mobile video.

Only a few years ago a common comment about mobile video was, “Who would ever want to watch a movie or TV show on the small screen of a cell phone or PDA?” Well, it did not take long to prove that the “who” includes a very large part of the population who are adopting PMPs with touch screens and smart phones with powerful video capabilities. Market researcher, IDC, announced 39% smart phone growth in the fourth quarter of 2009: that is simply amazing. And now, new mobile video products are popping up like weeds and include a host of sophisticated Android based smart phones, higher video-resolution PMPs, and new tablet computers. Many of these new mobile products will be featuring dazzling OLED screens to enhance the video experience with a bit of “wow” factor. Furthermore, an entire ecosystem of docking stations handling video has sprung up to support mobile video handhelds. Clearly, there is no question now that video has fully taken to the road.

From the perspective of an integrated circuit (“IC”) supplier, mobile video presents exciting design and production challenges because power and size both need to be lowered while higher and higher video definitions must be supported. Fairchild Semiconductor has been particularly active in the integrated video filter driver segment, so we will focus on video filter driver ICs to illustrate how the trends of lower power and size and higher definitions are shaping the IC product landscape, particularly by driving the application of more sophisticated semiconductor process and packaging technologies.

To address mobile’s lower power requirements, the industry’s standard video filter ICs had to be redesigned into more advanced processes. Fairchild, for example, developed a high performance, low power Silicon On Insulator (SOI) process in their Bucheon, Korea fabrication facility precisely to address such challenging design requirements. To make the advantages of the advanced process technologies accessible for mobile applications, low power products need to come in small packages.

Companies like Fairchild offer video filter drivers (and a range of other products) in different types of tiny packages including MicroPak™ MLP, which is small enough to fit through the holes of a salt shaker.



Figure 1: One- and three-channel Video Filters in packages so small they can be poured from a salt shaker

The gold-standard package for small analog ICs in cell phones has quickly become wafer level chip scale packages which are called “WLCSP”, or sometimes just “CSP”. CSP packages are about as simple as it gets in terms of construction because they are just silicon dice with solder bumps: that’s about it. However, IC companies are relentlessly driven towards constant innovation, and even something with the Zen-like simplicity of a CSP is the target of further refinement. So, new styles of CSP packages that aim to reduce silicon die area to lower the overall cost of CSP-based IC products are now under development. These new style CSP packages will drive further cost reduction for tiny packages, which is the ideal situation for cell phone video filter (and other) applications.

So, with power and size being addressed, that leaves higher definition and channel count. Cell phones and personal music players (PMPs) segregate into two channel counts: one and three channels. Single channel video filters are being adopted to support composite video, also called “CVBS”. Consumers may be familiar with the yellow video cable that connects to their TV or Set Top Box. This cable is used to handle CVBS.

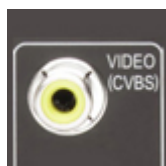


Figure 2: Composite Video (CVBS) Output Jack and Typical Composite Video cable with Stereo Audio (Right and Left)

Many phones connect from the phone’s audio jack to the CVBS socket to provide Standard Definition (SD) video out signals.

The other important video connection scheme is component video (also called “Y, Pb, Pr”) which is used on certain popular mobile phones and PMPs. Component video requires three video channels, of course. So why use three channels? Y, Pr, and Pb outputs roughly correspond to a channel each for red, green, and blue signals. The reason for breaking it out this way has always been to support higher definitions, and this is still the case with mobile.



Figure 3: Component (Y Pr Pb) Video cable with Stereo Audio (Right and Left)

Enhanced Definition (“ED”) supporting up to 720i has been the popular standard for better video resolution on cell phones and PMPs. However, High Definition (“HD”) 720p/1080i has emerged recently on an interesting PMP product, which could be pointing to the future direction in the mobile market. There are two ways to support 720p/1080i: analog-out and/or HDMI.



Figure 4: Typical HDMI output Jack

HDMI on a PMP is now hitting the market, but HDMI may not be the promised (or feared) analog- killer any time soon. The market leading PMP product line has this wonderful ecosystem of docking stations with analog connections that continues to proliferate. It seems that support of analog may remain around a while due the notion of backwards compatibility, which has always been a powerful force in the video world. So, as mobile processors which power mobile handsets move to HD 720p/1080i capabilities, both HDMI and HD analog may coexist for some time.

Designers of mobile video products have a selection of video filters tunes to the needs of mobile platforms to choose from, offering low cost, low power, small size, as well as a variety of packages, channel counts and definitions. Having a range of IC products will help designers track and support developments including smart phones, PMPs, tablets, and whatever else decides to go mobile.

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