



Dr. Ken Gilleo

# Pack It In! (Your Cellphone, That Is)

**Talk is cheap, but the device in your hand can really take you places.**

**A** 21<sup>st</sup> Century Rip Van Winkle might well ask, "Say, what's that on your belt?"

And you might reply, "Oh, just my phone. Sorry if the built-in alarm clock woke you."

Now hold on. You are packing more than just a tough, lightweight, affordable phone, especially if it is a new high-end product. From humble beginnings as the radio phone in 1946 to a true cellular system by 1977, the cellphone has morphed into something incredible, a device not to be taken for granted. Designers have packed in more hardware, software and features than anyone ever dreamed, even Dr. Martin Cooper, the Motorola innovator often credited for this invention.

Let's examine the top-of-the-line models now being released. All that power in your palm was made possible by major advances in chips, packaging, displays, software and circuitry. Indeed, telecom drives much leading-edge technology including 3-D stacked die, CSP and flip chip and high-density circuitry. The cellphone is a sophisticated, self-contained, self-adjusting two-way radio system that may operate on three or more bands. It is constantly checking test signals, adjusting power, updating the clock and letting the ground system know where you are as part of the routing logistics.

Well, that sure is an attractive display, and no wonder, with up to 262,000 colors (not a misprint). Of course, it has a touch screen so you can write e-mail. And just like a good PDA, that screen pad scribbling you call handwriting can be transcribed into digital format. Some phones have a thin version of Microsoft Office, allowing you to compose a letter in Word. If you prefer to dictate a letter, basic voice recognition is available. Just want to record some chatter? With up to 80 MB of memory, that's a lot of talking.

The phone chimes loudly with one of those irritating scales of notes while up pops a picture of the caller who can be heard loudly through the speakerphone because you forgot your wireless headset. Your friend has a new ringtone for you, which you edit using special software. Still not satisfied, you get on the Internet and replace the idiotic tone with "voice ring" and Clint Eastwood authoritatively says, "Answer the phone or make

my day." You can also add audio to the instant messaging, paging, alerts, calendar reminders and such.

You have time for sightseeing and e-sharing to show off the 1.3 megapixel camera. The next model you buy will have 5 megapixels, some serious memory and a fuel cell. But for now, at least, you have an 8X digital zoom with built-in flash. But you want live action and decide to shoot 10 minutes of scenery using MPEG4 compression. The memory can be removed from the SDIO slot so more (or other) functions can be added. You download the pictures through the USB port, although you could have used at least four other methods. You have written letters, sent e-mail from three accounts, made a blind date via Bluetooth, accessed stock reports, checked your house, filled in the calendar and edited all those pictures while checking what was going on everywhere by direct phone link, Wi-Fi and WAP. Time to turn on some entertainment.

You begin to listen to recorded music with the built-in stereo MP3 player and are soothed by watching the rhythm lights flashing in sync with the melody. But you want something more. You tune in the FM radio and listen for a spell, but it's not enough. There must be more to phone life than sound, flashing lights and pictures. Of course! You can now access digital TV thanks to a new chip by Motorola. And if the TV gets boring you can play any of a few dozen Java-enabled games. Are you lost? Nothing to worry about because the locator will tell you where you are, offer you a map and even indicate where your friends are. And if they are close, you might link up with Bluetooth or swap data via infrared, methods that you prefer since these transactions are not logged into the cellular base network. Someone is promising medium-range laser-linking for free and secure messaging by next year, but the snoops may have it already.

It has been a long day and your built-in MEMS-powered pedometer indicates that you have walked many miles while the timers say that you have talked away half the day. Wouldn't it be great to be home? Maybe next year's models will have a really useful feature – like teleportation.

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