

# **THE TREND TOWARDS VOICE FEATURES IN CELLULAR AND WIRELESS PHONES**

## *Mobile Telephone Growth Prompts Demand For Voice Features*

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As mobile phones have rapidly been transformed from status symbols for the rich and famous to valuable tools for the masses, the consumption of wireless phones throughout the world continues to spiral upward. With that growth comes the demand from consumers for increased features and functionality. As people are moving from their initial “free” phones, that were included in the deal they signed with their first service contract, manufacturers are trying to gain a competitive edge over their competitors, by adding new features to phones, which provide customers valuable added functionality. One such feature which is rapidly becoming a standard in mobile phones, is voice storage, the addition of an answering machine and voice memo function built directly into the mobile phone.

There are many reasons why voice functions in mobile phones are increasing dramatically. Among them are the need for people, especially business people, to be able to get their messages quickly, the safety issues involved in capturing information while driving and speaking on a mobile phone, the price reductions in mobile phone service, and the growing propensity people are having towards having one phone, one phone number, with an integrated answering machine on-board. This has all been enabled by the technological advances allowing for non-volatile, long duration, single-chip solutions that can easily be integrated into mobile phones without adding any burden on the phone’s processor or software development.

According to Herschel Shosteck Associates, Ltd., a cellular market research and consulting firm based in Wheaton, Md., with the acceptance of one additional major mobile phone manufacturer they expect voice features to be a standard in virtually every mobile telephone by the year 2000. Several phone manufacturers like Motorola, Ericsson, Toshiba, JVC, Casio, Panasonic and French manufacturer Sagem, already include voice features in their mobile phones.

### **Voice in the Business World**

For today's business people, it's crucial that they not only receive their messages, quickly, but are able to easily return them. By having a built-in answering device in their mobile phone they are assured of not missing an important call, are aware of receiving a call and can return that call instantaneously. Of course service providers offer voicemail but that involves added steps for the user. They need to call to check their voice mail to see if they even received a call, have the expense of placing a call to their voicemail, through the use of air time, and use precious battery power checking for messages. Of course one can call their voicemail from a wired phone to check their messages but that defeats the convenience and timeliness of having a cell phone for these activities. In an article about his new Motorola Microtac Elite phone with built in answering machine, Stewart Alsop, a noted industry computer columnist wrote, "With this phone there's almost no reason to use any other telephone, home phone, office phone, or car phone."

### **Safety**

A study by University of Toronto researchers in the New England Journal of Medicine states that "the use of cellular phones in motor vehicles is associated with a quadrupling of the risk of a collision during the brief period of the call." Since it is believed that most people use their mobile phones while driving and that is not likely to change, it is necessary to have features that can make it safer to use mobile phones while driving. One such feature is a voice memo in a mobile phone that allows the user to record their phone conversations "on-the-fly." For obvious reasons the CTIA, Cellular Telecommunications Industry Association, recommends that you "Never take notes while driving." However, automobile drivers, already tempting fate by driving and talking on the phone in hand-held mode drivers, are constantly writing down directions, telephone numbers, or other bits of important information. Traditionally, mobile phone communications have presented a serious obstacle to driver note taking. Holding a steering wheel in one hand and a phone in another leaves a driver one hand short of being sufficiently equipped to perform the task. "On-the-fly" recording of a mobile phone conversation allows the driver to record both sides of the conversation and play it back repeatedly. No need to write down information or later take your eyes off the road to read back the information.

It's obvious that the voice memo function, at the risk of being overly dramatic, is a life saving device. Drivers, trying to write down notes or get directions are an accident waiting to happen. The memo function is an easy and safe way to record and playback directions or other pertinent information a driver may need. The voice memo pad feature also allows users to simply press a button on their portable phone to record important messages to themselves. The messages can be played back later, much like a tape recorder.

### **Universal Phone**

Although making predictions is always tricky, one thing is certain about mobile phones: they promise to become even more integrated into our personal lifestyles in the coming years -- making communication easier and more convenient. The cellular industry's vision all along has been to provide customers with one phone number at which they can be reached no matter where they happen to be. According to the Semico Research Group, in a 1996 white paper on Analog or Digital Answering /Scratch Pad Features on Digital Cellular Phones, the impact of wireless communications is just beginning and we can expect to see communications to look quite different in the next ten years. "The digital cordless phone of the future will be the only phone necessary. Users will not have to have a "home" phone and a "car" or portable cellular phone. The only phone necessary will be a digital cordless phone with a single phone number that goes with the individual."

In addition, mobile phone growth in the undeveloped parts of the world is exploding. Without the infrastructure of land lines, and being unwilling or unable to lay those lines, mobile phone service has become the only choice for new phone users. It stands to reason that people with a single phone would just assume to have an answering device built right into the handset.

As we move towards that day of having only one phone, customers will expect the features that we currently take for granted. Something as simple as having an answering machine take our messages when we're unable or unwilling to answer the phone, is one of the most obvious needs people will be clamoring for in a very short time. The answering machine. Who doesn't have one at home? As well as voice mail in the office and maybe voice mail through their cellular carrier? Why not just have one answering machine on one phone. The phone that is always with you, no matter where you go.

Even before this magical day of just having one telephone comes, there's a very real need for a segment of the mobile phone community in need of an answering machine or a voice memo pad to be a part of their phone. Most of us can't remember the days of phone service when we couldn't ignore a ringing phone by saying, "I'll let the machine get it". The answering machine has become almost as important as the phone itself.

### **Service Providers**

A large part of the recent acceptance of voice features in mobile phones has to do with the drastic reduction in fees billed by the service providers. The rates for cellular service have been dropping substantially. In the past owners of mobile phones have been reluctant to give out their phone numbers or leave their phones on due to the fact that they were billed for every call and the rates were high. International Data Corporation (IDC), in a 1996 paper, said "While the idea of an answering machine in a cellular phone would seem compelling to users, there are several issues that need to be considered. Namely the number of cellular users that give out their cellular number and whom they give it to." The conclusion was that the number of incoming calls for most people is severely limited since few people know the number to call. This was due to the fact that in the United States, the cellular carriers made a business decision early in the life of the industry to charge cellular users air time for incoming calls. Thusly, a users bill can increase significantly if calls are received into the phone. IDC added that "In other cellular and PCS markets around the world, carriers do not always charge for incoming calls. In these markets, answering machines on the handset are certainly more appealing. IDC concluded that "Changes in the typical cellular business model in the US and other markets of the world, as well as user education, will increase demand for integrated answering technology on handsets." This is exactly what we're now experiencing. As digital networks grow, reducing costs for providers and creating the infrastructure for many more users, cellular rates will continue to drop. Carriers are already offering hundreds of free off peak minutes every month, and the providers are even toying with the idea of having the phoning party pay. All these factors should lead to increased use of voice phone features in mobile phones.

### **The Right Technology**

Over the past two years the semiconductor industry has developed the right technology allowing for voice features to be integrated into mobile phones. An example is ISD, who has rearchitected its ChipCorder technology specifically for the mobile phone market. It uses a single microchip to record and play back voice, sound and music with very high quality sound. For voice storage solution in mobile phones ISD also offers miserly power consumption and a short design cycle for manufacturers. In addition ISD's voice storage will soon be doubling in duration from four to eight minutes with 30 minute recording times expected by the end of 1998.

ISD's analog approach for voice storage is an ideal solution for both analog and digital phones since it eliminates the need to convert analog voice to digital simplifying the external circuitry required. The analog ChipCorder device includes high-performance analog memory circuits and a complete set of digital control circuits on the same substrate, providing a true mixed-signal, single-chip solution. The ChipCorder includes an oscillator, anti-aliasing filter, smoothing filter, and on-chip speaker amplifier for a complete system on a chip. An external microphone, speaker, power source and some passive components are required for a complete record/playback device. These devices can be cascaded to increase the length of record and playback time. Because the ISD chip is an analog solution, voice and audio signals are stored in memory in their natural state. No digitization or compression techniques are used. This equates to natural quality voice reproduction. This 3V chip stores analog voice and audio signals directly into on-chip nonvolatile memory. The product is available in a series of durations ranging from one to four minutes.

### **Features and Technology**

The ISD33000 series is based on ISD's patented ChipCorder technology which enables a single-chip solution for voice record and playback in a variety of consumer, communications and industrial applications. It uses a proprietary "multilevel" storage methodology in which one of more than 250 distinct voltage levels are precisely stored per memory cell. This provides approximately eight times more storage space for any given memory size than the alternative two-level, digital signal storage technology. ChipCorder technology enables voice and audio signals to be stored directly in their

natural form into nonvolatile EEPROM or Flash memory cells, eliminating the need for external A/D and D/A circuits.

### **Conclusion**

The cellular telephony world is changing dramatically. Consumers are passed the novelty stage of owning a cellular phone, and in many parts of the world the cell phone is the *only* phone. Cell phone rates are being drastically reduced and providers are contemplating changing their business model so the burden of payment doesn't fall on the cell phone owner. Users are demanding and expecting features, especially features they've come to expect with their traditional phone - especially voice. The technology is available for manufacturers to add voice features easily and economically. Companies like Motorola, Panasonic, JVC, Sagem, and Casio understand their customers desire to have these features. To remain competitive other major phone manufacturers will have to follow the trend towards voice, or be left speechless.