



The IP-Chip

*What's in store for
our interconnected world?*

In his column of September 21, 2003, Dan Gilmour, Technology Columnist for the San Jose Mercury News, made the observation, "Now I know why my refrigerator should be connected to the Internet."

He made this comment after returning home from a trip – and finding the rather unpleasant results of a power failure. His comment? His fridge should be Internet equipped so that it could call a repairman!

It seems an opportune time to resurrect an extract from an old book I wrote with my partner years ago – in which we specifically noted that "we believe that we are destined for a future in which the everyday appliances and technologies which surround you are soon to be linked into the Internet, often, through the home network or a wireless Internet connection that is set to invade your home! As this occurs, the devices will emerge with capabilities that are quite unimaginable today."

Related to this was our prescient prediction that one day your fridge will call your repairman.

As the world emerges from its 90's tech-hangover, it is a good time to revisit the fact that an era of hyperconnectivity is still set to emerge – one of multiple sensors, multiple devices, linked together in a fascinating new world of hyperconnectivity.

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Observations from “*Light Bulbs to Yottabits*”

“Quite simply, it will be a computer microchip or microprocessor that has Internet capability built in.

One of the most significant trends involving the Internet is the arrival of the “IP-chip,” a little device that is going to invade your daily life, whether you like it or not. (IP rhymes with chip, hence, you pronounce it ip-chip.)

The IP-chip doesn’t quite yet exist — yet we believe that it is something that is imminent.

What is an IP-chip? Quite simply, it will be a computer microchip or microprocessor that has Internet capability built in. It will be like any other microprocessor in existence today, except it will have the ability to link to other computers and computer chips around the planet via the Internet. It will accomplish this link via a wireless connection, or via a direct connection to the Internet. It doesn’t matter how it does it — it will simply be plugged in to the global Internet, and will be able to communicate with other computers and other IP-chips, wherever they might happen to be.

The emergence of the IP-chip is going to have far-reaching implications on all of the technologies and devices that surround us in our homes and our offices.

Massive interconnectivity

The IP-chip will emerge in two ways.

First, it will start to appear in new appliances and technology that you purchase — your fridge, microwave, home stereo, and automobile. You won’t consciously purchase an IP-chip, in the same way that you haven’t gone out to buy the computer chips currently located in some of these appliances and devices.

Second, it will be found within the many new Internet devices set to appear; in this way, the IP-chip which will be the basis of an entirely new type of product.

The ubiquity of computer chips and microprocessors

Computer chips are already prevalent throughout our daily lives, providing a degree of intelligence to many devices that we use on a day-to-day basis.

If you think of it, even hotel doors have computer chips built in. When you check into a hotel that uses “card” technology for keys, you are basically sliding your card into a little box on the door that happens to contain a microprocessor.

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Microprocessors — also known as embedded chips — are everywhere. Indeed, the world really became aware of their extent with the Y2K crisis. Suddenly, there were a lot of news reports about a variety of equipment that was susceptible to failure, due to the fact that a non-Y2K-compliant microprocessor chip might be involved.

According to the Forum for Applied Research & Public Policy, there are about 70 billion embedded chips in the world, about half of them in the US. They are found in household devices, including TVs, video cameras, VCR's, microwaves, washing machines, and alarm systems. They are located throughout building systems, including fire control systems, heating and ventilating systems (HVAC), elevators, security systems, safes and vaults, and door locks. They are in traffic lights, ticket machines, and parking meters. They're also found in medical equipment, motor vehicles, automatic banking machines, manufacturing equipment — everywhere you look, you can find an embedded microprocessor.

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They're certainly ubiquitous. And they are getting smarter — it is said that the new generation of microprocessors, which contain “32-bit” and “64-bit” logic, are as smart as today's leading-edge computers. Shipments of these particular types are going to grow from some 106 million in 1998 to 228 million in 2002.

The thing is, at some point in the near future, the embedded chips that will be installed will have Internet capability built in; that is, they are going to be sold with an IP-chip built in.

When this occurs, it means that the new devices that you purchase will be able to link into the Internet, and will thus be able to do some very interesting things.

The Linking of “Devices” to the ‘Net

What we can learn about IP-chips from current devices plugged into the Internet?

The concept of linking “devices” to the Internet has long existed; indeed, in the early days of the explosive growth of the Internet around 1995 and 1996, you could often find a major news story focussing upon the types of things you will have seen above. More often than not, these reports poked fun at these people, observing how ridiculous it all seemed.

Yet these efforts are defining the future role of the Internet. Why? Because we are destined for a world in which the microprocessor currently found in various devices has been turned into the IP-chip. The result is that the device itself becomes plugged into the massive global network that is the Internet, and can suddenly do a greater number of things.

The IP-chip microwave

How will an IP-chip work?

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Let's consider an IP-chip-based microwave. If you own a microwave today, you will know that there is no "exact" cooking time by particular make and model. Some microwaves take far less time to prepare foods than others, depending upon the wattage and power of the particular model used.

Microwaves are particularly tricky when it comes to popping popcorn. Buy a package of microwave popcorn, and you'll notice that the cooking instructions tell you to carefully listen as it pops. When you hear one to two seconds between pops, you are advised that it is likely that your popcorn is ready. Of course, anyone who cooked popcorn in a microwave knows that there is a strong likelihood that they'll burn it the first few times, until they get a sense of just how long it takes to cook in their particular microwave.

Enter the IP-chip based microwave. Buy it, bring it home, and plug it into the wall. The microwave will use the basic Internet connectivity found in your home to establish a connection to the Internet. (For example, it will link into the Internet via a wireless Internet connection in your home, via the Internet-connectivity that runs through your electrical wires, or will plug directly into your home network via an Ethernet connection.)

The package of microwave popcorn that you have purchased includes a bar-code on it that uniquely identifies it. When you press "cook," the microwave will read the bar-code. It will then use the IP-chip to send a query through the Internet to a central database. There, it will ask a question, in effect: "*For this particular model of microwave and for this particular package of popcorn, how long is the cooking time?*" Receiving the answer, it will then proceed to provide you perfect popcorn — every time.

Far-fetched? We don't think so — indeed, we believe that we are destined for a future in which the everyday appliances and technologies which surround you are soon to be linked into the Internet, often, through the home network or a wireless Internet connection that is set to invade your home! As this occurs, the devices will emerge with capabilities that are quite unimaginable today.

It is the IP-chip that leads us into the realm of the Jetson's TV show: it involves some of the more outlandish and far fetched proclamations of where the Internet is taking us.

Yet if you think about it, such claims are probably not too out of touch with reality.

Examples of IP-chips

Is the IP-chip a mere bit of weird science fiction?

Not at all — the IP-chip is already here, and during the next ten years, is going to invade your home or office in unprecedented numbers. Like the evolution to a telephone system that is based upon the Internet, you probably won't even notice it happening.

There are early signs which herald the arrival of the IP-chip, from companies such as Seiko (www.seiko.com), iButton (www.ibutton.com) and Emware. (www.emware.com). You can take some time to browse their sites in order to get a bit of an idea as to the what an IP-chip might do.

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Emware claims to make the worlds’ smallest Web server — basically, a microprocessor with built in Internet connectivity. Take some time to go through the demos on their site, and you’ll get further insight into many of the roles the IP-chip will come to play. For example, the demo shown above puts into perspective the role an Emware chip can play in the home. Where do they plan on positioning themselves? Right smack in the middle of the market that will link IP-chips to the Internet, and hence to the world.

Then take a look at the iButton, and you are launched further still into the new millennium. Although not yet Internet specific, the company does show a clear vision of the future role of connected microprocessors in a variety of settings.

Home automation and the IP-chip

Home automation will be one of the most important markets for IP-chips. While we think of the Internet as a tool to surf the Web and read e-mail, the reality is that it is also a technology that will one day link our refrigerator to the manufacturer, notifying them when it is about to break down, taking us to the next stage of home automation.

Yet beyond home automation there are many other practical applications for this technology. Emware, for example, foresees an industry emerging in which it can sell IP-chips to vending machine owners. Vending machines will send a message when they need to be filled — and the vending machine company can check in at any time to see the machine status. They also foresee the implementation on this technology into industrial trash compactors — an IP-chip could monitor the trash level, and advise the trash company when a bin is almost full.

IP-chips lead to some of the more futuristic claims involving the Internet, a world in which the everyday devices that surround us become Internet aware.

Jim Carroll, FCA

As a leading international futurist, innovation and trends expert, Jim dedicates his time & expertise to making organizations and their people ready and able to adopt tomorrow, today.

Since 1992, Jim Carroll has spoken to tens of thousands of people as a conference opening and/or closing keynote speaker, or a workshop/seminar leader. His clients include many of the world's leading organizations, such as Microsoft, American Express, Taiwan Semiconductor Mfg. Co. VISA, Electronic Transaction Assn, Blue Cross/Blue Shield, KPMG, IBM, Nortel Networks and many more.

Jim has written 34 books that have sold in excess of 750,000 copies worldwide, as well as over 600 articles for a wide variety of national and international publications.

