

General Magic Unveils Magic Cap OS

Magic Cap Demonstrated, But Devices Won't Ship Until Second Half

by Michael Slater

General Magic's plans have remained cloaked in secrecy since the company announced its alliances and gave a general overview of its plans last February (*see 070303.PDF*). The company has now announced its technology, and about 25 software developers have announced plans to provide applications, but hardware announcements remain in the future. Shipments of handheld communicators, along with applications and online services, are promised for the second half of the year.

General Magic has been developing several technologies:

- Telescript is the most profound, but the hardest to grasp; it is a platform for communicating applications that makes Sun's old motto—the network is the computer—literally true. Telescript is an interpreted language that is executed not only by the sending and receiving devices, but also by the network itself.
- Telescript engines are the interpreters that execute Telescript programs. Two versions will be available: one for client devices and another version for network servers.
- Magic Cap is a software environment for personal communicators. It includes a Telescript engine, as well as the usual set of personal information manager functions (note taker, address book, e-mail, and fax). Magic Cap software will also run on Macs and PCs.
- A reference hardware design, based on Motorola's 68349 "Dragon I" processor and the proprietary "Astro" peripheral chip, will be used by General Magic's licensees—initially Matsushita, Motorola, Philips, and Sony—to build the first Magic Cap communicators.

AT&T has announced plans for PersonaLink, a Telescript-based network for electronic mail and on-line services. Magic Cap devices can communicate with existing e-mail and online services, but (at least at first) only PersonaLink will offer the full power of Telescript. Note that AT&T, while an investor in General Magic and the builder of the Telescript network, has not licensed Magic Cap and remains committed to Eo's PenPoint for its handheld devices.

Sony and Motorola plan to announce Magic Cap communicators in the first half of this year, with shipments beginning in the second half. Devices from Philips and Matsushita presumably will follow in 1995. The PersonaLink service is planned to become available this summer, in time for the first communicator shipments.

Magic Cap Communicators

The initial communicators will be implementations of the reference design. In time, the designs will diversify, but General Magic requires all Magic Cap devices to include a minimum feature set so software developers can count on those functions being present. In addition to the processor, memory, digitizer, and display, a Magic Cap device must include at least one PCMCIA slot, a connector for MagicBus (a Magic Cap-specific peripheral expansion bus), a microphone and speaker for audio input and output, and infrared (IR) communications. In addition, to emphasize the importance of these devices as communicators, an internal fax/data modem is required.

Unfortunately, the IR communications are not compatible with those of any other handheld computing device. This is an area where standards are sorely needed.

Device makers will use varying amounts of memory, depending on the software they choose to include in the base unit. The minimum requirement is 3 Mbytes of ROM and 1 Mbyte of RAM. The base display resolution is 480×320 with two bits per pixel. The software supports a variety of resolutions with up to 32 bits per pixel.

The Astro ASIC, which is manufactured by Motorola and will be offered only to General Magic licensees, is a 35,000-gate, 208-pin device that provides most of the interface functions to support the 68349 processor.

At the Desk, Down the Hall, and Downtown

Hoping to make Magic Cap devices less intimidating to technophobes, GMI crafted the user interface around a real-world metaphor of streets and buildings. One view shows a 3-D drawing of a desk, with a phone, postcard, notepad, datebook, and Rolodex; pointing to these devices activates the phone dialing, e-mail, note-taking, calendar, and address-book functions. Down the hallway are doors for the game room, library, storage room, and so forth. Service providers are accessed by going "downtown," which shows several buildings. Pointing to a building activates the interface for that service.

While some people find the interface nauseatingly cute, underlying it is a remarkable degree of sophistication. Shortcuts are available to bypass the graphical metaphors, which can get in the way once a user gets past the initial learning curve. Throughout the interface are little details that add up to an impressive device that, in many respects, goes well beyond competing systems. For example, whenever a message is received, the sender's information is entered into the address book, or updated if it is already there.

The system does not include handwriting recognition, which General Magic believes is still at least two to three years away from being good enough to be truly usable. Instead, the device displays a “tap” keyboard that the user types on with the stylus. Unlike other PDAs, Magic Cap devices use a landscape orientation for the display, which enables a much larger keyboard to be shown. Whenever possible, the software recognizes words from the first few characters, often eliminating the need to type the entire word.

Making the Network Smart

Telescript represents a radical change in the design of networks. Each message carries with it not only the message content but also a program written in the Telescript language. This enables a wide range of new capabilities. For example, a “smart envelope” can tell the network to attempt to deliver a message through the recipients wireless link, but if it is unable to do so within an hour, to then render the image into a bit map and fax it to the recipient. Users can also send routing information for incoming messages: for example, one might tell the network to route all messages to a wire-line connection, except for messages from certain people, which should be sent over a more costly wireless connection.

PersonaLink will support a wide range of service providers, each of which could operate on leased space on the AT&T system or on their own computers. Each computer would include a Telescript interpreter. Unlike existing online services, it will be easy for large and small information or service providers to add their offerings to the PersonaLink network.

Telescript can do much more than message routing. Telescript programs can act as “agents,” traveling to various information servers and performing actions for the user. For example, suppose you have a reservation on a particular flight. A Telescript agent could monitor the flight schedule for any changes, and automatically send you a message should there be any. Creating agents is fairly simple (a “go” instruction transports the agent to another host, where it continues executing) but still requires some programming skills; most users are likely to customize agents provided by third-party developers.

Apple and AT&T are committed to supporting Telescript on the Newton and PenPoint operating systems, but such support seems unlikely to appear before 1995. One key vendor that has not licensed Telescript is Microsoft, whose designers are inclined toward solutions that put the intelligence in the client devices rather than in the network. WinPad applications could still support Telescript, even if the operating system does not.

68000 Architecture to Be Supplanted?

Although it is far too early to claim any victories in the PDA operating system battle, Magic Cap clearly has

Magic Cap Applications

General Magic has been working with dozens of third-party developers, and about 25 of them have announced their product plans. In most cases, no product specifics were provided, and first shipments were promised to coincide with the shipment of Magic Cap communicators in the second half of 1994.

Several general-purpose applications were announced. Pocket Quicken, from Intuit, tracks expenses; Penware's PenCell is a spreadsheet designed especially for handheld devices; Tangent is a drawing program from Driftwood Systems; Mnemo Software's Magic Foreign Interpreter will translate words and phrases from English to five European languages; and Spell Finder, from Sony Electronic Publishing, is a spelling dictionary that will work with all Magic Cap applications.

Several communications products and online services were also announced in addition to AT&T's PersonaLink. RadioMail will provide two-way wireless messaging, initially for a Magic Cap communicator from Motorola. News Electronic Data and Streetlight Software will each provide travel information services, while Mead Data Central will offer online news and shopping services. America Online will provide a customized version of its on-line service. Sony Electronic Publishing will offer the Official Airline Guide, and Ex Machina and Compsoft Services will provide general-purpose communication utilities.

the features and the supporters to be a serious contender. While it is late to market compared with the Newton, Geos (Zoomer), and PenPoint (Eo) products, it should be available at about the same time as WinPad devices. The market is in such an early stage that the prior shipment of the other devices may not be particularly important. Telescript is all but assured a pervasive role, as it is the only solution being offered to enable cross-platform communicating applications.

Magic Cap communicators will give the 68000 family a role in the PDA market, but it is not clear how long-lived this will be—the 68020-class core in the 68349 is unlikely to deliver the performance needed for Magic Cap devices to remain competitive. Moving to a higher-performance 68000-family core would be possible, but we expect that General Magic will port its software to at least one RISC architecture.

Given the company's partners, there are two obvious choices: MIPS, which Sony is planning to use throughout its consumer products, and PowerPC, which surely would be Motorola's choice for a successor to the 68000. Unlike Apple's Newton, however, Magic Cap applications are distributed in 68000 code, not in a processor-independent language, and application developers presumably will have to provide ports of their software for each architecture. ♦