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Apple Newton

The **Newton** is a series of personal digital assistants (PDA) developed and marketed by Apple Computer, Inc. An early device in the PDA category – the Newton originated the term "personal digital assistant" – it was the first to feature handwriting recognition. Apple started developing the platform in 1987 and shipped the first devices in 1993. Production officially ended on February 27, 1998. Newton devices run on a proprietary operating system, Newton OS; examples include Apple's MessagePad series and the eMate 300, and other companies also released devices running on Newton OS. Most Newton devices were based on the ARM 610 RISC processor and all featured handwriting-based input.

The Newton was considered technologically innovative at its debut, but a combination of factors, some of which included its high price and early problems with its handwriting recognition feature, limited its sales. Apple cancelled the platform at the direction of Steve Jobs, after his return to Apple, in 1998.

Newton

The Apple Newton MessagePad 2100, running Newton OS, alongside the original iPhone running iOS

Developer	Apple Computer, Inc.
Type	Bar PDA
Release date	1993
Discontinued	February 27, 1998
Operating system	Newton OS
Input	Touch screen

Contents
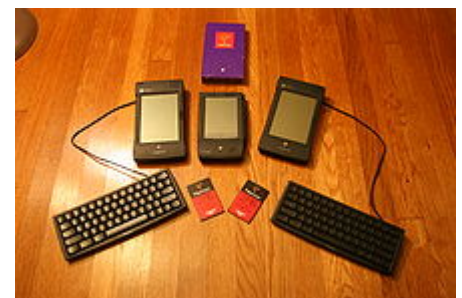
Three Newton MessagePad devices with keyboard and LinearFlash PCMCIA memory card accessories

Development

The Newton project was a underline personal digital assistant platform. The PDA category did not exist for most of Newton's genesis, and the phrase "personal digital assistant" was coined relatively late in the development cycle by Apple's CEO John Sculley,[1] the driving force behind the project. Larry Tesler determined that an advanced, low-power processor was needed for sophisticated graphics manipulation. He found Hermann Hauser, with the Acorn RISC Machine (ARM) processor, and put together Advanced RISC Machines (now ARM Holdings).[2] Newton was intended to be a complete reinvention of personal computing. For most of its design lifecycle Newton had a large-format screen, more internal memory, and an object-oriented graphics kernel. One of the original motivating use cases for the design was known as the "Architect Scenario", in which Newton's designers imagined a residential architect working quickly with a client to sketch, clean up, and interactively modify a simple two-dimensional home plan.

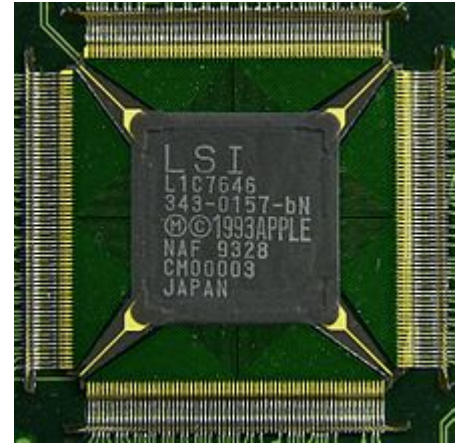The custom ASIC chip inside the original Apple Newton H1000

There is, however, an extensive history of pen computing that predates the Newton, though not generally in the form of what would now be called a PDA.

For a portion of the Newton's development cycle (roughly the middle third), the project's intended programming language was Dylan, a language Apple created for this platform, though in fact the language and environment never matured enough for any applications to be successfully written. Dylan never lived up to its developers' performance expectations. When the move was made to a smaller design (designed by Jonathan Ive),[3][4] Dylan was relegated to experimental status in the "Bauhaus Project" and eventually canceled outright. Its replacement, NewtonScript, had garbage collection and tight integration with the "soup" storage and user-interface toolkit, and was specifically designed to run in small RAM/large ROM environments. It was mostly developed by Walter Smith from 1992 to 1993.

Inside the Apple Newton Messagepad H1000, with back cover removed

The project missed its original goals to reinvent personal computing, and then to rewrite contemporary application programming. The Newton project fell victim to project slippage, scope creep, and a growing fear that it would interfere with Macintosh sales. It was reinvented as a PDA platform which would be a complementary Macintosh peripheral instead of a stand-alone computer which might compete with the Macintosh.

Although PDAs had been developing since the original Psion Organiser in 1984,[5][6] the Newton has left one particular lasting impression: the term *personal digital assistant* was first coined to refer to the Newton.[6]

According to former Apple CEO John Sculley, the corporation invested approximately US$100M to develop Newton.[7]

The Newton was considered innovative at its debut, but it suffered from its high price and problems with the handwriting recognition element, its most anticipated feature. The handwriting software was barely ready by 1993 and its tendency to misread characters was widely derided in the media. In particular, Garry Trudeau mocked the Newton in a weeklong arc of his comic strip *Doonesbury*, portraying it as a costly toy that served the same function as a cheap notepad, and using its accuracy problems to humorous effect. In one panel, Michael Doonesbury's Newton misreads the words "Catching on?" as "Egg Freckles", a phrase that became widely repeated as an emblem of the Newton's problems. Although the software improved substantially in Newton OS 2.0, it was not enough to inspire strong sales.[8]

The original color Apple logo on the Newton

The Newton became popular in some industries, notably the medical field. However, the debut of the competing Palm Pilot substantially reduced its market share. Apple struggled to find a new direction for the Newton, and when Steve Jobs returned to the company in 1997, he killed the project. He was critical of the device's weak performance, the management of the development team, and the stylus, which he disliked as it prevented the use of the fingers. He was likely also motivated by the fact that the Newton was the pet project of his old adversary John Sculley. However, Jobs saw potential in the technology and concept, if not the execution, and eventually led Apple to create its multi-touch devices, the iPhone and iPad.[8][9]

Product details

Hardware models

From Apple:

- MessagePad (also known as the H1000, OMP or Original MessagePad)
- MessagePad 100 (same hardware as OMP, but newer system version)[10]
- MessagePad 110
- MessagePad 120
- MessagePad 130
- eMate 300
- MessagePad 2000
- MessagePad 2100

From Motorola:

- Motorola Marco

From Sharp:[11]

- Sharp ExpertPad PI-7000 (equivalent to OMP)
- Sharp ExpertPad PI-7100 (equivalent to MP 100)

From Digital Ocean:

- Tarpon[12]
- Seahorse[13]

From Siemens:

From Harris:

- Harris SuperTech 2000[15]

MP100   MP120   eMate 300   MP2000

Application software

Most Newton devices were pre-loaded with a variety of software to help in personal data organization and management. This included such applications as Notes, Names, and Dates, as well as a variety of productivity tools such as a calculator, conversion calculators (metric conversions, currency conversions, etc.), time-zone maps, etc. In later/2.x versions of the Newton OS these applications were refined, and new ones were added, such as the Works word processor and the Newton Internet Enabler, as well as the inclusion of bundled 3rd party applications, such as the QuickFigure Works spreadsheet (a "lite" version of Pelicanware's QuickFigure Pro), Pocket Quicken, the NetHopper web browser, and the EnRoute email client. Various Newton applications had full import/export capabilities with popular desktop office suite and PIM (Personal Information Manager) application file formats, primarily by making use of Apple's bundled Newton Connection Utilities (or the older Newton Connection Kit, which had been sold separately for Newton devices that used the 1.x versions of the OS).

Notes

The Notes application allowed users to create small documents that could contain text that had been typed, or that had been recognized from handwriting, as well as free-hand sketches, "Shapes", and "ink text".

In version 2.0 of the Newton OS, the Notes application (as well as Names) could accept what Apple termed "stationery", 3rd-party created plug-in modules that could extend the functionality of the basic applications.

One of the new types of Notes stationery added to Newton OS 2.0 was a hierarchical, bullet-ed, collapsible, multi-line "Checklist", an implementation of outliner software. This could be used for organizing thoughts, priorities, "to do" lists, planning steps and sub-tasks, etc. Each bullet point could contain as many lines of text as desired. A bullet point could be dragged and placed underneath another bullet point, thus forming a hierarchical outline/tree. When a bullet point was dragged, the entire sub-tree of child bullet points underneath it (if any) would be dragged along as well. If a bullet point had child bullet points, tapping the hollow parent bullet point once would "roll up" or collapse all the children ("windowshade" effect). The parent bullet point would become a solid black circle and all the children would disappear. Tapping the parent bullet point again would make the children re-appear. Because this functionality arrived in Newton OS 2.0, several third parties made similar software before for OS 1.x Newton machines, the most notable of which was Dyno Notepad, released in 1993.

Names
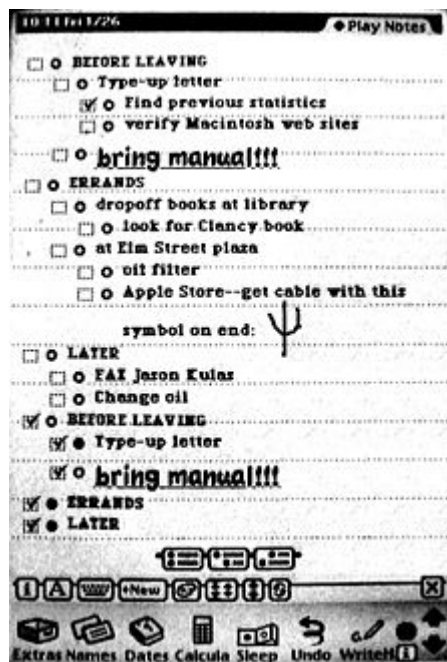
Photograph of screen displaying Checklist, some bullet points checked and/or "collapsed"

The Names application was used for storing contacts. Contacts created either on the Newton device or on a Windows or Macintosh desktop PIM could be synchronized to each other.[16][17] Entering a date in Names for fields such as birthday or anniversary automatically created corresponding repeating events in the Dates application. Each contact had an attached free-form notes field available to it, that could contain any mix of interleaved text, ink text, Shapes, or Sketches. Like Notes, Names could be extended by developers, to create special new categories of contacts with specialized pre-defined fields. Names shipped with 3 types of contacts, "people", "companies", and "groups", but a developer could define new types, for instance "client", "patient", etc. Stand Alone Software, Inc. also created a Newton software package called the Stationery Construction Kit, which allowed users to make stationery themselves without aid of any other tools.

Dates

Dates supplied calendar, events, meeting, and alarms functions, including an integrated "to do" list manager. It offered many different display and navigation styles, including a list view, graphical day "time blocking" view, or a week, month, or year grid. As with Names and Notes, Dates items created either on the Newton or on a Windows or Macintosh desktop PIM could be synchronized to each other.

Operating system and programming environment

The Newton OS consists of three layers. At the lowest level, a microkernel handles resources like tasks and memory. On top of the microkernel, the bulk of the operating system is implemented in C++, including the communications layer, handwriting recognition, and the NewtonScript environment. The top layer consists of built-in and user installed applications written in NewtonScript.

NewtonScript is an advanced object-oriented programming language, developed by Apple employee Walter Smith.[18] Some programmers complained at the $1000 cost of the Toolbox programming environment. Additionally, it required learning a new way of programming.

The Newton Toolkit (NTK), an integrated environment tailored to the graphical nature of the Newton platform, was developed specifically for developing applications for the Newton platform and included a graphical view editor, a template browser, and an interactive inspector window for debugging. Initially, it was only available for Macintosh computers, and later a Microsoft Windows version was developed. The Technical Lead for the Newton Toolkit was Norberto Menendez; other engineers on the team were Ben Sharpe and Peter Potrebic.

Data storage

Data in Newton is stored in object-oriented databases known as soups. One of the innovative aspects of Newton is that soups are available to all programs; and programs can operate cross-soup; meaning that the calendar can refer to names in the address book; a note in the notepad can be converted to an appointment, and so forth; and the soups can be programmer-extended—a new address book enhancement can be built on the data from the existing address book. The

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