

The Memotech MTX Computer System

By Dave Stevenson

Memotech were a UK company formed by Geoff Boyd and Robert Branton in the early 1980s, originally to produce RAM expansion modules for the Sinclair ZX81 computer. They went on to produce a range of other ZX81 add-ons, including a high resolution graphics (HRG) module, RS232 and Centronics interfaces and a full travel keyboard.

Following their success in the ZX81 expansion market, and anticipating the gradual decline in sales of their ZX81 products, Memotech decided to produce their own computer – the Memotech MTX. Like many of the other “home” computers of the time, including the Sinclair ZX range, Memotech computers were based on the Zilog Z80 8-bit microprocessor. It was originally available in two models, the MTX500 with 32KBytes of RAM and the MTX512 with 64KBytes of RAM. Although the Z80 is limited to a 64k address space, the MTX could address up to 512KB of memory using page switching. The MTX500 was launched at the Earls Court Computer Fair in June 1983 and the MTX512 was available later the same year.

The build quality of the MTX computer was far superior to the many plastic cased micros of the time, the computer board was mounted in a black, brushed aluminium case and had a 79 key, full travel, typewriter style keyboard with separate number and function key groups. Aluminium was chosen for good heat dissipation, durability and RFI shielding but also gave the MTX a very high quality look and feel. Unfortunately, this quality came at a price – the MTX was relatively expensive when compared to its competition, for example, when released, in the UK, the MTX500 cost £275 pounds and the MTX512 cost £315 pounds, at the time, the 48K Zx Spectrum was £129.

Memotech MTX Computer Specification	
Processor	Zilog Z80A
Clock Speed	4 MHz
RAM (installed)	32KB (MTX500), 64K(MTX512)
RAM (maximum)	512KB
ROM	24K Standard, 8K OS (operating system), 8K BASIC & 8K ASSEM(bler)
Video Processor	Texas Instruments TMS 9929A (UK/PAL) or TMS 9918 (US/NTSC)
Dedicated Video RAM	16KB
Display	16 Colours 24 lines of 40 characters of text per line 24 lines of 32 characters of text with graphics per line 256 x 192 pixel resolution 32 independently controlled user defined "sprites"
Sound Processor	Texas Instruments SN76489AN 3 independent voices plus 1 pink noise channel
Input / Output	Z80 Bus, RF Out (TV), Cassette Interface (2400 baud), 2 Joystick ports, Hi-Fi out, Composite Video out, Centronics Parallel Port, User I/O Port
Expansion options	Dual RS-232 ports, Floppy Disk Expansion (FDX/SDX), Printer (DMX80)

Software Features

The standard ROMs included a powerful version of BASIC, with a Memotech developed text processing language called "NODDY", as well as a built-in Z80 assembler/disassembler with an integrated PANEL display that allowed the user to inspect, edit and move blocks of memory, display the Z80's internal registers and disassemble the program code. With the PANEL monitor you can follow the contents of the machine's registers while a program is running. This made the MTX a very powerful computer – particularly for Z80 assembler/machine code programmers.

Graphics Capabilities

A Texas Instruments TMS9929/9918 video display processor provided the excellent graphics capabilities of the MTX and the dedicated 16KB video RAM made the full amount of RAM available for programs – unlike many other micros of the time, the amount of RAM was not reduced when the higher resolution graphics modes were used.

Software

Unfortunately, most games software publishers were not confident of the size of the potential market for the MTX and its software, and so the MTX computer was not well supported by the games publishers, most games were created by Memotech's own label, Continental Software, with good support from Syntaxsoft (the UK Memotech User's Group) and Megastar Games. Only a very small number of games were produced by other software houses, such as Level 9 and PSS Software. The total number of games available for the MTX was only around 120, an order of magnitude less than the many thousands available for the Sinclair ZX Spectrum. This was a vicious circle for Memotech, the lack of software restricted its popularity, which further reduced the potential for games developers to embrace the MTX platform.

Expansion Capabilities

Memotech released a range of add-ons for the MTX computer, including the hugely expensive twin-floppy disc FDX system which ran CP/M 2.2 and supported an 80 column text board which gave the users access to a wide range of CP/M software. Smaller disk systems were also released but they were expensive for home computer users and were released too late in the machine's life to make much difference to the size of the MTX user base.

Memotech also targeted the business user, particularly with the FDX disk system, unfortunately, the machine also failed to make significant inroads into this market.

Memotech's Demise

1984 was the peak of the UK home computer market and the market had crashed by Christmas. In the previous year, retailers had underestimated demand and had not ordered enough stock to satisfy the demand that year. In 1984, determined not to make the same mistake again, they increased stock levels dramatically. By this time, the market was becoming saturated with home computers and demand had dropped significantly by the Christmas of 1984. Such is the power of the large retailers that the stock that they ordered was on a "sale or return" basis from the manufacturers. The retailers had over ordered for the 1984 Christmas market and returned large

quantities of unsold stock to the manufacturers, hitting companies such as Sinclair, Dragon and Acorn, not to mention Memotech, very hard.

In order to get the best component prices, the computer manufacturers had long term orders with their component suppliers, placed at peak prices at the height of the home computer market. Other suppliers such as Amstrad were able to return a lot of inventory to component distributors, whereas Memotech, for example, had bought direct from factories in Japan and USA and was not able to return or decline delivery of any stock. This left the manufacturers with a large stock of surplus computers and component orders which could not be halted continuing to pour in which had to be paid for.

The Memotech MTX range was also competing for the UK schools market, but in the UK, this was effectively monopolised by Acorn Computers with the BBC Micro. They had the great advantage of the publicly owned British Broadcasting Corporation heavily promoting the Acorn (BBC) Micro for use in the nation's schools.

Given a level playing field, it is conceivable that the MTX range with its powerful hardware and software features could have made a bigger impact on the UK education market. As it was, because the BBC Computer had, in effect, locked out most other worthy contenders, Memotech had to reach farther afield in an attempt to get into the education market - i.e., its attempt to sell a specially "Russified" MTX to Russia.

The Russian schools system was looking to place a contract for some 64,000 systems in schools, to be used to provide education and training for robotics and control applications. In an attempt to secure the contract, Memotech worked with the Norwegian company, Norbit Elektronikk, to develop an add-on electronics unit to be offered alongside the CP/M based FDX disk system and with Oxford University to develop a Russian (Cyrillic) version of the system and BASIC ROMs, along with Russian documentation and keyboard. Memotech invested heavily in the development of this machine, but ultimately, lost out to the a South Korean company offering an MSX computer.

By the time of the Russian bid, the writing was already on the wall, not just for Memotech, but for the majority of home computer companies at the time. The Russian deal was the last throw of the dice for Memotech and when it failed, Memotech had nowhere to go and the company was put into administrative receivership.

By 1985, the UK home computer boom was over. Those computer manufacturers who had survived the carnage of the 1984 Christmas sales period quickly began to turn their attention away from home users to the growing and potentially much more lucrative business market. By then, the IBM PC had made a big impact on the business computer market and the popularity of CP/M had been surpassed by MS-DOS – the beginning of Microsoft's domination of the world software market.

Memotech Video wall Systems

When Memotech Computers failed, Geoff Boyd started Memotech Computers Limited,

When the original Memotech company failed, Geoff Boyd continued marketing and supporting the MTX computer for a while, including the then just released RS128 (which included 128KB of RAM and RS232 ports as standard) and the later Memotech MTX512S2 (Series 2) with 256K of RAM, a

500KB RAM Disk, 80 column colour graphics and integrated 3.5" disk drive. However, as the market for the MTX computer continued to decline, the Company was repositioned to market the Memotech Video wall system. The Video wall system was a development of the Memotech HRX, a high resolution digital video frame grabber.

Memotech Video wall systems were initially made up of a Memotech computer (RS128 or MTX512S2) with a minimum of 128K RAM, attached through the printer port to external electronics used to drive a wall of video monitors used for advertising. Some later systems were equipped with the MTX 2000 computer, before the company moved onto the industry standard PC platform.

A German language review of the Memotech MTX512 was printed in "ct" magazine in May 1984, you can read the article at <http://www.primrosebank.net/computers/mtx/mtxarticles.htm#ct0584>

Memotech in the 21st Century

Despite their limited success in the 1980s, the Memotech MTX has a small, but enthusiastic, group of "retro" computer users who are continuing to keep the MTX alive. The most active community can be found on the **Memotech MTX-500** group on Facebook, their also a dedicated user forum at <http://memorum.mtxworld.dk/>. There are a small number of MTX focused web-sites, including :-

- www.mtxinfo.de – run by Peter Kretzschmar
- www.mtxworld.dk – run by Claus Baekkel
- www.nyangau.org/memotech/memotech.htm - run by Andy Key
- www.primrosebank.net/computers/mtx/mtx512.htm - run by Dave Stevenson

Back in the 1980s, Andy Key worked for Continental Software writing many of the games for the MTX and for Memotech Computers Limited writing software to control the Memotech Video Wall system.

Using his detailed knowledge of the MTX hardware and software, Andy has developed a number of emulators and enhancements for the MTX range, including :-

- REMEMOTECH – a modern day re-implementation of a Memotech MTX/FDX/SDX compatible computer, built in VHDL and running on an Altera DE1 board. Full details can be found at <http://www.nyangau.org/rememotech/rememotech.htm>
- MEMU – Andy's Memotech Emulator, this is a comprehensive software (available for Windows and Linux) emulation of the Memotech MTX/SDX and CP/M systems. It is capable of running the vast majority of MTX games and application software. Full details can be found at <http://www.nyangau.org/memu/memu.htm>

- REMEMOrizer – an add-on for a real MTX500, MTX512 or MTX512S2 computer built using hardware and software developed for REMEMOTECH. It provides functionality including an 80 column graphics card with VGA output, an SD card as a large and fast alternative to floppy disk, extra memory up to 512KB , SDX and CP/M ROM emulation. Full details are available at <http://www.nyangau.org/rememorizer/rememorizer.htm>
- MTX Memory Card – which can be used to expand an MTX computer up to 512KB of RAM. Full details are available at <http://www.nyangau.org/memcard/memcard.htm>

Andy also has a number of other MTX related projects which are described on his web site.

Claus Baekkel has converted a number of games written for other Z80 platforms to run on the MTX, details are available at <http://www.mtxworld.dk/convgame.php>

The Facebook group includes a number of other Memotech hardware experts and additional enhancements for the MTX range are currently being discussed and/or in development.