HRT Super-Res Graphics Board
from High Res Technologies
An internally-mounted, high-resolution graphics card for PETs and SuperPETs

Review by Tom Stiff

In my work, I accumulate a lot of data; data that must eventually be analysed. As anyone who has had to handle large amounts of data will attest, the best way to begin to understand the meaning of large blocks of related data is to display it graphically. The old adage "a picture is worth a thousand words" never held more truth than in the field of data analysis.

In a single night's observing at the York University Observatory, I can easily accumulate more than a megabyte of data in the form of digitized one dimensional stellar spectra, or a few dozen megabytes in the form of two dimensional digitized astronomical images. Producing a hard-copy of these images is very expensive and time consuming. A fast graphics terminal seemed to be the best solution, and I began a search for a PET or SuperPET graphics package.

Months of letter writing, phoning and searching through back issues of every Commodore-related magazine failed to produce any satisfactory results. In the Spring of 1984, there were three manufacturers of hi-res boards, all for 65xx based machines (designed for PETs, but not for SuperPETs); all were priced over 600 dollars (US); and none offered a screen resolution any better than the C-64.

Each system also had serious design flaws that made them unsuitable. One used up a lot of the PET's memory, another required major hardware modifications and yet another limited the PET's capabilities by redefining some of the PET's BASIC keywords to incorporate graphics commands.

At the 1984 Annual TPUG meeting, I discovered High Res Technology's booth, and described my graphics needs to Dan Deconinck. He seemed optimistic about designing a suitable graphics board. That summer, Dan contacted Avygdor Moise (of OS-9 fame, and also author of **PET-COM**) at York University, for details about the 6809 side of the SuperPET. Since my graphics needs were relatively modest, Dan also asked Avy for additional ideas and suggestions. Gradually, a prototype graphics card began to emerge.

During the next year, two prototype boards were produced. Each was demonstrated at a meeting of the SuperPET User's Group, and each time ideas for enhancements were solicited. Ideas thrashed around during these meetings led to further board revisions and improvements. In the early spring of 1985, HRT felt that their card was ready to 'field test'. Accordingly, they installed their graphics card in my SuperPET.

The graphics card was fully transparent and did not interfere with any PET functions, nor did the card use any of the PET's memory. In other words, with the card installed, I was totally unaware of its existence. I could tack graphics sub-routines onto any existing program and the program would run perfectly!

I have been using an early version of an HRT graphics card for about ten months now, and I am extremely pleased with its operation. I use the graphics capabilities of my SuperPET to analyse stellar spectra. A typical spectrum (called a frame) is 500 pixels in length. The spectra are taken with a silicon-intensified television videcon (a sort of fancy digital TV system). All of the observatory's instrumentation, by the way, is controlled by an ordinary PET 2001.

The data are written onto a floppy disk for temporary storage, then handed over to a VAX 8600 for large-scale 'number-crunching'. I then download the reduced data from the VAX to my SuperPET, for graphics display. The graphics program I have written is entirely in BASIC, and has been compiled, using **PETSpeed**.

It takes about thirty seconds to create a full screen image consisting of over 600 line segments. Most of this time is taken by the SuperPET, to execute an auto-scaling subroutine to a VAX 780 system using a VT100 terminal and operating with normal daytime user-loading. To generate an equivalent hard copy graphics display takes about twenty minutes, using an H-P plotter! Furthermore, the HRT card allows me to overlay an infinite number of frames for comparison if I need to do so, or to simply display them, one at a time. The images can be scrolled off the screen, if I wish to plot more data; and instantly scrolled back, if I want to view them again.

With the birth of Super-OS/9, additional enhancements were made last summer to increase the graphics board's capabilities, and to further increase the screen resolution. Screen resolution is 700 pixels on 80 column PETs, and 640 by 200 on 40 column PETs. But — and this is a nice feature — the total resolution is 1024 by 512 pixels, and the screen can be scrolled in all directions.

The graphics card is easily installed into any PET or SuperPET. It requires no external power supply, no soldering, and no other hardware modifications. The board simply plugs into the main board's 6502 slot, and the 6502 chip is moved to the graphics board. It works equally well on either the 6502 side or 6809 side of the SuperPET and — as if that weren't enough — it is perfectly compatible with OS-9. The icing on the cake is that OS-9 users can also use the graphics card's memory as a 64K RAM disk.

The main problem with this card is that software is scarce. You will have to write your own — in machine language, if you want it to be fast. I have a feeling that this will not be a problem for long, since there are several users that I personally know of (and probably many others) that are already developing graphics utilities that will be placed in the public domain, via TPUG.

I have also heard rumours that PH.D. Associates will be marketing a version of **PETCOM** which will support VT100 and maybe VT240 graphics with HRT's graphics board. Perhaps this upgrade will also be available to registered **PETCOM** users for a modest fee. (Are you listening PH.D. Associates?)

This card is the finest and best designed piece of graphics hardware on the market today for any microcomputer — and at any price. This little card has many excellent features and, in some areas, it out-does the illustrious Amiga. For example, I use the graphics card to produce a 'plotting window' on the top two thirds of the screen while I simultaneously use the bottom third of the screen to edit programs, as well as to display numerical results as they are being calculated. In fact, the normal text screen can overlay the graphics screen. I can choose to erase either the text or graphics, or both.

If you want to breathe new life into your old PET and re-kindle some of the enthusiasm you had the day you first lifted it lovingly out of its styrofoam cradle, this addition might be just what you're looking for.

The HRT Super-Res Graphics Board, from High Res Technologies, 16 EngishIvy Way, Toronto M2H 3M4. Price $200.00 (US), $225 (Cdn). □