A Focus on Video

K.A.M. Morshed

The video display is the primary mode of output we use in computing. So, no doubt to produce the output we got to manage the display in a more effecient way. In this article, I will try to focus on both the video hardware and the methods of manipulating the video from a user's perspective. In this discussion, I will restrict myself on video systems used in Intel 86 family of micro-computers.

The basic story

The heart of the video sub-system is a special circuitry, called display adapters. The primary responsibility of display adapters is to control the signals send to the Monitor to display an image. The monitor or the VDU (Video Display Unit) we use also plays a special roll. It is the monitor that has to translate the signals received from the adapter and display accordingly. The adapter and the application programme communicate through a common memory area. To show something on the screen, the application program places required code in that memory location, known as 'display buffer', 'video buffer' or 'regen buffer'. The display adapter then reads-the memory area and send appropriate video signals to the VDU. That is, the display memory is assessed by two master. one is the video adapter and the other is the application. This is why, this memory is called 'dual post' memory. So, we can say, anything displayed on the Screen has a trace in the memory. Hence, IBM's display technic is called Memory Mapped Display Technic. The display adapter constantly reads the contents of this location and translate them to appropriate signals which are send to the monitor. To control the way adapters translate the content of regan buffer, we have to give special instructions to the adapter through designated port. This, in short, is the whole story of IBM's display technic. Now, let us explore them in detail.

Video adapters

In present days, there are several popular video adapters. As we have said earlier, each video adapters with their respective capabilities and limitations controls the display of our computers. Let us take a bird's eye view of the most popular video adapters. To start with, let us take up the case of MDA (Monochrome Display Adapter), the original video adapter that came with the original IBM/PC in fall 1981. The adapter was based on motorola's 6845 chip. This adapter can display alphanumeric (AN) characters. Besides, some characters, with ASCII more than 127, can be used to draw simple lines and boxes.

With the same machine came the CGA (Color Graphics Adapter). This adapter is also built around the same 6845 chip of motorola. Beside AN mode, the CGA can supports two graphics mode, one with 320X200 pixel and 4 color, and the other with 640x200 pixel and 2 color.

The EGA (Enhanced Graphics Adapter) was introduced with the IBM PC/AT and dominated the market until PS/2 series appeared. This adapter supports all the modes of CGA and added some other new modes and capabilities.

The VGA and MCGA was first introduced with the IBM PC/2 series. MCGA (Multiple Color Graphics Adapter) was the in-built adapter

for some of the models of PS/2. Generally speaking, MCGA has all the capabilities of MDA and EGA and has a technical similarity with VGA (Video Graphics Array). VGA, on the other hand, is a high end graphics adapter with power to display professional graphics. These two adapters, like EGA, added several other new capabilities. The last of the series is the XGA (Extended Graphics Adapter) or, comparable SVGA (Super VGA). Here also you can find some new and improved features which are not present in VGA. The following table lists some of the modes of these adapters.

One interesting question can be, what is the difference between mode 0 and 1, as both modes signifies the same thing? Okey, the difference of these modes are only valid with CGA. In mode 1, video signals are generated for composite color monitors while, in mode 0, the signals are for composite monochrome monitors. The same is true for mode 2 and 3, and mode 4 and 5.

You may wonder why there are 256 colors supported by video adapters. As you see, TVs produce sharper images than computer monitors. The reason is TV sets can display a lot of colors or shades. No doubt, human eye even can not distinguish one shade from another, but, this large number of shades allows TV pictures to change a dark shades to light shades gradually. In fact, the more gradual the transformation is, the more will be the vividness of the image. So, with 256 colors this graduation can be smoothed than otherwise. Hence, a VGA image looks more realistic than a CGA or EGA image.

Mode (Number)	Type	Resolution	Colors	Video Sub system
0,1	Text	40x25	16	CGA, EGA, MCGA, VGA, XGA
2,3	Text	80x25	16	CGA, EGA, MCGA, VGA, XGA
4,5	Graphics	320x200	4	CGA, EGA, MCGA, VGA, XGA
6	Graphics	640X200	2	CGA, EGA, MCGA, VGA, XGA
7	Text	80X20	Mono	MDA, EGA, VGA
13	Graphics	320X200	16	EGA, VGA, XGA
14	Graphics	640X200	16	EGA, VGA, XGA
15	Graphics	640X350	Mono	EGA, VGA, XGA
16	Graphics	640X350	16/64	EGA, VGA, XGA
17	Graphics	640X480	2	MCGA, VGA, XGA
18	Graphics	640X480	16	VGA, XGA
19	Graphics	320X200	256	MCGA, VGA, XGA
—	Graphics	640X480	256	XGA
—	Graphics	1024X768	256	XGA

1. Display modes and capabilities of standard video sub-systems

The Monitor

How a monitor works

The front end of a monitor is a glass made transparent plate. The opposite side of this plate is coated with electron sensitive material. Usually, this material is phosphorus. There is an electronic gun on the rear end of the monitor. The electronic gun emit ray of electron when requested. The gun moves from the left to right and top to bottom. The path it follows in its way from left to right is called scan path. The movement is known as horizontal retrace. After each horizontal retrace, the gun has to move to the right of a new line. This is known as retrace interval. After the gun completed horizontal retrace for all the lines, it has to go back from the bottom left corner to the top left corner of the screen. This is known as vertical retrace.

Any character we see on a monitor is a set of small light dots. The dots are called pixel. You can think of a character as a matrix of white dots and black dots. You can see the white dots, but can not see the black. The character matrix or box defines the framework within which the character is drawn. For example, the Monochrome Display Adapter's character box's dimension is 9x14. Of the nine columns across, the first and the last is not used to have space between character. Of the 14 rows down, the upper and bottom 2 are not used to produce gaps between lines. Among the rest 11 rows, 2 are used for descenders, as on the lower case p,g or y. So, only the rest 9 rows are used for the main part of the character. However, the setting aside of columns and rows for spaces are only applicable for the standard ASCII characters. ASCII above 127 may not leave this room for spaces.

```
           x
      x          x
      x          x
   x                 x
   x                 x
x  x  x  x  x  x  x  x
x                    x
x                    x
```

2. The ASCII 'A' in character box
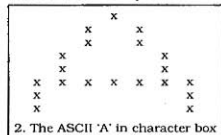
Now, if the adapter signals the monitor to light a point, the gun emits electron to that point on the screen. The phosphor on that point is excited with the extra electron emitted by the gun and emit light.

From the front end, we see the point as displayed. A pixel can be exited more than another, simply be emitting more electron to that point than the other. This is known as intensifying a pixel. If a pixel is intensified, we see the point a bit brighter than a point which is not. As you can guess, the phosphor thus exited emit light only for a fraction of a second. After that, the phosphor returns to its original state. The time, a phosphor emit light after it has been excited is called persistence interval. To display something constantly on the screen, the gun has to fire electron beam again on the same point before the phosphor fades away. Otherwise, the image will flicker. So you see, the gun moves as quickly during its retrace cycle as to reach the same point on the screen within a fraction of seconds. The speed of the gun's movement, is known as video retrace speed and expressed in cycles. A good VGA analog monitor normally has 70 to 90 Hz (cycle per second) retrace speed. That is, in a single second, the gun completes 70 to 90 retrace cycle.

A RGB (Red-Green-Blue) screen, on the other hand, uses three different types of phosphors which emit red, green and blue lights respectively. A single pixel of a RGB monitor is made up of these three types of phosphor. So, when the adapter signals to display a red dot on the screen, only the red pixel is exited by the gun. Likewise, when white dot is required, all the three phosphor element is excited by the gun. Just like a monochorome monitor, a RGB monitor is capable of exiting a specific type of phosphor more than another. As above, this is known as intensity. So, it can display a combined color of intensified red and normal blue. Thus, we have three basic color element to make actual display colors in RGB. That is, you can have 8 (2³) combination of colors. Again, you can use them in both intensified or normal form. So, in total you can have 8x8=64 colors in a RGB digital monitor.

One final point about monitors is interlaced technic. Sometimes, the electronic gun moves over every other alternative lines. That is, on the first cycle all the even numbered lines are painted. And on the second, all the odd numbered lines are painted. Normally, TV sets follow this technic. Recent mid-range VGA analog monitors are also common

to use this method.

Types of monitors

Direct-drive monochrome monitors : These monitors are designed to work with Monochrome Display Adapters. However, Enhanced Graphics Adapters (EGA) can also use them. Normally, P-38 phosphors are used for these monitors which emits green lights. Usually, all the 'normal' monochrome monitor you use are of this type.

Composite monochrome monitors : This is probably the least expensive type of monitors used in modern computing. However, you can only use Color Graphics Adapters (CGA) with these monitors. The screen output is fairly good and clear on such monitors.

Composite color monitors : Composite color monitors are same as TV sets but with higher resolution. It takes composite signals for both colors and display information. Normally, CGA uses this monitors for display.

RGB color monitors : The RGB color monitors are considered the best of both world. The combined the high quality text with equally high quality graphics display. These are known as RGB, because they uses Red, Green and Blue as their basic colors. Normally, Enhanced Graphics Adapters uses this display.

Analog monitors : The analog monitors uses analog signals, instead of digital, to display anything. A Digital to Analog Converter (DAC) is used for this purpose. Adapters like MCGA and VGA uses this type of monitors.

Present days analog monitors has another common features. To meet the demand of varied display standards, these monitor support multiple frequency of signals. For example, a NEC Multisync monitor can work with different variation of video standard like 8145, Hercules Graphics Card Plus, VGA etc.

Display resolutions

By the term display resolution we indicate the total number of pixel we can access individually. The display resolution of MDA text mode is 720 x 300 pixel. That is, there are 720 tiny dots across the display and 300 tiny doted lines in this mode. Because there are 25 rows and 80 columns in this mode, the columns are 9 pixel wide and rows are 14 pixel high.

Compared to MDA, the CGA has 640 x 350 resolution. That is, in CGA 80 x 25 text mode, the characters are 8 pixel wide and 8 pixel wide. This is why, MDA text looks sharper than that of CGA.

The EGA's 80 x 25 text mode is 640 x 350 resolution. That is, a character in EGA is 8 pixel wide and 14 pixel wide. The text mode resolution of MCGA is 640 x 400. That is, again, the character dimension is 8x16 pixels. The comparable mode in VGA has a 720x400 resolution, and has character dimension of 9x16 pixel.

Apart from text display, the resolution of CGA, EGA, MCGA and VGA have important implication in graphics mode display. Simply speaking the more resolution you have, the tinier will be the pixels given the display size. Hence, higher resolution means sharper images.

A note on colors

As I have mentioned earlier, colors for the video screens are produced by combinations of three basic elements, Red, Green and Blue. Plus, an intensity element is there to increase the number. Text and graphics mode use the same colors and intensity options, but they combine them in different ways to produce color display. Normally, in text modes you can not combine the intensity separately with each element. That is in this case you can have only 16 (2^4=16) colors in text mode. However, in high resolution graphics with EGA or VGA, you can use the intensity element separately with each basic colors to have more colors.

In 16 colors text mode, colors are specified by a group of 4 BITs. Each BIT designates whether a particular color element is used or not to form the display color. That is, the video buffer has a 8 BIT code (4 BIT foreground and 4 BIT background) to designate the colors. So, if we place the code 0000 0001 in the video buffer for the first character, then it means, we want the character in Blue color on the background of black.

In CGA, the specification of color is rather straight. In 4 colors mode, we use 2 BITs to specify one of the 4 possible combination, each to specify a single color.

To Be Continue

Lost in Multimedia Land

Coming soon on a screen near you—pixel people, Macbeth *karaoke*, and instant access to every art work in the Louvre, plus a video friend to make your viewing choice for you.

With computer cursors flying, the first international illustrated book and new media publishing market, Milia, got under way last weekend in Cannes with 3,500 participants from 40 countries flocking to the Palais du Congress for a window on the future of multimedia. It is a business whose practitioners say is expected to approach $3 trillion in annual sales by the end of the millenium.

Peter Gabriel, the rock and video star, said that "people must have felt the same sort of excitement at the birth of radio, television and the cinema." Mr. Gabriel recently unveiled a collaboration with Apple Computer Inc. in CD-ROM, or visual compact disks. "The Explorer," Mr. Gabriel's interactive disk, allows viewers the opportunity to piece together a jam session of digitized performance clips of various musicians and hear the results immediately.

Traditional publishers did their best to prove that reports of the death of the book have been greatly exaggerated. "Here is something more portable than a Powerbook and just as interactive," declared Pierre Marchand, chief executive of Gallimard's children's book division, as he pulled a paperback out of his pocket.

"Publishers should not be threatened by this new media, because what we are using are simply new versions of the book," countered John Hawkins, president of Dutch-based Philips Interactive Media Systems.

But with half of all personal computers sold last year equipped with CD-ROM drives and a total of 45 million predicted by 1996, there is some cause to think that CD-ROM or Philips CD-I players will tempt even the most loyal readers of books. That is particularly the case since the cost for the disks has dropped to the $50 range.

Satjiv Chahil, Apple vice president for new media, threw down the gauntlet in a cost comparison between the book and CD-ROM versions of the photographer Rick Smolan's "From Alice to Ocean," recounting a camel trek across the Australian outback. "The book costs $10 to produce," Mr. Chahil said, "and the CD-ROM costs $1. The book contains 100 photos; the CD has 300. The book takes weeks or more to reproduce; you can have a copy of the CD in eight minutes."

In addition, the CD allows the viewer to call up a postcard-sized video insert of the photographer commenting on how he shot his pictures. (That, by the way, is a pixel person— a film image transformed into tiny video dots for computer presentation.)

Despite Mr. Chahil's comparison, development of CD-ROM titles does not come cheap; costs range from $300,000 to $1 million per creation. According to Michael Backes, screenwriter on "Rising Sun" and multimedia entrepreneur, in coming years individual games will cost up to $10 million to develop— producers can afford such sums because of the promise of enormous revenues.

"One single game— 'Streetfighter II'— made $1.5 billion last year," Mr. Backes said. "Nothing, not even 'Jurassic Park,' touched that success in the entertainment business."

Also at the Milia market, the Voyager company demonstrated an interactive version of Macbeth that allowed viewers to record themselves playing roles opposite actors from the Royal Shakespeare Company.

Turner Broadcasting Systems Inc. previewed a "Gettysburg" CD that lets viewers alter the course of the battle, while Canal Plus's MediaLab showcased a tour of the Cluny Abbey, destroyed in the 17th century, but reconstructed in virtual reality.

Olivetti SpA unveiled a computer with video telephony enabling simultaneous long-distance transmission of images and text. Jointly with British Telecom PLC, Olivetti has spent $15 million to develop the system, targeted for banks, insurance companies and advertising

markets. The Olivetti system, costs around $6,000 for the first station and about $4,500 each for additional stations.

Nearby, you could try speaking French with the animated comic characters inhabiting Apple's Asterix CD, one of the hundreds of titles aimed at the burgeoning children's education market.

Musical programs of all sorts abounded, with Smithsonian's two compendiums on the blues having the musicians themselves giving thumbnail lessons in playing guitar and harmonica.

"Star Trek Interactive," a video game developed by 3DO Co., promises to give synthetic computer characters a life of their own, beyond the control of the players.

"Our feeling is that all these media are going to run over you," quipped Siegfried Kögl, general manager of MacGuffin, a company based in Zurich. "So we've developed an interactive media guide that learns what you like by recording what you watch and then choses what programs to watch for you so you don't have to work too hard. It's not out yet, but our working title is 'The Friend."

In the disorienting, information packed multimedia future, nothing could come in more handy.

Richard Covington

NCR's Ahmad Qawasmeh says :
Demand for Solution Based System Is In The Offing

Mr. Ahmad Qawasmeh of NCR corporation said in an exclusive interview with Computer Jagat that though Bangladesh computer market is now dominated by PC, but in near future there will be a strong demand for solution based system.

Mr. Qawasmeh is a manager in the distributor Marketing Division of NCR's Middle East and Africa area office in Cyprus. Total 45 countries including Bangladesh is supported by this office.

He mentioned that NCR is leader in the Unix and Symmetrical Multiprocessor area. NCR became an early pioneer in Unix area through their Tower system he pointed.

Discussing on NCR's much acclaimed system 3000 Mr. Qawasmeh that this system support all seven platforms of computing and it offers industry standard operating system to go for open system. Different Intel chps were used in system 3000. Their 486 processors support pentium overdrive.

A Jordanian by birth and US educated Mr. Qawasmeh informed that NCR is leader in Financial and

Ahmad Qawasmeh

retailing sector with specialized products for financial sector, branch automation and self service. Mr. Qawasmeh, an enterprising marketing executive claimed that NCR is also No. 1 in the world in ATM and leader in item processing.

Replying a question Mr. Qawasmeh said that National Commercial Bank of Saudi Arabia, Egypt's Bank of Misser, Qatar National Bank, UBL and Habib Bank of Pakistan and Grindlays Bank are major clients of NCR in the region controlled by his area office. Most of them are using NCR's branch automation system - 3000.

In Dhaka he as usual past two very hectic days talking to many Govt. and financial institution and also had meeting with some of NCR's prospective client.

Mr. Qawasmeh said "I am seeing that traditional mainframe user switching to open system and Industry system which is also happening in Bangladesh in big way. We have already one client who has switched to open environment, many are in line."

"Specially when price of hardware is going down, maintenance of proprietary system is very expensive" said Mr. Qawasmeh.

After completing his masters degree in Company Information Systems from USA. He worked for sometimes in Wang Laboratory and in a university in USA.

A widely travelled Mr. Qawasmeh mentioned form his rich experience that Iran is most promising and uprising computer nation in Asia/Africa region. Iran is contributing highest sales in his territory through a distributer there and NCR's strong niche in Iran is Financial and Hotel sector. He mentioned that NCR has recently opened a branch in India.

Mr. Qawasmeh concluded — 'Since communication is an essential part of Information Technology excellence, so we are the only company which can offer quality communication products of NCR's parant company AT & T.

—Azam Mahmood

Industry Should Use Bar-code System For Error Free Data
—David B. Kennaugh.

Mr. David B. Kennaugh, Business development Director, Asia of Intermec, USA in an exclusive interview with Computer Jagat said,

"I think life is now becoming faster. So, it is essential that most of the industry should use bar code. If we collect data manually it is proven that in each 300 data there is an error, but data collected through bar coding an error occurs in more than three million data. Reading system of data through bar coding system is of optical, here ray and radio transmission are used to read the data and finally process. So, there is no possibility of error.

He told that most of the Asian countries like Japan, Korea, Indonesia, Thailand even India are now using bar coding system. Bar coding system is being used all over the world except South Africa.

In an answer to a questions Mr. Kennaugh mentioned that he talked to the members of Dhaka Chamber of Commerce & Industry for introducing bar code.

Almost every industry and industry like business organization, libraries, hospitals should be the users of bar code.

He expressed his optimism about introducing bar coding in Bangladesh. But it will takes time for the introduction. It will also depend upon the progress of communication. 'People should realize their need and then they could ask for it' said Mr. Kennaugh.

Tareq

New Distributor for Hewlett Packard

Computer World, one of the Sister Concern of **Multilink International Co. Ltd.** recently has been apponted as Authorised Distributor for Hewlett Packard computer system as well as printers and all range of products of HP in Bangladesh.

Mr. B. Mannan, of Computer World informed that all ranges of Hewlett Packard products will be marketed through their Authorised Dealer and provid strong support for their equipment.

Mr. M. Shahiduzzaman of Multilink int'l Co. Ltd. informed that HP users can get support & service from them.

Recently, Multilink announced their valued clients for promoting Hewlett Packard Products distribution through "U.S. TRADE SHOW '94".

Canon Makes PC With Innova

Canon Computer Systems' new Intel 486-based line of Innova notebook and desktop PCs technology is definitely in line with today's standards. Notebooks, monochrome, dual-scan color, and active-matrix color Innova have large, built-in-track-balls, ergonomic palm rests, 120MB hard disks, and slim 2-inch-high cases. The active-matrix Innova 486 TX also the two Type II PCMCIA slots.

The Innova desktop systems range in processor type from 486SX25 to 486DX2/66, and they're all upgradable to a Pentium processor. They have VESA local-bus graphics, 170MB or 240MB hard disks, and 1MB of video memory Higher-end models of Innova desktops also come with a 9,600-bps fax modem.

Low-cost Postscript Laser Printers

TI microWriter, a laser printer of Adobe PostScript sells for under $700 on the street. With the advent of True Type, PostScript is less significant than it used to be for many applications.

UPGRADATION OF AS/400 BY BEXIMCO

BEXIMCO has recently upgraded its **IBM AS/400** mini computer system of Model B-35 to Model F-35, which houses the central database of the Group's MIS. According to IBM sources, this is the first such event in Bangladesh. The upgraded model offers current version of **OS/400, QUERY/400, RPG/400** etc. and wider range of utilities like RLU, SDA, detail HELP support and many others. Users will have quick access to data, faster response avoiding conflicting job, easier control of spool file and priter and other facilities. For programmers, upgraded version of OS/400 and other utilities will expedite the process of developing improved and more efficient programs. The additional two GB hard disk consigned with the model provides a greater space for data storage and application uses. The commissioning of this new model of AS/400, which is at least three times faster than the old one, is yet another testimony to BEXIMCO's commitment to modern management and technical systems.

Dell PCs for "Techno - boomers"

Dell Computer Corporation has announced a new line of its **Dimension PCs** designed for what the company calls the "techno-boomer", the users who wants a good value for their money spent and can upgrade later.

The new systems are all Intel 486SX or DX-based, with clock speeds from 25 MHz to 66MHz; have system memory, or RAM, up to 64 MB and include 1MB of video RAM and local bus graphics. The PCs are upgradable to use Intel's Pentium Overdrive technology, and external cache of 128K or 256K can be added. Pricing for the new Dimension system starts at $1, 230 with a colour monitor.

Dell has also introduced some tower models of its **Dimension XPS** line which incorporates six external drive bays and use Intel 486DX2 microprocessors running at 50 or 66 MHz.

Bangladesh Can Enter Data Entry Market

Bangladesh can enter a more than 100 billion dollar data entry market with the installation of newly emerging **High-Bit-Rate transmission technology** in the country, reports UNB.

The technology called **Asymmetric Digital Subscriber Line (ADSL)** will greatly enhance the data transmission capabilities of the country using the existing telecommunication network infrastructure.

These informations were focused by **Dr Mahbub Hoque** of **Bell communication Research** (Belleore) in USA at a seminar on High-Bit-Rate transmission organised by Institute of Engineers, Bangladesh. Chairman of Bangladesh T &T Board **M.Fazlur Rahman** was the chief guest at the seminar which was presided over by **QARM Khaled**, Chairman of Technical Activities, seminar and conference committee for Electrical Engineering, IEB.

(Source : The Bangladesh Observer)

ORACLE COURSE

IBCS-PRIMAX Software (Bangladesh) have recently completed a project of WARPO Water Resources and Planning Organisation to develop their database structure on ORACLE RDBMS, Conversion Modules for converting data from non-oracle format to ORACLE. They have also conducted a training course on basic principles of data processing and ORACLE RDBMS.

Twenty eight senior officials of WARPO attended the training course.

Against a contract awarded by IDA of the World Bank, IBCS-PRIMAX Software (Bangladesh) Ltd., has completed the job and submitted their final report to **Mr. Taslimuddin**, Director General, WARPO, under the Ministry of Irrigation. Water Development and Flood Control, Government of Peoples Republic of Bangladesh.

India's Telemedicine Project

The Indian central government has evinced interest in the proposed telemedicine project to link the Indian cities with remote countryside centres, to be in turn connected with US hospital centres through satellite communication.

The English pages are sponsored by COMPUTERLINE