

NATURAL GRAPHICS

by

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The computer graphics explosion has been fueled by the increased availability of graphics hardware and software offered at affordable prices. The Langley Research Center has been caught up in that explosion. During the past year Langley has increased graphics hardware and software, significantly improving the Center's graphics capabilities in both the scientific and the business environments. Two major graphics software packages, IBM's Graphical Data Display Manager (GDDM) and Precision Visual's DI-3000, have been acquired and placed in production here at the Center. This document deals only with the graphics produced by the Business Data Systems Division (BDS) under the Management Operations Directorate.

A major component in any graphics system is the graphics hardware available to the user community. The GDDM software package requires an IBM or IBM-compatible computer capable of running the System/370 Instruction Set, 327X or 8100 Tele-processing Control Unit, and 327X, 8775, 328X, 3800, or 4250 Terminal Output Devices. It is not sufficient to know what terminals and control units are supported by GDDM; you must also know what features and configuration supports are required. Generally speaking, you require programed symbols and the extended function feature.

The installation of graphics hardware at BDS had its problems. Equipment ordered with program symbol support arrived without program symbol support, causing some confusion and a lengthy reorder process.

Our current graphics configuration consists of the IBM 3279 Color Display Station which is a tabletop high-resolution Color Cathode Ray Tube Display. The 3279 is classified as a raster terminal with each character containing a 9x12 point dot matrix. For passive hard copy output we use the 3287 and 3268 Printers with multi-color ribbon cartridges with colors red, blue, green, and black. The 3287 and 3268 are dot matrix Printers.

BDS looked at several graphics software packages and selected a combination of GDDM and NATURAL graphics. During the evaluation and selection period, it was clear that all of the graphics software packages required GDDM to drive the 3279 terminals. Therefore, GDDM was an obvious choice without preempting any of the other graphics software packages should it be determined that they are required or desirable. The possibility exists in the future that we might acquire Precision Visual's DI-3000 to give us compatibility with the scientific computers in the Analysis and Computation Division (ACD). A primary reason for attaining this compatibility is the mass storage system which BDS could use for storing charts and later outputting them to passive hard copy devices, or interacting with graphics hardware under the control of the Control Data Corporation Network Operating System (NOS) computers.

The software configuration required to run GDDM graphics consists of IBM's Advanced Communications Function-Virtual Telecommunications Access Method (ACF-VTAM) and IBM's Time Sharing Option (TSO), or Virtual Machine/Conversational Monitor System (VM/CMS), or Customer Information Control System (CICS). GDDM currently does not function under our teleprocessing system COM-LETE. However, the next release of COM-LETE does support GDDM and the extended functions of the 3279 terminal. Testing will be conducted to see if graphics users and general query users can mutually co-exist in COM-LETE before discontinuing TSO.

GDDM is a base graphics product and, as such, has many adjuncts. For the business graphics, we selected the Interactive Chart Utility (ICU) and the Presentation Graphics Feature (PGF). A significant problem in business graphics is the ability to present the data to the graphics software in such a format as to obtain the desired output graphics with little technical knowledge or effort. To meet this requirement, BDS selected the NATURAL graphics software package marketed by Software AG of North America.

NATURAL graphics interfaces with ADABAS, our Data Base Management System, at a very high level and, because we have trained over 100 employees in NATURAL programming, it seemed natural to acquire NATURAL for our graphics. NATURAL graphics has two verbs which allow graphics. They are 'PLOT' and 'DRAW'. PLOT is used to identify and accumulate the data points, and DRAW is used to tell the type of chart to draw and when to draw the chart. All of the capabilities of NATURAL are inherent in NATURAL graphics.