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Computer Systems for
Managers and Professionals

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INTRODUCTION

The need to increase productivity led to an investigation into the use of computers in the technical departments of the SABC in early 1983, with the subsequent introduction of a HP3000 and two HP9845B desktop computers in the third quarter of that year. The HP3000 was introduced to process technical equipment procurement requests, to track the delivery and quality control of purchased equipment, and to provide a central database containing details of all technical drawings in use (there are approximately 90000). The two HP9845B systems were introduced to provide a pilot service to evaluate the use of computer aided drafting within the technical departments. The system configuration at this stage was as shown in figure 1.

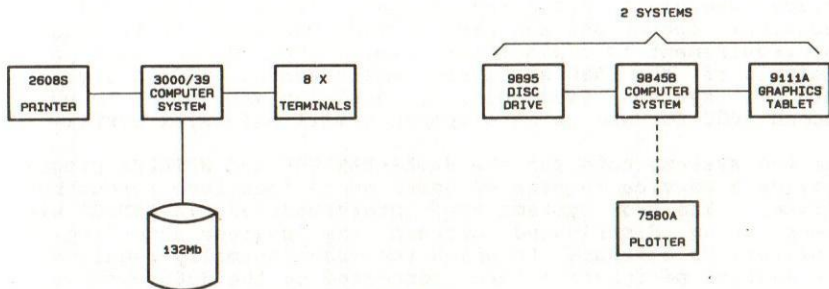


FIGURE 1

Today, 21 months later, there are two HP3000 systems serving 79 terminals and 24 printers, located at 13 sites throughout South Africa.

The computer aided drafting, now named computer aided design, has become a network of 31 computer systems at three different sites. In order to support these systems a data communications network was introduced in 1984 to optimise and control the transfer of data to and from these systems and the three IBM mainframe systems used for administrative and financial computing.

The technical computer system, a HP3000 model 39, was chosen to fulfil the technical data processing requirements, having the capability for the development of programs in PASCAL, FORTRAN and BASIC.

The first programs developed were:

1. A program to control the budgeting, scheduling and purchasing of all capital expenditure items used by the technical departments.
2. A program to control all technical drawings, their current status, and a record of their relationship to each other.

The requirement for an electronic mail service occurred not long after the introduction of the 3000 system when a large group of engineers were re-located to a second site 14km away. The pilot electronic mail service using HPDESKMANAGER was introduced with five users consisting of members of engineering management. The service proved to be very effective and has been extended to all members of engineering management and those in support roles, bring the number of users on the two sites to twenty four.

The method of communication between SABC offices throughout South Africa was via a store and forward telex system which enabled technical operations and news service messages to be transferred. The requirement to replace this system occurred in 1984 and after analysis of the SABC's future requirements, and an investigation into the systems available, a decision was made to purchase a second 3000 for use as an electronic mail and telex system.

The two systems both run the HPDESKMANAGER and HPTELEX programs and provide a service to over 60 users at 13 locations throughout South Africa. The two systems are interconnected via DSN/DS with the users being distributed between the systems according to the applications software to which the user normally requires access. All system peripherals are connected to the 3000 systems via the data communications network.

The systems have been interfaced to the South African Post Office TELEX network and telexes may be directed to any local or international location utilising the HPTELEX software either as a stand alone software product or integrated with HPDESKMANAGER. Both of these configurations are currently in use, the mode chosen being dependent on the specific user application. The HPTELEX software also enables incoming telexes to be directed to a specific user's "IN TRAY" through the use of a routing sequence attached to the telex as a header.

The telex system has also been interfaced to leased telex circuits which are used to feed, on a multidrop basis, syndicated news stations in other countries in Southern Africa.

The systems configuration to support the current user requirements is as shown in figure 2.

HP 3000 SYSTEMS

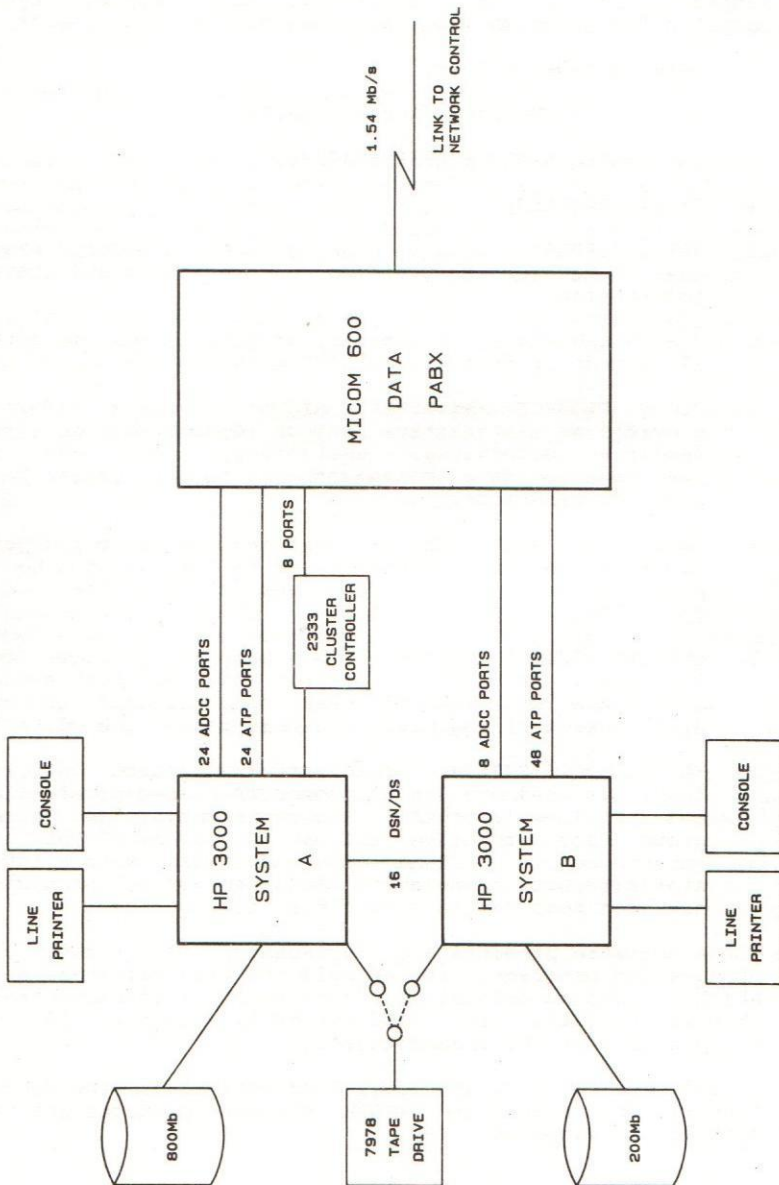


FIGURE 2

3000 SYSTEMS APPLICATION SOFTWARE

The programs mentioned form the basis on which the technical computer system was introduced, and which later led to the introduction of the electronic mail computer system. The application programs which are now available to systems users are:

1. DRAWING INDEX SYSTEM.
2. CAPITAL EXPENDITURE CONTROL SYSTEM.
3. ELECTRONIC MAIL (HPDESKMANAGER).
4. TELEX (HPTELEX).
5. HPLISTKEEPER - This is a HP application program which allows a user to create, edit, find, sort, print and store lists of information.
6. VISICALC - This spreadsheet program is run in either a stand alone mode or from within HPDESKMANAGER.
7. GCCUE PROJECT MANAGEMENT SYSTEM - This software package provides an interactive project control system with time and resource scheduling, estimating, cost and performance measurement, data management, a report writer and network graphics generator.
8. PRODUCTION MANAGEMENT - This HP software product, PM3000, provides an interactive system for managing the production planning and control functions of the SABC manufacturing operation.
9. QUALITY CONTROL SYSTEM - This software package, developed by the SABC, is used to control the QC test scheduling, to maintain a database of test results, and to control the distribution of equipment that has passed the QC testing.
10. FAULT REPORT SYSTEM - This software product, developed by the SABC, is used to log all computer system problems and faults, and provides a control and reporting system to ensure that prompt and effective action is taken. This system is interfaced to HPDESKMANAGER and mails automatically system status reports to relevant management on all problems that have not been resolved in a specified time period.

These software products are supplemented by a number of database application programs, for example the transmitter network database which is used to maintain a record of all information relating to a transmitter site. The SABC currently has over 100 transmitter sites with over 600 transmitters.

In addition to the high level languages used, the Hewlett Packard TOOLSET, DICTIONARY and INFORM software products are used during software development.

COMPUTER AIDED DESIGN

The two systems installed in the pilot scheme to provide computer aided drafting facilities proved to be very successful, with productivity increases in the order of 3:1 to 4:1 being achieved. The number of CAD systems installed increased rapidly and today there are 31 computer systems installed at three sites, as shown in figure 3.

The CAD systems operate with one of three software products, these being:

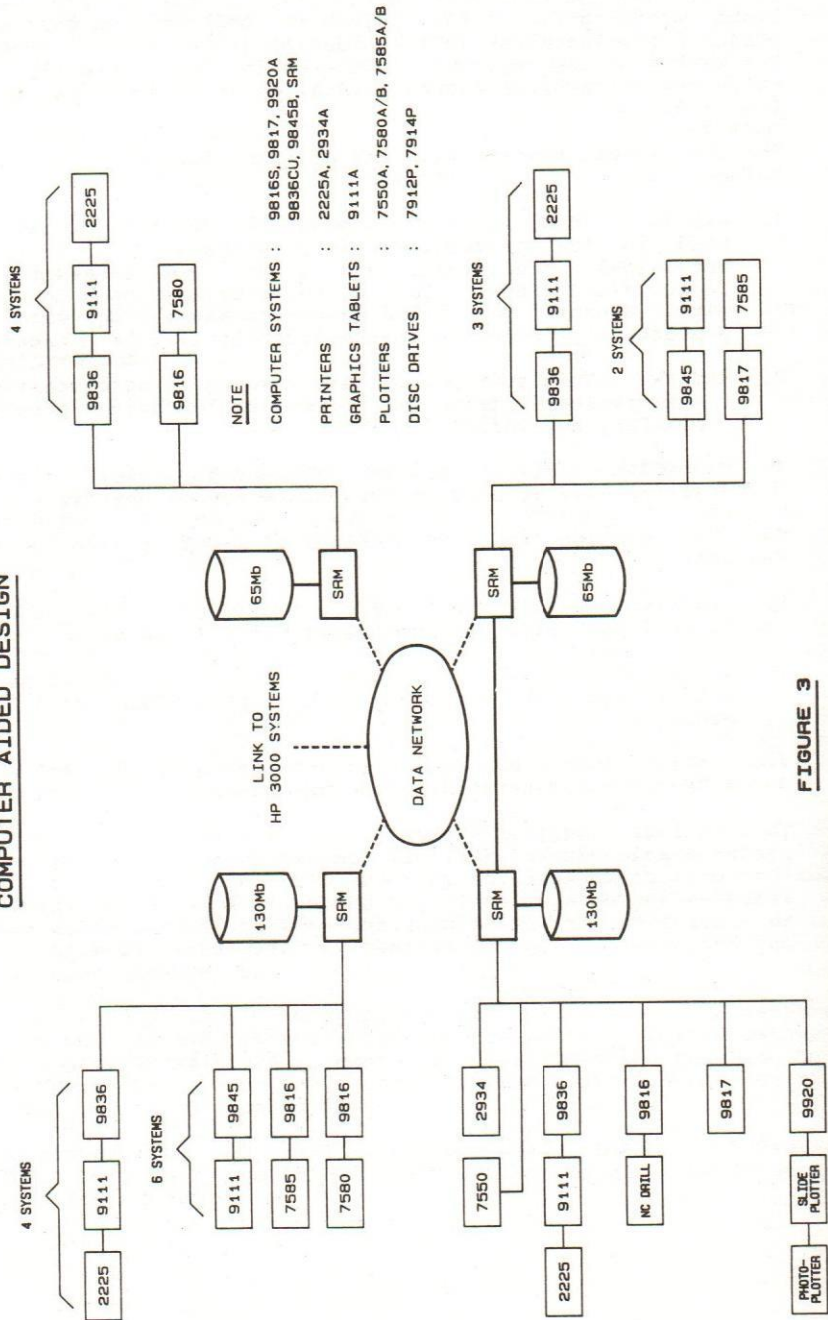
1. ARPLAN - This is a two dimensional drafting package which is used in the production of drawings in the architectural, mechanical, electrical, and studio and transmitter system design disciplines. This software package used in conjunction with custom pre- and post-processor software enables productivity increases in the order of 20:1 to be achieved.
2. ARVIEW - This software package enables three dimensional views to be developed from two dimensional drawings produced using the ARPLAN software.
3. HP EGS - This HP product is used for electronic schematic drafting and printed circuit board layout design.

The CAD section has comprehensive plotting facilities which include:

1. Drafting plotters which are capable of plots, on paper, velum or polyester film, on media sizes from A0 to A4.
2. A photoplotter which enables printed circuit board layout artwork and silk screen masks of up to 400mm by 500mm to be produced.
3. A slide plotter which enables 35mm colour slides to be plotted from artwork generated by the various software packages.

The various computer systems are networked using four shared resource management (SRM) systems which are interconnected using the data communications network. The 3000 systems are capable of transferring data files to the CAD network which are then converted to a graphics format using preprocessors, after which the drawing may be plotted using any of the available facilities.

COMPUTER AIDED DESIGN



NOTE

COMPUTER SYSTEMS : 9816S, 9817, 9920A
9836CU, 9845B, SRM

PRINTERS : 2225A, 2934A

GRAPHICS TABLETS : 9111A

PLOTTERS : 7550A, 7580A/B, 7585A/B

DISC DRIVES : 7912P, 7914P

FIGURE 3

DATA COMMUNICATIONS NETWORK

The data communications network is based on the MICOM 600 DATA PABX and 800 series DATA CONCENTRATORS, which provide the network as shown in figure 4. All communications circuits are leased Post Office data circuits operating at 9600bps. The introduction of an X.25 service has been commenced with nodes as shown. This service has access to international packet switch services via the SAPONET network.

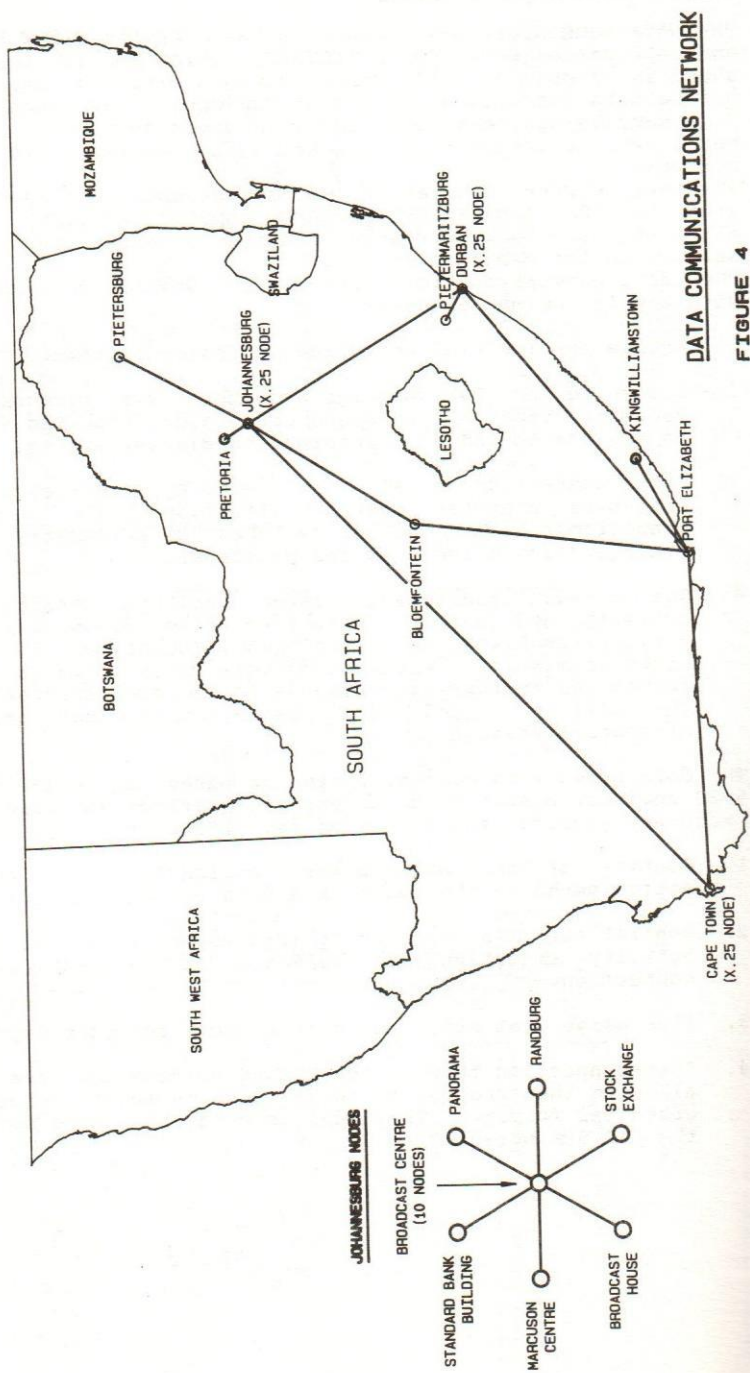
The data network carries both asynchronous and synchronous data from the IBM and HEWLETT PACKARD computer systems, and provides alternate or backup routes ensuring an effective and efficient service to the system users.

The data network provides users with HEWLETT PACKARD peripherals with the following features:

1. Access to either of the HP3000 computer systems.
2. Access to the IBM computer systems. The network handles the necessary protocol and speed conversion, enabling a HP terminal to emulate an IBM 3270 information display system.
3. Port contention on all the network resources enabling more effective computer system utilisation. The network allows connections to be either switched or permanent, the latter configuration being used for printers.
4. The network management system monitors connections for no activity and after a specified time disconnects an unused terminal enabling the associated computer port to be used by other terminals. When the network disconnects a terminal it issues the appropriate commands to the computer port to ensure the user is logged off, resets the terminal and displays a disconnect message.

The data network management system is based on a Hewlett Packard 9020 computer system which through the various software programs it executes, provides the following facilities:

1. Control of the data network configuration and re-routing of active paths in the event of a data circuit failure.
2. Control of the disconnect procedure initiated when a no activity condition is detected on a particular network connection.
3. Line usage statistics and data circuit analysis reports.
4. Interconnection between the HP3000 systems and the CAD network allowing the transfer of data which is to be processed into graphical format. The 9020 is connected as a workstation on the CAD SRM network.



DATA COMMUNICATIONS NETWORK
FIGURE 4

CONCLUSION

The current technical computer networks and their inter-relationship has been described, with reference to the software products being used. The system development has been done over an extremely short period of time and is considered to be only the first phase in a long term plan. Development work is currently being done in the fields of fibre optic communication, high speed data transmission, BELTEL, TELETEXT and facsimile transmission, all of which are seen as providing an integrated information service together with the existing services.