

# Connectivity: The Unisys/Burroughs Way

Connectivity in the Unisys/Burroughs world was first established with Burroughs Network Architecture (BNA). Together with the environmental software (i.e. Message Control System MCS) residing in the mainframe, BNA provides transparent support of terminals connected to a host computer and host-to-host communications. Through BNA, mainframes and terminals can be granted access to data bases throughout a network. BNA depends on logical links rather than physical links, relying on network tables maintained in the host for routing. Network Services, a BNA software component, performs message routing, linking hosts using the Burroughs Data Link Control (BDLC) bit-oriented protocol. Network Services also permits connection of Unisys processors to packet-switching services using X.25 procedures. Links to non-Unisys machines are established by using the Network Definition Language II (NDL II). IBM data communications algorithms allow Unisys/Burroughs networks to interface to non-Unisys terminals utilizing 3270 and 2780/3780 protocols. To improve the connectivity between Unisys and IBM systems, Unisys developed the SNA/SDLC gateway which supports IBM's Logical Unit (LU) 6.2 the peer-to-peer communications protocol, and emulates an IBM cluster controller. Under IBM's Structured Network Architecture (SNA), a cluster controller is classified as a Physical Unit Type 2.0 (PU Type 2.0). The PU Type 2.0 device emulations allows access to SNA from a MT-like device and translates MT data streams to 3270 data streams and vice versa.

Because personal computers and microcomputers are taking the role of workstations more and more these days, Unisys is offering its users connectivity tools that not only link its own, but also IBM PCs and Unisys/Sperry PCs to its mainframes. Connectivity products for the Unisys (Burroughs) systems are based on software only. No hardware such as converters are required. Communications with the host mainframe is mostly through the RS 232-C interface or Unisys Two-wire Direct Interface (TDI) using the Multi-point (BMulti) poll/select protocol.

Most of the Unisys connectivity software is resident in workstations and uses MT terminal emulation to provide processing capabilities ranging from a simple transfer of information from the mainframe to the workstation and vice versa, to providing multiple windowing capabilities and multiple terminal access to a mainframe from a single workstation. Integrated (operating on both the mainframe and workstation) software packages provide the ability to incorporate mainframe data in spread sheets, pie charts, and bar graphs, and to mix text with graphics. A fourth generation language software product permits mainframe functions to be performed at the workstation level to relieve congestion at the host level. Several software packages are available for workstations operating under the MS DOS and PC DOS operating systems allowing the IBM PCs and the Unisys/Sperry PCs to communicate with the mainframe.


**Connectivity is a word that is heard quite frequently nowadays. This one word stands for a multitude of different products, ranging from the early emulation boards, protocol converters, and simple software to today's networked distributed data base systems, local area networks, and fourth generation languages. All of these offerings promise to solve the communications problems of users and bring law and order to the various minis, micros, departmental workstations, and personal computers proliferating outside the established MIS environment. Almost every software house offers some sort of third-party link product. Product categories are increasing and sales are climbing, but the perfect link has not been developed yet. It is still a product of the future. In this report we will cover the connectivity products offered by Unisys to link minicomputers, microcomputers, and workstations, including the IBM PC XT and AT, to Unisys mainframes.**

## The Micro-to-Mini-to-Mainframe Connection

Host-Link, the first Unisys (Burroughs) connectivity software product, was first announced February 1985. It takes advantage of the data communications and personal computer capabilities of the ET 2000 workstation and is designed to provide a file transfer mechanism between the host system and the workstations. One of the key elements of Host-Link is the Pseudo Volume capability, which provides an extension to the local storage capacity of the ET 2000. Each user can create and maintain a library of up to 999 Pseudo Volumes (logical drives) on the mainframe. Host-Link consists of two distinct sets of software. Host-Link Client resides on the ET 2000 and operates under MS DOS. It contains a complete set of programs to manage the workstation part of the connection. Host-Link Server resides on B 1000 minicomputers, and A Series, V Systems, and B System mainframes and maintains all aspects of the system. The major function of Host-Link Server is to provide the various file and device handling services to the ET 2000 systems in the network. Host-Link Server contains a set of utilities which allows files to be transferred between the ET 2000 MS DOS environment and that of the host system giving controlled access to host data bases.

Host-Link Server is qualified for up to 24 concurrent ET 2000 users. System software requirements include MCP Release 11.0.2 for the B 1000, MCP 3.4 for the B Systems and A Series, and MS DOS 2.11 and BIOS 1.52 for the ET 2000.

Host-Link is a basic software product with most of the functions being performed by the host mainframe. Whereas the Data Transfer System (DTS) Level 3.0 offers much improved capabilities, such as extraction and reformatting of information it transfers from the mainframe to the B 20.

The Data Transfer System (DTS), running under the microcomputer multitasking, multi-user operating system 

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▷ BTOS, transmits business information between the B 20 series of microcomputers, the B 1000 minicomputers, and the A Series, V Systems, and B System mainframes. Using existing data communications networks, data in sequential access method files on the mainframe can be transmitted to the B 20, where it can be stored in sequential, direct, or indexed sequential access method files. Data in these files may also be transmitted to the mainframe and stored in a new file, or appended to an existing, sequential file. Data may also be transferred to and from the B 20 in an "as is" format. The DTS is composed of two modules: the DTSB20 and DTSMF. The DTSB20 executes on the B 20 providing most of the system's features and allowing communications directly with the mainframe; DTSMF the mainframe module provides access to sequential files on the mainframe for both input and output transfers. DTSMF is also used during the transfer definition process. On A Series systems, DTS also supports file transfer with Extended Retrieval with Graphic Output (Ergo) Release 3.6, and provides a relational view of DMSII data bases as well as conventional files.

System software requirements are BTOS Level 5.0 and BMulti Level 5.0 for the B 20 microcomputers; MCP Release 12.0 for the B 1000 minicomputers; MCP Release 7.0 for the B 2000, B 3000, and B 4000 systems; MCP Release 1.0 for the V 300; and MCP Release 3.6 for the A Series.

The MicroView Level 2.0 is a key decision-support software product designed to address management needs, and to offer a solution for departmental information problems.

The MicroView program is a workstation based application that provides a transparent interface to the A Series mainframes. The software has been designed for individual or departmental use and enables users to selectively transfer data managed on an A Series mainframe to B 25 microcomputers and XE 520 shared resource processors. Users can create data dictionaries on the workstation representing the mainframe DMS II data bases. Information can be defined and extracted from a DMS II data base, with MicroView performing the selection criteria and passing it to Extended Retrieval with Graphic Output (Ergo), the software residing in the mainframe. No knowledge of Ergo is required. A full profile or partial profile, the selection of which is user-defined, can be viewed on the workstation display, but data can also be viewed on the mainframe without extracting the information to the workstation. Users can define, enter, and maintain data entered locally on the B 25. This data can then be used, together with data extracted from the mainframe, for analysis through reporting and spread sheet functions. Profile data can be transferred to the mainframe in the form of a flat file. User-defined reports can be directed to a printer, display or disk. An archive facility for backing up and restoring MicroView files is provided.

To successfully implement MicroView, the following system software is needed on the B 27 and B 28 microcomputers: BTOS Level 7.0, Level 5.0 for the B 26; Multipoint Communications Service (BMulti) Level 6.0, Level 5.0 for the B 26; and Isam Level 6.0, Level 5.0 for the B 26. System

software requirements for the XE 520 shared resource processor include, BTOS Level 5.0; BMulti Level 5.0; and Isam Level 5.0. The B 5900, B 6000, B 7000, and A Series mainframes require the following system software: MCP Level 3.5, MCP/AS Level 3.6, DMS II Level 3.5, Ergo Level 3.5 Support Release 4, DMInterpreter Release 3.5, and DTS Release 2.0.

The B 25 based InfoView II Release 2.1 software works with the InfoView II running under MCP on B 2000, B 3000, B 4000 and V System mainframes. InfoView II also provides a comprehensive interface to the InterPro Software on the A Series systems.

InfoView II provides a window-based environment for the B 25 user, and simultaneous access from a single workstation to multiple hosts and local BTOS applications for both inquiry and update. Information may be queried from several hosts or local BTOS applications and combined with responses from windows to generate input to either host or local programs. A window may be defined to be as small as a single character, or as large as the whole viewing screen, and text from one window may be copied and pasted to another. Single reports may be simulated on one screen by the combination and placement of multiple windows. The information displayed in the windows can be derived from incompatible applications running under the same or different Message Control Systems (MCS) or different host systems utilizing BNA. InfoView II features an integrated MT emulation which allows each terminal to be independently configured for maximum functionality. Users of B Systems and V Series mainframes can run day-to-day on-line applications while simultaneously accessing microcomputing functions such as spreadsheeting and word processing by utilizing InfoView II. The windowing capability allows programmers to take full advantage of the multiple functions available in the Programmer Productivity System (Props) software residing in the mainframe. The development center tools, Screen Design Facility (SDF), Interactive RPG Utility, and Linc II, can be accessed through a single B 25 running InfoView II. Based on the B Systems and A Series, InfoView II displays multiple windows of the Communications Management System (Coms). While one window through Coms is dynamically updated, all windows can be visible depending on the size and shape of the windows.

The B 25 requires 512K bytes of main memory, local floppy or hard disk storage, and BTOS Level 5.0 and BMulti Level 5.0 software.

InfoView II and InterPro InfoView II software provide a local editor which runs as an application on the B 25 workstation and operates in a shared resource environment with an A Series host. The workstation version of the Intelligent Distributed Editor (IDE) contains the same command interface and general characteristics as the host-based version.

The Intelligent Distributed Editor Release 3.6 is host-based on the B 5900, B 6900, B 7900 Systems, and A Series mainframes, or shared resource-based on the ET 2000, B 25, and ▷

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▷ IBM PC XT workstations. IDE is an on-line, interactive program development tool, designed to enhance programmer productivity. Multiple functions can be performed simultaneously in a host-based or shared-resource environment. To aid programmers, multiple windows of IDE activity are simultaneously available. Virtual files are contained in Edit windows and List windows contain lists of information such as compiler messages and cross-reference data. The Command window is used to control IDE. More than one file, and more than one portion of a single file can be viewed and edited. A full range of window manipulation commands are available. For the host-based version commands are provided for IDE to act upon, InfoView II window manipulation commands are used for the shared-resource version.

Software requirements include MCP Level 3.6.2, host-based version of IDE, shared-resource version of IDE, and InfoView II Release 2.1.

The Intelligent Workstation Editor II (IWE II) runs as an application of InfoView II and shares the ability of InfoView II to access resources in the B 2900, B 3900, B 4900, and V 300 host systems and manage multiple processes at a single workstation through windows. The IWE II Release 7.1 is a shared-resource editor system that provides a micro-to-mainframe program development environment for the B 25 series workstations, and has the same capabilities and features as the A Series IDE product.

The Extended Graphics Terminal (ETG) Release 2.1 software for the B 25 microcomputer is another application that functions under the control of InfoView II Release 2.1. Through one of the InfoView II mainframe windows, EGT provides emulation for the Tektronix 4014 graphics terminal commands as well as a key subset of the ANSI X3.64 terminal control character set. The 4014 window is functional on the same communication line as other InfoView II windows running the conventional MT Poll/Select terminal emulator. As with the 4014 emulation, X3.64 permits a single communication line to support standard MT Poll/Select windows concurrently with an X3.64 window on the same B 25. EGT supports, within an InfoView II window, a text screen and separate graphics screen for viewing both graphics and text. A monitor window is available as a debugging tool. This window contains a visible representation of every character received from the mainframe, including all control codes. Other features include, the support of 20 function keys with a programming option to change the value of a key; multiple pages, allowing information to be saved on one page while receiving host messages on another; and an on-line Help feature with detailed information about all screen forms and their controls.

EGT works with B System and A Series mainframes running the MCP or MCP/AS 3.6 operating system. BTOS Level 7.0, BMulti Level 5.0, and InfoView II Release 2.1 software is required for the B 25, B 26, and B 27. EGT does not directly require host memory, disk or other resources. A minimum of 512K bytes of main memory and local hard disk storage is required for the B 25.

The Logic and Information Network Compiler II (Linc II), is the most significant connectivity tool offered by Unisys. The new release allows the integration of line-of-business terminals and workstations into the mainframe environment.

Linc II is a complete interactive, menu-driven development system. It provides screen and report painting, data dictionary, multi-threading and synchronized recovery; in addition to realtime communication to other application systems, multiple language support, and many more capabilities. The latest version of Linc II features the ability to download select application functions and data to BTOS and MS DOS-based workstations from a host mainframe. Linc II functions, such as screen formatting, basic data editing and validation, can be performed at the workstation, then sent to the mainframe for further processing and data base updating. If the mainframe is inaccessible, users of BTOS workstations or MS DOS based personal computers can enter data in an off-line mode, save the transactions locally, then upload the new data to the mainframe when it becomes available. The Release 13.0 will provide additional support for display devices, including IBM 3270 or compatible terminals running on A Series mainframes, and cluster terminals configured under BTOS. It will also support BNA to allow transparent distributed processing across host systems.

### Multivendor Connectivity

The DOS Data Transfer System (DDTS) is utilized to integrate the B 25 microcomputers and IBM PCs or compatible systems running MS™DOS with Unisys's mini-computers and mainframes. DDTS performs the identical file transfer functions as the DTS described above. Data transmitted from the mainframe can be automatically reformatted for use not only by applications such as Multiplan but also Lotus 1-2-3 from Microsoft Corporation.

System software requirements include BTOS Level 7.0, BTOS MS DOS Level 2.11/4.0, and BMulti Level 5.0 for the B 25 microcomputer and MS DOS/PC DOS Level 2.0 for the IBM PC. Minicomputer and mainframe operating system requirements are the same as for DTS.

A version of InfoView II Release 2.1 is available for the IBM PC XT with the same general features—windowing capabilities, and MT terminal emulation as—the InfoView II software available for B 25 workstations.

The IBM XT workstation requires 512K bytes of main memory, the PC DOS Level 3.0 operating system, a hard disk, a monitor, a keyboard, and one serial board. Also required are the IBM asynchronous communications adaptor board and an optional Blackbox Corporation Model IC300 RS-232 to TDI adaptor for TDI support.

To help with the integration of its two separate product lines, Unisys entered an agreement with Intercomputer Communications Corporation (ICC) to provide Sperry PC-to-Burroughs host, and B 25 workstation-to-Sperry host links. ICC hardware and software allow Burroughs termi-▷

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Terminal emulation for Sperry PCs and facility file transfers and data base extraction. Sperry terminal emulation software is provided for B 25 workstations.

The latest revision of the Sperry Terminal Emulation Package (Step) allows MS DOS compatible PCs, such as the B 25, to communicate with the 2200/200 mainframe. Step transforms MS DOS-based PCs into multifunctional terminals capable of running up to eight host sessions at the same time. To the host, the PC appears as a cluster of terminals, and it is possible to run synchronous and asynchronous sessions together. The Step package consists of an expansion board with a serial port, and software that emulates several different terminals. With Step the progress of all terminal sessions can be viewed within user-defined screen windows. Up to 14 windows can be defined, with width and length of up to 256 characters.

### The Micro-to-Micro Connection

Unisys offers the B 20 ClusterShare™ acquired on OEM basis from Convergent Technologies, to connect Unisys PC ITs, IBM AT and XT PCs, and other compatible micros to a Unisys B 20 BTOS cluster. ClusterShare combines cluster sharing system software and the RS-422 add-in Cluster-Card™ board. ClusterShare software contains both MS DOS software executing in the PC and a BTOS system service installed in the master workstation. The Cluster-Card is an RS-422 interface board that can be installed by the user in any standard PC workstation expansion slot. It is designed to operate in either an 8-bit or 16-bit bus configuration and is automatically configured when the PC is initialized, providing a connection to either a 307K bps or a 1.8M bps cluster line.

Through ClusterShare, PC workstations can co-exist on the cluster line with Unisys BTOS workstations, sharing the resources of the master. The master can be a Unisys B 26, B 27, B 28, or B 38 workstation, or a XE 520 Shared Resource Processor. The B 26 and B 27 master workstations can each support a maximum of 5 clustered workstations, including PCs. A maximum of 11 clustered workstations

including PCs can be supported by the B 28 and B 38 masters. The XE 520 can support a maximum of 64 clustered workstations and PCs. The ClusterShare server, operating on the BTOS master is compatible with B-Net. Through ClusterShare, PCs can access remote MS DOS volumes and printers located on the local master or on other masters in the B-Net network.

The software product OFISbridge is designed for the B 25 family of workstations and the XE 520 shared resource processor. OFISbridge allows word processing documents or other files created on these systems to be integrated with IBM's mainframe-based office automation system, Distributed Office Support System (DISOSS). No additional software or changes to existing software on the IBM host is required to achieve this integration. OFISbridge uses BTOS SNA Gateway and Unisys/Burroughs implementation of LU6.2 to access the services provided by DISOSS. OFISbridge allows full adherence to IBM's Document Content Architecture (DCA) standard and to Document Interchange Architecture (DIA). With OFISbridge, documents created on the B 25 can be sent to and received from other workstations connected to the DISOSS host, or sent to the DISOSS host, and then to an IBM Displaywriter for amendment. The modified document can be returned to the B 25 workstation for additional edits, then printed and stored on the DISOSS host library. The software BTOS Windows adds power to OFISbridge providing the B 25 workstations with multiple, overlapping and variable sized windows. BTOS Windows allows for concurrent operation of a DISOSS session from one window, and MS DOS application in another and BTOS application in a third window. Up to 10 windows are possible on a system. A B 25 workstation can access the large library of PC AT software packages with the help of a snap-on PC Emulator module. The module is based on the Intel 80186 processor and has 768K bytes of internal memory.

For further information on the mainframe software packages listed in this report, please refer to the individual Unisys product reports in this volume or in Volume 3. □