



NGEN

CONVERGENT TECHNOLOGIES

NGEN™ Family Overview

- **Modular, high performance desktop computing systems**
- **System components fit together like building blocks**
- **System installation, expansion and reconfiguration easily performed by end users**
- **Basic system includes an Intel 16-bit microprocessor, with 256 KB of RAM**
- **Systems are expandable to 768 KB or 1024 KB in 256 KB increments**
- **High quality 12-inch and 14-inch monochrome and 15-inch color displays with 29 lines of 80 characters**
- **Both monochrome and color graphics with 720 x 348 pixel resolution**
- **Mass storage options include both floppy and hard disk subsystems**
- **Maximum formatted hard disk capacity per system is 139 MB**
- **Individual systems can be linked together into clusters via a high speed local area network operating at 1.8 million bits per second**
- **OEMs can build unique hardware options, in the NGEN form factor**
- **Operating system environments include CTOS™, MS™-DOS, CP/M-86® and DISTRIX™**

- **Programming languages include COBOL, FORTRAN, BASIC, Pascal, assembler, and C**
- **Data management facilities include CT-DBMS, ISAM, Sort/Merge, and an interactive Forms facility**
- **Data Communications facilities include X.25, SNA (RJE and interactive), Bisync 3270 and 2780/3780, CT-Net (over RS-232 and X.25 media), and asynchronous terminal emulation**

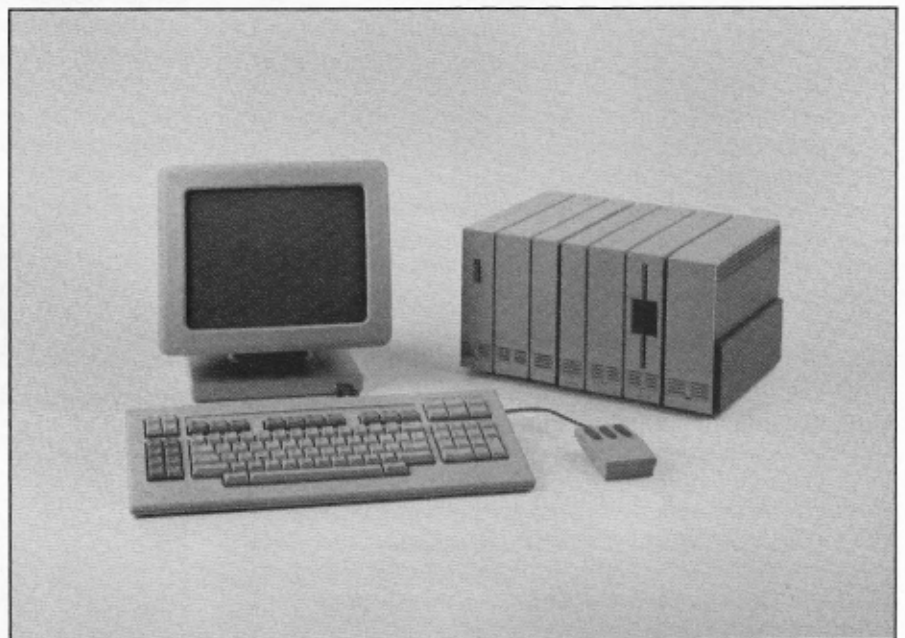
- **Office Automation facilities include the Convergent Word Processor, Multiplan™, the Project Planner, the Business Graphics Package, and CT-Mail**
- **Comprehensive Visinostics diagnostic package verifies system configuration, and allows operator to visually select system components to be tested**

Software compatible with the Convergent AWS™ and IWS™ Workstations

The Convergent™ family of NGEN™ Workstations is a modular family of workstations which can be configured in a wide variety of ways, to meet diverse application requirements in office and business applications.

Configured around 16-bit Intel microprocessors, and the latest in 5¼-inch mass storage technologies, the NGEN family is designed for applications that require the power and flexibility of a minicomputer, but at a far lower cost.

Utilizing a distributed intelligence architecture, each NGEN Workstation provides a high performance CPU, a high quality video display unit, a programmable keyboard, up to one million bytes of RAM with parity error detection, a range of mass storage options, and optional bit-map graphics capability.



NGEN Workstations can stand alone, or they can be connected together in a local area network, via a high speed data link, sharing peripherals and data bases. The result is high responsiveness, with the ability to support complex and diverse applications operating on the same data base, simultaneously.

The NGEN Workstation hardware and software architectures are totally modular, with several entry level configurations, and multiple upgrade expansion paths. All hardware expansions are field installable, by non-technical personnel; the major components of the system are packaged separately, and fit together like building blocks. The CTOS operating system recognizes each element configured in an individual system.

The real-time, multi-task operating system, CTOS, is a powerful tool for developing and executing sophisticated applications software. Five standard programming languages (COBOL, FORTRAN, BASIC, C, and Pascal) plus assembler are supported. A range of data management tools, including CT-DBMS, ISAM, Query, and Forms, as well as a variety of data communications packages for industry standard communications environments, are available.

The CTOS operating system supports several end-user tools for office automation applications. These include a fully featured word processing package, the Multiplan spreadsheet package, the Business Graphics Package (BGP) which fully supports the NGEN monochrome and color graphics hardware, CT-Mail, an electronic messaging system, and the Project Planner, a graphically-oriented scheduling tool.

The CTOS operating system hosts two additional operating systems, MS-DOS Version 2 from Microsoft, and CP/M-86 from Digital Research. The machine dependent portions of these two systems (the BIOS) have been implemented to take advantage of the CTOS environment. This allows the NGEN user to switch between CTOS, MS-DOS, and CP/M-86 applications at the stroke of a key, without needing to reboot the system. Files for all three environments can simultaneously reside on the system's hard disk, and data can be easily moved from one subsystem's file environment to another's. In a cluster environment (see below), users on cluster workstations with no local mass storage facilities can utilize CP/M-86 and MS-DOS capabilities on their systems by taking advantage of storage resources on the master workstation. Through the use of these two hosted operating systems, it is possible to run many application packages available for popular personal computers. Convergent publishes a catalog of third party software packages which are available for NGEN and other workstation products.

In addition to CTOS, and its associated software environment, Convergent also supports its own version of UNIX System V, called DISTRIX, on NGEN workstations. The full range of software packages normally associated with UNIX is available, including a C language compiler, editors, file utilities, and text processing facilities. DISTRIX can be used on standalone workstations con-

figured with hard disk, or on cluster workstations, which are connected to a master station with hard disk. DISTRIX supports the same set of office automation applications available in the CTOS environment.

The NGEN Workstation family has been designed with sensitivity to the physiological and psychological needs of the operator, and the physical environment of the office. The low-profile, tactile feedback keyboard and the flicker-free video display greatly reduce operator fatigue. The electronic modules (processor, mass storage, and various options) need not be placed on the work surface, but can be up to 16 feet from the video display. These modules have been designed to fit neatly on the surfaces and shelves found in contemporary office furniture. The small monitor footprint (7 in. by 9 in.) means that NGEN takes up minimal space on the desks of its users.

The NGEN Workstation family has been designed with sensitivity to the needs of the OEM customer. Most components have been designed for worldwide shipment, and are totally generic with regard to line voltages and frequencies, and national character sets. RAM expansion, mass storage and video options are provided on a totally modular basis. This high degree of modularity allows the OEM to inventory a very small number of distinct NGEN components, and still be able to ship a wide range of systems, with varying capacities and features, to a worldwide market. With less than thirty distinct NGEN components, the OEM can ship systems ranging from a 256 KB Workstation with no mass storage, to one containing 1024 KB of RAM, 160 MB of hard disk, and color bit-map graphics capability. NGEN's modularity also allows the OEM's customers to order and install expansions and upgrades to their initial systems, as their requirements change and needs for capacity increase.

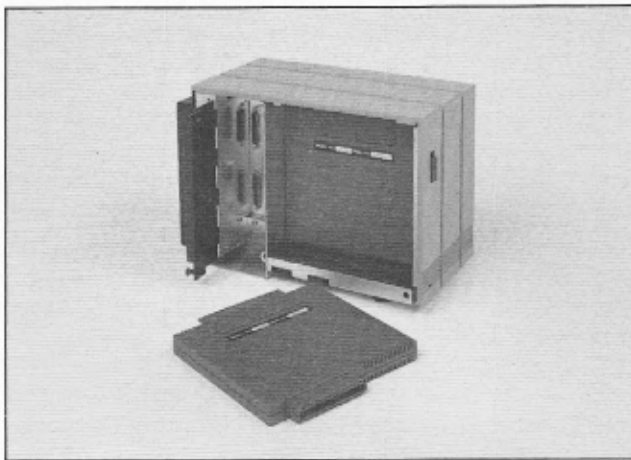
NGEN's modularity allows Convergent and its OEM customers to add new subsystems to the NGEN line to suit unique customer requirements, or to take advantage of improvements in semiconductor and mass storage technology. New modules can be added to the product line in a non-disruptive manner. This means that OEMs can expand their offerings without obsoleting their investments in hardware and software, and thus they can avoid the problems encountered whenever it becomes necessary to convert their offerings to an entirely new product base. OEM customers can develop their own unique hardware subsystems to operate with NGEN workstations; Convergent provides empty NGEN module shells for OEMs who wish to avoid the expense of tooling for these mechanical elements.

SYSTEM OVERVIEW

Each NGEN Workstation is comprised of a series of discrete, separately packaged modules, which are connected together via Convergent's proprietary X-Bus. Different combinations of modules can be combined by the ultimate end-user of the system, in order to obtain workstations with varying capabilities and capacities.

An entry-level NGEN Workstation consists of a 12-inch monochrome monitor, a keyboard, a central processor module, and a power supply. This configuration can be enhanced to support bit-map graphics, with the addition of a graphics controller. Color graphics, with 8 viewable colors out of a palette of 64, can be obtained by substituting a 15-inch color display for the monochrome version. Mass Storage options, including floppy disks and Winchester disks, can be added, with a system maximum of 4 floppy drives and 4 Winchester drives.

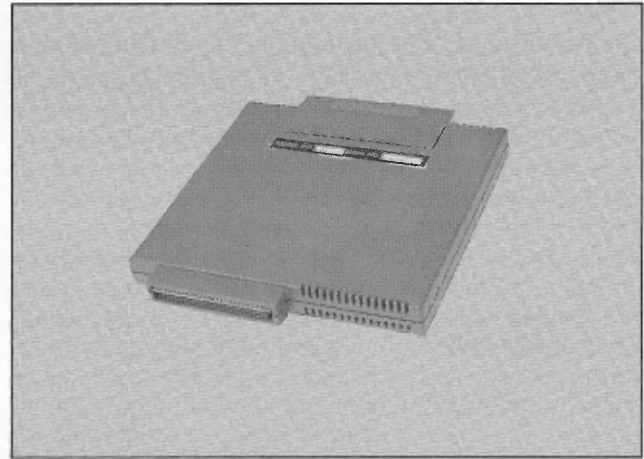
The Processor Module forms the core of the workstation. Two versions of this module are available. The *CP-001/8* contains an 8 MHz Intel 80186 microprocessor. The *CP-001/7* contains an 8 MHz Intel 8086 microprocessor. In addition to the microprocessor, both CP-001's contain video control logic for the 29 line by 80 character display, 256 KB of RAM with parity error detection, slots for up to three 256 KB RAM expansion cartridges, and input/output channels to accommodate two RS-232-C ports, an RS-422 port, and a parallel printer port with a Centronics-compatible interface.



Memory expansion is accomplished by the use of one, two, or three 256 KB RAM expansion cartridges (*XM-001*). Each cartridge is encased in a plastic shell, and is user-installable. Cartridges are completely interchangeable, and no switch settings or other adjustments are required to expand the system memory up to 1024 KB for the *CP-001/8*, and to 768 KB for the *CP-001/7*.

The 12-inch monochrome monitor (*VM-001*) and 14-inch monochrome monitor (*VM-002*) each display 29 lines of 80 characters. Both units sit on 'tilt and swivel' bases, have a non-glare coating to reduce eyestrain, and have easily accessible brightness controls.

The 15-inch color monitor (*VC-001*) displays 29 lines of 80 characters each, and is physically attached to the system via the *GC-001* Graphics Controller. It can display eight on-screen colors out of a palette of 64 colors. There is an exact correspondence of each pixel in the bit-map to each pixel in the character map, allowing text and graphics information to be overlaid on the screen.



The logic to drive monochrome and color bit-map operations is provided in the optional graphics controller module (*GC-001*) which attaches to the Processor Module via the X-Bus. This module provides a bit-mapped screen resolution of 720 x 348 pixels.

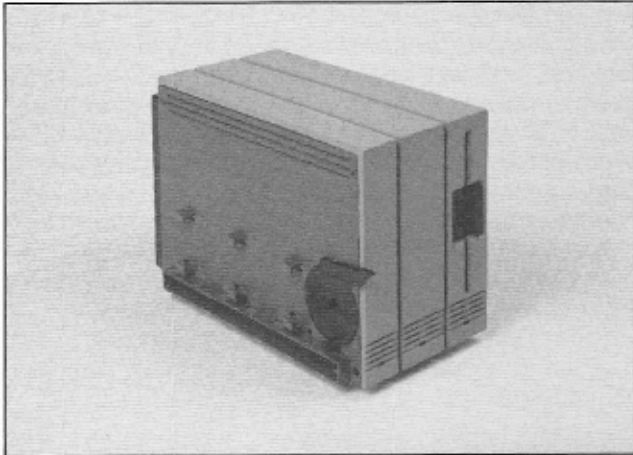
A range of keyboards (*KM-00x*) are available to satisfy various national character set requirements. All contain 98 keys, and are arranged in a typewriter style layout. Keys are arranged in functional clusters, including the QWERTY portion, a 14-key numeric pad, an 8-key status/control pad, a 6-key cursor control pad, a 4-key page control pad, and 10 user-definable function keys. The keyboard also provides software controllable LED indicators on 8 keys. The keyboard is connected to the base of the monitor by a 6-foot coiled cable, which may be connected to either the right side or left side of the keyboard itself. The unused connector port may in turn be used to connect a second serial input device, such as a special-purpose keyboard or a mouse.



The keyboard contains an Intel 8051 microprocessor, which senses the state of all keys, and reports any changes of state (key depression and release) to the central processor module. This feature allows the keyboard to be utilized in sophisticated applications, in which multiple key sequences or the length of time a key is held down, can be used to enhance the operator interface. Data which enters the keyboard through its

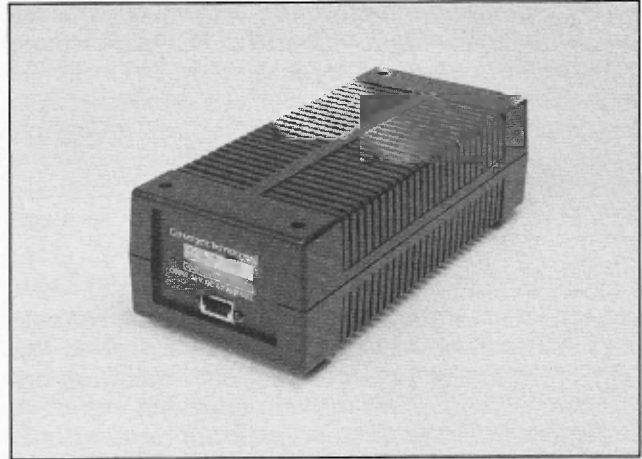
auxiliary port is passed to the central processor, with identifying codes that distinguish this data from that entered on the KM-00x itself.

The NGEN family contains a variety of mass storage modules, all based on 5¼-inch technology. Each module is packaged in its own enclosure, and attaches to the rest of the system via the X-bus. Modules can be installed, and systems can be reconfigured, by non-technically trained customer personnel. These modules include a dual floppy module (*FD-001*), a floppy/hard disk module, with hard disk capacities of 10 MB or 20 MB (*HD-002*, *HD-003*), or a hard disk module with the same capacities (*HD-005*, *HD-006*) high capacity, high performance 40 MB hard disk module (*HD-010*) also available. One hard disk expansion unit, in 10 MB, 20 MB and 32 MB capacities (*HX-002*, *HX-003*, *HX-011*), can be attached to each HD-0XX module. The maximum formatted hard disk storage that can be configured in a single workstation is 139 MB; this is achieved using two HD-010 37.5 MB modules, each with an HX-011 expansion module.



Each NGEN workstation is powered by a free-standing 150 watt power supply (*PS-001*). This unit normally resides on the floor, beneath the surface containing the Processor and related modules. The PS-001 is switch selectable for nominal 110 Volt or 220 Volt operation. The output of the PS-001 is 4.2 Amps at 36 VDC, and this DC voltage drives all major NGEN subsystems. The use of this approach to powering NGEN has many advantages. Most modules are generic with regard to the external power environment (110V vs. 220V) of the system. There are no hazardous voltages in desktop modules. Space is conserved on the top of the desk.

The *PS-001* power supply provides power to all NGEN components except the color monitor, which is powered independently. The PS-001 operates over input voltage ranges of 85V to 130V RMS, and 180V to 260V RMS, and is UL Recognized, CSA Certified, and conforms to BSI, and VDE specifications. The supply is switch selectable for nominal 110 Volt or 220 Volt operation. It operates over an input line frequency of 47 to 440 Hz, using a three wire, single phase AC voltage source. The supply protects itself from input transients and output overloads.



The output of the PS-001 is 4.2 amps at 36 VDC, or approximately 150 Watts. This is sufficient to drive most system configurations that do not include hard disk drives. A second PS-001 is required in most hard disk configurations.

The PS-001 is designed to sit on the floor, beneath the surface containing the system electronics. A six foot cable connects the supply to the Processor Module. If additional supplies are required, an AC jumper cable allows an additional supply to be connected to the first, so only one line cord is required. The output from each additional supply is connected to the first module in the system whose power requirements exceed the output of the first supply.

The use of a free-standing power supply minimizes the amount of desk space occupied by the NGEN system, and makes it possible for the OEM customer to stock most NGEN components without concern for the country (and corresponding line voltage) in which they will be used. This approach greatly simplifies forecasting and inventory management tasks for multi-national enterprises.

The key to the modularity of the NGEN family is the *X-Bus*. This bus provides the mechanical, logical, and power distribution connections between each major electronic module in the system. The mechanical connection is achieved via a patented latching mechanism, in which a sliding plate in one module grabs six protruding fingers from the mating module, and draws the two units together, forming a rigid mechanical subassembly. As the enclosures are drawn together, two mating 120-pin connectors slide into place, and pass both power and logic signals down to the additional module. When the latch is released, the modules are automatically separated. In this manner, system expansions and upgrades can be field installed, without the use of complex cabling arrangements, by non-technically trained personnel.

STANDALONE AND CLUSTER SYSTEMS

Convergent's NGEN Family of desktop workstations can be configured as *standalone* or *clustered* systems.

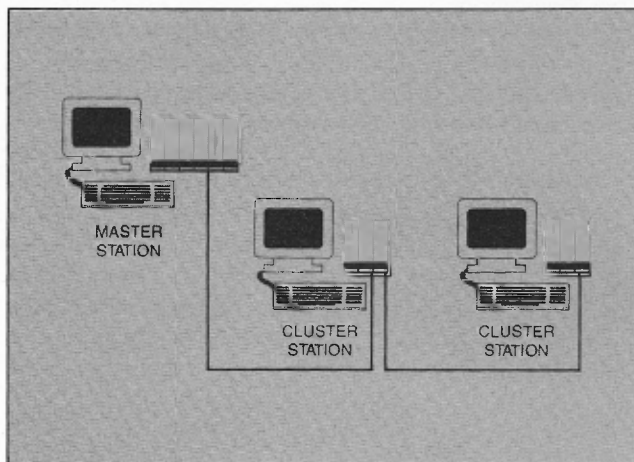
- An NGEN Workstation with mass storage devices is an "NGEN standalone system."

- An NGEN Workstation with mass storage devices that provides resources such as disk storage to other NGEN workstations is called an "NGEN master station."
- An NGEN workstation that utilizes resources provided by a master station is called an "NGEN cluster station."

A master station serves two functions:

- Running applications
- Providing resources to the individual cluster stations.

The balance between the two functions depends on the kind of applications being executed, the number of connected cluster stations, and the amount of memory in the master station. The master station can run the same application programs as the cluster stations. The master station can also run the server programs: ISAM, CT-DBMS, CT-Mail, the Print Spooler, the 2780/3780 RJE server, the Bisync 3270 Server, the SNA Transport Service, and the X.25 Network Gateway. Typically, the master station serves both functions: running application programs and a number of server functions.



Cluster Workstations are connected to the master Workstation using the RS-422 capability of the NGEN system, over shielded twisted pair cables. Workstations are connected using a passive "daisy-chain" approach; the maximum length of the cable, from the master station to the last workstation in the chain cannot exceed 1200 feet. Cluster communications for NGEN normally operate at 1.8 million bits per second, but when a cluster contains AWS or IWS Workstations, or PT terminals, then the cluster operates at 307,200 bits per second.

The number of cluster workstations that can be linked together into a cluster system with an NGEN Master Station is highly dependent upon the configuration of the individual stations, the nature of the applications being run, and the usage patterns of individual workstations. If no cluster station contains mass storage resources, and thus all stations must share the master's disk capacity, then a maximum of five cluster stations is recommended. If all stations contain local hard disk storage, and the cluster capability is used primarily to share printer and/or communications resources, then

more cluster stations, up to a maximum of 16, can be accommodated.

NGEN workstations can coexist in clusters with other Convergent products. An NGEN master station can support a mixture of NGEN, AWS, and IWS workstations. In a mixed cluster, the RS-422 network operates at 307,200 bps, to accommodate the lower speed of the AWS and IWS RS-422 interfaces. An AWS or IWS master station can support a mixture of AWS, IWS, and NGEN cluster stations. All three types of workstations can be supported by a Convergent MegaFrame master. The multiple-processor architecture of the MegaFrame allows the construction of very large clusters; up to 128 NGEN cluster stations can be attached to a single MegaFrame.

SOFTWARE

NGEN software represents the continuing evolution of software first delivered with Convergent's IWS products in 1980. With the NGEN product line, Convergent has broadened its software product line by adding support for CP/M-86, MS-DOS, and DISTRIX to its already rich repertoire of software offerings.

The *CTOS Operating System* provides a reliable, high-performance foundation for real-time, interactive applications. It is efficient, easily extended, and highly configurable. Its modular structure, combined with its carefully planned model for extension, provide an ideal environment for developing and executing application programs.

CTOS contains a number of features which differentiate it from less powerful, small computer-oriented operating systems. Its multi-partition, multi-tasking capabilities allow a number of foreground systems activities to take place concurrently. Background services include a variety of spoolers, communications servers, and batch processors.

The *Context Manager* option for CTOS allows the workstation user to establish up to ten distinct software contexts within the system. Any application program, including MS-DOS and CP/M-86 applications, can be associated with a context. The keyboard and video display can be switched between contexts with the stroke of a key. The user can start lengthy operations, such as sorting routines, and then use the workstation for other interactive applications, while the time-consuming ones continue in the background. In this fashion, the workstation operates the way people operate — working on many loosely related tasks in a parallel fashion.

A number of programming languages are available within the CTOS environment:

- COBOL (GSA High-Intermediate Level)
- FORTRAN — ANSI '77 Standard
- Pascal — ISO Draft 5 Standard
- BASIC (Compiler and Interpreter) — ANSI '78 Standard
- C — C language Standard (Small and Large Models)
- Assembler for Intel 8086/80186 Assembly Language

Each of these languages implements the relevant standard, and is augmented by extensions aimed at enhancing its utility in its application area. All languages utilize a common calling sequence, thus enabling the software developer to mix modules written in different languages.

Productive program development requires good tools. Convergent supplies a complete, state-of-the-art environment. The *Editor* makes it easy to write and revise source code. Source programs may also be edited using the *Convergent Word Processor*. The *Linker/Librarian* is used to maintain object code libraries, and to link together separately compiled modules. The *Debugger* allows developers to debug programs interactively and efficiently.

The *Font Designer* provides an interactive facility for designing fonts to customize the character set displayed on the video display for specific applications.

Data Management facilities are optimized for the Convergent system architecture. The multi-key *ISAM* provides flexible access to records; its B-Tree implementation allows efficient retrieval by exact match, range match, or prefix match, utilizing a variety of data types as keys. *ISAM* also provides multi-user access to files stored on a master workstation, and allows individual records in a file to be locked in the course of a transaction, to protect the integrity of the data base. The Convergent Data Base Management System (*CT-DBMS*) provides a relational view of the data base, and allows the development of data-independent applications software; i.e., data items can be redefined without needing to alter the programs that refer to them. Like *ISAM*, *CT-DBMS* provides multi-user access to the data base, and handles the locking and unlocking of records to preserve the consistency of the data base. *CT-DBMS* also allows access to individual items in the data base to be protected at the field level. *Query* supports interactive inquiry and update of *CT-DBMS* data bases using a screen-oriented, forms-based, point-and-type user interface. Query results may be displayed to the screen and also saved in either a text file or a Document Exchange Format file which can be used by the *Word Processor* or *Multipan*. The *Forms Facility* makes it easy to design screen-oriented forms interactively, and for applications programs to invoke these forms, and accept operator-supplied data. The *Sort/Merge Facility* sorts multiple files of unordered records, and merges multiple files of ordered records into one ordered file.

Data Communications facilities are also optimized for the Convergent system architecture. They take advantage of the "layered architecture" of contemporary networking designs, by splitting the supporting code into modules which support low-level transport services, which normally reside in master workstations, and modules which support high-level presentation (or logical) services, such as screen management or RJE, which normally reside in cluster workstations. In this manner a single communications port can support a cluster of workstations accessing a mainframe or public data network.

CT-SNA allows each workstation in a cluster to access IBM mainframes with SNA networks. Interactive access is provided via 3276/3278 emulation; NGEN systems with color displays can emulate the IBM 3279 as well. RJE access for job submission and/or file transfer is provided via the SNA/RJE workstation emulator. 2780/3780 and Binary Synchronous 3270 protocols are also supported.

CT-X.25 allows each workstation in a cluster to access public data networks, based on the C.C.I.T.T. X.25 standard, such as Telenet™ or Transpac. Customer-written software can build and control virtual circuits, and facilities are provided to access other hosts on the network, via a standard terminal emulator facility.

CT-Net allows standalone workstations, or clusters of workstations, to be connected on a peer-to-peer basis. This allows a cluster station to access resources on any master station in the network, in addition to the resources normally available on its own master station. *CT-Net* operates over switched or dedicated synchronous facilities, and over packet-switched facilities (with the use of *CT-X.25*).

The *Asynchronous Terminal Emulator, ATE*, allows a Convergent workstation to be used as a "dumb terminal" in conjunction with another computer system that supports simple asynchronous devices. *ATE* accommodates a wide variety of transmission parameters, and can be used both interactively, and as a universal file transfer mechanism.

A complete set of office automation applications rounds out the CTOS software environment. These products can be "passed-through" by the OEM to the ultimate end-user customer, or they can be modified by the OEM, and sold as added value products. The *Word Processor* is a fully featured product that supports the creation and maintenance of complex, highly formatted documents. In addition to its powerful editing capabilities, it also supports document assembly, records processing, list processing and spelling verification.

The *Multipan* spreadsheet package supports a variety of arithmetic calculations, and facilitates the "what-if" analyses often required in today's business world. It is fully integrated with the *Business Graphics Package (BGP)*, which can display numeric data in many graphic forms, both on the video display and in hard copy form as well.

Project Planner is a sophisticated graphic project management package that allows the scheduling of project tasks and milestones, and the monitoring of resource allocation within an organization. Schedule charts show project tasks, milestones, dependencies, and the dates on which they occur with the critical path highlighted. Resource charts show resource utilization over time and task charts display all the tasks in a project and who performs them.

CT-Mail provides a turnkey messaging facility. It allows users to create messages, using the same editing commands available with the *Word Processor*. Messages are

received in an electronic In-Tray, and can be filed in file folders created by the user. Messages can be transmitted to other users at electronic speeds over dedicated and switched facilities. By combining CT-Mail with CT-Net and CT-X.25, communications paths utilizing packet-switched networks are also possible.

NGEN's *VISINOSTICS* package provides a user friendly interface for running system and component level diagnostic software. *VISINOSTICS* provides a graphic representation of the NGEN configuration on the system display, and allows the user to select visually which elements are to be tested. It then runs the selected test programs, and highlights any components which do not run their diagnostics properly.

CONFIGURING NGEN WORKSTATIONS

The modules described above may be combined in an almost unlimited number of ways, to suit various end-user requirements. Convergent has defined a number of standard configurations of these modules, and the OEM is free to order these configurations, or to order modules "a la carte" to meet unique market requirements.

The standard configurations fall into three major classes. *Cluster Workstation* systems contain the Processor, Video, Keyboard and Power Supply modules. These systems are useful when attached to a master station in a cluster environment. *Personal Computer* systems contain the Cluster Workstation elements, plus a Dual Floppy module. Such systems can be used in a standalone environment, running CTOS, MS-DOS, or CP/M-86, or they can be attached to a master station in a cluster environment. *Professional Workstation* systems contain the Cluster Workstation elements, plus a Floppy/Hard Disk module in 10 or 20 MB capacities. These systems can be used as powerful standalone systems running CTOS, MS-DOS, CP/M-86, or DISTRIX, or as master stations in a cluster, or as cluster stations with local file resources. Each class of system has three display options: character map monochrome video, bit-map monochrome video, and bit-map color video. All systems contain 256 KB of RAM, and are expandable to 768 KB or 1024 KB, depending on processor type. Depending on overall system power requirements,

either one or two Power Supply modules and one or two line cords are included in the overall configuration. The table below outlines the contents of each of these configurations.

CUSTOM NGEN CONFIGURATIONS

OEM's can expand any of the systems above, or create their own NGEN configurations. All such configurations must obey the following rules:

1. Each system must contain a Processor Module, Video Module, Keyboard, and appropriate power supplies and line cords.
2. There can be only one Processor Module, Video Module, and Keyboard (exclusive of auxiliary keyboards) per system. The Processor Module must be at the extreme left end of the system.
3. There can be at most two Dual Floppy modules (FD-001) per system.
4. There can be at most two Hard Disk with integrated Controller modules (HD-0XX) per system.
5. There can be at most one Hard Disk Expansion module (HX-0XX) per Hard Disk (HD-0XX) module. (Maximum system capacity is four hard disk and four floppy disk drives.)
6. There can be a maximum of one Graphic Controller module (GC-00X) per system. If present, it must be immediately to the right of the Processor Module.
7. The total length of the system, cannot exceed 30 inches.
8. There can be at most eight modules connected via the X-Bus.
9. All modules must receive adequate power. Each module is rated in terms of power consumption on the basis of its "power code," where one unit in the power code equals 15 Watts of input power. The table below defines power consumption per module. (An entry of "0" means the group gets power from an external source.) Modules are grouped on the X-Bus so that their power codes total 10 or less. Each group requires a PS-001 supply.

NGEN CONFIGURED SYSTEMS

Model #	Name	Included Modules
CN-1000	NGEN Workstation	CP-001, VM-001, KM-001, PS-001, LC-001
CN-1010	NGEN Graphic Workstation	CP-001, VM-001, KM-001, PS-001, LC-001, GC-001
CN-1020	NGEN Color Workstation	CP-001, VC-001, KM-001, PS-001, 2 LC-001, GC-001
CN-2000	NGEN Personal Computer	CN-1000, FD-001
CN-2010	NGEN Graphic Personal Computer	CN-1010, FD-001, PS-001 (2 Total)
CN-2020	NGEN Color Personal Computer	CN-1020, FD-001
CN-3000	NGEN Professional Workstation (10 MB)	CN-1000, HD-002, PS-001 (2 Total)
CN-3010	NGEN Graphic Professional Workstation	CN-1010, HD-002, PS-001 (2 Total)
CN-3020	NGEN Color Professional Workstation	CN-1020, HD-002, PS-001 (2 Total)
CN-3060	NGEN Professional Workstation (20 MB)	CN-1000, HD-003, PS-001 (2 Total)
CN-3070	NGEN Graphic Professional Workstation	CN-1010, HD-003, PS-001 (2 Total)
CN-3080	NGEN Color Professional Workstation	CN-1020, HD-003, PS-001 (2 Total)

10. The Color monitor (VC-001) includes its own AC power supply. It requires an additional line cord.
11. There can be a maximum of three RAM expansion cartridges (XM-001) per system, for CP-001/8 based systems, and two cartridges for CP-001/7 systems.

MODULE POWER REQUIREMENTS

Module	Power Code	Module	Power Code
CP-001	4	HD-003	6
VM-001	3	HD-005	5
VM-002	3	HD-006	5
VC-001	0	HD-010	6
GC-001	2	HX-002	2
XM-001	0	HX-003	2
FD-001	3	HX-011	4
HD-002	6	KM-00x	0

SPECIFICATIONS

Storage Capacity:

RAM: 768 KB or 1024 KB, Maximum
 ROM: 8 KB

Serial I/O Rates:

External Clock: RS-232-C: 110 Baud to 19.2 Kbaud
 Internal Clock: RS-232-C: 50 Baud to 19.2 Kbaud
 RS-422: 100 Baud to 1.8 MBaud

Parallel I/O Rate (Printer Interface):

Programmed I/O — 9600 Characters/second (typical)

Electrical:

AC Power: 85 to 130 Vrms @ 47 Hz – 440 Hz
 180 to 260 Vrms @ 47 Hz – 440 Hz

AC Power Requirements: Configuration Dependent — See Above

ENVIRONMENTAL, SAFETY, AND ERGONOMIC

Safety:

Meets UL 478 (EDP) and 114 (Office Equipment)
 Meets CSA 154 (EDP) and 143 (Office Equipment)
 Meets VDE 0806 (Office Equipment)
 Meets BSI 5850 (Office Equipment)

PHYSICAL

Module	Height		Width		Length		Weight	
	Inches	MMs	Inches	MMs	Inches	MMs	Lbs	Kgs
PS-001	3.0	76.2	4.5	114.3	10.5	266.7	3.1	1.4
KM-001	1.18	30.0	18.0	457.2	9.0	228.6	3.8	1.7
XM-001	6.6	167.5	0.7	18.0	6.6	168.5	0.8	0.4

Emissions:

Meets VDE 0871 (Emissions Standards)
 Meets FCC Part 15, Sub-part J for Class A Emissions

ESD:

5,000 Volts: No observable effect
 12,500 Volts: Errors corrected via Software Intervention
 17,500 Volts: Errors corrected via Operator Intervention
 25,000 Volts: No permanent damage

Altitude:

Operating: 15,000 feet ASL
 Non-Operating: 25,000 feet ASL

Acoustic Noise Level: NR 30

Temperature/Humidity: (Excluding magnetic peripherals)

Operating: 0° to 40°C,
 5%-95% RH
 Non-Operating: -40° to 75°C,
 90% @ 65°C for 12 hours

Temperature/Humidity: (Magnetic peripherals)

Operating: 10° to 40°C,
 20%-80% RH
 Non-Operating: -20° to 65°C,
 90% @ 65°C for 12 hours

Cable Lengths

Keyboard: 14 inches coiled, 6 feet extended
 Monitor: 16 feet (Monochrome), 6 feet (Color)
 Cluster: 1200 feet, maximum

Ergonomic:

Designed in accordance with DIN "Safety Regulations for Display Workstations in the Office Sector" (Standard 66234, December 1979), and "Basic Ergonomics for Desktop Workstations."

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