

Digital Communications Associates System 355 Network Processor

MANAGEMENT SUMMARY

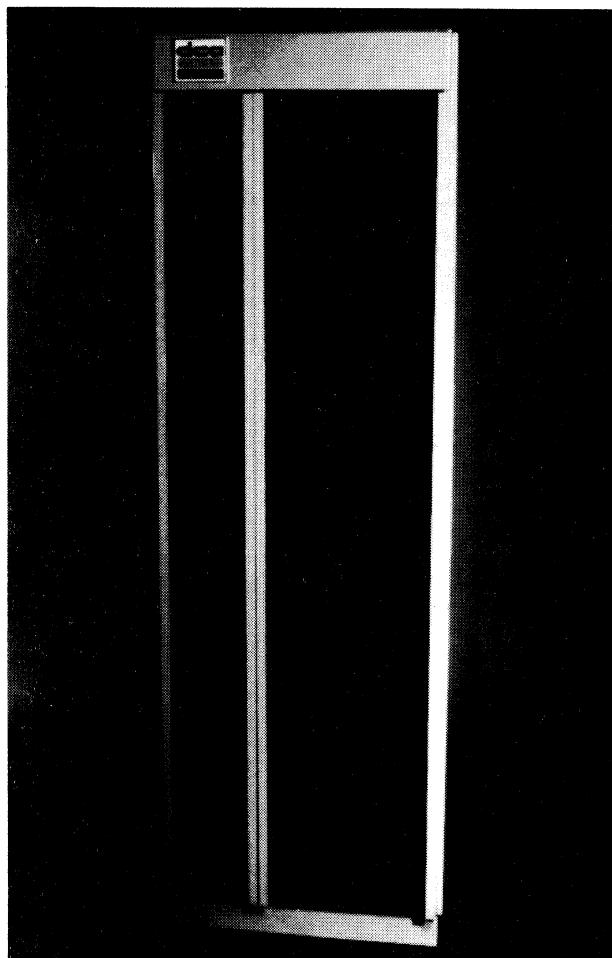
The System 355 Network Processor from Digital Communications Associates is a versatile host-independent communications processor. Built around a statistical multiplexer, it is capable of supporting data from large numbers of asynchronous or synchronous terminals with an effective throughput of up to 400K bps.

With the System 355, it is possible to build a private INA (Integrated Network Architecture) network, with host selection, automatic routing, port contention and network management and control performed by the 355, at a significantly lower cost than using a public data network. It will handle a large variety of resources—terminals, computers, packet-switched networks—using microprocessor-based protocol converters. From a single master network processor, data can be transported from as many as 256 computer ports using up to 44 trunk links. It is also ▶

The System 355 Network Processor from Digital Communications Associates is a statistical, point-to-point, multi-point, or multidrop multiplexer. It accepts up to 126 asynchronous line inputs at standard rates from 50 to 9.6K bps. Characteristics can be set by PROM, console, or changeable cartridge tape.

ARQ error correction, data concentration, flow-control, and dynamic buffer allocation are standard. The latest software package, version 3.0, offers additional features of per-port-testing, downline file loading, and simplified operator commands.

The DCA System 355 is available for purchase at prices ranging from \$9,995 and upwards, depending on size and cabinetry.



The DCA System 355 Network Processor supports multiple configurations that can expand in performance as well as size due to the software and hardware modularity of its design. The processor's capabilities of port contention, routing, and multiplexing offer a viable alternative to using public packet-switched networks.

CHARACTERISTICS

VENDOR: Digital Communications Associates, Inc., 303 Technology Park/Atlanta, Norcross, Georgia 30092. Telephone (404) 448-1400.

DATE OF ANNOUNCEMENT: May 1980.

DATE OF FIRST DELIVERY: October 1980.

NUMBER INSTALLED TO DATE: 150.

SERVICED BY: Digital Communications Associates.

CONFIGURATION

The DCA System 355 consists of rack-mountable card files, each of which contains one adapter module plus slots for one to eight communications modules. These card files can be daisy-chained up to a maximum of eight per 355 unit. The communications modules can be either microprocessor-based processing modules or LSI-based dual-port modules accommodating RS-232-C and/or active current-loop connections.

The accompanying Figures 1-4 show four possible configurations for the DCA 355 and associated support modules. These applications include a stand-alone network, a multidrop, multiplexing network, a multi-link network, and a remote concentration network.

The DCA 355 has 64 slots for communications modules in a fully expanded unit (of eight card files). These slots can support either user equipment with a maximum operating speed of 9600 bps, (two ports per slot) or multiplexed trunk links with a maximum speed of 19.2K bps (one or two per slot), depending upon throughput requirements. The cartridge-tape based Program Load Unit is also in a card-file-size enclosure.

The DCA System 355 is available in three enclosure models: a rack-mountable, one-card-file model, a 4-foot high cabinet model, and the 6½-foot cabinet model. The cabinet models ▶

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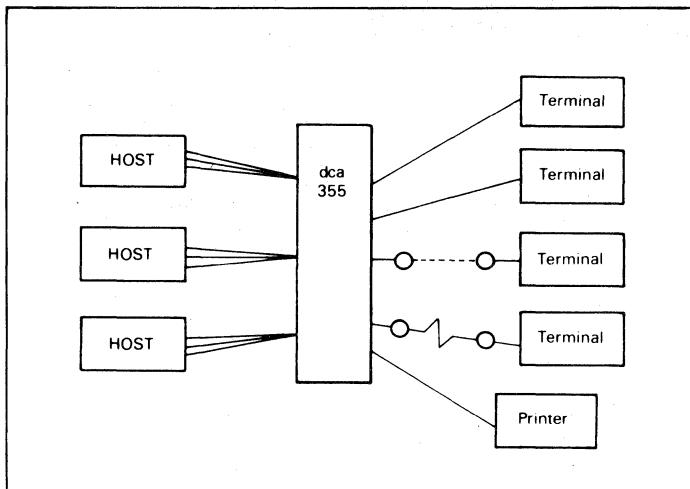


Figure 1. Stand-Alone Network

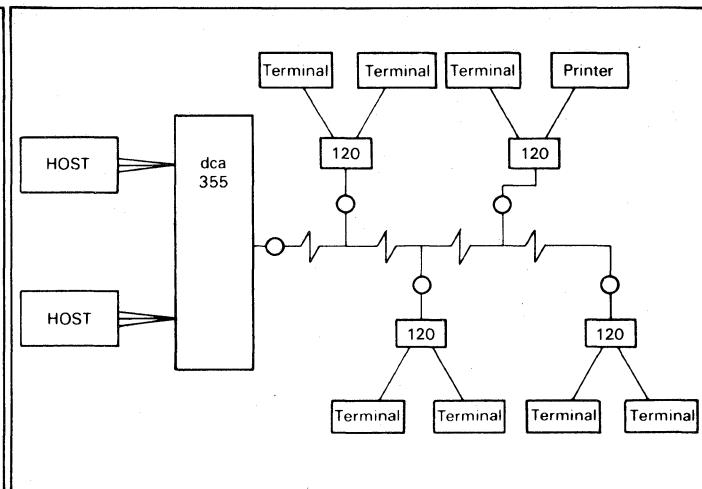


Figure 2. Multidrop Multiplexing Network

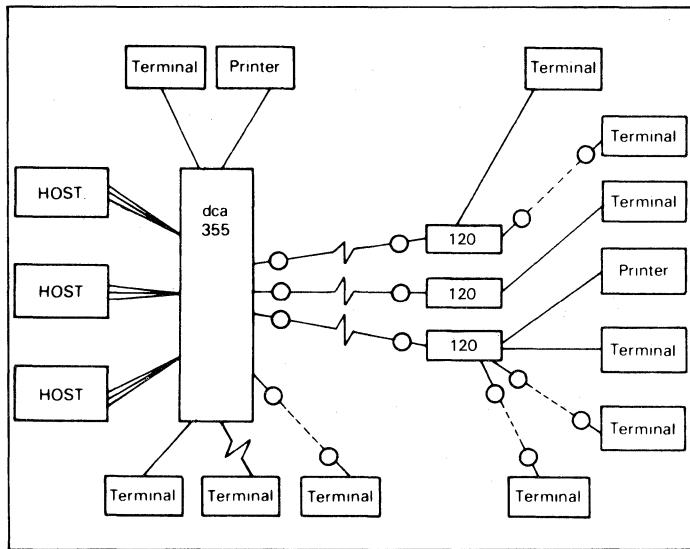


Figure 3. Multi-Link Network

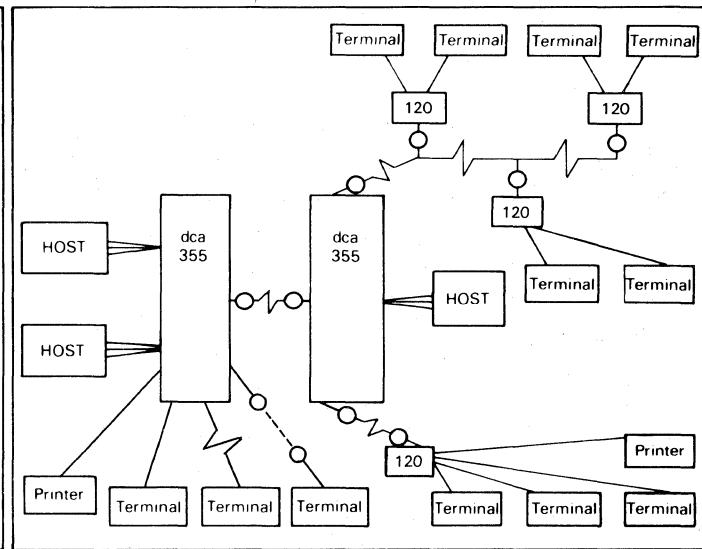


Figure 4. Remote Concentration Network

► possible to transport data using multidrop multiplexing over a single trunk link to multidropped nodes.

The DCA System 355 Network Processor can self-diagnose its hardware and software components, and is loaded automatically on power-up (manual or remote reset). Unattended operation allows the network components to perform their functions without human intervention, and with the ability to be monitored from either the central site or by DCA. A virtually unlimited number of DCA 355s can be tandemed in a network.

Software version 3.0 has been released, and as of June, 1982, is nearing completion of its beta tests. This software package includes additional features and the 64K processing module required to support them. These features include per-port-testing, downline file loading, simplified operator commands, and additional network management capabilities. These features are described in the accompanying Software section of this report.

► permit multiple card files to be rack-mounted inside. The 4-foot model measures 48 inches high, 22 inches wide, and 25 inches deep, and holds up to four card files. The 6½-foot model measures 78 inches high, 22 inches wide, and 25 inches deep and holds up to eight card files. Card file dimensions are 7 inches high by 19 inches wide by 11 inches deep.

Host selection allows asynchronous terminal users to access their choice of up to 256 host computers in the network. When a terminal user specifies a destination within the network, the network uses its automatic routing capability to find the best route to that destination. The network processor then uses contention to connect to a destination port on a first-come-first-served basis. In the most basic, stand-alone network, the DCA 355 can support 63 simultaneous cross connects.

The System 355 has a throughput of up to 400K bps, which allows the system to support up to 44 trunk lines. Protocol converters can be easily implemented, allowing asynchronous terminals to talk directly with packet-mode host computers or to packet-switched networks. Synchronous user equipment ports can be supported with a synchronous channel option that is transparent to the system. The built-in diagnostics for all microprocessor-based modules simplifies the isolation of faults within the system.

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> USER REACTION

In May 1982, Datapro conducted telephone interviews with four users of the DCA System 355 Network Processor. These user names were supplied to us by the vendor. The users represented experience with eight units for an aggregate total of five years. Their ratings of the equipment are as follows:

	<u>Excellent</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>	<u>WA*</u>
Overall performance	1	3	0	0	3.3
Ease of use	1	3	0	0	3.3
Software reliability	1	3	0	0	3.3
Hardware reliability	3	1	0	0	3.8
Maintenance service	1	2	0	0	3.4
Documentation	0	0	2	1	1.7

*Weighted Average is based on a scale of 4.0 for Excellent.

Two of the four users represented companies that were beta test sites for the version 3.0 software. The other two users indicated that they were planning on expanding their networks and acquiring version 3.0 software.

One user, representing a technological institute, was currently supporting approximately 30 terminals. He was very impressed with DCA's maintenance service, in which a replacement board was shipped the same day. He felt that the documentation, which at first was sketchy, was improving. This user was impressed with all the aspects of the DCA 355's performance. He was planning on acquiring the version 3.0 software, especially desiring the feature whereby the DCA 355 would automatically go through a power-up sequence after a power-down, without any operator intervention.

A second user, representing a power company, was supporting 60 terminals with his DCA 355. He was planning on expanding to support 110 terminals. He felt that the DCA 355 was ideal for small to medium configurations, but that trying to support a large network of terminals would tax its capabilities. He said his selection to purchase the DCA 355 was based on its ability to interface with DEC 205s and to demultiplex.

A third respondent, who represented a time-sharing software house, had been testing the version 3.0 software. He owns three DCA 355s in a multi-site arrangement with a remote stat mux and over 300 terminals on line. He said that while he had experienced problems with the new software, he attributed this somewhat to the fact that his network was operating in a totally new facility. This, he felt, had also made it harder to identify problems. He felt that the features that were most useful were the DCA 355's throughput, its echoing capability, and its practically limitless topology. He declined to rate documentation, because he felt it was in transition and improving greatly. He recommended the unit to a potential buyer, adding that he felt it was cost-competitive.

A fourth user, whose network was a beta test site for the 355, represented a second power company. This

> TRANSMISSION SPECIFICATIONS

Trunk lines operate synchronously up to 19.2K bps, and have dynamic bandwidth allocation based on statistical multiplexing. All industry-standard asynchronous and serial data formats are supported with throughput equal to the transfer speed of the bus (up to 400K bps effective throughput).

SOFTWARE

The DCA System 355 version 3.0 operating software is equipped with the following features:

- **Dynamic Configuration Control**—allows the network manager to reconfigure the network on-line via the console, without disturbing on-line users.
- **Network Control Security**—use of the log port and console port can be restricted to operate with password.
- **Traffic Counter**—count of the characters and modem transactions transmitted over a specified virtual circuit during a given period of time is obtainable by the network manager.
- **Port Speed Compensator**—allows for different baud rates at each end of a virtual circuit.
- **Console Macro Facility**—allows the network operator to associate complex software commands with simple operator-defined words. This feature tailors the console commands to the operator's environment. For example, the "word" NY.PORTS can be defined to mean all the ports in New York. To then get the status of all ports in New York, the network operator types "STATUS NY.PORTS."
- **Downline File Loading**—allows the network operator to copy a tape file from a tape drive on one node to the tape drive on any other System 355 node. This allows centralized configuration management and control.
- **Log Port**—provides an optional data stream of exception messages, connect/disconnect messages, and repeated statistical reports. This data stream can be directed to a printer for hard copy. It can also be directed to a host for further processing to perform network analysis, derive customer billings, or other customer-determined processing.
- **Per-Port-Testing**—allows the network operator to selectively loopback and test individual ports, and to generate test messages to ports. Ports, both on the System 355 and on its slaves, can be tested.
- **Supervisory Processing Module Relocation**—allows the network operator to configure a system with more card files than are initially installed, thereby facilitating expandability.
- **Network Management Commands and Statistics Functions:**

Repeat Command—allows the network operator to cause the System 355 to automatically repeat any group of console commands at any chosen time interval. The network operator can then get customized reports of network activity and status at time intervals appropriate to the network.

Per-Session Character Count—every time a virtual circuit is disconnected, the System 355 reports to the network operator how many characters were passed since the beginning of the session in each direction, and at what port

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► respondent owns three DCA 355s and has two more on order. His three DCA 355s are in separate buildings and are connected by three trunk lines that individually operate at 19.2K, 9600, and 4800 bps. His network supports 150 terminals. He said the selection to buy the DCA 355s was based on its capability for port contention, routing, and especially its simplicity of modular expansion. He declined to rate maintenance service, since his DCA 355s had not needed any: Swapping out boards had been easy enough for his company to perform themselves; and when more complex problems came up, they had been quickly solved by DCA in their simulation lab, in which the symptoms of the malfunction were duplicated, the problem quickly diagnosed, and the solution relayed back over the phone. He recommended the unit especially to those who had enough data communications savoir faire to not need extensive "road maps" in developing their networks.□

► speed. This allows the timesharing service to bill customers for number of characters passed.

Per-Handler Flow Control Reporting—allows the network operator to ask how many times a handler has stopped the flow of data into itself. If the network operator observes that the input ports are continuously flow-controlling, consideration should be given to either obtaining greater trunk-link bandwidth or reducing the number of characters coming into the network.

Buffer-Size Alarm—the system 355 will monitor free buffer space in each processing module and report each time it drops below an alarm level of 2048 bytes. This function

allows the network operator to know when a system needs more processing modules.

Load-Shed Exception Message Count—the System 355 will count the number of load-shed exception messages generated by the system and make this count available upon operator command. This information lets the network operator know if the network is so overloaded that it is protecting itself by purposely dropping data.

Bell On/Off Command—allows the network operator to enable or disable the sending of ASCII "bell" characters preceding an exception message. This audio indication calls the network operator's attention to problems in the network.

Additional features include unlimited network routing, host selection, port contention, character transparency, data-flow control, local echoplex, and X.25 protocol network interfaces for connection to Datapac, Telenet, Tymnet, or Uninet networks. The DCA 355 also conducts statistical multiplexing through dynamic allocation of the bandwidth to an active virtual circuit, and allows trunk-link multidrop multiplexing. It has character compression, variable block framing, and offers trunk-link error-controlled transmission.

PRICING

The DCA System 355 is available for purchase for \$10,995 for the 4-foot model, and \$11,295 for the 6½-foot model. Without a cabinet, the DCA 355 can be purchased for \$9,995. Available options are the network port modules (two ports each) for \$300, file card adapter for \$300, X.25 software (with gateway to Datapac, Telenet, Tymnet, or Uninet networks) for \$4,495, 8-card cage assemblies for \$2,065 each and a synchronous channel option for \$500. Asynchronous ASCII port cables are available for \$40 per 25 feet.■