Display Data In*sight System

MANAGEMENT SUMMARY

Display Data began operations in October 1973. It delivered its first In*sight system to an automobile dealer in Baltimore in January 1974, and by August 1977 the company had installed about 175 systems, mostly to automobile dealers. It has opened 17 branch offices, and plans additional expansion in its product line, industry areas covered, and branch office locations.

The In*sight system is billed as a turnkey system, and normally all programming is done by Display Data, but the systems tend to be installed in the same manner as user-programmed ones; i.e., basic functions are installed first and additional functions are implemented over a period of time.

The original choice by Display Data of automobile dealers as the first industry group to be approached was a good one. The auto dealers share a common reporting system to each of the major manufacturers. This provided a large base of common applications. In addition, many auto dealers are already familiar with data processing, usually through a service bureau specializing in their applications.

Now the company is expanding its horizons into other industry areas. A Contractor System has been officially released and is being marketed in the Baltimore area, and a Wholesale Distributor System is approaching its planned November 1977 release date. Consideration is also being given to specialized systems for CPA firms, automobile parts distributors, licensed beverage distributors, sand, gravel and concrete distributors, and printers. ▷

The In*sight system, a multi-terminal small business computer system aimed initially at automobile dealers, is also offered in two new versions for contractors and wholesale distributors. The 175 In*sight systems currently in use are maintained from 17 Display Data branch offices in major cities nationwide.

CHARACTERISTICS

VENDOR: Display Data Corporation, Executive Plaza IV, Hunt Valley, Maryland 21031. Telephone (301) 667-9211.

MODELS: In*sight.

DATA FORMATS

The user of an In*sight system works entirely with the data formats established by his procedures and files. Turnkey software is provided. The internal representation of data and instructions is that of the Microdata 1600/30; see Report M11-050-101.

MAIN STORAGE

TYPE: Core.

CYCLE TIME: 1 microsecond per 8-bit byte.

CAPACITY: 32,768 to 65,536 bytes in increments of 8,096 bytes.

CHECKING: None.

STORAGE PROTECTION: None.   ▶

*The multi-user, multi-job In*sight system provides user access through CRTs. Up to 32 local and/or remote CRT display units and printers can be supported by the Microdata 1600/30 minicomputer and 10-megabyte disk drive which form the heart of the In*sight system. The applications software is tailored to each individual installation and includes essential accounting functions installable in free-standing modules.*

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▷ From Display Data, you get a turnkey system suitable for operation by non-EDP professionals and a dedication by the company to support the installation. The company furnishes its own maintenance. When it started out, Display Data tried a third-party maintenance arrangement, but found that the level of installation loyalty by the third-party personnel was not high enough to provide the support (response time to service calls) that the company felt was necessary to ensure good customer relations. Display Data will not contract for an installation beyond a three-hour radius of one of its branch offices, so that it can maintain that response time to service calls.

Right now, the company has branch offices in Baltimore, Washington, D.C., Philadelphia, Greensboro, N.C., Atlanta, Cleveland, Detroit, Los Angeles, New York, San Francisco, Chicago, Columbia, S.C., Newport News, Va., San Diego, Houston, Cincinnati, and Dallas. Others are planned for 1978.

Expansion of industry areas served will proceed more slowly. At present, the branch offices market only the auto dealer package. As the other packages become fully developed, they will be released to the branch offices.

Overall, you get the idea of a well-planned business. The company has been profitable in each of its years, and a projection of $20 million in revenues for fiscal 1978 has been made.

The In*sight system is built around a Microdata 1600/30 processor using Microdata's standard firmware. Although microprogrammability was a major factor in selecting Microdata as a vendor, Display Data has only recently begun work on developing firmware specifically for its systems.

System configuration includes 32K to 65K bytes of main memory, one to eight 10-megabyte disk drives, and up to 32 local and/or remote CRT display units and printers. Up to four magnetic tape drives can also be added. Among the systems presently installed, the configurations tend to include six or fewer CRT's, one printer, and one or two disk drives. The largest configuration currently installled includes nine CRT's, four printers, and three disk drives (30 megabytes of storage).

The applications software furnished includes essential accounting functions such as general ledger, accounts receivable, accounts payable, billing, inventory control, and payroll. The software is tailored to the pecularities of each individual installation and is installable in free-standing modules. While any level of programming can be negotiated, users naturally tend to minimize changes from the basic apporach of the existing packages in order to minimize their costs. Software is separately priced and ranges from about $1,500 for a single program for payroll to about $15,000 for a complete auto dealer set. Custom programming naturally increases this cost. ▷

▶ RESERVED STORAGE: A total of 256 bytes of low-order memory are dedicated to interrupt, DMA status, and DMA control information.

CENTRAL PROCESSOR

The Display Data In*sight system is built around the Microdata 1600/30 minicomputer. At present, the standard Microdata firmware set is used without alteration. Because the user does not become involved with the internal details of the system in any fashion, even programming, those details are not repeated here. Please see Report M11-050-101 for the specifications of the Microdata 1600/30 processor.

INPUT/OUTPUT CONTROL

I/O CHANNELS: Printers and CRT's operate through programmed I/O up to a maximum total data rate of 40,000 bytes per second. A DMA facility capable of up to 1,000,000 bytes per second is used for the disk drives.

SIMULTANEOUS OPERATIONS: All peripheral and processing activities are overlapped within the capability of the memory and processor cycling rates.

CONFIGURATION RULES: The In*sight system can accommodate up to four 10-megabyte disk drives, four magnetic tape drives, and up to 32 local and/or remote CRT's and serial printers. Each CRT and serial printer counts as one device. In addition, up to four line printers can be attached.

MASS STORAGE

3201 DISK DRIVES: The 3201 consists of one disk drive and a controller capable of handling three additional 3201 add-on drives. Two sets of four drives can be installed on a system. Each drive consists of one fixed and one removable, 5-million-byte, top-loading, IBM 5440-style cartridges mounted on a common spindle. Data is recorded on 406 tracks on each of the 4 disk surfaces. The total capacity of one drive (two cartridges) is 10 million bytes. The disks rotate at 2400 milliseconds. Head movement time is 10 milliseconds minimum and 35 milliseconds average. The average access time is 47.5 milliseconds. The data transfer rate is 200,000 bytes per second.

INPUT/OUTPUT UNITS

See the Peripherals/Terminals table.

COMMUNICATIONS CONTROL

The In*sight system can operate with local or remote CRT and printer stations. Remote stations can be linked via point-to-point or multidrop arrangements. Transmission speed is 1200 bps. Multidrop operation requires a dedicated voice-grade line. The remote operator has access to the system in the same manner as a local operator, subject to special programming restrictions.

A special communications mode is provided with all In*sight systems. A 300-bps facility, including modem, is provided for operation over a dialed connection of the public telephone network to establish a link between a CRT station at Display Data's headquarters and the customer's system. Through this link, program changes can be made to the operating system, new programs can be loaded or activated, and diagnostic routines can be run. A CRT station at each branch office permits this facility to be used to perform diagnostic tests prior to a service call.

SOFTWARE

Software support for the In*sight system consists of a proprietary operating system devloped by Display Data and ▶

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PERIPHERALS/TERMINALS

MODEL	DESCRIPTION & SPEED	MANUFACTURER
MAGNETIC TAPE EQUIPMENT		
3601	9-track, 800 bpi, 45 ips; 36 KBS	Microdata
CHARACTER PRINTERS		
3401	80 columns, 64-character set, serial; 100 cps	Centronics
3402	132 columns, 64-character set; 165 cps, 60 lpm	Centronics
LINE PRINTERS		
3403	132 columns, 64-character set, 6 or 8 lines/inch; 300 lpm	Dataproducts
3404	132 columns, 64-character set, 6 or 8 lines/inch; 600 lpm	Dataproducts
TERMINALS		
3301	Local CRT/keyboard, 1920 characters, 24 lines by 80 characters, 64-character set, reverse video, numeric keypad; 1200 or 9600 bps	ADDS
3302	Portable CRT; includes built-in acoustic coupler	ADDS
3311	Printing terminal, 80 columns; 30 cps	Texas Instruments

▷ All programming is done by Display Data in assembly language. While this results in more efficient operation of the programs, it essentially precludes the user from making any modifications himself. Finding a Microdata assembly-language programmer or training one is not an easy task. However, because Display Data is willing to undertake customized programming, it becomes a question of dealing with a single vendor rather than giving up functional capabilities. The question of a single source also applies to expansion of the hardware components of the system. While alternate sources do exist for essentially all of the In*sight components, integrating them into the system typically involves software, so you're right back to the single-vendor question.

Although the In*sight system is a purchased entity and you might consider writing off its cost just like that of other capital equipment, computer systems typically demonstrate a functional life beyond the expected life of any particular component. Maximum economies are achieved when you make computers last as long as possible. Raising the question of a single source is not done to cast doubts on the advisability of your looking into the In*sight system—it is done merely to alert you to another significant point in your evaluation. It is typical of many systems offered in the computer market.

Being locked into support from one vendor is one side of the coin. The other side is simplified procedures, with only one phone number to call, no matter what the problem. Display Data provides both software and maintenance support, and feels that it can better serve its customers than if it were in a multi-vendor environment. The User Reaction section that follows suports this contention.

USER REACTION

Datapro interviewed five users of the In*sight system, including four automobile dealers and one contractor. ▷

▶ applications packages needed for each customer. New software applications packages are developed as needed, drawing on the company's previous work whenever possible. All newly developed packages are provided on a non-exclusive license basis; i.e., Display Data retains title and can offer them to other customers.

The general philosophy or program design used by Display Data is to use the CRT screen to replace or utilize the standard documents currently in use by the customer. Minimum change to existing precedures is a design goal. At present, a complete package is offered for general business accounting and other functions. Several new industry areas are being explored, and some are already implemented in pilot installations. All Display Data programming is done in assembly language.

OPERATING SYSTEM: The general method of implementing the multi-user, multi-job operating environment is through co-resident, re-entrant applications programs. The operating system controls program loading and activation, the interface between the applications programs and I/O devices, and the interface between programs and the master and working files held on disk storage.

A scratchpad area is maintained for each active program within the operating system resident area. For small to medium-sized configurations of about six terminals, the operating system occupies about 18K bytes of main memory. Applications programs typically require from 1K to 8K bytes, with the average about 3K bytes. Display Data says that one installation with 48K bytes of memory and one 10-megabyte disk unit is typically able to run six or seven programs simultaneously.

Multiple master files are maintained on disk. The disk access method is index sequential. Multiple indexes are maintained to files for more rapid access. Application programs for updating master files typically affect several files. A memo posting technique is used for most master files. Transactions are recorded when entered but are not immediately used to change the master file. However, if any inquiry is made to that file, the transactions are applied so that the displayed result is as if the master files had been updated. Physical updating or changing of the master file occurs when reports are printed, which is usually but not necessarily daily. Typically, each application program works with only one device—a CRT or printer; i.e., separate programs are used for input/inquiry and printing. This is feasible because the ▶

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▷ Each of these users had one system installed. The largest system included six CRT's and the smallest had two CRT's. The oldest installation had been in use for two years; the most recent, for two months. One of the users had previously been using a service bureau for his data processing work, and three had replaced in-house computers from Burroughs or NCR. The fifth user had converted from an entirely manual system. A summary of the ratings assigned by these users follows:

	Excellent	Good	Fair	Poor	WA*
Ease of operation	3	2	0	0	3.6
Reliability of mainframe	4	1	0	0	3.8
Reliability of peripherals	3	2	0	0	3.6
Maintenance service:					
Responsiveness	4	1	0	0	3.8
Effectiveness	4	1	0	0	3.8
Software	3	2	0	0	3.6
Ease of conversion	2	3	0	0	3.4
Overall satisfaction	4	1	0	0	3.8

*Weighted Average on a scale of 4.0 for Excellent.

All the users gave In*sight high scores. From talking with them, we learned that the things they liked most were the quickness with which information was available compared to their previous operations, and Display Data's responsiveness to service problems. Uniformly, the users reported service response times of three hours or better, as claimed by Display Data.

The automobile dealers that we interviewed expressed unanimous satisfaction with the In*sight systems and with Display Data's maintenance and technical support. One of the dealers said that he had especially benefited from the vendor's policy of updating the systems and applications programming. He cited in particular a new, faster sort program that had saved time in his operations.

One user, who said that he was the first contractor to implement In*sight, reported that although there was a period of adjustment during the development of the programming, there were no big problems in adapting the system to his business.

Datapro also interviewed two manufacturing/wholesale distribution companies that are pilot sites for the new In*sight Wholesale Distributor System scheduled for release in November 1977. Both of these systems had been implemented for less than a year, and both were experiencing some programming problems. Neither of these installations was fully operational yet in that it was not performing all the functions required by the user. The two companies were still in the middle of conversion and having difficulties that were being solved, according to one user, through a process of mutual education. Both users rated the hardware performance highly. Moreover, both felt that Display Data has been very cooperative and responsive to their needs and that the system will eventually satisfy their requirements.

These two companies stated that the problems arose in customizing the existing In*sight programming for the ▷

▶ application is completely defined and not subject to direct modification by the user.

LANGUAGES: None is normally accessible to the user.

APPLICATIONS: Three applications packages are currently offered: Auto Dealer, Contractor, and Wholesale Distributor.

The *Auto Dealer* package is tailored for the particular reporting requirements of each automobile manufacturer. Display Data has installed packages for General Motors, Ford, Chrysler, American Motors, Jeep, truck manufacturers, and foreign manufacturers. The package consists of the basic Auto Dealer System and a series of optional modules including Parts Inventory—Back Office, Parts Inventory—Counter Billing, Leasing, Service, Merchandising, and Sales Prospecting.

The Basic Auto Dealer System includes a variety of programs to accomplish general ledger, accounts receivable, accounts payable, purchasing and receiving, and payroll functions. All of these, except payroll, are accomplished within the context of a single "interface" with the user. In general, a two-level "menu" approach is used to select the operation performed.

The first level provides selection among only six categories: Utilities, Disk File Set-Up, Inquiry Programs, Transaction Entry, Prints, and Log Off (system shutdown). Each of these categories possesses a second level of program selection. The Transaction Entry and Prints categories are the ones used for most day-to-day operations. The Inquiry Programs category provides access to the parts inventory, auto service transaction, and system operating instruction files only. General inquiry for master file records and previous transactions in the current accounting cycle is handled through the Transaction Entry category of programs.

A long list of programs is provided under the Transaction Entry category for transactions such as general journal entry, new car sales, used car sales—retail, repair orders, internal sales, fleet sales, parts, body shop, repair orders, cash receipts, cash disbursements, new car purchases, etc. Each of these transactions in effect corresponds to a journal entry in a double-entry bookkeeping system. The reason many specific types of transactions are identified, rather than one general type, is to permit close identification of the system's operation with the documents that are created during the normal course of the auto deler's business. For any of these transaction types, the user has the option for creating automatic general ledger account entries so that the operator has only to enter amounts. The automatic account numbers are displayed with the names of the accounts to permit easy operator identification. The automatic numbers can be overridden for special handling of certain transactions.

The general style of input consists of keying transaction-identifying information, such as invoice number, customer number, etc., into the top half of the display area, with identifying information such as customer name and address automatically supplied for visual verification. Multiple-line journal entries are made in the bottom half. Up to 4 "pages" of 20 lines each can be maintained for each transaction to retain account activity information. Because of the historical information, the Transaction Entry operation also permits file inquiry. Reversing entries are used to make corrections.

The Prints program category contains programs for generating printed journals of each Transaction Entry type, management summary reports, trial balances, financial statements, analysis reports, and all of the payroll reports and checks. As a part of most print programs, the relevant master files are updated. The transaction journals can be ▶

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specific needs of their industry. One user said that Display Data had ironed out a lot of these problems from its experience at his site and would eventually emerge with a successful and saleable system. This user also said that although only half of the functions he requires can now be run on the system, the time savings have been tremendous with the functions it is performing now.

Display Data has demonstrated a dedication to serving the needs of its customers. The In*sight system shows the viability and desirability of a well-planned multi-user minicomputer system in serving small business data processing needs. With growing geographical coverage and increased support of industry areas other than the initial automobile dealer area, the In*sight system should satisfy the requirements of a broad range of data processing users.□

printed only once because of the master register updating that also occurs.

The Payroll package is complete for salaried and hourly employees and permits up to 10 different deduction types other than federal and state taxes. Checks, check register, payroll register, trial balance, and sorted labor distribution can all be printed.

The Parts Inventory programs provide for maintaining inventory control and for automating the generation of packing lists by bin number and inquiry for the status of specific parts. Specific reports include counter reference, various analyses and summaries, and suggested parts ordering information. With the additional programs contained in the Counter Billing version, customer bills can be generated at the counter through a CRT user station and 100-cps printer. Access to the system also permits reviewing a customer's history so that appropriate service suggestions can be made. The package simplifies coordinating the various labor parts and service charges and markups.

Auto dealer leasing has become increasingly important. In*sight's Lease module can be integrated with the accounting system or set up as a separate entity. (Some dealers set up leasing as part of their dealership; some establish a separate leasing corporation.) The leasing module is reportedly strong enough that a pure leasing company that carries 1600 leases installed the system for its leasing functions.

Details on the applications software for the new Contractor System and Wholesale Distributor System were not available at this writing.

PRICING

The Display Data In*sight system is offered for sale only. Maintenance is provided by Display Data from branch office locations. A response time of three hours is guaranteed; consequently, sales are restricted to locations within three hours of a branch location.

The system purchase price includes complete installation, but not software. The software prices include complete installation and training. The software is guaranteed for one year, and package enhancements developed during that year are provided free. Enhancements after one year are provided for only the labor and equipment costs of installing them for the user.

In addition to on-call maintenance service, the company provides monthly preventive maintenance inspections; during these calls, the disks are cleaned and filters changed.

The maintenance arrangement is pre-paid amounts with monthly, quarterly, or annual billing. Quarterly billing costs 10 percent more than annual billing, and monthly billing costs 21 percent more than annual.

EQUIPMENT: The following typical systems include all controllers and adapters, but the prices are exclusive of software.

SMALL SYSTEM: Includes In*sight processor with 32K bytes of memory, one 10-megabyte disk drive, CRT controller, one local CRT station, a 165-cps printer, and modem for software/diagnostic connection to Display Data. The purchase price is $39,200 (software additional). Maintenance costs $295 per month, billed annually.

MEDIUM SYSTEM: Includes In*sight processor with 40K bytes of memory, one 10-megabyte disk drive, CRT controller, four local CRT stations, a 300-lpm printer, and modem for software/dianostic connection to Display Data. The purchase price is $57,300 (software additional). Maintenance is priced at $385 per month, billed annually.

LARGE SYSTEM: Includes In*sight processor with 56K bytes of memory, one 20-megabyte disk drive, CRT controller, nine local and two remote CRT stations, a 600-lpm printer, a 30-cps printing terminal, a modem for software/diagnostic connection to Display Data, and additional modems for remote screens. The purchase price is $104,300 (software additional). Maintenance is priced at $685 per month, billed annually.

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EQUIPMENT PRICES

		Purchase Price	Monthly Maintenance*
PROCESSOR			
3001	Central Processor, with 32KB memory	$15,000	$ 85
MEMORY			
3101	8KB Memory Module	3,500	10
CONTROLLERS			
3350	CRT Controller	750	10
3351	Terminal Controller	750	10
3450	Printer Controller	1,250	10
3550	Modem Controller	750	10
MASS STORAGE			
3201	Disk Drive, 10 megabytes	13,000	90
MAGNETIC TAPE			
3601	Magnetic Tape, 9-track, 800 bpi, 45 ips	8,950	70
PRINTERS**			
3401	Printer, 80 columns, 100 cps	3,000	50
3402	Printer, 80 columns, 165 cps, 60 lpm	4,750	60
3403	Printer, 132 columns, 300 lpm	10,500	80
3404	Printer, 132 columns, 600 lpm	17,500	100
TERMINALS**			
3301	CRT, 1920 characters, local	2,950	20
3302	CRT, portable, with built-in acoustic coupler	3,450	40
3311	Printing Terminal, 80 columns, 30 cps	1,950	20
3502	Modem, 1200 bps	1,500	20
3504	Modem, 1200 bps for GM transmission (requires 3550 Controller)	1,500	20
3506	Modem, 9600 bps	1,000	20

*Prepaid annually; prepaid quarterly billing is 10 percent higher; prepaid monthly billing is 20 percent higher.
**All printers require the 3450 Printer Controller, and all terminals require the 3350/3351 Terminal Controller.

SOFTWARE PRICES

	License Fee
Auto Dealer System—	
General Ledger and Accounts Receivable	$3,000
Payroll	1,500
Sales Follow-up	3,000
Service Follow-up	3,000
Parts Inventory—Back Office	3,000
Parts Inventory—Counter Billing	4,500
Repair Order Billing (requires Parts Inventory—Counter Billing)	3,000
Leasing	3,000
GM High-Speed Transmission	1,500
Contractor System—	
Accounting	3,000
Payroll	3,000
Job Cost	3,000
Estimating	3,000
Accounts Payable	3,000
Wholesale Distributor System—	
Inventory	3,000
Accounts Receivable/Invoicing/Sales Analysis	4,000
Order Entry	1,500
Payroll	1,500
General Ledger	1,500
Accounts Payable	1,500
Purchase Orders	1,500