

June 1978

Computers and the printing industry.

Computers can represent a substantial savings to the operators of commercial printing businesses. Presently there are over 22,000 printing establishments in the U.S., which are primarily involved in general printing production. They provide their customers with the billions of pamphlets, brochures, magazines, and newspapers which we see daily.

The printing business is a highly competitive industry which operates at a low margin of profit. The printer must ensure that he produces a product that is of the quality the customer is seeking, at a price low enough to win the contract yet high enough to make a profit. To do this he must control his labor and material expenses while understanding the use of sophisticated equipment, complex techniques, and intricate schedules.

In order to see how a small computer can aid a printing business, it is helpful to understand the nature of the printing industry. There are over 22,000 general printing houses and 2,600 specialists, e.g., newspapers, business forms, etc. Five thousand of these establishments hold 50% of the industry's receipts at an average of 1.4M each. These are medium-sized companies usually employing between 20 and 250 employees. This group represents the prime target for selling small computers.

The operation of a printing house is extremely complex. It entails the management of sophisticated and expensive equipment and juggling complicated production schedules. Every day a high number of estimates must be computed and inventories (paper, ink, film, etc.) must be controlled. The business must run smoothly, taking into account the relationships between time factors, labor, and material costs. The industry is not standardized; in fact, every job is different.

In the printing industry "different" is the key word. For every job, different raw materials are needed. Different amounts and types of labor are necessary. (One job may require some artwork, another, none at all). Different production techniques are required, depending on what type of printing process is used. Some jobs may require that a specialist be subcontracted to do parts of the project. Even the printing presses themselves may differ.

Besides the fact that each of these variables represents a decision which must be made, each also represents expenses. Therefore, each factor is referred to as a cost center which the management must control. To do this, both the output and performance of the company are measured against established standards. To monitor these expenses requires a great deal of clerical time. This is one area where a small computer can ease the business's operations.

It is also helpful to understand the various types of printing processes that are available to printers today. The use of the lithographic press (also known as offset printing) continues to dominate the industry, while the letterpress is on the decline. Gravure printing is on the upswing although its use is still relatively limited. Finally, the web press, in use since the 1920's, is increasing in importance. This press is able to print on two sides, cut, dry, and fold the paper in one continuous process. Its new-found popularity is due to the fact that increased technology and improved management have made the investment in such costly equipment worthwhile. Its major drawback is that since it is so expensive, often the printer must keep it running almost continuously in order to realize a profit. Thus, to keep the printing house operating in the black, it is often advisable to use a small computer in conjunction with web press operation.

The applications for small computers are numerous in the printing industry. The first step in accepting a printing job is the estimate of what it will cost. This is also the first area in which a small computer can make its presence felt.

Job cost estimating is extremely important to how successful the printing establishment will be. If the printer cannot give an accurate estimate of what his expenses will be to do a particular job, he may as well kiss his profits goodbye. Thus the job cost estimate is the basis for the company's profit and loss. In this process the printer prices the costs of his materials, labor, printing processes, sales commission, and overhead to arrive at a final quote figure at which he can do the work, hopefully to his customer's satisfaction.

In order to arrive at such an estimate, a great deal of detail work is required. Throughout this process certain concessions and tradeoffs must be made to ensure that the job is completed in the best manner possible. Once these decisions are made, the process is mostly a numbers game. With a small computer whose data base consists of equipment characteristics, production times, and the standard costs of the labor and material, the printer receives an accurate picture of what a project will cost.

The computer may also be beneficial for production planning and scheduling. With a number of jobs running at any one time, deciding where and when to run each particular job becomes the key to an efficient operation. Besides the task of scheduling each project in relation to others, scheduling also involves arranging the various steps within one job. In terms of setting schedules, the printing industry faces a most difficult task, since every project is different.

As well as setting the schedules for the various jobs that come in and the steps required to do them, production planning also must regulate the use of the equipment in the plant. This is sometimes referred to as production loading. With the aid of a small computer, the printer can determine which areas are overloaded and which are not being used to their fullest capacity. Thus, production loading provides additional clues to the printer concerning his optimum schedule. Since the schedule for a printing plant is one that requires revisions daily, the computer can be instrumental in tracking the various departments, thus heading off potential logjams. To ensure peak efficiency, the printer must determine with the aid of a computer where to minimize, should he decide to maximize in other areas.

Job cost accounting is another important application that can facilitate the operations of a printing business. In this function the computer tracks the actual cost of the labor and all the materials. Without a computer all information concerning the purchase orders, materials used, and expenses are recorded manually to keep track of the actual cost of the project. With automation this information is entered into the

computer to be later used to determine the status of the project, the cost to date, or to obtain an analysis with its estimated cost. At the end of the project, it is much easier to discover where the profits or losses occurred.

The true assets of a printing company are its equipment and materials. Each printer makes a tremendous investment in the presses, the binders, the tons of paper, ink and film; so it is absolutely necessary that he maintain accurate inventory control. He must know what his current stock is, what has been ordered, and what price changes occur. Since the financial well-being of the company is very closely related to the value of its stock, inventory control is an extremely important application to a printer.

There are several clues to look for when trying to follow through on prospects. First, make certain that the printer usually handles fairly straightforward projects. Secondly, look for the printer who is concerned with the consistency of his estimates. Also, if he handles a large volume of estimates with a high number of variables (e.g., different quantities and sizes of paper), he is a likely candidate.

(Abstracted from SMALL BUSINESS SYSTEMS INDUSTRY REPORT.)

GBS

Updated Publications

Shortly, we will be releasing two GBS support documents: *Introducing GBS* and the *Sample Reports* manual. We have added GBS for Wholesale Distribution and Payroll (Mod IV) information, accordingly. This release should represent the final version of these documents since they now depict the complete GBS system.

Also, coming soon will be the final release of the GBS Technical Guide which now includes modules I through IV.

GBS in a Workstation Environment

In past newsletters we have presented several brief explanations relating to the installation of GBS in a workstation or multi-user environment. (GBS was designed strictly as a single-user system.) In an attempt to expand on this subject, we have included a few previously presented points along with many new ones.

In response to your requests and as mentioned in Newsletter #8, an MVP version of the GBS system is currently under development. However, there still appears to be a requirement for a "T" or "VP" version applicable to a workstation configuration. In consulting several GBS vendors who have undertaken this project on their own, the minimum common effort involved, in all cases, was the substitution of KFAM-5 (a multiplexed version) for KFAM-3 (a single-user version).

Bear in mind, though, that this is only the initial step. As a result of vendor input and having begun the MVP conversion design, a number of other considerations have become apparent.

Since Wang will not be providing a "T" or "VP" workstation version of GBS, we have compiled a list of points to be considered should you wish to undertake the conversion on your own.

GBS employs extensive use of RPL programs created with the RPL utility software. There are several file dump routines and a few other programs that utilize this software in conjunction with KFAM files. Because RPL does not support KFAM-5 files, several report programs must be rewritten in BASIC.

If you are modifying Mod I, including Accounts Receivable, please note that the "purge" program calls for a module named "BUILDKEY" which, in actuality, is modified KFAM-3 software. This module must be considerably reworked in order to perform in conjunction with KFAM-5.

GBS performs some updating in an automatic batch mode (i.e., invoice create and shipping confirmation update). This is perfectly adequate in a single-user environment, since an operator is logically prevented from keying in new orders or invoices until the system has completed the update from the previous batch. In a multi-user operation, entry cannot be made from two stations concurrently unless some of the critical files, like inventory, are updated in an on-line manner by each station.

"Hog mode" routines must be designed to control access to certain sequential files on the hard disk such as the Lost Sales/Estimated Shortage file and journal entry type files. In addition, the Control File, which is used to obtain the next available invoice or order number, to update A/R balances, sales totals, etc., must also have "Hog mode" routines incorporated.

Several programs use the printer in an interactive mode. For instance, during Shipping Confirmation, an adjustment report is produced showing all of the changes an operator enters. Obviously, an alternative method of recording adjustments would be required if both stations were to confirm orders at the same time. A simple, but more costly, solution would be to provide each station with its own printer. Even after the alternatives to interactive printing are provided, all programs that print reports must be modified to check for printer availability (no one else using it) and react accordingly.

The hard disk version of GBS makes extensive use of the single diskette drive to store three different classifications of files. Each type presents its own unique set of problems. However, common to all is the need to move these files to the hard disk platter (if there is available room) and to establish

arbitrary limits to the size of each (on diskette, these files are multi-volume and can thus be as large as necessary).

The "audit" files store information relative to the maintenance of certain master files. Each master file has its own audit file in GBS. These files could be eliminated, but this is not advisable. More advisable is that they be stored separately on the hard disk, stored in reusable files, or combined into one file which is hogged and written with similar records...a single audit report being produced by the system. This last method obviously involves the most programming changes.

The second type of diskette files are the transaction and journal files. These files receive data in the same sequence in which it is entered by the operator or from certain system updates, such as "service charge calculation." Later, upon request, a detailed report is produced in the same sequence (i.e., journal entry, cash receipts). These files cannot be eliminated and should be stored separately or in reusable areas with fixed maximum sizes. Programs that print these files need to indicate when the file is free for re-use in order to prevent loss of report data.

The final category of diskette files includes both the Invoice Transaction and Order Transaction Files. These two sequential files are the output of the three largest entry programs. The invoicing, order entry, and shipping confirmation functions are normally the reason a user will require a workstation configuration; so it is most likely that the user will need to run these applications simultaneously from two stations. The Order Transaction file could be eliminated if the open order file was updated during entry and methods were designed to print the Order Register and Shipping Papers directly from the Open Order file. The Invoice Transaction File is not as easy to eliminate. No other file in the system contains all of the data stored within this file. This data is necessary to update inventory, sales, and accounts receivable and to produce invoice and shipping registers as well as the invoices themselves. Thus, this file must be retained as either several independent sequential files, as one sequential file (with sort programs to properly assemble the header detail and total records), or as a single KFAM type file to which each station can add. Again, all reports produced by this file and all updating performed from it require program changes.

A further point that should not be overlooked concerning the Invoice and Order Transaction files, is that new, more complete techniques for voiding entries must be incorporated as more on-line updating is added. (GBS offers many opportunities to void an entry.)

Finally, one obvious addition to the system would be certain control status checks that would prevent stations

from performing conflicting operations that could cause errors or loss of data.

These are the major areas that we have determined need attention if you are installing GBS in a workstation environment. As we become aware of other points concerning advisable changes, they will be published in subsequent issues of the *Newsletter*.

The amount of work necessary to install GBS in a multi-user environment is directly proportional to the individual customer's requirements. Some of the points listed above may be of no concern in particular situations. For instance, if a second station is to be used for inquiry only, complications with transaction file handling diminish. However, even in an inquiry situation, care must be exercised with regard to KFAM files. KFAM-3 may be used only as long as the inquiry station does not access a file being used by the other station. This situation could be very dangerous if the responsibility for determining the proper file handling was placed on the user. KFAM-5 substitution or some file contention controls should be considered the minimum change required.

Recent Publications

The following items have been released from Lowell between March 1, 1978 and April 30, 1978.

DATA SHEETS

2271P Plotting Output Writer Data Sheet (700-4366A)
2231W-6 Line Printer Data Sheet (700-4677)
2200MVP Data Sheet (700-4656)
5595-5 Bisynchronous Communications Option Data Sheet (700-4657)
(This data sheet replaces the 5528 Data Sheet (700-4382A))

MANUALS

Word Processor Operator's Reference Guide (700-4465)
2200 Multiple Comparison Tests User Manual (700-4460)
2200 Introducing Life Insurance Illustration System Manual (700-4603)
GBS For Wholesale Distribution Operator's Manual (700-4609)
2200 Bioassay and Probit Analysis User Manual (700-4602)
2271P Plotting Output Writer Reference Manual (700-4479)
9005 Paper Tape Punch User Manual (700-4618)
2200 Analysis of Covariance User Manual (700-4626)
GBS for Wholesale Distribution System Manual (700-4645)
2282 Graphic CRT Plotter User Manual (700-4627)

Word Processor Twin Sheet Feeder Operator's Instructions (700-4664)

Word Processor System Security Option Operator's Instructions (700-4673)

Word Processor Mathpak Option User Manual (700-4671)
2228B/Option 62B Synch./Asynch. Communications User Manual (700-4670)

Time and Record Keeping System User Manual (700-4680)

PRODUCT BULLETINS

#160 Word Processor Twin Sheet Feeder
#158 2281P Printer/Plotter
#161 Word Processor Sort Option
#162 Word Processor System Security Option
#163 Word Processor Mathpak Option
#164 2231W-6 Line Printer

REPRINTS

2254 IEEE-488 Interface Data Sheet (700-4008B)
2209 Nine-Track Tape Drive Data Sheet (700-3565E)
9027 Scanning Input Interface Operating Procedures (700-4389A)
2200T Introductory Guide (700-4613)
2200 Programming in BASIC Manual (700-3231G)
2202 Plotting Output Writer Data Sheet (700-3223H)
2228B or Option 62B Synchronous/Asynchronous Communications Controller D.S. (700-4143B)
2231W-3 Line Printer User Manual (700-4457A)
GBS Demo (700-4293A)
2227B or Option 62 Buffered Asynchronous Communications Controller Data Sheet (700-3830C)
Word Processor Accessories Data Sheet (700-4109B)
GBS Mod I (Disk) System Manual (700-4102B)
GBS-Mod I (Disk) Operator's Manual (700-4100A)
2200 Plotter Utilities Manual (700-3838C)
2272-2 Digital Drum Plotter Data Sheet (700-3826E)
WCS/15 Data Sheet (700-4296A)
2281P Printer/Plotter Data Sheet (700-4473A)
Word Processor 30 Data Sheet (700-3897D)
GBS-Mod III (Disk) Operator's Manual (700-4363A)

Trade Show Exhibit Schedule

Some of our readers have requested that we publish a continuing list of trade shows in which Wang will be participating. Beginning with this issue, we will be providing you with this information. If you have a desire to attend or display in these shows, please contact the host district for the "particulars."

June

| | | |
|---------|---|-----------------------|
| 5 - 8 | 1978 National Computer Conference (National) | Anaheim, CA |
| 12 - 14 | Minnesota Bankers Association | Bloomington, MN |
| 15 - 17 | Florida Association of Insurance Agents | Walt Disney World, FL |
| 18 - 20 | Professional Insurance Agents | McAfee, NJ |
| 18 - 21 | Independent Insurance Agents of Massachusetts | Portsmouth, NH |
| 18 - 21 | Texas Society of CPA's | Dallas, TX |
| 18 - 21 | Georgia Pharmaceutical Association, Inc. | Jekyll Island, GA |
| 20 | Association of Practicing CPA's | Bethesda, MD |
| 20 - 22 | Armed Forces Communications and Electronics Association | Washington, DC |
| 21 - 23 | International WP Syntopican VI (National) | Washington, DC |
| 21 - 23 | Minnesota State Bar Association | St. Paul, MN |

July

| | | |
|---------|----------------------------------|---------------|
| 18 - 20 | National Secretaries Association | Vancouver, BC |
|---------|----------------------------------|---------------|

August

| | | |
|-------|---|------------------|
| | Albuquerque Chamber of Commerce | Albuquerque, NM |
| 2 - 4 | South Carolina Association of Countries | Myrtle Beach, SC |

| | | |
|-------|---------------------------------|--------------|
| 3 - 8 | 1978 Lawyer's Exposition of ABA | New York, NY |
|-------|---------------------------------|--------------|

September

| | | |
|---------|--|-----------------|
| 11 - 13 | Canadian Industrial Communications Assembly Conference and TC Exposition | Toronto, ON |
| 14 - 16 | Florida Society of Professional Land Surveyors | Sarasota, FL |
| 25 - 26 | Management of an Accounting Practice Conference | Kansas City, MO |
| 28 - 29 | Trade Fair II | Albuquerque, NM |

October

| | | |
|-------------|--|-------------------|
| 12 - 14 | Massachusetts Association of Land Surveyors and Civil Engineers | Provincetown, MA |
| 15 - 19 | Financial Managers Society for Savings Institutions | Honolulu, HI |
| 16 - 19 | Info '78 (National) | Chicago, IL |
| 17 - 19 | ACSM - ASP Fall Convention (National) | Albuquerque, NM |
| 20 - 22 | Massachusetts League of Cities and Towns/Massachusetts Selectman's Association | Hyannis, MA |
| 24 - 26 | IWP Fall Symposium (National) | St. Louis, MO |
| 31 - Nov. 2 | Southwest Business Services and Equipment Exposition | Houston, TX |
| 31 - Nov. 2 | Word Processing and Office Equipment Trade Show | San Francisco, CA |

November

| | | |
|---------|---|----------------|
| 20 - 21 | Seventh Annual Word Processing Equipment Exposition | Washington, DC |
| 26 - 28 | 1978 Congress of Cities and Exposition | St. Louis, MO |

1979

Trade Show Exhibit Schedule

April

| | | |
|--------|------------------------------|-----------------|
| 4 - 6 | Word Processing Exposium '79 | Lake Geneva, WI |
| 9 - 12 | Interface '79 (National) | Chicago, IL |

Sept.

| | | |
|-------|-------------------------------------|---------------|
| 6 - 8 | Graphic Arts '79/The Charlotte Show | Charlotte, NC |
|-------|-------------------------------------|---------------|

Modems

INTRODUCTION/DEFINITION

The computer industry manufactures data processing equipment that utilizes DIGITAL signals to represent binary coded information internally. The communications industry provides networks and communications equipment that supports voice information which is carried or transmitted using ANALOG signals.

For data communications it is necessary to provide a means of connecting or interfacing the analog designed communications network to the digital pulse requirements of the data processing equipment. Devices used to make this connection are called MODEMS. The term modem is a contraction of the words modulator/demodulator. A modem, therefore, is an electronic device for the conversion of signals between a business machine and a communications line. When in the send mode, it modulates digital pulses to analog form. When in the receive mode, it demodulates the analog form back into the original digital pulses. The data link consists of two modems, one at each end of the telephone line, to provide for this signal conversion. The modems must be matched; that is, they must be identical or electrically equivalent in operation.

MODEM TYPES

There are many types of modems available from Bell Telephone and from other independent companies. Modems can best be grouped according to operating speeds and by identifying a special function group.

GROUPED BY SPEED

| Type | Speed | Use with Wang Equipment |
|-----------------|----------------------|---|
| 1. Low Speed | 0 - 600 BPS* | 2227B or 2228B |
| 2. Medium Speed | 1200 - 2400 BPS | 2227B or 2228B |
| 3. High Speed | 3600 - 9600 BPS | 2227B or 2228B (2228B or 7200 BPS only) |
| 4. Wideband | 19,200 - 230,400 BPS | not supported |

*BPS - Bits Per Second - Modem speed is specified in Bits Per Second.

Low-Speed Modems

Low-speed modems most commonly support speeds of 50, 75, 110, 300 and 600 BPS. These modems are used primarily in the interactive communications environment supporting teleprinters and display terminals.

Medium-Speed Modems

Medium-speed modems support transmission speeds from 1200 to 2400 BPS. They are utilized for interactive or low speed batch operations.

High-Speed Modems

High-speed modems operate in the 3600 to 9600 BPS range. Most common speed is at 4800 BPS on dial-up lines. Leased lines are usually required for 7200 and 9600 BPS. This modem type is used for high speed remote batch data transmissions.

Wideband Modems

Wideband modems support transmission speeds greater than 9600 BPS. Use of these modems is small and requires special leased lines.

The following is a list of special-purpose modems. They are listed apart from the standard modem types because of their uniqueness and special purpose. Except for the null modem, they serve the same purpose as the standard modem (i.e., signal conversion).

GROUPED BY SPECIAL FUNCTION

| Type | Speed | Use with Wang Equipment |
|-------------------|----------------|-------------------------|
| Acoustic Couplers | up to 1200 BPS | 2227B or 2228B |
| Short Haul Modems | up to 9600 BPS | 2227B or 2228B |
| Wang Null Modem | up to 9600 BPS | 2227B or 2228B |

Acoustic Couplers

Acoustic Couplers do essentially the same thing as modems. The modem is hard-wired connected to the telephone line and electrically transfers data. The acoustic coupler is portable and transfers data acoustically via an ordinary telephone. Acoustic couplers support transmission speeds up to 1200 BPS maximum.

Short Haul Modems

Short Haul Modems, also referred to as Limited Distance Modems, are designed for data communications ranging from a few hundred feet to about ten miles. They are non-Bell compatible and are used mostly for private line hard-wired links. Some can operate over Bell voice grade telephone lines.

Wang Null Modems

The Wang Null Modem is simply a connector that provides for the local connection of a Wang 2200 System to a terminal, a host computer, or another Wang System. The null modem replaces standard modems providing for local connections and makes the pin assignments compatible between the two devices being connected.

There are two versions of the null modem; they are the 2227N and the 2228N. As their names imply, the 2227N is used with the 2227B controller and the 2228N is used with the 2228B controller.

The 2227N has no polarity; that is, it makes no difference how it is connected. It is used only with the 2227B (or OP62). The 2228N has polarity. In other words, one end of the null modem must receive the cable from the 2228B (or OP62B). The other end will receive the cable from the other device being connected. The null modem is used with the 2228B controller and will support the synchronous mode of communications. The 2228N null modem can be used with the 2228B in asynchronous mode and with the 2227B. However, the reverse channel capability becomes disabled.

AVAILABILITY

Wang Laboratories does not manufacture or supply modems or acoustic couplers. This equipment must be obtained from Bell Telephone or from other suppliers. Modems may be rented from Bell in your locality or they may be purchased from any one of several modem manufacturers:

Ordering of a modem for a Wang Customer is not the responsibility of a Wang salesman nor is the installation of a modem the responsibility of a Wang serviceman. However, as a service to your customer you can assist in this area by referring him to the Data Service Representative of Bell Telephone in your local area. Or, you can provide him with a list of various suppliers as given in this article. The listing of

these suppliers is for convenience only. Wang Laboratories is not affiliated with or endorsing any of those listed companies.

BELL MODEMS

Just as IBM is the giant in the computer industry, Bell is the dominating force in the modem marketplace. Because of sheer size and total number of modems installed, Bell modems have become the "standard" and are used to measure or compare modems of other vendors for compatibility. As mentioned earlier, two modems are required in the data link and they must be matched.

In other words, it must be identical in operation to that of the Bell modem it will be communicating with. Bell Modems compatible for use with Wang 2200 Series Systems:

| Bell Modem | Speed |
|------------|----------|
| 103A/103J | 300 BPS |
| 212A | 300/1200 |
| 202C | 1200 |
| 202S | 1200 |
| 202T | 1800 |
| 201A | 2000 |
| 201C | 2400 |
| 208A | 4800 |
| 208B | 4800 |

MODEM OPTIONS

Bell System Modem Options to be used with Wang 2227B/2228B Controllers.

REQUIRED OPTIONS

Bell 103A Series 300 BPS

- Without Auto-Dialer
- Loss of Carrier Disconnect
- Send Space Disconnect
- Receive Space Disconnect

Bell 102J Series 300 BPS

- Request Standard Bell
- Factory Furnished Options
- Without Auto-Dialer
- Common Grounds

Bell 202C or 202S Series 1200 and 1800 BPS

- No Local Copy or Primary Channel
- Bell Engineered Timing Options
- Without Auto-Dialer
- Signal and Frame Ground Connected

Bell 201A Series 2000 BPS

EIA Interface
With Alternate Voice
Without New Sync
Half-duplex (2-Wire)

Bell 2201C Series 2400 BPS

Transmitter Internally Timed
EIA Ring Indicator
Without New Sync

Bell 208B Series 4800 BPS

Transmitter Internally Timed

Rixon, Inc.

2120 Industrial Parkway
Silver Spring, MD 20904
(301) 621-2121

Syntech Corporation

11810 Parklawn Drive
Rockville, MD 20852
(301) 770-0550

Vadic Corporation

505 East Middlefield Road
Mountain View, CA 94043
(415) 965-1620

SUPPLIERS

Low-Speed Modems

Anderson Jacobson, Inc.
1065 Morse Avenue
Sunnyvale, CA 94086
(408) 263-8520

Omnitec Data Corporation
2405 South 20th Street
Phoenix, AZ 85034
(602) 258-8244

Rixon, Inc.
2120 Industrial Parkway
Silver Spring, MD 29004
(301) 622-2121

Vadic Corporation
505 East Middlefield Road
Mountain View, CA 94043
(415) 965-1620

Medium-Speed Modems

International Communications Corp.
8600 Northwest 41st Street
Miami, FL 33166
(305) 592-7654

Intertel, Inc.
6 Vine Brook Park
Burlington, MA 01803
(617) 273-0950

Penril Data Communications Corp.
5520 Randolph Road
Rockville, MD 20852
(301) 881-8151

High-Speed Modems

GTE Lenkurt, Inc.
1105 County Road
San Carlos, CA 94070
(415) 591-8461

Rixon, Inc.
2120 Industrial Parkway
Silver Spring, MD
(301) 621-2121

Acoustic Couplers

Anderson Jacobson, Inc.
1065 Morse Avenue
Sunnyvale, CA 94086
(408) 263-8520

Data Access Systems, Inc.
100 Route A6
Mountain Lakes, NJ 07046
(201) 335-3322

Livermore Data Systems Inc.
2050 Research Drive
Livermore, CA 94550
(415) 447-2252

Omnitec Data Corporation
2405 South 20th Street
Phoenix, AZ 85034
(602) 258-8244

Short Haul Modems

Computer Transmissions
2352 Utah Avenue
El Segundo, CA 90245
(213) 973-2222

Gandalf Data Communications, Ltd.
15 Grenfell Crescent
Ottawa, Ontario, Canada K2G 0G3
(613) 225-0565

Penril Data Communications Corp.
5520 Randolph Road
Rockville, MD 20852
(301) 881-8151

Prentice Electronics Corp.
795 San Antonio Road
Palo Alto, CA 94303
(415) 494-7225

Spectron Corporation
Church Road & Roland Avenue
Mt. Laurel, NJ 08057
(609) 234-5700

Technical Information Center May We Help You?

Frank Agnew
Gerard S. Boyer
Michael J. Chen
Christopher J. Glueck
Theodore J. Leonsis
Wayne Sandberg

Special Product 9016

In certain configurations the need to multiplex more than four CPU's to one disk may arise. For the purpose of this article, we shall define a CPU as any Wang 2200 Processor capable of supporting a disk drive. The Special Product 9016 is capable of this task. In fact, a total of 16 CPU's can be multiplexed to one disk with a 9016 configuration, but some clarification of this point is necessary.

The 9016 consists of three major components: 9016C, 9016A, and 9016B. Think of the 9016C as a "Controller" ("C" for controller), and, in your minds, "equate" the 9016A with a 2230MXA and the 9016B with the 2230MXB.

Let us first consider the 9016C. Essentially, the 9016C is a small "box" with four amphenol connectors and one connecting cable. The connecting cable plugs into the disk drive to be multiplexed; each of the four amphenol connectors may be cable-connected to a 9016A.

The 9016A can go anywhere a 2230MXA can go. In fact, the same rules apply to the 9016A that apply to the 2230MXA. Likewise, the 9016B can go anywhere a 2230MXB

can go, including into a WS (workstation) of which it is an integral part.

The 9016 Multiplexer allows the creation of up to four (4) "2230MXA/MXB like" chains, each of which is directed through the 9016C, resulting in a multiplexed system of up to 16 CPU's.

Three different models of the 9016 are available.

| MODEL | DESCRIPTION |
|--------|--|
| 9016-2 | 2-Chain Multiplexer System (5 to 8 CPU's) |
| 9016-3 | 3-Chain Multiplexer System (9 to 12 CPU's) |
| 9016-4 | 4-Chain Multiplexer System (13 to 16 CPU's) |

Ordering the above models will provide the 9016C plus the appropriate number of 9016A's. Then you must decide on the number of 9016B or 9016B Equipped Workstations to order. That determined, order as follows:

MODEL DESCRIPTION

| | |
|-------------------------|---------------------------------|
| 9016B | Multiplexer Slave or |
| *WS-9016B Conversion | Multiplexer Slave Conversion |

Note: *Workstations may be factory-ordered to include 9016B instead of MXB. Field upgrades are also available.

An example of the above might be:

A customer has a 2200T and a 2200VP. In addition, he has ordered five workstations. His goal is to have these seven CPU's all multiplexed to his 2260B-2 disk. What 9016 components must he order? Which choice is the best choice?

- 1 - 9016-2
1 - 9016B
4 - WS - 9016B (Conversions)
- 2 - 1 - 9016-3
5 - WS - 9016B (Conversions)
- 3 - 1 - 9016-2
5 - WS - 9026B (Conversions)

Choice "1" does not convert all of the workstations.

Choice "2" is an acceptable configuration.

Choice "3" is the best choice because it will provide the optimum hardware at the lowest price.

The Technical Information Center can help you to configure a multiple processor system. Additionally, TIC can provide you with alternative solutions to multiple processor systems.

For help in configuring ANY system, feel free to call the TIC at any time.

2272 Drum Plotter Manual (700-3868A)

PLEASE NOTE: The current edition of the 2272 Drum Plotter Manual (700-3869A) contains misinformation concerning available options and effective plotting areas. The following is offered as an Errata Sheet and should clarify any and all misconceptions.

1. Page VI: Omit references to Appendix E.
Example: Appendix A Hexadecimal Codes . . . 49
Appendix B Plotter ASCII Character Set Sizes 51
Appendix C Specifications 55
Appendix D Paper Specifications . . 56

NOTE: *Delete* Appendix E Paper Roll Dispenser (optional) 57

2. Instructions

This manual describes the characteristics and operations of the Model 2272 Digital Drum Plotter (see Figure 1-1). The Model 2272 is a Digital Drum Plotter that provides point plotting and continuous line plotting over a plotter area with a dimensional width of 26 inches (40.6 cm.) and "unlimited length." The plotter operates at a rate of 4.5 inches per second (11.4 cm./sec.) maximum in each axis with a plotting accuracy of .01 inches plus 1%

Correction: delete "unlimited length," change to 81.9 inches (208 cm.).

3. Page 12 — State the upper and lower plot area boundary.

Example: To clear the top limit of the plot, hold down the CLEAR switch and depress said switch. This "clears" the current paper out "limit."

Correction: delete "clears" and "limit" — change sentence to read; This resets the current paper out limit to 40.8 inches.

4. Page 35 — Specify the effect of the Set Home code (HEX(E4)) on the upper and lower limits.

Example: *Set Home Position (HEX(E4))*

This code duplicated under program command the function of setting the plotter home position (X = 0, Y = 0) which is done manually via the plotter control panel. The home position (X = 0, Y = 0) is set to the position at which the plotter pen and drum is currently positioned by the following command Addendum: the horizontal limits are not altered, but the vertical limits are reset to power on default values (i.e., the 41.8 inches above and below home).

5. Page 17 — State the horizontal and vertical limits.

Example: Set Limits 8 inches to "each side (plotting area) of home position."

Delete: "each side of home position." Change sentence to read: 8 inches to left and right limits, 41.8 inches to upper and lower limits.

6. Page 36 "A"

Example: It should be noted that although additional plots could be made without resetting the home position; *if reset to home position is not used in plotting*; it is good practice to do so because . . .

Delete: "if reset to home position is not used in plotting"

7. Page 36 "B"

Pen left margin — left edge of plotter surface
Pen right margin — right edge of plotter surface
Paper out margin — "no limits"
Paper in margin — "no limits"

Delete: "no limits" — change to read — 41.8 inches

8. Page 55 should be amended as follows:

Example: plotting area:
16 in. (40.6 cm) wide by "any length"

Delete: "any length" — change to read — 81.9 inches long

9. Page 56

Weight should read "15 lbs"

- 10. Page 57 — "Delete entire page"
 - 11. Page 58 — "Delete entire page"
 - 12. Page 59 — Delete mention of paper roll dispenser
- Example: ON/OFF Switch 8
 Paper Roll Dispenser 57

Delete

ISS Full Record Sort

Did you know that there is a way to calculate the work file size for a full record sort in ISS release 3.0 and 3.2? It's true that the system itself goes through a similar calculation in one of the inherent sort modules; however, for those of you who have restricted disk storage, utilizing the formula in the *ISS Release 3.2* manual will allow you to set a more accurate work file size, thereby utilizing your disk storage more efficiently.

But there is some confusion concerning this formula that we will try to clarify for you. In your *ISS Manual, Release 3.2, page 243* you will see the following:

The length of the sort record for a full record sort is:

$$S = K + I + U - A + N + 3 * SGN(N)$$

Where

- S = SORT RECORD LENGTH
- K = KEY LENGTH
- I = LENGTH OF INPUT RECORD
- U = MAXIMUM LENGTH OF A VARIABLE PORTION
- A = TOTAL LENGTH OF ALPHA SCALAR FULL FIELD SORT KEYS
- N = NUMBER OF INTERNAL NUMERIC FIELDS IN INPUT RECORDS
- F = $R * S / 186$

Where

- F = Work file size (Actual Work File Size)
- R = # of records
- S = From above circulation

If you have read all the sort 4 documentation, the before-mentioned formula appears clear and straightforward except for Variable A. Variable A equals the total length of an alpha scalar full field sort key.

Normally, the sort keys specified to sort the file are detached from each record by the Sort 4 system and reattached to the beginning of each new record. The only case in which the sort keys do not need to be detached and reattached to each record is when the sort key specified is

alphanumeric and resident in a full field. Under this condition, the sort key can be maintained as part of the record in its place.

Example:

File: 2 records/sector
 124-byte records

- K \$ (k2) 10
- C \$ (2) 1
- D1 \$ (2) 64
- E\$ (2) 9
- F \$ (2) 3
- D 2 \$ (2) 32

The sort key = K\$; thus, when using the formula:

$$S = K - I - U - A - N - 3 * SGN(N)$$

$$S = 10 - 124 - 10 - 0 - 0$$

$$S = 124$$

Now, you may calculate your workfile size

$$F = R * S / 186$$

$$F = \text{Work file size}$$

$$S = \# \text{ of records sorted}$$

Software Package Listing

The trend toward cross-licensing of software packages is on the increase. The number of vendors cross-licensing and the number of requests from vendors looking for available packages has indicated that there is considerable interest in this method of doing business.

Thus, we have instituted the "Software Package List." The list will be printed each month in this newsletter and listings entered will be repeated until we are told that they are no longer valid. Each entry is classified by industry, in generic rather than SIC code format. Your comments and suggestions are welcome and encouraged.

Construction

VENDOR: Arden Business Consulting, Ltd.
 926 Roslyn Boulevard
 North Vancouver, B.C. Canada V7G
 IP3

CONTACT: Nick Arden

TELEPHONE: (604) 929-7614

(Continued)

APPLICATION: Job Costing, Accounts Payable, Accounts Receivable, Multi-union Payroll, Multi-company General Ledger.

DESCRIPTION: Fully integrated systems utilizing keyed access files. Emphasis is on ease of use by inexperienced operator, including extensive data validation. Orientation is on-line (c.f. Batch) transaction processing, well documented at user and program level. Job costing includes breakdown of job activities, with each activity having several cost categories. Full multi-company features. Job cost types, payroll rates and deduction; and benefits are table-driven for easy customizing.

MINIMUM H/W
CONFIGURATION: 24K-T Dual Floppy

Printing

VENDOR: Printing Systems (Pty) Ltd.
P.O. Box 48535 Roosevelt Park
2129 Transvaal, South Africa

CONTACT: Austin Daly
TELEPHONE: Johannesburg 726-3008

APPLICATION: For Administration and Management System

DESCRIPTION: The following functions are undertaken: — Estimating, Work tickets, Wages, Debtors, Creditors, General Ledger, Stock Control, Production Control, Cost Recovery.

MINIMUM H/W
CONFIGURATION: 16K Dual Floppy

Real Estate

VENDOR: Michael J. Butler
3450 Sawtelle Boulevard
Los Angeles, CA 90066

CONTACT: Michael J. Butler
TELEPHONE: (213) 776-2985

APPLICATION: Rental Listings or Property Listings

DESCRIPTION: Stores data on rental listings and provides custom demographic reports on this data. Currently used by a company that sells these lists to consumers. Can be easily modified to handle Real Estate property listings. Designed to accommodate up to 24 offices or branches.

MINIMUM H/W
CONFIGURATION: WCS-15 Dual Floppy, 24K, 2231W-2 (also hard disk).

Medical

VENDOR: Thomas M. Carpenter, Systems Engineer
703 North Avenue P
Clifton, TX 76634

CONTACT: Thomas M. Carpenter
TELEPHONE: (817) 675-6253

APPLICATION: Medical Accounting and Billing

DESCRIPTION: Complete Accounting and Billing application designed for individual physicians as well as multi-physician group practices; itemized patient statements; third party claim forms (insurance) including Medicare, Medicaid, Blue Cross/Blue Shield and AMA Standard; aging Shield, lists and automatic notification, detail accounting and statistical reports, and diagnosis/procedural analysis are some of the main features.

MINIMUM H/W
CONFIGURATION: Triple Floppy WCS/20 with 16K "T" processor and 2231W Printer.

NOTE: Seven current installations including internal medicine, radiology (2), family practice, cardiovascular, ear-nose-throat, and neuropsychiatric.

VENDOR: On-Site Computer Systems
P.O. Box 622
Savannah, GA 31402

(Continued)

CONTACT: G. Harn
TELEPHONE: (803) 726-5363
(912) 354-0851
APPLICATION: Obstetrics Patient Profile Monitor for Term of Pregnancy.
DESCRIPTION: System provides O.B. doctors on-line data for each patient term of pregnancy. With terminals in delivery room any doctor can view patient history on-line. Terminals communicate at 1200 baud, dedicated line to WCS-30 via polling processor. License fee - \$1,500.

MINIMUM H/W CONFIGURATION: WCS-30-4, 10 MEG, 2227B's remote PCS-II's as needed with 2227B, 2200T-4 polling processor.

Education

VENDOR: Compleat Computer Solutions
382 Hitching Post Drive
Orange, CT 06477

CONTACT: Dr. Michael Zabinski
TELEPHONE: (203) 795-9069
APPLICATION: Student Test Scoring System
DESCRIPTION: System scores up to 250 tests consisting of up to 100 questions, and each test may have up to 4 parts. System uses custom printed mark sense cards with 2 to 5 responses (true/false, or A, B, C, D, E) per question. Questions may be weighted, results curved. Many reports including grade distribution, bar charts, means, stand deviations, item-analysis.

MINIMUM H/W CONFIGURATION: 16K core, 1 floppy disk, card reader, line printer. Cost — \$300.

VENDOR: Compleat Computer Solutions (same as above)
APPLICATION: Student Grade Reporting (Grades 8-12)
DESCRIPTION: System designed to maintain files used

to store course information, student data and grade records. System generates the following reports: Proof (edit) grade lists, quarterly and end-of-year report cards, class ranking, academic deficiency lists, also cumulative class ranking, permanent record labels and grade distribution tallies by teacher, by course. The system is compatible with the student attendance system.

MINIMUM H/W CONFIGURATION: WCS-20, 12K core, 3 floppy disk drives, card reader, and a 112-column printer.

VENDOR: Compleat Computer Solutions (same as previous)
APPLICATION: Student Scheduling (Grades 8-12)

DESCRIPTION: System designed to store on diskette the student course selections, school master schedule, course structures, teacher and room assignments. Diskette is then sent to the Wang Data Center where the actual scheduling reports are generated.

MINIMUM H/W CONFIGURATION: WCS-20, 12K core, 2 floppy disk drives, card reader and a 112-column Printer.

VENDOR: Compleat Computer Solutions (same as previous)
APPLICATION: Student Attendance (Grades 8-12)

DESCRIPTION: System maintains a file of absentees, tardies, and dismissals by student and by date. System generates daily attendance, tardy, and dismissal reports as well as quarterly and year-to-date reports. System capable of responding to inquiries about a specific student's attendance record and lists all the dates on which the student was absent since the start of the academic year. System is compatible with the student grade reporting system.

MINIMUM H/W CONFIGURATION: WCS-20, 16K core, 2 floppy disk

(Continued)

drives, a marksense/punched card reader, and a 112-column printer.

with complete overview of system. License fee — \$500.

Business (GENERAL)

VENDOR: Productive Resources, Inc.
115 Northwest 15th Street
Corvallis, OR 97330

CONTACT: Judy A. Witt, Customers Relations

TELEPHONE: (503) 757-7225 (or 6)
(503) 752-5704 (24 hrs.)

APPLICATION: Payroll Processing

DESCRIPTION: Mini-Mis Payroll System is an 8K package that can batch process a variety of payrolls at once. Each employee is assigned a data file that is automatically updated as payrolls are processed. Payroll checks are printed with details (customized checks available), and time summary and tax reports are furnished. Up to 5 types of pays can be customized for each employee in addition to salary, regular and overtime. Includes W-2 (forms available) and 941 information, FICA and Federal Tax.

MINIMUM H/W CONFIGURATION: Dual minidiskette PCS-II with a 31W printer. WCS/20 with a printer.

MINIMUM H/W CONFIGURATION: WCS-20-4, Dual Flexible disk, 2221-W.

VENDOR: On-Site Computer Systems (same as previous)

APPLICATION: Tool or equipment allocation and control.

DESCRIPTION: System provides on-line control of tool/equipment inventories, which may be issued for later recall. Maintains inventory by issue location accountability as to who has been issued an item, how long he has had it. Terminals check items in and out and inquiry on tools or employee data.

MINIMUM H/W CONFIGURATION: WCS-30 VP-8, 10 or 20 meg, 2221W, 2228B'S. Terminals are Bell DS-40/3, 1200 baud dedicated lines. Maximum terminals system will support = 30 at 10 per 2228B port. License fee — \$5,000.

Programming Support and Utilities

VENDOR: Arden Business Consulting, Ltd.
926 Roslyn Boulevard
North Vancouver, B.C. Canada V7G 1P3

CONTACT: Nick Arden

TELEPHONE: (604) 929-7614

APPLICATION: Line Editor "Simple"

DESCRIPTION: Very simple, self-documenting line editor used to prepare letters, forms, documentation by computer or non-computer operators — features full "T" edit capabilities, plus 18 other special functions (additionally 10 screens of instruction) and fast print — system all core-resident — "crude but effective."

MINIMUM H/W CONFIGURATION: 8K — A with Edit ROM (Continued)

Government

VENDOR: On-Site Computer Systems
P.O. Box 622
Savannah, GA 31402

CONTACT: G. Harn

TELEPHONE: (803) 726-5363
(912) 354-0851

APPLICATION: Water and Sewer Billing System/Accounts Receivable/Payroll

DESCRIPTION: System provides complete accounts receivable for utility billing of water and sewer billing for small to medium municipals. Documentation available

VENDOR: Productive Resources, Inc.
115 Northwest 15th Street
Corvallis, OR 97330

CONTACT: Judy A. Witt, Customers Relations

TELEPHONE: (503) 757-7225 (or 7226)
(503) 752-5704 (24 hrs.)

APPLICATION: Word Processing

DESCRIPTION: Each page contains 14 names and addresses (up to 5 lines and 62 characters) or 868 characters of text. Any number of pages may be con-cocted together. For example, a minidiskette for PCS-II may contain either 952 customers' names and addresses or 71,176 characters of text. Triple these numbers for floppy. Fully documented (36 pages), shipped with sample data.

DESCRIPTION: Program Lister will let the user give a series of names of programs to be decompressed and listed on a line printer. The program will verify the existence of the requested program files on the disk and then prints a Table of Contents and listing of all programs on the list using decompressed format. Special characters are printed preceding the statement atoms to facilitate debugging, and the CRT lists statement numbers appearing in each statement.

MINIMUM H/W CONFIGURATION: PCS-II (8K) A cruder version is available for 2200B (4K).

MINIMUM H/W CONFIGURATION: PCS-II (8K) with dual minidiskette drive, printer or output writer or WCS/15 (8K) with dual floppy. Single disk version is also available but not recommended.

VENDOR: Productive Resources, Inc. (same as previous)

APPLICATION: Program Debugging Aid; Emergency Data and Program Fix-up.

DESCRIPTION: PRI Disk Editor (PRIDE) is a versatile 8K byte editor that lets a programmer get into any program or data disk and display the content of any sector in text, hexadecimal, or both forms. String search, replace, and remove can be performed locally or globally and use either a character string or hexadecimal string. Printer and output writer copies are available. The program occupies only 8K and may be made to reside in core with other PRI software.

MINIMUM H/W CONFIGURATION: PCS-II (8K), or WCS-15.

VENDOR: Productive Resources, Inc. (same as previous)

APPLICATION: Decompressed Program Listing for an 8K CPU.

Classified Ad Section

CUSTOM/ACCOUNTING/WORD PROCESSING/RECORD MANAGEMENT SOFTWARE

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This is a complete accounting and billing application designed for individual physicians as well as multi-physician group practices. Itemized patient statements, third party (insurance) forms, aging lists and automatic notification, detail accounting and statistical reports, historical (Major Medical) activity reports, and diagnosis/procedural analysis are some of the main features.

The patient master is randomized and available for review or update at any time. It is a full sector record with fields such as insurance-filed date, statement date, last payment date, and balance of account automatically maintained by the system. Support files such as diagnosis, procedure description, fee schedule, procedure code, etc., are customer maintained.

Mr. Thomas M. Carpenter
703 North Avenue P
Clifton, TX 76634
(817) 675-6253

WORD PROCESSING AND CLIENT SERVICING SOFTWARE

CWP — A completely revised version of the 8K software we licensed to Wang for use with LIFELINE and TIME/CHECK. Operating on all Wang disk systems with 16K memory (VP's included), the package provides text editing in both "page" and 'document' modes, random access to a 4000-line Glossary/Mailing List and a Client File Maintenance and Servicing package.

CWP was designed to handle tasks from spec writing to mass mailings and is easily modified for use in conjunction with other software. It is priced competitively and cross-licensing agreements are available.

SOFTWARE SYSTEMS COMPANY
14827 Ventura Blvd. Room 226
Sherman Oaks, CA 91403
(213) 995-0456

WANTED: Associate vendors who see a market for their product in Africa.

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Republic of South Africa

THREE D/ONE

A New Computer Application Software Development Method THREE D/ONE is a methodology based on 15 years of experience in improving the process of *designing*, *developing*, and *documenting* computer application software.

Many features of the THREE D/ONE method are designed to provide benefits for everyone that comes in contact with the application software development process.

The system analysts and programmers who actually use the method as a development tool realize many of the advantages in their day-to-day work. There is more time for creative thinking because the THREE D/ONE method eliminates, or at least lightens, the burden of a lot of the mundane, routine work they're normally required to do. Basically, their work is made easier for them because the documentation is standardized.

Another major benefit to the programmers/analysts is the improvement in communication with the users of their systems, and with their own non-DP oriented management.

Now, for the first time, DP management and system designers have the ability to successfully estimate, measure, and control the development process, because the method includes a unique time accounting feature.

A major feature of THREE D/ONE is that it makes the system development process auditable. Auditors, both internal and external, who understand this method can easily review any work-in-process where the method is being used. They are assured that all of the documentation is current and complete, that all data elements, files, records and reports are properly identified and cross-referenced, and that the appropriate security keys are in place.

Auditors who have reviewed the THREE D/ONE method have stated that everything else being equal, they would recommend a computer system that uses this method.

THREE D/ONE is constructed as a self-learning programmed instruction (P.I.) course. The system designers are first presented with the Overview, and at each step (procedure) there is a reference back to the "road map" so that they always know where they are in the process. They're then shown what has to be done in that procedure, what the parameters are, and why it's being done that way. They then simply answer questions in a Workbook made up of questionnaires, and that Workbook becomes an element of the controlled documentation library. Then, as in any good P.I. course, they review the work done, where they are in the process, and then proceed to the next procedure. *At that point, their documentation is current and complete through that step.*

A very general benefit accrues to any non-DP oriented people who come in contact with the THREE D/ONE method: It's an excellent educational tool for the uninitiated. It helps users, auditors, management people, and any others to understand the problems and the progress for the system development process. This means considerable improvement in the communications between such people and the EDP development team and results in faster system implementation, fewer misunderstandings, and improved results.

The standardization of the development process lowers the cost of system support activities. The computer manufacturers or system house trouble shooters have a complete and immediate understanding of the project status and method being used, so that considerable time is saved in analyzing any problem.

In summary, THREE D/ONE provides many benefits to everyone involved in the design, development, and documentation of application software. It helps users to understand the system development process and their

responsibility in supporting it. It increases the creativity and productivity of the systems development staff. Auditors are able to validate the system designs and data integrity. And finally, corporate, financial and EDP management has a tool with which to measure and control the system development process.

Any organization involved in computer application system design can afford the manual version of THREE D/ONE — it's priced at only \$995. Increases in staff productivity will pay for that on just one project.

Further information can be acquired from Sabar, Incorporated, at 5636 San Fernando Road, Glendale, CA 91202, (213) 240-8640.

■ Reprint from Computerworld ■

CLUB SWINGS SAVINGS WITH MODULAR MACHINE

WICHITA, Kan. — The Wichita Country Club decided it needed a computer system to handle its sports, entertainment and business accounts, and that decision is saving the club money and manpower, according to Donna Fowler, office manager.

In order to evaluate the feasibility of automating, the club organized a selection committee, which in turn directed some certified public accountants to draft requests for proposals.

The requests were submitted to several vendors, including IBM, NCR and Wang Laboratories. The returned proposals were evaluated and several manufacturers were selected to give demonstrations and oral presentations, Fowler said.

Since the staff would be directly involved with the operation of the equipment, it also participated in the decision. It attended oral presentations and demonstrations given by the vendors and gave its opinions to the selection committee and the club's board of directors.

The final selection of equipment was predicated on the following criteria:

- Equipment had to provide a flexible growth potential.
- Computer language had to be commonly understood.
- The office staff should be able to operate the equipment without excessive training.
- Support for the equipment should be available locally.
- Cost factors had to be competitive.

The committee finally selected Wang Laboratories for the hardware because it seemed to offer the best price and the best service, Fowler said.

A local software group was retained to provide the necessary programming. Programming considerations favored the local effort because no "package" applications were presented which resolved the needs of club operations, she said.

Difficult Application

One of the applications developed for the system was payroll, which needed the capability to handle high volume part-time help, seasonal fluctuations, salaried and hourly rates of pay, meals and other considerations such as employee benefit qualifications — all within a multiple-level accounting structure in which certain employees were allocated to more than one level.

Currently, payroll operations occupy about six hours, as opposed to three days previously, Fowler said. When the club staff expands to 120 employees in the busy summer season, 220 W-2 forms have to be prepared. This year-end work, which previously required approximately three-and-a-half man weeks, is now completed in one-and-a-half hours, she added.

Accounts receivable required the monthly computation of various classes of dues with the appropriate general ledger notation, member charges for all activities, including pro shop purchases, and rendering of statements and acceptance of payments.

In the area of accounts payable there were only minor deviations from "standard" to provide adequate general ledger accounting. Though by no means unique, the general ledger financial reporting system did need to prepare reports for and support each activity center.

Originally each item was handled a minimum of three times. First, it was classified and posted to expense; next the check was written (250 per month); and finally the check was properly posted to the ledgers.

With the Wang system the classifications and subsequent entry into the system is all that is required, Fowler noted. The computer prepares the checks, registers and appropriate expense account postings.

The club has a membership of 820, plus reciprocal memberships and a tennis and golf pro shop. Last year 23,500 rounds of golf were played with the usual amount of cart rentals and bag storage costs; a typical round of golf may result in four tickets of charges.

All the billings for the activities, services and merchandise are handled by the system, Fowler said.

System Benefits

One of the benefits the system has generated is its ability to reduce or eliminate the continual balancing and rebalancing which accompanies nonautomated methods, Fowler said. Time savings have been in segments of several hours or days in the various areas of application, she claimed.

This has resulted in special reviews and analysis being available which were not previously possible, she added. For example, financial statements for all 12 activity centers are now normally available by the 10th working day; member statements were previously rarely available before the 10th of the month and, of course, financials could not be started before member statements were finalized, Fowler said.

Club members' acceptance of the system was an original concern and, as was expected, a certain amount of confusion resulted from the first statements. A format change in the statements was presented which resolved most of the confusion, according to Fowler.

"We bought equipment which represented mid-range hardware for the vendor. We could have started smaller, but now we have the time and capacity for growth by simply adding modularly to our existing equipment," Fowler said.

SOFTWARE PACKAGE LISTING

DATE: _____

VENDOR: _____

CONTACT: _____ TELEPHONE: _____

INDUSTRY: _____

APPLICATION: _____

DESCRIPTION: _____

MINIMUM H/W CONFIGURATION: _____

INDUSTRY: _____

APPLICATION: _____

DESCRIPTION: _____

MINIMUM H/W CONFIGURATION: _____

INDUSTRY: _____

APPLICATION: _____

DESCRIPTION: _____

MINIMUM H/W CONFIGURATION: _____



Fold

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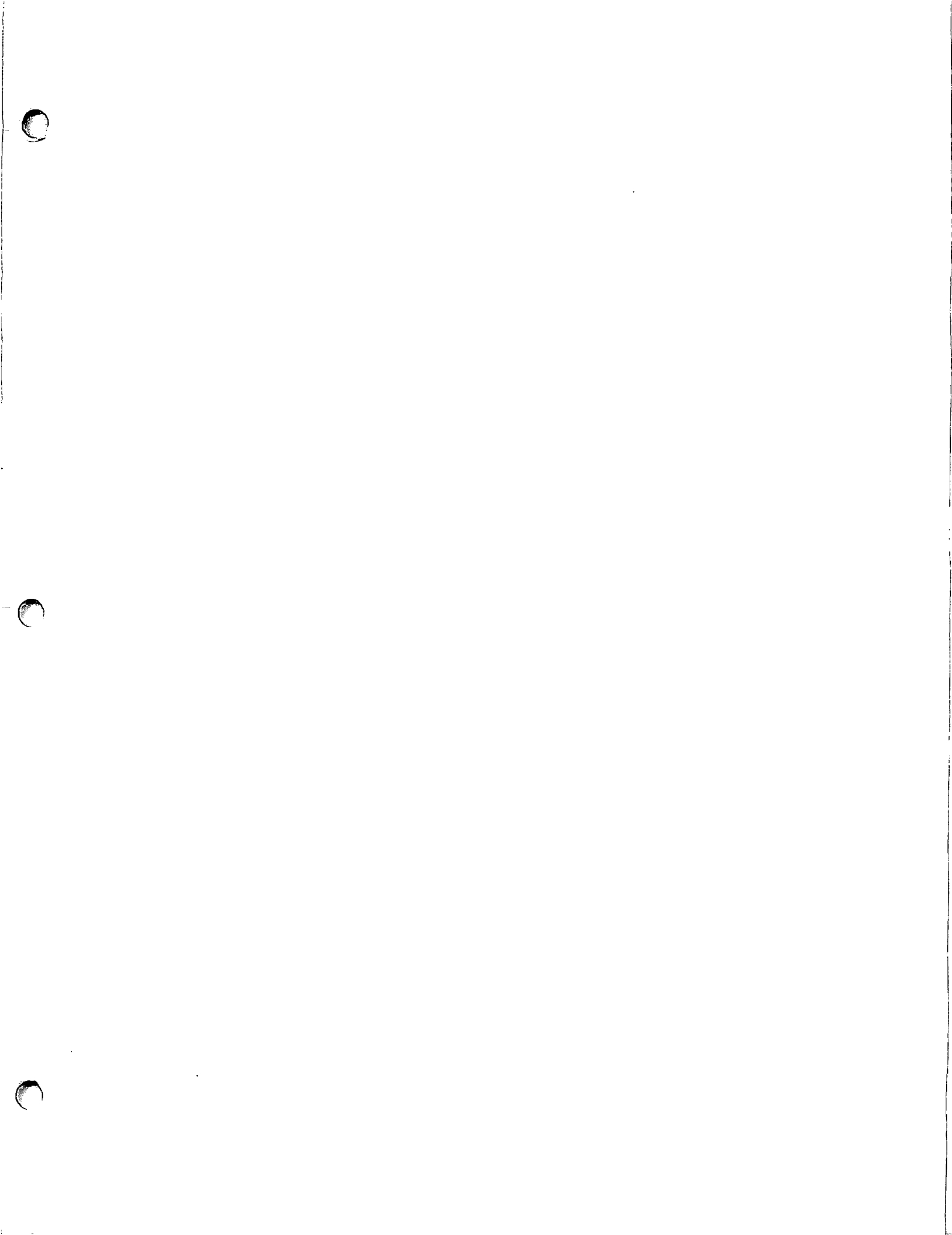
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