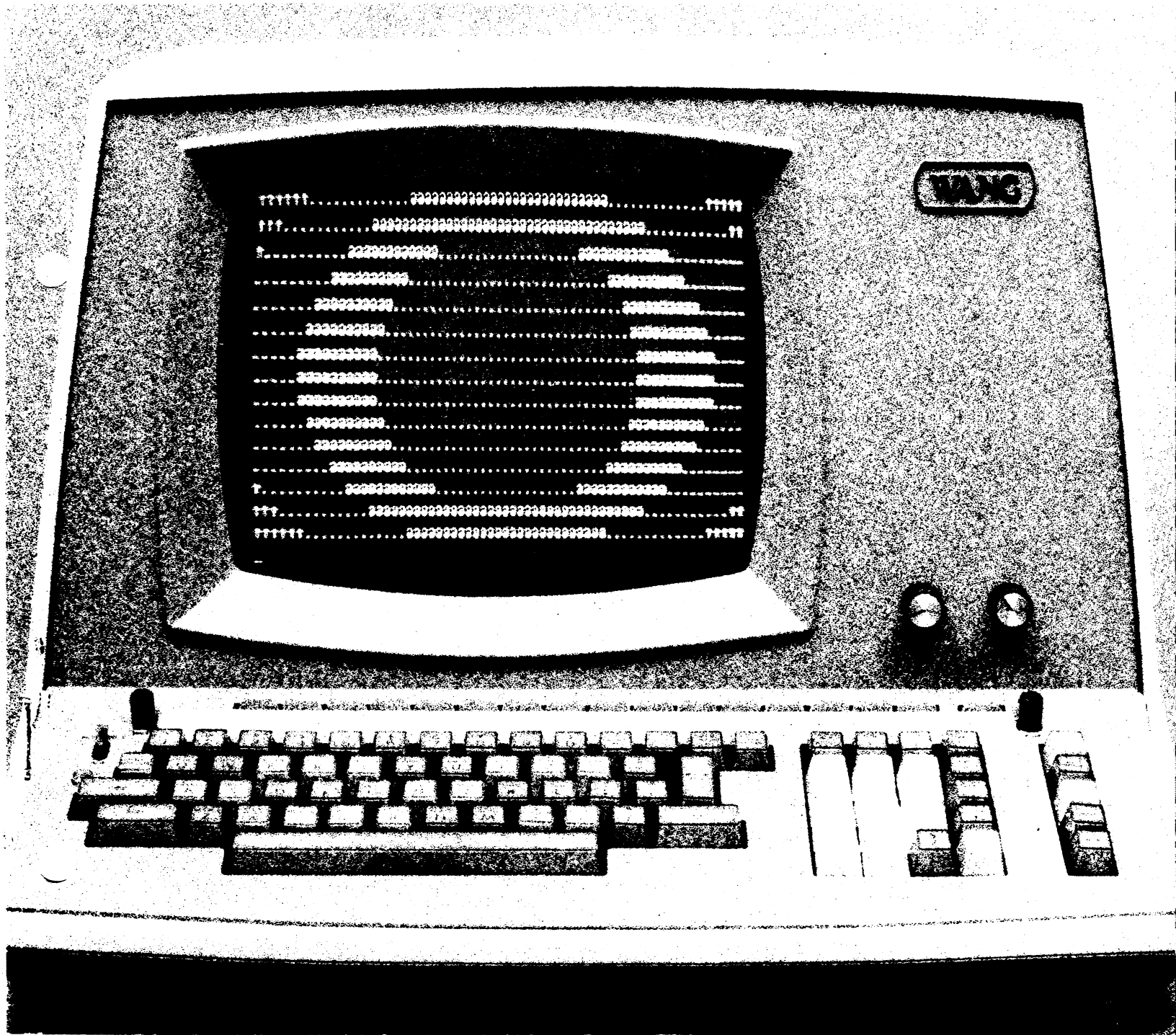
WANG

SOFTWARE HANDBOOK

System 2200



2200 Series Software Handbook

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INTRODUCTION

This software handbook provides a guide to software available for the Wang System 2200 Series in six application areas: Business; Education; Medicine; Public Service; Science, Engineering, and Mathematics; and Utilities. The software is developed by Wang Laboratories, Inc., SWAP (Society for Wang Applications and Programs), and Wang customers and software consultants (vendors).

NOTICE

HOW TO USE THIS HANDBOOK

The handbook is divided into chapters with each chapter representing an application area (e.g., Business). Each chapter is further divided into a certain number of categories and sub-categories within which the software is listed alphabetically by title. Included under each software title is the following information: the author, an abstract, minimum required equipment (explained in Appendix B), the price (for Vendor and SWAP software) or license fee (for Wang software), and (for Wang entries only) a package number.

HOW TO ORDER LIBRARY MATERIAL

The ordering procedure is determined by the source of the material being ordered. The source of the material is determined thus: all Wang and Vendor material can be identified by the letter at the beginning of their Central Library Number (W = Wang and V = Vendor), while all SWAP material has a SWAP Library Number. A library number is located at the bottom of each entry. (Prices subject to change without notice.)

Wang-Developed Software:

Wang-developed software is ordered according to the Package Number through General Services. (The individual tape, disk, and manual numbers are not required.) The Package Number is a nine-position alphanumeric field broken down as follows: 195-BCCC-DE, where

B = Type of program:

"0" for System Programs
"1" for Technical Programs
"2" for Commercial Programs
"3" for Demo Programs

CCC = Unique accession number assigned in steps of 1 beginning with 1.

D = Medium on which the system is distributed:

"1" Cassette
"2" Flexible Disk (2200-Memorex)
"3" Diskette (WCS-Shugart)
"4" Fixed/Removable Disk (Diablo)
"5" 9 Track Tape
"6" Punched Cards
"7" Disk Image Software on Cassette
"8" Mini-diskette

NOTE: Software is not necessarily provided on all media (e.g.,"-2(-3)" at the end of a Package Number indicates software is available only on Flexible Disk and Diskette).

E = Assigned by Home Office to indicate:

Blank = No Support
M = Wang Maintenance Responsibility
V = Vendor Responsibility

NOTE: The letter "M" is applied at the end of a Part Number to signify that a customer has purchased a Software Support Contract.

Software Support

Continuing software support is a new two-part offering from the Programming Department. Part 1 provides a 90 day service available to all customers (period begins with date of shipment), and Part 2 is an annual service contract.

The continuing support service is limited to those who are covered by the 90 day service or who have purchased an annual support contract, and normally includes:

1. Access to Field Analysts and Technical Information Center for questions.

2. Access to Programming Department for software bugs (only for Wang supported software that has not been modified).

3. Periodic receipt of technical notes on software problems.

4. Periodic receipt of errata sheets on software updates.

5. Periodic receipt, when necessary, of updated software on the magnetic media and updated manuals.

6. Periodic newsletters on new software.

The normal channel for service, be it questions or technical problems, initially should be through the Field Analysts or the Technical Information Center (T.I.C.). Any problem submitted to the Programming Department must be fully documented. In some cases, Programming may request a copy of the user's software on a magnetic medium.

The 90 day and annual support services in no way guarantee the software, and in some instances, the annual support contract is not offered. When available, it so indicated (in Wang entries only) under Price.

The principal purpose for this continuing support is to provide a mechanism for notifying users of Wang-supported software of errors and software enhancements.

Send requests for Wang software to:

General Services
Wang Laboratories, Inc.
1 Industrial Avenue
Lowell, Massachusetts 01851

SWAP Users Society Software:

SWAP material is available only to members for a nominal fee. Membership information can be obtained by writing to:

Wang Laboratories, Inc.
℅ SWAP
1 Industrial Avenue
Lowell, Massachusetts 01851

Vendor-Developed Software:

Many vendors and customers develop software for Wang equipment. The address of each vendor is located in Appendix A. To order any vendor material, write to the appropriate vendor(s) who will send you additional information directly.

DISCLAIMER

This volume consists solely of listings of available software. Wang Laboratories, Inc., by this listing makes no general warranties or representations concerning the suitability of a particular software item for a particular application, and cautions users to rely solely upon the developer's specific warranties and specifications made in connection with each software item.

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CHAPTER 1
BUSINESS (100.00-390.00)
2200 SERIES

ACCOUNTING APPLICATIONS (100.00-100.70)

General Accounting Applications (100.00)

TITLE: GENERAL BUSINESS SYSTEM (GBS)

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

General Business System (GBS) includes those applications judged most common to the greatest population of users, particularly small and medium sized businesses, and is designed to provide the most comprehensive business application package possible. All installations are performed by vendors who make the appropriate modifications for the user. GBS is composed of the following four modules:

- MOD I - Invoicing, Accounts Receivable and Sales Analysis
- MOD II - Order Entry and Inventory Control
- MOD III - Accounts Payable and General Ledger
- MOD IV - Payroll (not yet available)

MOD I is a prerequisite for MOD II. Otherwise, each MOD may be run independently.

BUSINESS

MOD I

MOD I contains programs to perform Invoicing, Accounts Receivable, and Sales Analysis functions. The Invoicing system creates and prints invoices while updating the Customer, Salesman, and Inventory Master File. The Accounts Receivable System allows transaction entries and prints statements, while updating the Customer and Open Item Files. It also performs Aging and Service Charge Calculations, Aged Trial Balance, and produces a Credit Report. Sales Analysis reports are produced for the Inventory, Salesman, and Customer Master Files.

Customer, salesman, or inventory information can be obtained quickly and easily. Inquiries may be made on a customer, salesman, or product, and the data may either be viewed on the screen or output on the printer. Adding, changing, or deleting information for the Customer, Inventory, or Salesman Files is accomplished efficiently through their respective maintenance programs. Inventory can also be adjusted as goods are received or withdrawn.

MOD I also produces the following reports: Customer Master File Report, Inventory Master File Report, Salesman Master File Report, A/R Open Item File Report, File Maintenance Reports, Invoice Register, Inventory Transaction Entry Report, A/R Transaction Entry Report, Service Charge Control Report, Aging Control Report, Aged Trial Balance Report, Purged Transactions Report, and Credit Report.

MOD II

MOD II contains programs to perform Order Entry and Inventory Control functions. To use MOD II, MOD I must also be available. The Customer Inventory and Salesman data files created in MOD I are used in MOD II. The Order Entry System allows processing of customer orders, adjustment of the orders and printing of the shipping papers for the orders, while updating the Customer, Inventory and Open Order Files. The Inventory Control system expands the Inventory Programs used in MOD I, and provides stock status, low stock, and inactive items information. It also produces inventory sheets for a physical inventory to be compared against the Inventory Master File.

Open Order information can be easily obtained. Orders that cannot be filled in entirety can be adjusted, and shipping papers produced for the items actually shipped. As in MOD I, changing, deleting, or adding information for the Master Files is accomplished with a minimal effort through their respective maintenance programs.

The following reports are produced by MOD II: Open Order Master File Report, Open Order Adjustment Report, Order Register, Shipping Register, Shipping Adjustment Report, System Activity Report, Lost Sales/Estimated Shortage Print Report, Shipping Shortage Report, Stock Status Report, Low Stock Report, Inactive Items Report, Physical Inventory Sheets, Physical Inventory Transaction Report and Physical Inventory Variance Report.

MOD III

MOD III contains programs to perform Accounts Payable and General Ledger functions. The Accounts Payable System allows posting of payables and creation of checks for payment selection, while updating the Chart of Accounts and Vendor Master Files. The General Ledger System allows posting of transactions and merges with the Accounts Payable System to create the Trial Balance and Financial Statement.

Vendor, Chart of Accounts and Open Item information can be easily obtained. Inquiries may be made on vendors, accounts, and open items, and the data viewed on the screen or output on the printer. Adding, changing, or deleting information for the Vendor, Chart of Accounts, or Open Item Files is accomplished quickly and easily through their respective maintenance programs.

The following reports are produced by MOD III: A/P Transaction Entry Report, Open Items Report, Payment Selection Report, Check Print Report, Check Register, Open Item and Vendor Update Report, Vendor Master File Maintenance Report, Open Item Maintenance Report, Vendor Master File Report, Open Item Master File Report, Control Master File Report, Distribution Report, Correct Journal Entries Report, Journal Entry Report, Merged Journal Entries Report, Trial Balance Report, Income Statement, Balance Sheet, Budget Report, Schedule Report, Chart of Accounts Control Report, Chart of Accounts Maintenance Report, and Chart of Accounts Master File Report.

MINIMUM REQUIRED EQUIPMENT: Diskette System - 2200T (24K), 2226, 2270-3, and 2221W (2231W-2 may be used with available program modifications), with Option 31 recommended.

Disk System - 2200T (24K), 2226, 2260B1/2 or 2260B, 2270-1, and 2221W (2231W-2 may be used with available program modifications), with Option 31 recommended.

PACKAGE NO.:		
	MOD I (Diskette)	195-2025-2(-3)
	MOD I (Disk)	195-2028-2(-3)
	MOD II (Diskette)	195-2029-2(-3)
	MOD II (Disk)	195-2030-2(-3)
	MOD III (Diskette)	195-2031-2(-3)
	MOD III (Disk)	195-2032-2(-3)

LICENSE FEE: Refer to current price list.

CENTRAL LIBRARY NO.: W22-100.00-00264

BUSINESS

TITLE: GENERAL ACCOUNTING SYSTEM

AUTHOR: Stern Bernstein Associates

ABSTRACT:

The General Accounting system is a real time, random access, disk oriented system. Included in the system are cash receipts and disbursements; sales, purchase, general and payroll journals; provisions for sale commission; bank reconciliation; and accounts receivable-accounts payable. It is a fully coordinated and linked adjunct to the system. There is order creation and invoicing, including back order capabilities as well as unique group and tiered inventory.

The system has the capability of operating in multiple foreign currencies for one or several companies and is adaptable for CPA write-ups.

General ledger system follows the double entry standards of accounting. Provision is made for all types of receipts and disbursements, bank debit and credit memos, clients-vendor debit and credit memos in addition to invoices.

A full payroll system is offered, capable of handling salaried and hourly employees year to day, quarter to day, and current figures are kept for each employee in addition to his source data.

Each client may be "tagged" with a salesman's code to facilitate commission accruals to each salesman's account. Payed invoices are so recorded thus facilitating payments to salesman of commission.

The accounts receivable-payable section is an open item system. Both outstanding and paid invoices are maintained so that statements can be rendered by open item only or all historical data, in case the account is in dispute. Access to accounts is by acronym or account number. Invoices for goods sold and purchased are automatically entered during invoicing and purchasing cycles. Provision for every type of payment and discount is made.

The inventory system creates a hard goods trail showing all increments or decrements from invoicing and purchasing programs. Special adjustments are provided for. Inventory values can be updated under Lifo accounting. Inventory status is available at all times including on order, backorder, and current stock in several locations.

The invoicing program is complete in every respect and works on the packing list-invoice completion-invoice printing system, but may be easily modified for a single invoice print run including packing list. Both financial and merchandise transactions are automatically posted to their respective trails.

The entire system produces all customary reports of financial and merchandise transaction, summaries and analysis.

The system does not include cost accounting or manufacturing process accounting.

MINIMUM REQUIRED EQUIPMENT: 2200B-2, 2230-1, 2216, 2221 and 2222 or 2215.

PRICE: $8,000.00 - $10,000.00, determined by the amount of customization necessary.

CENTRAL LIBRARY NO.: V22-100.00-00013

Accounts Receivable (100.10)

TITLE: ACCOUNTS RECEIVABLE - BILLING

AUTHOR: Walter A. Treff, Process Equipment Design Corp.

ABSTRACT:

Programs permit complete handling of accounts receivable - broken into sub-groups as follows:

Fileview - permits CRT viewing of the account

a) address characteristics
b) all current posting
c) last billing date
d) aging groups at last billing

Posting - permits both debit and credit entries.

Statement Run - program mode prints statements for all accounts other than those inactive for more than a month (Numerical Sequence). All accounts are updated; aged and posting details are deleted after statement is run.

Trial Balance - program mode permits complete aged trial balance for all accounts other than those with a zero balance.

New Account - permits addition of new files and automatically inserts same in numerical sequence.

Past Due - program prints past due notice for option of 30, 60 or 90 days overdue.

Correct - allows operator to access all data in account for purpose of correction or change.

Two System Programs - program modes for disk initialization and backup copying.

Five Functional Programs - permits assorted operator convenience functions (i.e., rapid display of all customer account names & numbers on the disk - trial statement run without disk updating).

BUSINESS

MINIMUM REQUIRED EQUIPMENT: 2200B-2, 2216, 2217, 2261, 2230, and 2222.

PRICE: $1,800

CENTRAL LIBRARY NO.: V22-100.10-00064

Assets Accounting (100.15)

TITLE: FINANCE/UTILITIES/GAMES GENERAL PROGRAM LIBRARY GLBR22B

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

This package provides descriptions, operating instructions, and examples for various programs in finance, utilities, and games in the following areas:

1. Assets Accounting - programs applicable to Assets Accounting are: Depreciation Charge (Declining Balances), Declining Balance Depreciation Rate, and Salvage Value.

2. Bond Analysis - programs applicable to Bond Analysis are: Number of Semi-Annual Periods between Two Dates (360 Day-Year), Bond Dollar Price, and Bond Yield (Basis).

3. Financial Analysis - programs applicable to Financial Analysis are: Present Investment, Nominal Interest Rate, Effective Interest Rate, Investment Withdrawal, Initial Investment, Sum Total from a Single Investment, Periodic Investment, Sum from Periodic Investment, and Average Growth Rate and Projected Sales.

4. Installment Loans - programs applicable to Installment Loans are: Discount and Price on Discount Commercial Paper, Interest Bearing Commercial Paper, Number of Days Between Two Dates, Day of Year, and Annual Debt Payment.

5. Mortgage Loans - program applicable to Mortgage Loans is: Mortgage Payment.

6. Portfolio Management - program applicable to Portfolio Management is: Annuity.

7. Chemical (Engineering) - programs applicable to Chemical Engineering are: Mass of Nitrogen in Containment System, and Percent Absorption to Concentration.

8. Statistics - programs applicable to Statistics are: Plot, Multi-Plot, T-Plot, and Histogram.

9. Graphics and Plotting - programs applicable to Graphics and Plotting are: Plot, Multi-Plot, Polar Plot, T-Plot, and Histogram.

10. Games - programs applicable to Games are: Artillery, Craps, Tic-Tac-Toe, One-Armed Bandit, and Black Jack.

MINIMUM REQUIRED EQUIPMENT: 2200A-1 (A-2 for #2), 2215, and 2216/2217. It may be adapted to 2201 or 2221W, if hardcopy is desired.

PACKAGE NO.: 195-0007-1 (195-0008-2(-3)(-8): Includes also Statistics/ Engineering General Program Library (p. 74) and General Mathematics Program Library (p. 92).)

LICENSE FEE: $50.00 for 195-0007-1 and $100 for 195-0008-2(-3)(-8)

CENTRAL LIBRARY NO.: W22-100.15-00004

Billing (100.20)

(See: ACCOUNTS RECEIVABLE (100.10), abstract "Accounts Receivable-Billing", p. 5.)

CPA Packages (100.30)

TITLE: CASH-ACCOUNTANT'S CLIENT WRITEUP SYSTEM

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

CASH-Accountant's Client Writeup System is a powerful, economical turnkey accounting system for large or small firms, and features a simplified method of entering transactions, a flexible chart of accounts, and a wide variety of reports. Each client is on a separate flexible disk, and his chart of accounts is created uniquely for him by the accountant, with provision for the type of account and for subaccount and branch designations on every account. Transactions are entered in a batch mode, with the date and the batch, client, and accountant numbers entered once as part of the batch header. A reference number, employee number, English description, account number and amount are entered on each transaction. A running subtotal of the batch is available at any time with the touch of a key.

The system prepares a wide range of reports, including a Balance Sheet, Income Statement, Detailed General Ledger, Journal Audit List, Working Trial Balance, Pre-Closing Worksheet, 941A Forms, W-2's, and Payroll Compensation Report, among others. All reports except the Working Trial Balance and the Payroll Compensation Report are printed on regular 8 1/2" by 11" paper for easier storage.

A Pre-Cash system is also available. It is specially designed as a low cost data entry facility which allows the operator to enter a large number of transactions for one client. The entries are saved for later processing by the regular CASH system.

MINIMUM REQUIRED EQUIPMENT: 2200T (16K), CRT, Keyboard, two diskette drives, and matrix or daisy printer.

NOTE:

Also available on PCS-II (mini-diskette version) 16K, with matrix or daisy printer.

PACKAGE NO.: (CASH) 195-2014-2(-3)(-8); (PRE-CASH) 195-2015-2(-3)(-8)

LICENSE FEE: Refer to current price list.

CENTRAL LIBRARY NO.: W22-100.30-00256

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TITLE: PACAS - PUBLIC ACCOUNTANTS' CLIENT ACCOUNTING SYSTEM

AUTHOR: Niakwa Management Services Ltd.

ABSTRACT:

This client writeup system produces ledgers, journals, and financial statements for clients of both U.S. and Canadian accountants. The system is designed to make data entry as simple, rapid, and error-free as possible, and provides the following: consolidation of statements at two levels, comparative balance sheets and income statements, budget comparisons, funds flow analysis, unique reports showing percentage changes in account balances, graphs of any two accounts on the same chart (e.g., total income vs. total expenses for each month of the year), and invoice advices - easy to install and already operational in over a half-dozen locations.

MINIMUM REQUIRED EQUIPMENT: 2200T (12K), CRT, Keyboard, dual flexible disk drives, and 2231 line printer.

PRICE: $3,400

CENTRAL LIBRARY NO.: V22-100.30-00236

Costing (100.35)

TITLE: COMPUTER ACCOUNTING WITH JOB COSTING

AUTHOR: Pendarvis Construction Corporation

ABSTRACT:

This program is a complete checkbook and statement oriented accounting system designed for Bookkeepers, Accountants, Apartment Contractors, Home Builders and any Engineering Company where separate cost on many jobs is needed. Job costing separates each job and lists all expense deductions and purchases by account number and account name, and debits or credits each amount. All totals are provided on each job and the "TOTAL ALL JOBS" when processing is complete. The detail trial balance lists all assets, liabilities, income and expense accounts; each check or item is also listed

under its proper account with all input data listed and all balances updated (leaving the perfect audit trail). The trial balance is grouped to separate expense deductions, purchases, office salaries, advertising expenses, depreciation, land and building assets, and vehicle expenses. One month's input takes about 4-7 hours to process. A minimum of 12 units per year is needed, 20-30 units per year provide excellent results, and for 30-120 units per year, it is a must.

MINIMUM REQUIRED EQUIPMENT: WCS/20 (16K), 2270-3, and 2221W.

PRICE: $4500 (License Fee)

CENTRAL LIBRARY NO.: V22-100.35-00438

Order Processing (100.50)

TITLE: S.E.L.S. (SIMPLIFIED ELECTRONIC LIQUOR SYSTEM)

AUTHOR: Real-Time Engineering Systems, Ltd.

ABSTRACT:

S.E.L.S. is an order entry, billing, accounts receivable, sales analysis and inventory control system designed especially for the wholesale liquor and wine distributor.

S.E.L.S. produces meaningful reports to allow the efficient control of inventory and accounts receivable. The invoicing program is the key to the system. With it, invoicing is fast, reliable and accurate. The numerous management reports include stock status, backordered and low stock report, daily activity report, receiving report, invoice register, sales analysis by brand and by salesman, aged trial balance, detail age analysis and customer statements.

S.E.L.S. keeps a record of sales several ways: by brand for week and month, by salesman by brand for week and month with YTD totals, and also gross profit by salesman.

Detailed marketing booklet is available upon request.

MINIMUM REQUIRED EQUIPMENT: 2200B-3, 2216/17, 2222, 2230-1, and 2221 (disk size and print speed expandable per user needs).

PRICE: Package price is $4,500.00. Modifications and training are additional. Includes documentation and software (tape). Deposit required.

CENTRAL LIBRARY NO.: V22-100.50-00011

Payroll (100.55)

TITLE: NUM ALFA

AUTHOR: Irving S. Karpe, Karpe Insurance Service Company, Stroudsburg, Pennsylvania

ABSTRACT:

This program is used to convert numeric values from .00 to 999999.99 to alpha expressed in dollars and cents and may be used to write checks (Payroll). If variables are taken from the main program, less than 600 bytes are used.

Known Program Anomalies:

Slight modification will expand capacity. Negative values result in "no dollars and cents". One million dollars or more results in error unless expanded.

MINIMUM REQUIRED EQUIPMENT: 2200B-1 and 2216.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: B.61-10.6

TITLE: PAYROLL AND LABOR COSTS REPORTING SYSTEM (PRA)

AUTHOR: Andres Loo

ABSTRACT:

This payroll and cost control system is available as part of a modular management information system for small to medium sized construction firms.

Designed for Canadian (B.C.) use, but can be modified. The system has two main functions, originating from a single major input. It does a complete payroll, including hours entry, calculation, printing of checks, payroll summaries, employee earnings record(s), list of checks printed, monthly union reports, and yearly T4's for an average of at least 250 employees. From the same hours entry, it produces complete labor hour reporting for at least 100 different activities for up to 25 different job sites simultaneously. The labor hours reporting can be linked with estimates and percent completion inputs to give a complete cost control of the job for customers who so desire, for moderate additional cost.

Inputs

Employee Hiring Slips
Employee Daily Timesheets
Changes in employee status and other corrections
Payouts (advances -- amount of check)
Stopped Check Entry

Outputs

Payouts (advances)
Payouts (terminations)
- employee daily hours record
- paychecks
- record of employment (separation certificate)

Up-to-date labor costs report
Employee earnings record(s)
-(including all employee particulars & details from past pay periods)
Index of employees, either in alphabetical or employee number order
List of checks disbursed; in check number order
Viewing employee daily hours for any employee

Weekly

Complete payroll run for each of 25 job sites
- employee daily hours records
- paychecks
- payroll summary
- labor costs report

Monthly

Report to each union of hours worked and dues paid for each employee

Annually

Automatic generation of T4's for all employees

MINIMUM REQUIRED EQUIPMENT: 2200B-4, 2230-1, and 2221. Can run with flexible disk, but capacity is limited.

PRICE: $2000

CENTRAL LIBRARY NO.: V22-100.55-00072

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TITLE: W/H TAX

AUTHOR: Irving S. Karpe, Karpe Insurance Service Company, Stroudsburg, Pennsylvania

ABSTRACT:

Given the weekly pay, marital status, and number of dependents, this will compute the withholding tax (Federal).

Known Program Anomalies:

Designed for weekly payroll, but could be converted easily to monthly or bi-weekly, by substituting data from government tax formulas (uses IRS Table 1 effective 4/30/75).

Reviewer's Editorial Comment: This is an example only and not a working program.

MINIMUM REQUIRED EQUIPMENT: 2200A-1 and 2216.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: B.60-10.6

Personnel & Pensions (100.60)

TITLE: EMPLOYEE BENEFIT ADMINISTRATION SYSTEM I

AUTHOR: Financial Statistics, Inc.

ABSTRACT:

The Employee Benefit Administration System (EBAS) is a mini-computer based package for administering employee benefit plans including allocations and statement preparation. EBAS eliminates many of the problems and delays inherent in large scale, batch computer systems and in actuarial service organizations, because it provides the user department (1) absolute control over processing priorities and (2) immediate data collection and editing facilities in an "on-line" or conversational mode. Coding forms, keypunching, multiple edit runs, turn around delays are totally eliminated from the processing cycle. Plan description and employee data is entered directly via a CRT display, and the minicomputer supporting the EBAS system is so compact that it is located in the user area.

After a brief training period, clerical or accounting personnel can efficiently process complex plans from update through allocations and statement preparation. EBAS accepts a wide variety of benefit plan types, vesting provisions and allocation algorithms. The EBAS conversational software prompts the operator through the processing steps in easily understood user terms. Tight financial controls are maintained through internal checks, hard copy trial balances and administrative reports.

Both sequential and random access update and retrieval methods are incorporated. Termination calculations are instantly displayed including withdrawals, forfeitures, and lump sum distribution tax calculations. Specific plan descriptions or employee data may be recalled to the CRT screen by account number, social security number, or by participant name.

The installation, conversion, production processing and program maintenance require little or no data processing support. In fact, on the very first day of operation, new plans may be initialized, allocations performed, participant statements generated and mailed to your clients.

MINIMUM REQUIRED EQUIPMENT: 2200B (20K), two cassette or diskette drives, CRT, Keyboard, and 132-column printer.

PRICE: Varies with hardware configuration and is available upon request (license fee includes: conversational software system, warranty, 40 hours installation and training support, and documentation).

CENTRAL LIBRARY NO.: V22-100.60-00237

AUTO DEALER APPLICATIONS (120.05-120.20)

Accounting (120.05)

TITLE: AUTOMATE III

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

Automate III is a fully automatic accounting system which offers the automobile dealer complete control of all his financial operations, provides quick-look management reports on demand, and maintains information for sales analysis. The system contains three major sections: the first does the back-office accounting, the second prepares payrolls, and the last prepares reports to assist the follow-up sales activity.

Back Office Accounting

Back Office Accounting performs all the functions of a comprehensive journalized general ledger system. Its special features include:

- secure and fully-controlled preparation
- customized chart of accounts
- customized daily operating control (DOC) report
- dealer-specified month-end schedule reports
- hourly, daily, or demand journals, journal summaries, and DOC report
- aging of account balances or open items as needed
- month-end financial statements
- daily transaction source journals and summaries:
  - new vehicle sales
  - new vehicle trades with other dealers
  - used vehicle sales
  - customer repair order sales-charge
  - customer repair order sales-cash
  - warranty claims
  - parts counter sales-charge
  - parts counter sales-cash
  - internal parts and service sales
  - cash receipts
  - cash disbursements
  - new vehicle purchases-factory
  - new vehicle purchases-dealers
  - used car purchases
  - general purchases
  - other sales

- month-end accounting reports:
  - general ledger
  - unadjusted trial balance
  - balance sheet
  - profit and loss statement
  - missing document number reports
- subsidiary schedules and statements:
  - all vehicle/inventories-aged
  - accounts receivable-aged (selective retrieval)
  - accounts payable-aged analysis
  - contracts in transit
  - customer deposits
  - cash in bank
  - open warranty claims-aged
  - notes payable
  - sublet repairs/inventory
  - new car freight and handling
  - accounts receivable aged statements
- journal transaction reports for each journal source with:
  - detail transactions
  - daily summary balances
  - month-to-date summary balances
- name listing on demand for:
  - car deals
  - accounts receivable
  - stock numbers
  - vendors
  - other dealer-specified categories
- general ledger reports containing:
  - flexible sub-totals
  - cost center grouping
  - profit and loss
  - balance sheet statements
- daily operating control (DOC) report with:
  - daily activity for each cost center
  - month-to-date activity for each cost center
  - balances for selected general ledger accounts
- detail schedule reports for any specified account in three formats:
  - detail transaction (contains every transaction to the account; detail is purged at end-of-month).

    - control balance (contains balance for transactions grouped by control account; detail is purged only when end-of-month balance is zero).
    - aged control balance forward (contains aged balances for each control account; details used to update balances are purged at end-of-month).

- statements for accounts receivable:

    - in ready-to-mail form
    - shows balance forward, current month activity and aged balance due

Payroll

The Payroll System takes the headaches out of preparing weekly, bi-weekly or monthly payrolls. It provides for standard earnings and deductions such as:

- salaried, hourly, commissioned and flat rate employees
- all gross to net pay calculations
- automatic deduction of federal and state taxes
- automatic deduction of dealer-specified deductions

and it also prepares:

- paychecks
- check stubs
- payroll register (summary and journal reports)
- quarterly 941/941A IRS forms
- yearly W2 forms

Sales Follow-up

The Sales Follow-up system provides for the salesmen timely reports indicating which of their customers and prospects to contact in an ongoing sales effort. A salesman is prompted at warranty inspection times, customer birthdays, normal trade-in times for a particular customer, etc., so that he can contact the right people at the right time. Information about each customer's buying habits, personal interests, financial data, and details about the cars he owns are on the reports, giving the salesman the maximum amount of information he needs to make the customer feel that a truly personal interest is being shown. Its reports include:

- an individual salesman's list of prospects. It shows all data for each customer and can be changed or added to.

- a list of customers to be called, sorted by salesman. Used by the sales manager in checking up on his salesmen, it gives one line of vital information about each customer and the principal reason for the follow-up.

- address labels for a newsletter or special mailings.
- total file listings and lists of all the customers of one salesman.
- special listings selected on one or more criteria in the data base. For example:
  - all customers with wagons over two years old,
  - all customers who purchased a sedan before 11/30/76,
  - all customers with no second car,
  - all people attracted to the dealership via newspaper ads, and so on.

MINIMUM REQUIRED EQUIPMENT: 2200B or T(16K), CRT, Keyboard, 5 megabyte Disk, and 2221W Printer.

PACKAGE NO.: 195-2018-4

LICENSE FEE: Refer to current price list.

CENTRAL LIBRARY NO.: W22-120.05-00432

Finance and Insurance (120.10)

TITLE: LIFELINE

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

LIFELINE is a proposal system for the general life insurance agent. It is a fully automatic computing system which prepares a wide variety of insurance proposals, and offers the general agent and salesman complete control of his proposals with the facility of rapid and inexpensive turnaround when minor changes are needed for a completed proposal. LIFELINE puts the maximum amount of saleable information at the agent's fingertips.

LIFELINE contains a full complement of proposal routines which perform all the computations necessary for generating the many forms of a proposal. It also contains a complete letter-writing/editing system which can be used to prepare form letters, send out mailings, work on correspondence, contracts, and trust documents, etc.

LIFELINE offers the following proposals pertaining to cash value insurance plans:

- Cash Flow Analysis
- Tax-Sheltered Life Insurance (Flip-Flop)
- Flexible Deposit Schedule
- Split-Dollar

- Split-Dollar with Minimum Deposit
- Cumulative Cost Comparison (Term Versus Cash Value Plan)

It also offers:

- Capital Needs Analysis
- Fixed Income Analysis
- Policy Comparisons
- Estate Analysis

It provides a number of dividend options for its ordinary and term life policies:

- Non-Participating
- Premium Reduction
- Accumulations
- Additions
- Term/Reduce
- Term/Accumulate
- Term/Additions

Once a policy illustration has been prepared, the user can elect to change:

- Premium Values
- Cash Values
- Death Benefits

When adding riders and waivers, such as accidental death benefits to a policy, the ability to make such changes on the spot can be very useful and time-saving.

Available Proposals

Cash Flow Analysis

This proposal illustrates how the net cost (actual cost minus dividends) changes during the life of the policy. Yearly figures for forty years and summary years can be shown.

Ledger Statement

This proposal illustrates any whole life plan, tracing premiums, cash value, death benefits, and paid-up insurance as they change with the life of the policy.

Flexible Deposit Schedule

This proposal illustrates the result of systematic borrowing against the cash value of a whole life (ordinary or permanent) policy. Outlay before and after taxes can be shown, and checks for tax qualifications are part of the program.

Cash Flow Analysis (Split-Dollar Basis)

This proposal illustrates over 120 splits of premiums, cash values, and death benefits. Tax rates for both employer and employee for projection of increased taxes can be shown.

Split-Dollar Schedule (Minimum Deposit)

This proposal illustrates a cash value policy between employer and employee in which the employer pays all premiums and retains all cash value (and dividends). The proposal provides for an employee "bonus" to avoid IRS taxation and uses several methods of reducing the employee's tax base and thus the required "bonus".

Flip-Flop Proposal

This proposal illustrates the result when one "cash value" and one "term" policy are purchased simultaneously. In the second policy year, the term policy is converted to whole life (cash value) and a "flip-flop" borrowing scheme is used to produce the minimum premium outlay to sustain both policies. A maintenance sheet is printed to assist in administering the borrowing. (Two dividend options are available--"reduce" and "one-year term/reduce".)

Special Features

Policy Comparison Analysis

This feature simultaneously displays two plans on the same page or video screen, with premiums, cash values, and death benefits compared side-by-side. Any two plans can be analyzed this way.

Compound Interest Schedule

This feature prints a record tracing the periodic combinations to and withdrawals from an imaginary bank account. Up to four different interest rates can be specified. It can typically be used for pension fund proposals and alternate investment analyses. It can also be used in estate planning to project family needs over a period of time.

Term Insurance Schedule

This feature produces a schedule showing premiums and death benefits for up to 40 policy years.

Term Insurance for Company Gift

This feature projects the cost to a company and an employee for a company-purchased policy. It computes tax benefits and costs for both employer and employee.

Term Insurance Plus Investment

This feature projects the result of a term insurance purchase when additional funds are placed in an interest-bearing account.

Fixed Income Analysis

This feature emphasizes the effect of inflation on any fixed income, showing the change in "purchasing power" of the dollar over a particular time-period.

Capital Needs Analysis

This feature provides a two-page proposal of the amount of life insurance required to supply family needs after death. The effects of inflation are automatically included. The illustration specifies immediate cash requirements, dependency income, college funds, and widow's income. Up to six children can be included in the analysis. Social Security benefits are automatically utilized in the projections.

Estate Analysis

This feature provides an accurate record of a client's assets and liabilities and can be used to estimate the value of an estate, potential probate costs, and tax credits upon death.

LIFELINE also keeps track of all clients, storing permanent information for each of them on diskettes. Whether it be a whole company or just one individual, the user may store:

- Name, company, address, city, state, and zip code
- Nickname
- Two phone numbers (with area codes)
- Birthdate
- Twenty codes to describe client facts
- Notes
- Three action dates and messages (such as billing date, policy expiration date, etc.)

A client file can be scanned automatically and clients can be extracted based on stored information (for example, all clients with certain zip codes, or all clients born in a particular month, etc.).

MINIMUM REQUIRED EQUIPMENT: WCS/20 with an 8K CPU, a large screen 24/line (1,920 character) CRT, Keyboard, a pair of flexible Diskettes, Audio Signal, and Daisy Wheel Printer.

NOTE:

Also available on the PCS-II (mini-diskette version) 8K, with Dual Mini-diskette Drives, 24x80 upper/lowercase CRT, Keyboard Clicker, Audio Alarm, and Daisy Wheel Printer (2281).

PACKAGE NO.: 195-2017-3(-8)

LICENSE FEE: Refer to current price list.

CENTRAL LIBRARY NO.: W22-120.10-00431

- -

TITLE: 2200 AUTO BILLING 1 AUBL22

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

This package performs all the mathematical operations associated with the sale of a car. It is designed to disclose all items required by the "Truth-In-Lending Act". It also prints out any of the necessary forms associated with the sale of a car. Local vendor customization is required. Package price is approximation and subject to change by local software vendor.

MINIMUM REQUIRED EQUIPMENT: 2200A-2(8K), 2216/2217, 2222 and 2201.

PACKAGE NO.: 195-2011-1

LICENSE FEE: $250 NOTE: Modifications needed for local forms.

CENTRAL LIBRARY NO.: W22-120.10-00010

Inventory (120.15)

TITLE: $PARK

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

$PARK is a perpetual inventory and parts pricing system, designed specifically for automotive parts wholesalers and jobbers. Consisting of a master console and one or more counter terminals, it performs all the functions of a central inventory system for one to four stores, providing instantaneous inquiry and updates to inventory on a part-by-part basis for every single transaction. It helps fill customer orders promptly, gives prices when needed for maximum profitability, extends prices or sales, checks vendor prices on replenishment orders, recommends reorders for depleted stock, provides daily profit and sales analysis, informs about lost sales, updates prices and costs, handles alternate parts, and cuts the on-shelf inventory through better replenishment control.

$PARK accomplishes all this by controlling the three most critical areas of an operation:

> It improves office control by providing profitability analysis by line and by store.

- It increases counter productivity through the speed and accuracy with which prices and price extensions are supplied.
- It manages inventory by making possible a better mix of parts.

Office Operations

- Prints daily profitability reports: period and yearly sales history for each part and line.
- Extends received restock orders.
- Checks latest order prices against your files.
- Updates prices.
- Prints Lost Sales Journal.
- Recommends reorders by the replenishment method or the min-max method. (In the replenishment method, the same number of parts are ordered as are sold; in the min-max method, parts are not listed for reorder until the sum of the quantity on hand and the quantity on order falls below the quantity representing the reorder point.)
- On demand, the following reports are available:

    - Daily Operational Report.
    - Lost Sales Journal.
    - Sales Analysis by Line/Store.
    - Sales Analysis by Store/Line.
    - Sales Analysis by Part/Line/Store.
    - Low Movement Report.
    - Recommended Order List.
    - Automatic Price Updates.
    - Period Closing.
    - Year End Closing.

Counter Operations

- Indicates availability of a part on part-by-part basis.
- Provides actual inventory in stock.
- Gives the correct price.
- Indicates availability of parts at other stores.
- Gives alternate part information.
- Provides price extensions and Sales Tax computation.
- Allows immediate inventory update.
- Allows invoice printing at the point of sale with the account receivable option.

Counter work stations can be used only for sales and credit inquiry, invoice totalling, and recording of lost sales. Operations that add, change, or remove inventory, price or sales information from your files can only be performed by the master back-office terminal thus promoting maximum security. However, if desired, the counter work stations may be set to perform immediate inventory update for transaction to transaction accuracy.

AVAILABLE REPORTS

Daily Operating Report

Throughout the day, sales and cost figures for all confirmed sales are accumulated by line, store, and overall. From this information, the Daily Operating Report prints sales, costs, gross profit, profit percentage, dollar value of new inventory, and dollar value of core returns. Although usually produced at the end of each day, any schedule (daily, weekly, etc.) can be selected.

Lost Sales Journal

During the course of the day, each time that a sales transaction turns up an INSUFFICIENT STOCK message, depressing the LOST SALE key records the dollar value of the part(s) as a lost sale (totals kept by part number). Using this information, the Lost Sales Journal prints for each part the part number, quantity lost, value of lost sales, quantity on order, quantity representing the order point, dollar amount of sales this period and last period, and dollar amount of sales this year and last year.

Sales Analysis by Line/Store

Sales Analysis by Line/Store indicates how a line (or lines) is doing in each store. First the sales information is divided by line, and then listed by store for each line. Units sold last period and this period, last year and this year, and the inventory dollar value on hand and on order, both from the beginning date of the fiscal year and the current date, are all listed by store number for each line.

Sales Analysis by Store/Line

Sales Analysis by Store/Line organizes sales information in exactly the reverse manner from sales analysis by Line/Store. The sales information is first divided by store, and then listed by line for each store. Exactly the same type of information is given, but the object is to indicate how a particular store or stores are doing in each line.

Sales Analysis by Part/Line/Store

Sales Analysis by Part/Line/Store provides a list containing the sale status for each part: the jobber price, units sold this period and last period, this year and last year, the inventory quantity currently on hand and on order, and the quantity representing the reorder point. This information is listed by store, by line within a store, and by part within a line.

Low Movement Report

Low Movement Report shows which lines or parts are not selling up to expectations in any store. For every part having sold less than a previously indicated minimum quantity, the following are printed: units sold this period and last period, this year and last year, quantity on hand now, quantity on order, and the reorder point or minimum quantity for not ordering. This information is organized by line, by part within a line, and finally by store.

Recommended Order List

The Recommended Order List produces a list of parts to be reordered, grouped first by line and then by store within a line. This report reflects current cost, inventory on-hand and on-order prior to reorder, suggested reorder quantity which is automatically added to on-order field, and the cost of the reorder.

Automatic Price Updates

Automatic Price Update changes the price of a part, asks what line is to be changed, which prices, and if a printed listing of the changes is desired. If so, the line number, part number, old price and new price are printed on the report. Changes may be a percent above existing cost per price or across all prices.

Period and Year-end Closing Reports

These reports are run at the end of a desired period or fiscal year. The Period Closing Report reflects units sold last period and this period per store for the entire inventory file. The Year-end Closing Report reflects units sold last year and this year-to-date.

Accounts Receivable Option

$PARK also offers a fully integrated accounts receivable system which eliminates rekeying data into a separate accounts receivable system. Some of the features of this system are:

- Invoice preparation with an invoice register.
- Automatic aging and service charge calculation.
- Aged Trial Balance Report.
- Statement preparation.
- Service Charge Report.
- Maintenance of salesmen information.
- Credit Report.
- Complete Customer information.

MINIMUM REQUIRED EQUIPMENT: 2200VP-8 CPU, 2226 CRT and Keyboard, 2260B Disk Drive with four additional cartridges, and 2231W-1 Printer.

Options

Accounts Receivable: addition of a 2270-1 Diskette Drive.

Work Station: MXA Disk Multiplexer, 2200-WS-6 Disk Work Stations (maximum of three), T-connector for second and subsequent Work Stations, and cable.

NOTE: The 2200T-6 CPU may be substituted when processing speed is not important and the accounts receivable option is not selected.

PACKAGE NO.: 195-2016-4 (195-2027-4 for Accounts Receivable)

LICENSE FEE: Refer to current price list.

CENTRAL LIBRARY NO.: W22-120.15-00429

BANKING APPLICATIONS (130.05-130.85)

Bond Analysis (130.15)

(See: ASSETS ACCOUNTING (100.15), abstract "Finance/Utilities/Games General Program Library GLBR22B", #2, p. 6.)

Financial Analysis (130.45)

(See: ASSETS ACCOUNTING (100.15), abstract "Finance/Utilities/Games General Program Library GLBR22B", #3, p. 6.)

Installment Loans (130.55)

(See: ASSETS ACCOUNTING (100.15), abstract "Finance/Utilities/Games General Program Library GLBR22B", #4, p. 6.)

Mortgage Loans (130.65)

TITLE: MORTGAGE MANAGEMENT SYSTEM

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

Mortgage Management is created on three diskettes. The first diskette, called the SET-UP diskette, contains the programs necessary to set-up, edit, and establish the user's loan system. The second diskette, called the MANAGEMENT diskette, performs the functions needed after the prompting questions and forms are set-up, and stores the input files of prompting questions and forms. The third diskette, called the DATA FILE diskette, contains the mortgagor loan file. (The Management and Data File diskettes are specific to each loan system, and not interchangeable with other systems.)

The general functions performed by the system are as follows:

Set-up Functions

Five basic functions are performed by the set-up diskette:

- INITIALIZATION - Both the input file (which contains the prompting questions and forms) and mortgagor loan file are initially created and formatted to receive data by the initialization procedures.

- INPUT QUESTIONS - System prompting questions are created, edited and listed by three functions. Questions may be listed on either the CRT or printer.

- OUTPUT FORMS - Forms processed by the system are set-up and maintained.

- BACKUP PROCEDURE - Backup copies may be created from either the set-up menu or the management menu.

- MGMT FUNCTIONS - Execution of management functions (customer processing, forms printing, etc.) may be made without reloading the program from the menu function.

Management Functions

The day-to-day operations are controlled by the management diskette:

- CUSTOMER DATA FILE - Loan data files are created, edited, deleted, updated, or interrogated by selecting the functions which process loan information.

- CONTROLS - The user may make inquiry against the loan data base and form files as well as text and extract information on the entire data file.

- OUTPUT FORMS - The system forms are listed on the video display or printed by the output device.

- BACKUP PROCEDURE - Backup copies of any of the system's disk files may be generated by selecting function keys 29, 30, or 31.

- SET-UP FUNCTIONS - If more forms are to be set-up or questions added, the operator may execute this function to return to the Set-up menu without having to reload the system programs.

Data File

The loan data file contains response information and forms control.

The loan data files are the responses by the mortgagor to the system prompting questions. Form control is provided by entering a form sequence number with each mortgagor's record for each form to be controlled.

Form control provides management with form completion information - whether or not a form is complete, and if not, what responses are missing - and form printing information.

Disk Allocation

The disk allocation for a system is:

Set-up Disk - one diskette, plus backup.
Management Disk - one diskette per system, plus backup.
Data Disk - multiple diskettes per system (a diskette holds 73 loan applications), plus a backup for each diskette.

NOTE: Backup copies of important disk-based files should be created regularly. Like other storage media, diskette platters can wear out with excessive use and are subject also to accidental damage or destruction.

Two backup copies should be created for each diskette. Backup for customer data files should be created on a daily or weekly basis, depending on the frequency of changes in customer data files.

Summary of Benefits

1. Management control over mortgage process.
2. Increased accuracy of all mortgage forms.
3. Ease of form changes.
4. In-house control of mortgage department.

MINIMUM REQUIRED CONFIGURATION: WCS/20 (16K), dual diskette drive (third optional), and output writer (2202 or 2281).

Note:

Also available on the PCS-II (mini-diskette version).

PACKAGE NO.: 195-2026-2(-3)(-8)

LICENSE FEE: Refer to current price list.

CENTRAL LIBRARY NO.: W22-130.65-00441

TITLE: MORTGAIN

AUTHOR: Joel Filler

ABSTRACT:

A customized set of inputs, calculations and forms is established for the user during the installation process. The program prompts the operator for inputs, performs calculations, and provides editing facilities. Input and calculated data is then recorded on a data cassette, and the "PRINT" portion of Mortgain read in. "PRINT" reads data from the data cassette, and calls in the individual forms. The operator is prompted as to form insertion and alignment, and the forms are printed out. A check-writing and ledger program is also available. Installation time: 4-6 weeks.

MINIMUM REQUIRED EQUIPMENT: 2200B-3, 2222, 2216/2217, 2217 and 2201.

PRICE: One Time License Fee - $5000 (includes 25 forms).

CENTRAL LIBRARY NO.: V22-130.65-00163

(See Also: ASSETS ACCOUNTING (100.15), abstract "Finance/Utilities/Games General Program Library GLBR22B", #5, p. 6.)

Portfolio Management (130.75)

(See: (1) ASSETS ACCOUNTING (100.15), abstract "Finance/Utilities/Games General Program Library GLBR22B", #6, p. 6; and (2) PORTFOLIO MANAGEMENT (180.15) (FINANCIAL APPLICATIONS), abstract "Investment Performance System (IPS)", p. 28.)

COMMUNICATIONS INDUSTRY (150.00)

TITLE: RAPID-RADIO AID PROGRAM/INFORMATION DIRECTORY

AUTHOR: VIAcomp Systems

ABSTRACT:

The RAPID System is a complete, fully integrated data management system designed especially for Radio and Television Stations. It performs the analysis, verification and maintenance of Contract, Account, Sales, and Inventory Files. The system provides an efficient and accurate billing process, and produces affidavits, invoices and monthly statements. A complete inventory of commercial spots is maintained by a one-time entry when the contract is entered, and provides daily program logs, sales analysis information, and availability reports.

The Accounts Receivable portion includes audit trails for daily, weekly, monthly, and annual cycles and creates transaction and aging reports.

The system was written by a radio engineer familiar with the problems of radio station management and experienced with Wang equipment.

MINIMUM REQUIRED EQUIPMENT: 2200T (24K), CRT, Keyboard, Single Flexible Disk Drive and 10-Megabyte Disk Drive, and 132-column printer.

PRICE: License - $11,400 with one year program maintenance (payable $950.00 per month).

CENTRAL LIBRARY NO.: V22-150.00-00221

CONSTRUCTION INDUSTRY (160.00)

TITLE: PLANNING AND ECONOMICS PACKAGE

AUTHOR: H.C. Priest, Trans Mountain Pipe Line Co., Vancouver, B.C.

ABSTRACT:

This package contains programs which are used for economic analyses of operating and capitol projects and investment opportunities.

MINIMUM REQUIRED EQUIPMENT: 2200, 2215/2222, 2216/2217, and 2201.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: B.43-8.6

FINANCIAL APPLICATIONS (180.05-180.20)

Portfolio Management (180.15)

TITLE: INVESTMENT PERFORMANCE SYSTEM (IPS)

AUTHOR: Financial Statistics, Inc.

ABSTRACT:

The Investment Performance System (IPS) produces a series of reports to communicate to fund managers and their clients significant statistics covering the performance of investment funds. The reports display statistical information, including the BAI recommendations, in a user oriented, easily interpreted format. Among the available investment statistics are (1) time and dollar weighted rates of return, (2) unit value tables, (3) risk measurements displayed as performance consistency (mean absolute deviation) and market sensitivity (regression analysis). Reporting options include selection of the total account, the equity portion, fixed income portion or any user defined subset. Many of the reports compare the account performance factors to weighted or unweighted market indexes.

The user may specify, through control cards, on an account by account basis, exactly which statistics are to be displayed on the reports and the time period to be covered from one month to twenty years. Absolute control is maintained on the content and volume of output for each account. In addition, the user can define any aggregate of funds for a management review such as all funds assigned to an individual portfolio manager, all equities or municipal bonds.

The system is a "stand-alone" package. As such, it includes file maintenance facilities and can readily extract data from existing asset and trust accounting systems. IPS maintains an historical data base to facilitate past or present performance analysis. IPS is also available as a processing service.

MINIMUM REQUIRED EQUIPMENT: 2200B (20K), two cassettes or two floppy disks or equivalent, printer, CRT, and keyboard.

PRICE: License fee $9,750-includes conversational software, documentation, and 180 day warranty, with installation and training on a time and materials basis. Optional software maintenance agreement is $500 per year.

CENTRAL LIBRARY NO.: V22-180.15-00238

Financial Forecasting(180.25)

TITLE: MANAGEMENT PLANNING SYSTEM (MPS)

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

Management Planning System (MPS) is an innovative, comprehensive software package that performs financial modeling and budgeting, statistical forecasting, and business graphics. It is especially useful for management planners, decision makers, and budgeters. True "what if?" financial statement and cash flow modeling is achieved through powerful pre-programmed functions which include depreciation, return on investment, and discounted cash flow. In addition, the user enjoys complete modeling flexibility with a versatile easy-to-use modeling language which can be mastered by anyone familiar with BASIC. The programs of MPS are:

STATISTICAL FORECASTING - uses powerful seasonal analysis and regression techniques which are extremely easy to use and yet are based upon the most powerful techniques of statistical mathematics. The user simply enters a minimum of two years historic data and the system automatically computes prediction values upon the basis of past trend. If the user prefers to predict yearly aggregate performance upon the basis of judgment rather than prior trend, the system automatically distributes his yearly aggregate prediction among quarterly or monthly reporting periods upon the basis of prior seasonality pattern. Seasonal indices are computed for a given time series either with a trend (trend seasonal) or without a trend (horizontal seasonal) and mean absolute deviation for the appropriate parameters. Predicted values are both printed and plotted, and estimated values can be input.

BAR CHART - prepares bar charts labelled above the X-axis and scaled along the Y-axis to fit on the available output device. Each bar is labelled at the bottom and capped with its actual value. A two line chart title can be output. Charts can be up to 157 columns wide and 30 lines high; the width of a column depends on the number of digits in its Y-value.

REGRESSION ANALYSIS - computes regression coefficients for weighted or unweighted (all weights set to unit Y) data using the Least Square Fit method. The regression curve may be a linear, quadratic, or cubic polynomial.

DISCOUNTED CASH FLOW - computes present or future value given the interest rate and number of periods for single, level and different payments, and also the effective interest rate.

FINANCIAL PLANNING - performs financial projection in financial statement format using modeling language and pre-programmed functions which include return on investment, discounted cash flow, and all IRS depreciation formulas. Row and column reports in which the user inputs data and combines it with a number of built-in functions are generated. The user can also define his own unique functions for combining or computing rows and columns.

RETURN ON INVESTMENT - calculates the return on investment by either the Dupont Method, Payback Method, Discounted Cash Flow Method or Accounting Method.

MINIMUM REQUIRED EQUIPMENT: 2200T (16K), CRT, Keyboard, Single Diskette, and 80-column Printer (a Plotter for Bar Chart, Seasonal Analysis, and Regression Analysis and a 132-column Printer for Financial Planning strongly recommended).

NOTE:

Also available on the PCS-II (mini-diskette version) 16K, with Dual Mini-diskette Drives, 24x80 CRT, Keyboard Clicker, Audio Alarm, and Daisy Wheel Printer.

PACKAGE NO.: 195-1024-1(-2)(-3)(-8)

LICENSE FEE: Refer to current price list.

CENTRAL LIBRARY NO.: W22-180.25-00424

INSURANCE INDUSTRY (200.00)

(See: PERSONNEL & PENSIONS (100.60), abstract "Employee Benefit Administration System I", p. 12.)

MANUFACTURING INDUSTRY (250.05-250.30)

Scheduling (250.30)

TITLE: CPM-PERT LEAST-COST SCHEDULING SYSTEM

AUTHOR: Cogebec Information, Inc.

ABSTRACT:

After a project network has been drawn and approved, the system is used for creating and updating network data files, performing network computations, and printing these results. Network data is entered via the keyboard and is recorded on tape cassette. The system then uses the network data file to compute, for each activity, the following results:

- Earliest and latest beginning dates.
- Earliest and latest completion dates.
- Total margin (total float), Free Margin, Available Margin.
- Probability of completion at a given date (PERT-type networks only).
- Cost Slope (if "crash" duration and cost are present).

The System Update Function allows the user to update the network file by adding new activities, modifying existing activities, or deleting activities.

Three different reports, using project-relative or calendar dates, may be produced. In addition, users may define and produce a variety of customized, parameter-defined reports. Reports may be printed using either continuous or separate forms. The number of printed lines per page, line spacing, and report headings are determined by the user.

Auxiliary functions of the system include creation and printing of a five year calendar file (using either calendar dates or project-relative dates) and a network file backup system.

MEMORY SIZE	MAX # OF ACTIVITIES	MAX # OF EVENTS
12K	440	310
16K	675	480
20K	910	650
24K	1,145	820
28K	1,380	990
32K	1,61	1,160

MINIMUM REQUIRED EQUIPMENT: 2200B-3, 2216/2217, 2217, 2222, and 2201 (alternate optional equipment: 2223, 2218, 2202, 2221W, 2231, and 2261).

PRICE: Negotiable.

CENTRAL LIBRARY NO.: V22-250.30-00239

BUSINESS

TITLE: PRODUCTION SCHEDULING - COST & CONTRIBUTION

AUTHOR: Walter A. Treff, Process Equipment Design Corp.

ABSTRACT:

Program group permits establishment, maintenance and selected recall of a data base item. Assemblies are broken into sub-assemblies for total quantity run requirements.

Group functions are as follows:

1) Data Base Load - permits loading inventory items (each with approximately 30 data fields) onto disk base. (2230-1 will hold approximately 2000 data base items.)

2) Data Base Read - retrieves any desired data base item and displays it on CRT for operator review.

3) Assembly Breakdown - stores sub-assembly data to make up one complete assembly (explosion) - Disk space requirement = 1 sector per assembly breakdown.

4) Order Entry Log - stores assembly production requirement as to: assembly number, number required, date due.

5) Long Run

   a) Stores order entry log for one additional month's retrievability.

   b) Prints the following tabulated values for each assembly:

      A) Due Date B) Assembly Number

      For each sub-assembly:

      aa) Shop order number
      bb) Sub-assembly number
      cc) Total quantity
      dd) Mfg. due date
      ee) Price per 1000
      ff) Setup charge
      gg) Invoice price
      hh) Contribution

   c) Prints total of columns

MINIMUM REQUIRED EQUIPMENT: 2200B-2, 2216, 2217, 2201, 2230, and 2222.

PRICE: (contract) $1100

CENTRAL LIBRARY NO.: V22-250.30-00077

MARKETING APPLICATIONS (260.05-260.15)

Market Research (260.10)

TITLE: TABLES

AUTHOR: Real Share Inc.

ABSTRACT:

Tables is a functional analytic tool for business and research analysts. Tables flexibility and power surpasses similar systems found on even large computers. Features include: one-, two-, and three-way tabulations; records; filtering; a wide variety of print options, including histograms; and full spooling of table requests and table outputs. With Tables' highly developed filters mechanism, you may request anywhere from a 1 to 17-way Analysis. Other highlights:

1) Publication-ready output
2) Complete and easy to use editing
3) Comprehensive report generator that maximizes the kinds and types of tables that can be generated including:
   a. 1-way, 2-way, and 3-way cross-tabulations
   b. 5 regular filters
   c. 9 summation filters
   d. up to 255 unique variables per data set
   e. histograms
   f. percent only, number only, or both
   g. percentages by row, column, or total
4) Ordering or rearranging lines or columns
5) Inverting lines into columns or columns into lines
6) Capability for recoding and collapsing
7) The unique feature of computing contingency summation tables where the cells are summations rather than frequency counts
8) Recapping of tables
9) Automatic footnoting
10) More than 200 unique table requests for each computer run (spooling).

MINIMUM REQUIRED EQUIPMENT: 2200B-3, 2240, and 2201.

PRICE: $5,000

CENTRAL LIBRARY NO.: V22-260.10-00093

PROPERTY MANAGEMENT/REAL ESTATE APPLICATIONS (280.00)

TITLE: REAL ESTATE PACKAGE

AUTHOR: Structural Programming, Inc./Mitchell Systems

BUSINESS

ABSTRACT:

Title	System	Description
Appraisal RA-1	1	RA-1A MORTGAGE INFORMATION

This program calculates, with a breakdown of interest and principal repayments, any one of the following 5 quantities given the others:

Loan Balance
Interest Rate
Period of Loan
Number of Payments Per Year
Monthly Payment

RA-1A SIX FUNCTIONS OF A DOLLAR

This program calculates "The Six Functions of a Dollar":

Amount of $1
Amount of $1 Per Year
Sinking Fund Factor
Present Worth of $1 (Reversion Factor)
Present Worth of $1 Per Year (Inwood Factor)
Partial Payment (Mortgage Requirement)

The quantities can be compounded at any desired rate (monthly, quarterly, etc.).

The Ellwood tables contain the same values compounded yearly only.

RA-1A DEPRECIATION

This program calculates depreciation schedules for an asset given the following quantities:

Cost of the Asset
Useful Life of the Asset
Salvage Value

Five types of depreciation schedules are printed:

Straight Line Method
Sum-of-Years-Digits Method
Declining Balance - Real, i.e., the declining balance rate that will reduce value of asset to salvage value at the end of useful life.

Declining Balance - Optional Rate, e.g., 125% or 200%.

Same as above

RA-1A ELLWOOD GRAPHS

This program computes and prints out Ellwood-type graphs given:

Overall Capitalization Rate
Nominal Annual Interest Rate on Mortgage Loan
Loan Value Ratio
Annual Rate of Growth Income
Equity Yield Rates

RA-2 1 RA-2 MARKET DATA ANALYSIS

This program performs a multiple Linear Regression on a given set of data. It calculates the correlation matrix for the variables and generates the Regression Line.

RA-3 1 RA-3 CASH FLOW ANALYSIS

This program calculates and prints the internal rate of return for a given set of cash flows secured from a specified equity. A sinking fund factor can be applied to the positive cash flows in order that they may be compounded to adjust for the negative cash flows.

RA-3 CASH FLOW ANALYSIS

This program calculates and prints out the internal rate of return for a set of cash flows from a property held for a specified period, given Purchase Price and Resale Price Mortgage and Depreciation Information Tax Rates.

Investment

RE-3 2 RE-3 RESIDENTIAL INVESTMENT ANALYSIS

This program enables an investor or developer to analyze an investment in apartments or condominiums. The program develops:

Income schedules for a variety of user-specified unit types and income producing parts of a project. Rental schedules can be increased over time at user-specified rates.

Expense schedules with different user-specified inflation rates for the various types of expenses.

Cash flow schedules based on a selection of up to 10 different mortgages and 5 types of depreciation. The CRT displays tables of debt service, cash flow, depreciation, tax savings, and yield (cash on cash) and gives the user the opportunity to review basic results before proceeding further with the program.

Resale projection schedules with a choice for capitalizing net or gross rents. Computations are made for sale expenses, adjusted depreciation, ordinary and capital gains, taxes payable, loan balance, and sale proceeds.

Limited partnership schedule for up to 20 partners with the specification of partnership interests and tax bracket. Computations are made for the partners' tax savings, cash flow, net spendable cash, and internal rate of return.

Once the preliminary CRT display has been evaluated and the additional input information has been supplied, the machine generates a completely detailed and formatted record copy output for the user.

RE-4 2 RE-4 COMMERCIAL INVESTMENT ANALYSIS

This program is similar to the residential program. It permits user input that relates specifically to commercial projects, e.g., office building investments. Among other things, it includes leasing options and component depreciation as well as expanded maintenance and expense schedules that follow accepted accounting procedures for office and other commercial structures. The printed output of cash flow schedules, resale projection schedules and limited partnership schedules is similar to (RE02).

RE-5 2 RE-5 CONDOMINIUM INVESTMENT ANALYSIS

This program requires a detailed input of all construction, development and financing costs, construction loan interest rates, and disbursement methods, along with construction and rental/sales schedules. It then develops:

A detailed breakdown of all expenses with time. Closing disbursements, and uniformly distributed and variable costs are related to the construction schedule.

A cash flow schedule is derived from the construction and sales schedules. This is printed out in a separate "pro forma" for use by the lending institution.

The program can be used to effectively determine the impact of varying construction and sales schedules, interest rates, et cetera, on the overall feasibility (profitability) of real estate projects.

RE-6 2 RE-6 CONSTRUCTION COST EVALUATION

This program requires a detailed input of all construction, development and financing costs, construction loan interest rates, and disbursement methods, along with the construction schedule. It then develops:

A detailed breakdown of all expenses with time. Closing disbursements, and uniformly distributed and variable costs are related to the construction schedule.

The program can be used to determine the impact of varying construction schedules, interest rates, etc., on total construction costs.

MINIMUM REQUIRED EQUIPMENT:

SYSTEM 1		SYSTEM 2	
A)	2200 A/B	A)	2200 A/B
B)	2201 or 2221	B)	2201 or 2221
C)	2216/2217	C)	2216/2217
D)	2222	D)	2222
		E)	2217/2218

BUSINESS

PRICE:

RA-1		$700
RA-2		$700
RA-3	A	$300
	B	$500
RE-3		$1000
RE-4		$1000
RE-5		$1500
RE-6		To be supplied

CENTRAL LIBRARY NO.: V22-280.00-00016

TRANSPORTATION INDUSTRY (320.00)

TITLE: DISPATCH

AUTHOR: Real Share Inc.

ABSTRACT:

Dispatch was developed for ground transportation companies. Matching perhaps several thousand passengers, each with his own travel pattern, with a fleet of vehicles can be time consuming, prone to error and is likely to result in poor fleet utilization.

Dispatch automatically groups all passengers with similar travel patterns together and produces a dispatch ticket for the vehicle driver.

Machine 'run time' for a company of 100 vehicles is about 2 hours per day, which includes all input, sorting and ticket printing.

Airline schedules and other fixed information is carried in the system. Full editing capability is provided.

MINIMUM REQUIRED EQUIPMENT: 2200B-3, 2240, and 2221.

PRICE: $4,500

CENTRAL LIBRARY NO.: V22-320.00-00096

UNCLASSIFIED BUSINESS APPLICATIONS (390.00)

TITLE: EZWRITER

AUTHOR: Felkins Consulting & Data Processing

ABSTRACT:

This program provides the 2200B System operator with text editing, printing, storage, and retrieval capability. The system has the following features: (1) stores and retrieves a 'page' of text (up to 62 lines) on disk or tape; (2) displays text on CRT, 15 numbered lines at a time; (3) prints any selected group of lines or the complete page as many times as desired; (4) allows one text to be appended to another; (5) deletes, replaces or inserts complete lines of text; (6) deletes, replaces or inserts characters within a line; (7) accepts almost all characters on the keyboard, including quotes, blanks, and commas in free form without the use of quotes; and (8) allows backspacing, tabbing and underlining. The system is used primarily for creating error-free business letters, reports, contracts, and other documents which must be created on a repetitive basis, and do not require retyping in order to correct a few errors.

MINIMUM REQUIRED EQUIPMENT: 2200B-2, 2222, 2201, 2216/2217, and 2230-1.

PRICE: $700.00 (includes tape and instruction manual).

CENTRAL LIBRARY NO.: V22-390.00-00241

CHAPTER 2
EDUCATION (400.00-490.00)
2200 SERIES

INSTRUCTION (410.05-410.20)

Primary/Elementary (410.05)

TITLE: A TALKING ALPHABET LESSON

AUTHOR: Michael Taylor, Muzzey Junior High School, Lexington, Massachusetts

ABSTRACT:

Each letter of the alphabet is individually and sequentially displayed on the CRT and simultaneously spoken to the student, who is asked to find the letter on the keyboard and key it in. If an incorrect key is depressed, the computer states that it was incorrect, states what the depressed key was and repeats the original question. A correct reponse generates a large, animated CRT display of many of the letters.

This is an excellent program for pre-readers and blind or visually impaired students. Printed output records can be obtained by users with output peripherals. See also "A Sound Approach in Education," June 1976 PROGRAMMER magazine, Vol. 10, No. 2, page 3.

This program is part of a project "A Sound Approach in Education", chosen as one of the top 59 out of 400 submittals for the National Student Computer Fair at the 25th Annual National Computer Conference at the New York Coliseum, June 7-10th, 1976. It won 4th prize-one of the highest places of a 9th grader.

MINIMUM REQUIRED EQUIPMENT: 2200-2, modified 2207A interface board, Votrax basic audio synthesizer serial interface 403, speaker.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.69-10.6

- -

TITLE: BASECTR

AUTHOR: Frank Short, Brookfield High School, Brookfield, Connecticut

ABSTRACT:

This program counts in any base from base two up, in any sequence desired.

Known Program Anomalies:

Uses numbers to represent characters in bases higher than 10. For example, A (base 16) is 10.

MINIMUM REQUIRED EQUIPMENT: 2200A-4K and CRT.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.184-10.5

- -

TITLE: SPELL-M

AUTHOR: Michael Gualtieri, Boxford, Massachusetts

ABSTRACT:

This program uses voice output in conjunction with the CRT to demonstrate a spelling lesson. The words chosen are the twelve months of the year. The program asks the student to spell each month successively. Erroneous answers are spelled out letter by letter by the system. Each incorrect month is repeated at the end of the spelling quiz by the 2200/Votrax.

MINIMUM REQUIRED EQUIPMENT: 2200S-2, 2220, modified 2207A board, Votrax basic audio synthesizer serial interface 403, speaker.

PRICE: Available to SWAP members only-nominal charge.

SWAP LIBRARY NO.: E. 73-10.9

(See Also: JUNIOR/SENIOR HIGH (410.10), abstracts (1) "CATS (Computer-Assisted Testing System)" and (2) "Computer Aided Instruction (C.A.I.) Package", pp. 44 and 47.)

Junior/Senior High (410.10)

TITLE: ALGEBRA

AUTHOR: Ron Silver, Kelvin High School, Winnipeg, Manitoba, Canada

ABSTRACT:

This program requires 4K to run and prints a worksheet of 4 different types of equations in 1 unknowns and the solutions. It will print any number of such worksheets, each having any number of each type of equation. It is recommended that no more than 7 of each type be put on one worksheet since 28 questions (7 x 4) fill one output page.

MINIMUM REQUIRED EQUIPMENT: 2200A-1 and 2244A.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.59-10.5

- -

TITLE: A CLASSROOM TOOL - PROBABILITY AND STATISTICS ON THE COMPUTER

AUTHOR: David Clayman, Methuen Public Schools, Methuen, Massachusetts

ABSTRACT:

This is one of two high school course texts (see also SWAP Program No. E.44-9.1) described in the article, "Mathematics in Motion in Methuen", on page 12 of the December, 1974 issue of the PROGRAMMER Magazine, Vol. 8, No. 4.

NOTE: There is a $4.00 charge for this text to cover the cost of printing and mailing.

Program E.43-9.1 contains:

INTRODUCTION

1. MEET THE COMPUTERS - Organization of a Computer System, Components of Wang 2200 System.

2. IMMEDIATE MODE AND ITS USE - Permutations, Combinations, Probability.

3. PROGRAM MODE - Program Loop, Formatting, INPUT statement, N Factorial, INT Function, Rounding Off, Paging, "How Many Bridge Hands", GOSUB Routine.

4. USING THE OUTPUT WRITER AND SAVING A PROGRAM ON A CASSETTE - Binomial Distribution Problems, Multinomial Distribution, Birthday Problem.

5. POISSON DISTRIBUTION - Exponential Function, Operating Characteristic Curve.

6. FINITE MARKOV CHAIN - READ and DATA Statements, Matrices, Loading a Matrix in the computer, using matrices for sales and commission problems.

7. STATISTICS - Measures of Central Tendency, Standard Deviation, Coefficient of Correlation.

8. FLOWCHART.

9. PROGRAM CHAINING.

10. THE DEFFN' STATEMENT AND THE SPECIAL FUNCTION KEYS.

11. EPILOGUE.

MINIMUM REQUIRED EQUIPMENT: 2200 (4K).

PRICE: See "NOTE" above in Abstract.

SWAP LIBRARY NO.: E.43-9.1

TITLE: A CLASSROOM TOOL - COMPUTER SOLUTIONS FOR BUSINESS AND INDUSTRIAL PROBLEMS

AUTHOR: David Clayman, Methuen Public Schools, Methuen, Massachusetts

ABSTRACT:

This is one of two high school course texts (see also SWAP Program No. E.43-9.1) described in the article, "Mathematics in Motion in Methuen", on page 12 of the December, 1974 PROGRAMMER Magazine, Vol. 8, No. 4.

NOTE: There is a $4.00 charge for this text to cover the cost of printing and mailing.

Program E.44-9.1 contains:

PREFACE - The World of Computers

1. MEET THE COMPUTER - Components, Procedures, CRT Display, Keyboard.

2. OUR FIRST PROGRAM - Sample Programs, FOR NEXT Loop, Format.

3. USING THE OUTPUT WRITER AND SAVING YOUR PROGRAM ON A CASSETTE - SELECT, SAVE.

4. PRICE LISTS & TABLES - Water Bills, Int Function, Paging.

5. ROUNDING OFF - Further Use of Int Function.

6. READ and DATA STATEMENTS.

7. LITERAL STRINGS - "Flags" in Program, Payroll Program.

8. "MARK-UP" PROBLEMS.

9. INPUT - General Price List Program, Paging Output.

10. INTRODUCING REM AND THE STR(FUNCTION - Auto Registration Problem.

11. CREDIT CARDS - Further Use of STR(Function.

12. MATRICES - Column Vector, Row Vector, Addition of Matrices, Matrix, Salesman-Product Matrix, Multiplication of Matrices.

13. LOADING A MATRIX INTO THE COMPUTER, DIM STATEMENT.

14. USING MATRICES FOR SALES AND COMMISSION PROBLEM.

15. MONEY: BUYING & SELLING MONEY - Simple Interest, Compound Interest, HEX(03), Monthly Payments, Mortgages.

16. ARRANGING NAMES ALPHABETICALLY AND ORDERING NUMBERS.

17. THE SEARCH - Business Directory, Sifting Information, RESTORE, COM, Program Chaining.

18. TAXES, TAXES, TAXES - FICA Deductions.

19. REAL ESTATE - Multiple Listing.

20. SPECIAL FUNCTION KEYS - Billing Problems, Inventory.

21. CONTROLLED FORMATTING - PRINTUSING, IMAGE.

22. FLOWCHARTS.

MINIMUM REQUIRED EQUIPMENT: 2200 (4K).

PRICE: See "NOTE" above in Abstract.

SWAP LIBRARY NO.: E.44-9.1

TITLE: CATS (COMPUTER-ASSISTED TESTING SYSTEM)

AUTHOR: Real Share, Inc.

ABSTRACT:

The market for this set of programs is any school, college, continuing or supplemental educational facility. The purpose of these programs is to allow the student to progress at his own pace, while providing the stimulus of immediate feedback. Obviously such a tool allows higher student/teacher ratios with the attendant cost savings.

Features of the system are:

1) after hour or "off-line" monitoring of individual student progress.

2) up to eight versions of each question on any test, from which the computer will randomly select a "unique" test for each student.

3) a test-analysis which does a statistical analysis on each question which will indicate "poor questions" or material inadequately taught.

4) student ability to "flag" questions for later discussion with instructor.

5) instructor ability to create and alter quizzes at any time without programming changes -- just simple typing.

Used for three semesters at the University of Hawaii -- over 10,000 quizzes administered with excellent acceptance by students and faculty.

MINIMUM REQUIRED EQUIPMENT: 2200C-2 and 2218 (8K for instructor and student use, 4K units may be added for student use).

PRICE: $600 (50% discount for non-profit educational institutions).

CENTRAL LIBRARY NO.: V22-410.10-00097

- -

TITLE: CIVIL WAR (ONE OF A SERIES)

AUTHOR: Joel G. Ehrlich, Naval Ship Weapons Systems Engineering Station, Port Hueneme, California

ABSTRACT:

This game is a small-scale, economically-oriented simulation of the Civil War (the War between the States). It is a study based upon the economic factors of conducting a war. You are the Union (Commander-in-Chief) and the 2200 is the Confederacy. You decide how many men to draft, how much to pay them, how many guns to buy and how much to spend on food each quarter. Random factors and usual considerations are part of the program.

MINIMUM REQUIRED EQUIPMENT: 2200B-2, and 2222/2215/2223.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.61-10.5

- -

TITLE: A COMPUTERIZED SOCIAL STUDIES SIMULATION

AUTHOR: Edward Rodney Myers, Meadville Area Senior High School, Meadville, Pennsylvania.

ABSTRACT:

This program was chosen as one of the top 59 finalists out of 400 submittals for the National Student Computer Fair, held in conjunction with the 25th Annual National Computer Conference at the New York Coliseum June 7-10th, 1976.

This project, designed for use by social study teachers in explaining the complexity of international conflicts and the problems of leadership in maintaining a country's sovereignty, is a simulation of an economic, political, and military conflict between two modern third world powers. This simulation parallels the current conflict between the African nations of Rhodesia, and Mozambique.

The simulation, designed for two players, gives the population, treasury total, popular support, amount of territory, military strength, and available resources as comparable indicators between the two countries. Each player, a representation of the Government, enters a budget for that year. The budget consists of values for tariff, income tax, welfare programs, military programs, and resource development. With these values, the computer adjusts the country's indicators, and the cycle is repeated. After a random number of years, a war is declared by the computer. If each country (the players) decides to mend differences, or can negotiate a peace by transferring territory, the yearly cycle is not disturbed. If, however, a settlement is not made, the computer indicates the number of battles, casualties, and loss of equipment and resources each country experiences and adjusts the country's indicators accordingly. This report of the war and its effect on each country is then incorporated into each year's budget cycle with the opportunity (each year) for the countries to settle the war. If the war becomes too exhaustive to any one country, the computer will declare a ceasefire or a winner of the war. The peace settlement consists of territory transfers and reparation payments. The simulation culminates when a country's treasury, population, military strength, territory, or resources decrease below a minimum.

This project is unique in that it describes, in game form, the complexity of international conflicts and governmental difficulties in making beneficial decisions-two basic conditions discovered through historical perspective.

See also article in PROGRAMMER magazine, "M.A.S.H. Math Lab Active", Vol. 10, No. 2, June 1976, page 24.

Known Program Anomalies:

Since inverse trigonometric functions are used to generate asymptotic conditions, the program must be run in radian mode.

MINIMUM REQUIRED EQUIPMENT: 2200S-2 and 2201.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.58-10.4

- -

TITLE: COMPUTER AIDED INSTRUCTION (C.A.I.) PACKAGE

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The programs in this package allow the creation, editing, and inserting of lessons planned by an instructor, and also permit students to observe lessons, interact with them, and test their knowledge in particular areas of concentration.

The Computer Aided Instruction Package consists of the following four programs:

1. LESSON CREATION PROGRAM - used by the instructor to create a lesson tape.

2. LESSON EDITING PROGRAM - allows the instructor to modify or delete existing lessons on a lesson tape.

3. LESSON INSERT PROGRAM - used by the instructor to insert lessons at any point on an existing lesson tape.

4. C.A.I. PROGRAM - allows students to view and interact with a lesson tape created by the instructor.

The programs are basic in operation and only limited knowledge of the System 2200 is required. Although flexible in application, the package is limited in design, allowing only multiple choice questions to be created.

The package can be used by an instructor to develop self-taught courses in almost any subject matter (e.g., mathematics, social studies, English, the sciences, or computer languages) and as an aid to both the instructor and the student. The instructor can use the program as a testing aid, to individualize work, or check on the progress of individual students. Students can test their knowledge to determine where more work, study, or instruction is needed or to review material which was taught as a formal lesson. They also can study new material at a pace that is compatible to their learning ability.

MINIMUM REQUIRED EQUIPMENT: 2200(8K), Tape Drive, and printer (optional).

PACKAGE NO.: 195-2013-1

LICENSE FEE: $50.00

CENTRAL LIBRARY NO.: W22-410.10-00192

- -

TITLE: FARMER

AUTHOR: Frank Short, Brookfield High School, Brookfield, Connecticut

EDUCATION

ABSTRACT:

This program simulates farming in the 1880's. The player is able to plant up to 8 crops and raise up to 3 kinds of livestock - all for sale on the open market at the end of the year. The program demonstrates the unpredictability of seasonal changes and their effect on farm production. The program allows the student to take the role of the farmer and to experience his frustrations.

MINIMUM REQUIRED EQUIPMENT: 2200S (8K), CRT/2201 or 2231.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E. 65 - 10.6

TITLE: FRACTION

AUTHOR: Ron Silver, Kelvin High School, Winnipeg, Manitoba, Canada

ABSTRACT:

This program requires less than 4K to run. It outputs sets of random problems of fraction to decimal conversions grouped into worksheets with answers. The program will generate any number of problems on any number of worksheets.

MINIMUM REQUIRED EQUIPMENT: 2200A/2231.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E. 71-10.8

TITLE: GUESSING GAME WITH A TALKING 2200

AUTHOR: Michael Taylor, Muzzey Junior High School, Lexington, Massachusetts

ABSTRACT:

This is a completely and literally conversational talking/visual guessing game. The computer randomly chooses a number between 0 and 100. The player has six guesses in which to correctly determine the number. After each guess, the computer informs the player if his guess is high or low. Interesting remarks are made by the computer during the course of the play.

This program is especially designed for blind or visually impaired students, special students, pre-readers or anyone who may have a "fear" of computers. It doesn't take long to make friends with the 2200 during this game.

See also "A Sound Approach in Education," June 1976 PROGRAMMER magazine, Vol. 10, No. 2, page 3.

This program is part of a project "A Sound Approach in Education," and was chosen as one of the top 59 out of 400 submittals for the National Student Computer Fair at the 25th Annual National Computer Conference at the New York Coliseum, June 7-10th, 1976. It won 4th prize, one of the highest placements of a 9th grader.

MINIMUM REQUIRED EQUIPMENT: 2200-2, modified 2207A interface board, Votrax basic audio synthesizer serial interface 403, speaker.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.67-10.6

TITLE: HUNTINGTON I EDUCATION PROGRAMS

AUTHOR: Developed by the Huntington Computer Project Staff, under the direction of Dr. Ludwig Braun and Dr. Marian Visich, Jr.

ABSTRACT:

This package includes programs applicable to the following disciplines: Biology/Earth Science, Chemistry, Mathematics, Physics, Social Studies, and Teacher Assistance.

MINIMUM REQUIRED EQUIPMENT: 2200 (8K).

PACKAGE NO.: 195-1005-1(-2)(-3)

LICENSE FEE: $68.00

CENTRAL LIBRARY NO.: W22-410.10-00043

TITLE: KINGDOM GAME

AUTHOR: Frank Short, Brookfield High School, Brookfield, Connecticut

ABSTRACT:

You are the ruler of a mythical kingdom and make decisions on planting, buying and selling land, and food distribution. The game is similar to Hamurabi but includes instructions, potential scientific advancement and the ability to restart the game from any stopping point. (This game has been adapted from 101 Computer Games.)

MINIMUM REQUIRED EQUIPMENT: 2200A, and 2267S(8K).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.64-10.6

TITLE: METRIC

AUTHOR: Michael Gualtieri, Boxford, Massachusetts

ABSTRACT:

This is a voice output demonstration of the metric system using the 2200/Votrax audio synthesizer. Problems are spoken to the student. Provisions for wrong answers are included in the program by the System. This is an interactive presentation between student and "humanlike" Votrax interfaced to a Wang System.

MINIMUM REQUIRED EQUIPMENT: 2200S-1, 2220, modified 2207A interface board, Votrax basic audio synthesizer serial interface 403, speaker.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.72-10.9

TITLE: PROGRAMMING IN BASIC

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

"Programming in BASIC" is a beginner's introduction to programming in the BASIC language on the System 2200. Beginning at the most elementary level, it introduces the reader in a step-by-step fashion to the fundamentals of BASIC, the mechanics of creating programs on a System 2200, and all the concepts and statements needed for competent fundamental programming in BASIC (in commercial and non-commercial environments). It presumes no prior knowledge of BASIC or of programming in general.

The reader is urged to try out new statements and programming concepts as they are introduced, and to experiment with example programs (120 in all) by making changes to them, predicting the effects of the changes, and then confirming or correcting one's knowledge based on the observed effects. Example programs are drawn from both commercial and non-commercial or "technical" applications, and there is nothing that can be done from the keyboard that can damage the System. Cautions are included in the text when statements that might destroy on-line data files are introduced. Thus, the reader can feel free to experiment at every stage of learning.

This volume is specifically designed for the person who wishes to learn to program in BASIC on the System 2200, but it can also serve as a general introduction to programming in BASIC on any system. Although BASIC, like most programming languages, has many forms, each with its own idiosyncracies, there nevertheless remains a large common core that is part of Wang BASIC and most other versions of the language.

MINIMUM REQUIRED EQUIPMENT: 2200 CPU, CRT Display, Keyboard, Cassette and/or Disk (Diskette) Drive, and Printer (recommended).

PACKAGE NO.: 700-3231 (manual only).

PRICE: 15.00

CENTRAL LIBRARY NO.: none.

TITLE: QUADRATIC FORMS

AUTHOR: Michael Batty, Meadville Area Senior High School, Meadville, Pennsylvania

ABSTRACT:

The purpose of this program is to obtain the solution sets for all quadratic forms with real coefficients. In the case of equations, roots are output, whether real or imaginary. In equalities, the solution sets are output. All numerical values in the output are to three decimal places.

MINIMUM REQUIRED EQUIPMENT: 2200A-1 and 2201.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.63-10.6

TITLE: RANDOM NUMBERS WITH A TALKING 2200

AUTHOR: Michael Taylor, Muzzey Junior High School, Lexington, Massachusetts

ABSTRACT:

The 2200 speaks any desired number of random numbers as it displays them on the CRT. Each random number generated is equal to or greater than zero and less than 10. See also, "A Sound Approach in Education," June 1976 PROGRAMMER magazine, Vol. 10, No. 2, page 3.

MINUMUM REQUIRED EQUIPMENT: 2200-1, modified 2207A interface board, Votrax basic audio synthesizer serial interface 403, speaker.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.66-10.6

TITLE: A TALKING MATH QUIZ

AUTHOR: Michael Taylor, Muzzey Junior High School, Lexington, Massachusetts

EDUCATION

ABSTRACT:

The computer provides the student or teacher with a choice of an addition or multiplication quiz. The user chooses the number of problems, the highest and lowest desired numbers (i.e., degree of difficulty). Problems are spoken by the 2200/Votrax as they are displayed on the CRT. A second chance is given for the first incorrect answer. Correct answers are displayed and spoken when two incorrect answers have been given by the student. At the end of quiz, the total number of correct and incorrect answers as well as the final percent grade is spoken and displayed on the CRT. Note that problems with one incorrect and one correct answer are graded as incorrect.

Typewriter output for teachers' records can be obtained if hardcopy output device is used.

This program is especially useful for blind or visually impaired students. It also adds a new dimension to enhance the learning rate of any student.

See also "A Sound Approach in Education," June 1976 PROGRAMMER magazine, Vol. 10, No. 2, page 3.

This program is part of a project "A Sound Approach in Education," and was chosen as one of the top 59 out of 400 submittals for the National Student Computer Fair at the 25th Annual National Computer Conference at the New York Coliseum, June 7-10th, 1976. It won 4th prize, one of the highest places of a 9th grader.

MINIMUM REQUIRED EQUIPMENT: 2200-2, modified 2207A interface board, Votrax basic audio synthesizer serial interface 403, speaker.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.68-10.6

College (410.15)

TITLE: BASIC MATHEMATICS PACKAGE

AUTHOR: Carl W. Schlaphoff, Colorado Mountain College, Leadville, Colorado

ABSTRACT:

This package contains a series of computer programs written in the BASIC language for the purpose of presenting randomly generated basic mathematics problems to students and evaluating their responses - see also "A Teaching Assistant Named Wang," Sept. '74 PROGRAMMER, pp. 3 to 9. The included programs are designed to test twenty-five skills and are divided into eight major sections: Arithmetic, Integers, Fractions, Decimals, Simple Equations, Metric Conversions, Percent, Areas and Volumes.

The first four sections are stored on the first cassette tape, and the last four sections are stored on the second tape.

Purpose of the System:

The purpose of the BASIC Mathematics programs is to provide a narrowly-defined method for students to practice problem-solving skills in basic mathematics. These programs are intended to assist in the learning process, not serve as the "only way" to learn basic mathematics. They will be most effective if they are presented as an alternative method of practicing homework, one among several methods which are available to the students.

All programs stored on the cassette tapes require less than 4K of active memory.

Description of the System:

The system works as follows: A student inserts one of the cassette tapes into the cassette mechanism and a sheet of paper into the output typewriter. He loads and executes the first program on the tape. The first program gives information and asks questions which allow the system to determine the student's name, the date, the time, and what the student wants to practice. It then automatically loads the desired program, presents randomly-generated problems, and waits for the student to enter answers to the problems. The system watches the student's progress and grants a grade at an appropriate time and types the results on the grade sheet. The student then indicates what he wants to do next. The process continues until the student indicates that he is ready to quit. After the session is over, the typed gradesheet (figure included) is given to the instructor who copies the results on the student's record sheet (figure included). This allows the instructor to: (1) observe and record the skills which have been practiced by the student, (2) observe how well the student did, (3) determine if the student needs to discuss certain topics which are indicated by low scores, (4) observe improvement with a skill if it has been attempted more than once, and (5) suggest to the student which skills need further practice.

The record sheet provides a record of the amount of work each student puts forth and a detailed description of the student's strengths and weaknesses and progress throughout the course. It is easy to determine whether or not a student is keeping up with the course. The average time required to earn a grade is about 12 minutes, and about 8 hours of clock time is required for a student to complete practicing all 25 skills. Students need about an hour of practice each week to keep up with the course. One terminal is capable of handling only 50 to 100 students per term, which is a limiting factor. The record sheets, however, allow an instructor to handle large numbers of students on an individual basis.

TABLE OF CONTENTS

MINIMUM REQUIRED EQUIPMENT: 2200A-1/2201.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.52-9.6

TITLE: BIOACIDS

AUTHOR: Richard Hunter, Chemistry Department, California State College, San Bernadino, California

ABSTRACT:

This program is used in Chemistry Education for drill practice on names, structures, and properties of 20 amino acids. All structures are displayed on the CRT. These structures are compressed in the program in a unique manner to require only about 15% of the memory usually required. The method is explained in the documentation.

NOTE: Those users without a teletype must reprogram line 8010.

MINIMUM REQUIRED EQUIPMENT: 2200B-8K, 2216/2217, and 2212.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.57-9.8

TITLE: FISCAL1

AUTHOR: Joel G. Ehrlich, Naval Ship Weapons Systems Engineering Station, Port Hueneme, California

ABSTRACT:

FISCAL 1 is an educational game intended for the student of economics. As with several similar games, you attempt to build a stable macroeconomic model of a society (The United States in this case). External influences are programmed in and a series of knowledge-probing questions are asked. You are 'graded' by how well you keep GNP and Potential Output together (measured in constant dollars). All values other than government expenditures and taxes are provided - you become the government and try to 'hold the line.'

MINIMUM REQUIRED EQUIPMENT: 2200B-2, 2216/2216A, 2217, and 2222/2215/2223.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.62-10.5

TITLE: FORCES

AUTHOR: Edward J. Gucker, S.U.N.Y., Brockport, New York

ABSTRACT:

This program plots trajectories of particles in arbitrary, two-dimensional, user-defined force fields. User must specify initial conditions for each particle, mass, and time increment used in integrating the equations of motion. Output is in an 8" by 8" square region, with independent scaling for the x and y axes. Points outside the grid are suppressed. Plots may be interrupted and resumed with new particles or with the same particle.

See also, "Simulation and Teaching," June 1975 PROGRAMMER magazine, Vol. 9, No. 2, pp. 3 to 10.

Known Program Anomalies:

Forces must be specified by legal byte strings - no interpretation is provided.

MINIMUM REQUIRED EQUIPMENT: 2200B (4K)/2202.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.49-9.6

TITLE: HYPO

AUTHOR: Klaas Westera, Wang Laboratories, Inc.; Don Mills, Ontario, Canada

ABSTRACT:

HYPO is a popular and widely used machine language in educational institutes throughout Canada and the United States. This language is used to introduce students to some of the basic concepts of digital computers. The language allows program and data storage, addition, subtraction, multiplication and division, input and output of data and conditional branching. Options in the compiler program allow for batching or single program runs for printer or CRT output. A full line of error messages is built into the compiler. Presently uses 2244A for input but could be modified for keyboard input. Also runs on 2200B-2, but could be altered for 2200S-1.

Input media are Wang or GEAC Mark Sense Cards. Output is on printer or CRT.

MINIMUM REQUIRED EQUIPMENT: 2200B-2, 2244A, 2220, and 2231.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.50-9.6

TITLE: LEM

AUTHOR: Edward J. Gucker, S.U.N.Y., Brockport, New York

EDUCATION

ABSTRACT:

This program simulates a lunar landing, with human control of magnitude and duration of thrust. The simulation runs in "real time", with interaction taking place as the LEM descends. The CRT shows velocity, acceleration, fuel remaining, altitude and thrust. An "automatic guidance system" is provided and may be placed in control of the LEM at any time. This program may be used to teach the distinction between velocity and acceleration.

See also, "Simulation and Teaching," June 1975 PROGRAMMER magazine, Vol. 9, No. 2, pp. 3 to 10.

MINIMUM REQUIRED EQUIPMENT: 2200B (4K), and CRT.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.48-9.6

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TITLE: PERSONAL LOANS

AUTHOR: Harold Shair, White Plains Public Library Consultant, Rye, New York

ABSTRACT:

This program will help you shop for a loan that complies with the truth in lending law. It is divided into two parts: the first part is for comparison shopping on mortgage, auto, homeowner or personal loans. The second part, using the information on the federally required disclosure statement, checks whether the lender complied with the law by disclosing accurate figures.

MINIMUM REQUIRED EQUIPMENT: 2200B-8K.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.60-10.5

- -

TITLE: RYDBERG

AUTHOR: Ken Mantei, Chemistry Department, California State College, San Bernadino, California

ABSTRACT:

This program is used in Chemistry Education. It displays and compares a calculated hydrogen atom spectrum with an experimental spectrum for any trial value of Rydberg constant. Student must provide wavelength and intensity data. This trial and error optimization experience demonstrates the success of the Rydberg equation and the uniqueness of the Rydberg Constant.

MINIMUM REQUIRED EQUIPMENT: 2200B-8K, 2216/2217 and 2212.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.54-9.8

- -

TITLE: ZAP

AUTHOR: Klaas Westera, Wang Laboratories, Inc.; Don Mills, Ontario, Canada

ABSTRACT:

ZAP is a popular and widely used machine language in educational institutes throughout Canada and the United States. This language is used to introduce students to some of the basic concepts of digital computers. The language allows program and data storage, addition, subtraction, multiplication and division, input and output of data and conditional branching. Options in the compiler program allow for batching or single program runs and for printer or CRT output. A full line of error messages is built into the compiler. Presently uses 2244A for input but could be modified for keyboard input. Also runs on 2200B-2, but could be altered for 2200S-2.

Input media are Wang or GEAC Mark Sense Cards. Output is on printer or CRT.

MINIMUM REQUIRED EQUIPMENT: 2200B-2, 2244A, 2220 and 2231.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.51-9.6

(See Also: JUNIOR/SENIOR HIGH (410.10), abstracts (1) "CATS (Computer-Assisted Testing System)", (2) "Computer Aided Instruction (C.A.I.) Package", (3) "Huntington I Education Programs", and (4) "Programming in BASIC", pp. 44, 47, 49 and 50.)

Vocational and Technical (410.20)

(See: JUNIOR/SENIOR HIGH (410.10), abstracts (1) "CATS (Computer-Assisted Testing System)" (2) "Computer Aided Instructions (C.A.I.) Package", and (3) "Programming in BASIC", pp. 44, 47 and 50.)

UNCLASSIFIED EDUCATION APPLICATIONS (490.00)

TITLE: "TESTREAD" AND "TESTRITE"

AUTHOR: Richard G. Carpenter, Ohio Northern University, Ada, Ohio

ABSTRACT:

Uses 2200B with 2211 output for diagnostic testing (Multiple Choice/Fill in the Blank/True-False questions). Any subject area may be tested, not just Math. Program "TESTRITE" writes a test of one of the three types and saves it on tape.

Program "TESTREAD" reads the test off of the tape. "TESTREAD" is a timed test. The programs run better if a disk drive is used.

Known Program Anomalies:

"TESTRITE" cannot use built-in "sin", "log", etc. keys. Fill in answers - spelling is critical.

MINIMUM REQUIRED EQUIPMENT: 2200B (8K) and 2211.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: E.55-9.8

CHAPTER 3
MEDICAL APPLICATIONS (500.00-590.00)
2200 SERIES

ADMINISTRATION (500.05-500.20)

Clinics (500.05)

TITLE: MEDICAL LAB AND DOCTOR ACCOUNTING SYSTEM

AUTHOR: Ignacy Fonberg

ABSTRACT:

The System enables the user creation, updating, reviewing and deleting of the personal and medical files (accounts) of patients. Billing of patients is done automatically. The kind of insurance is selected, the appropriate form is placed in the printer and the machine prints the bills only for the patients with the given kind of insurance. Each patient's account can be billed at any time on any insurance form by recalling the account to the memory and using custom billing function key. The services paid in full or marked as such are omitted from the bill. They are printed on the billing form only if requested by the operator. The System considers aging of the balance and if payment is overdue prints an appropriate message on the bill. Number of days between billings is set up in each patient's account to 30, and can be changed by the operator. The services are entered into a file by keying a number which is assigned to given service. The machine displays on the CRT the English description of the service and the charge. The charge can be changed by the operator by entering a new charge or by keying in a discount coefficient, or both. The operator can also enter services which are not on the list of services. The list of services and the list of physicians (needed for certain billings) can be easily updated.

MINIMUM REQUIRED EQUIPMENT: 2200B-3, disk, and line printer.

PRICE: $5,000

CENTRAL LIBRARY NO.: V22-500.05-00244

- -

TITLE: MEDICO II MEDICAL ACCOUNTS RECEIVABLE

AUTHOR: Jinkins Associates

ABSTRACT:

The MEDICO II Medical Accounts Receivable System automates the complete accounts receivable function for a medical group practice. Programs include Billing Entry, Receipts Entry, Bill Printing & Posting, Receipts Posting, Changes & Adjustments Journal, Past Due Statements Printing, Aged Trial Balance, Delinquent Report, Procedure Usage Report, and Billing by Doctor Report. An interactive edit and correction module is included in the Bill Printing & Posting program. Reports such as bills, past due statements, and the Aged Trial Balance are printed in alphabetic order by patient in order to interface with manual systems. Capacity is 9000 active accounts, and more than 3000 new bills and 2500 past due statements per month.

Abercrombie Radiological Consultants, Inc. has estimated their total cost per statement at 34¢ - including an insurance form. The AMA Standard Insurance Form has been accepted nationwide by MEDICARE - MEDICAID and by most Tennessee insurors including Blue Cross.

Send a blank cassette to Jinkins Associates to receive a demonstration program, a 22 page brochure, a sample data-mailer, and a peddler's package.

MINIMUM REQUIRED EQUIPMENT: 2200B-3, 2216/2217, 2222, 2230-3, and 2221W (for larger users, a 2200S-2 for key-to-tape entry eases the workload).

PRICE: (for resale to end users only in a limited area) first system $2400, second system $2400, third system $1200, and additional systems no charge.

CENTRAL LIBRARY NO.: V22-500.05-00245

- -

TITLE: MED LAB - A PATIENT RECORD AND BILLING SYSTEM FOR MEDICAL LABORATORIES

AUTHOR: Real-Share Inc.

ABSTRACT:

This system creates a file of patient information, records lab test and test results, automatically assigns standard fees or permits manual entry of extraordinary charges, prints reports for the patients' doctor, prints a summary of laboratory production with a recap of tests given and a total of fees generated, bills the patient, separately bills the third party vendor, prints follow-up bills for individuals or agencies with overdue balances, records cash receipts and updates Accounts Receivable, prints a cash receipts journal, permits extensive editing of patient records or standard test information, and prints Accounts Receivable.

MINIMUM REQUIRED EQUIPMENT: 2200B-3, 2216/2217, 2222, 2231, and 2217.

PRICE: $2400, with monthly maintenance at $50.

CENTRAL LIBRARY NO.: V22-500.05-00020

TITLE: PATIENT BILLING SYSTEM (PBS)

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The Patient Billing System (PBS), designed for use in a physician's or dentist's office and emergency rooms at hospitals, provides the user with capabilities of third party form preparation and on the spot billing functions. It does not include any accounts receivable functions and should be considered only for high volume users with large volumes of form filling and billing routines.

The PBS software functions include:

Create Form Data File - provides the user with the capability of designing any third-party claim form, including Blue Cross/Blue Shield, Medicare/Medicaid, and the standard AMA claim form.

List Form - allows the user to review any claim form.

Edit Existing Form - permits the user to edit, either totally or partially, any previously created form.

Data Entry - guides the operator through every step of any claim form, resulting in an accurate, complete form.

List Created Data File - recalls, reviews, or modifies patient data or any claim form in process, at any time with just a touch of the keys.

MINIMUM REQUIRED EQUIPMENT: PCS-II (16K) with 9-inch CRT, dual mini-diskette drives, keyboard, Option 60A (80x14 CRT, keyboard clicker, and audio alarm), and 2231W-1 output device (2271 optional).

PACKAGE NO.: 195-1027-8

LICENSE FEE: Refer to current price list.

CENTRAL LIBRARY NO.: W22-500.05-00442

Nursing Homes (500.20)

TITLE: THE LAVAN NURSING HOME SYSTEM

AUTHOR: Lavan Systems, Inc.

ABSTRACT:

The LAVAN NURSING HOME SYSTEM is a complete Accounts Receivable package for the Nursing Home Industry. It produces all the reports necessary to maintain Accounts Receivable/Patient Billing for the following resident categories: Private, V.A., Medicaid, Medicare (parts A & B), and Welfare. A complete resident history is provided for and is chronologically ordered. All transactions (events) for as many months as required may be included. Various summary reports are provided to indicate admissions, terminations, level changes, payment history, etc. Especially important to accountants is a special feature which automatically compares charges with receipts and "ticks" the matching items. Retroactive adjustments are also simple to implement. The Census Report and its accompanying Matrix Summary are particularly comprehensive, showing categories of residents by day of month and total resident days by category and their accompanying Room/Board Charges.

MINIMUM REQUIRED EQUIPMENT: WCS/20 (16K), and 2231W.

PRICE: Negotiable.

CENTRAL LIBRARY NO.: V22-500.20-00443

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TITLE: NURSING HOME PACKAGE

AUTHOR: Mr. Labe Mell

ABSTRACT:

This system provides health care plans, physicians' orders, nursing and social service care plan, patient goals, medicine profiles, physical therapy care plan, completes third party insurance forms, bills patients, records cash receipts, bed census, aged accounts receivable trial balance, payroll, accounts payable, general ledger, and monthly profit and loss.

MINIMUM REQUIRED EQUIPMENT: 2200B-3, 2216/17, 2217, 2222, 2230-3, and 2231.

PRICE: $20,000

CENTRAL LIBRARY NO.: V22-500.20-00022

MEDICAL PRACTICE (510.05-510.60)

Biomedicine (510.05)

TITLE: LIQUID SCINTILLATION DATA SYSTEM (LSDS)

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The Liquid Scintillation Data System (LSDS) consists of the following six programs:

1. Single Label Liquid Scintillation - calibrates quench curves for liquid scintillation counters and uses the calibrated quench curves to correct counts for quenching.

2. Dual Label Liquid Scintillation - performs the same operation as the Single Label Liquid Scintillation program, but for dual label counting.

3. Single Label Digital Integration - used for single value analysis, this program sums the total activity of a sequential set of data and distinguishes peaks of activity in that set of data.

4. Dual Label Digital Integration - performs the same operation as the Single Label Digital Integration program, but for dual value analysis.

5. Quench Curve File Maintenance - allows the operator to update or modify calibrated quench curves.

6. Input/Output Test - aids the operator in understanding how the I/O (Input/Output) parameters for the system function.

MINIMUM REQUIRED EQUIPMENT:

Diskette

WCS-20 (8K), or CPU-T (8K), CRT, Keyboard, Single Diskette Drive, and an output device (either a Model 2201 Output Writer, Teletype, or the Model 2221 or 2231 Printer), with the Model 2203 Paper Tape Reader recommended as an option.

Cassette

WCS-10 (8K), or CPU-S (8K), CRT, Keyboard, Cassette Drive, Option 22, and an output device (either a Model 2201 Output Writer, Teletype, or the Model 2221 or 2231 Printer), with the Model 2203 Paper Tape Reader recommended as an option.

PACKAGE NO.: 195-1026-1(-2)(-3)

LICENSE FEE: $200 (Annual Support Contract: $100)

CENTRAL LIBRARY NO.: W22-510.05-00433

Cardiovascular (510.15)

TITLE: EVALUATION OF CARDIOVASCULAR FUNCTION

AUTHOR: Edward J. Reininger, Southern Illinois University, Springfield, Illinois

ABSTRACT:

Cardiac output can be determined using the Fick Principle in which the patient's oxygen consumption and the difference in the oxygen content of arterial and mixed venous bloods must be measured. This program was written to provide users with rapid, error-free computation of cardiac output and other derived parameters. A feature of the program is that gas volumes are reduced to a condition of standard temperature and pressure and dry automatically. By taking account of the difference in the volume of gas inspired and expired, the true oxygen consumption is calculated by determining the difference in the amount of oxygen per unit time which is inspired and expired. The true carbon dioxide production and the respiratory exchange ratio are also calculated.

Other cardiovascular parameters calculated include: cardiac index, stroke volume, stroke index, and total peripheral resistance. Data obtained from three determinations may be entered; the results are treated statistically.

See also March, 1976 PROGRAMMER magazine article, "Evaluation of Cardiovascular Function with the 2200," Vol. 10, No. 1, pages 3 to 10.

MINIMUM REQUIRED EQUIPMENT: 2200C.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: M.18-10.2

Medical History (510.25)

TITLE: MEDICAL HISTORY

AUTHOR: RCB Services, Inc.

ABSTRACT:

An off-line self-administered system utilizing a health questionnaire as the basis of input. Programs contain free text insertion as well as automatic branching techniques. This system is similar to our 720 version but uses the CRT to prompt the operator. During the testing period, a physician saved one half an hour per patient working with the use of the 2200 Medical History System.

MINIMUM REQUIRED EQUIPMENT: 2200B-2, 2216/17, 2222 and 2231.

PRICE: $3500

CENTRAL LIBRARY NO.: V22-510.25-00023

Pathology (510.35)

TITLE: CREATININE CLEARANCE CORRECTED FOR BODY SURFACE AREA

AUTHOR: David Buzzee, St. Elizabeth Hospital, Covington, Kentucky

ABSTRACT:

This program calculates the rate of creatinine clearance given serum and urine creatinine levels, time and volume of urine collection. Corrects for body surface area, given height and weight, to a normalized area of 1.73 square meters. The result is typed in format for placement on a patient's chart.

Also see "Streamlining Clinical Chemistry Tests in the Hospital Laboratory," PROGRAMMER magazine, pp. 18 to 25, December 1975, Vol. 9, No. 4.

MINIMUM REQUIRED EQUIPMENT: 2200B and 2222/2201.

PRICE: Available to SWAP Members only - nominal charge.

SWAP LIBRARY NO.: M.24-10.3

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TITLE: GASTRIC ACID CALCULATION AND GASTRIC ANALYSIS REPORT FORM

AUTHOR: David Buzzee, St. Elizabeth Hospital, Covington, Kentucky

ABSTRACT:

Given the normality of a standard acid against which samples of gastric contents are titrated, and the volume of titrant required to titrate the standard and the gastric samples, this program calculates gastric acid production through as many as six time periods both before and after acid stimulation. The program also allows input of test results for blood and bile assays on the gastric fluid, and prints a report suitable for placement in a patient's medical record.

Also see "Streamlining Clinical Chemistry Tests in the Hospital Laboratory," PROGRAMMER magazine, pp. 18 to 25, December 1975, Vol. 9, No. 4.

MINIMUM REQUIRED EQUIPMENT: 2200B and 2222/2201.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: M.27-10.3

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TITLE: GTT 1A

AUTHOR: Paul Laska, Pathology Lab Inc., Portsmouth, New Hampshire

ABSTRACT:

GTT 1A provides a graphic representation of glucose tolerance test results. It applies three sets of criteria in interpreting the results. 'Flat' and 'Hypoglycemic' curves are flagged. This work was inspired by Dr. Lupovitch at Holy Cross Hospital in Detroit.

MINIMUM REQUIRED EQUIPMENT: 2200B (4K).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: M.20-10.3

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TITLE: INTERPRETIVE LABORATORY REPORTING SYSTEM

AUTHOR: James W. Veenstra MD

ABSTRACT:

Based upon input from a Technicon SMA12-60 or SMA6-60, this system evaluates normal ranges of each test for each patient, generates a report indicating ranges, compares results to ranges, indicates disease possibilities and suggests additional tests which may be helpful.

MINIMUM REQUIRED EQUIPMENT: 2200B-2, 2216/17, 2222, and 2231.

PRICE: Negotiable.

CENTRAL LIBRARY NO.: V22-510.35-00025

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TITLE: LDH ISOENZYME FRACTION CALCULATION AND REPORT GENERATION

AUTHOR: David Buzzee, St. Elizabeth Hospital, Covington, Kentucky

ABSTRACT:

This program calculates the percent in each of five fractions of LDH following electrophoretic separation of serum LDH. Data input includes total LDH activity, patient identification, and integrator counts of each fraction. Prints out a report form suitable for patient chart.

Also see "Streamlining Clinical Chemistry Tests in the Hospital Laboratory," PROGRAMMER magazine, pp. 18 to 25, December 1975, Vol. 9, No. 4.

MINIMUM REQUIRED EQUIPMENT: 2200B and 2222/2201.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: M.26-10.3

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TITLE: OUNCES GLUCOSE DRINK TO GIVE 40 GRAMS PER SQUARE METER BODY SURFACE AREA

AUTHOR: David Buzzee, St. Elizabeth Hospital, Covington, Kentucky

ABSTRACT:

Given the starting height, this program calculates and prints the number of ounces of glucose drink (100 grams in 10 ounces of drink) required to load a patient at 40 grams glucose per square meter of body surface area for the oral glucose tolerance test. The program output is in a form suitable to be carried to the patient during the administration of the glucose drink.

Known Program Anomalies:

Beginning height must be in feet and even inches (e.g., 0, 2, 4, 6, 8, or 10).

Also see "Streamlining Clinical Chemistry Tests in the Hospital Laboratory," PROGRAMMER magazine, pp. 18 to 25, December 1975, Vol. 9, No. 4.

MINIMUM REQUIRED EQUIPMENT: 2200B and 2222/2201.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: M.28-10.3

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TITLE: PROTEIN ELECTROPHORESIS FRACTION CALCULATION AND REPORT FORM

AUTHOR: David Buzzee, St. Elizabeth Hospital, Covington, Kentucky

ABSTRACT:

This program calculates the percent and grams percent of the fractions of protein electrophoretic patterns, given the total protein and the integrator counts of each fraction. Prints out clerical information on the report, suitable for patient medical chart.

Also see "Streamlining Clinical Chemistry Tests in the Hospital Laboratory," PROGRAMMER magazine, pp. 18 to 25, December 1975, Vol. 9, No. 4.

MINIMUM REQUIRED EQUIPMENT: 2200B and 2222/2201.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: M.22-10.3

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MEDICAL APPLICATIONS

TITLE: RADIOIMMUNOASSY DATA SYSTEM (RIADS)

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

This newest version of the Radioimmunoassy Data System (RIADS) has been updated to include many of the various methods of RIA data reduction. It now provides:

1. Eight different data reduction techniques which include logit-log, logistic, single and dual label linear interpolation, polynomial, spline fit, H.A.A. and T-3 uptake.

2. Six graphic utilities including bound, B/B_o, bound/total, total/bound, free, and free/total.

3. 95% confidence limits displayed on the standard curve.

4. Four input routines including manual, paper tape, teletype, or teletype compatible (such as logging devices and Packard on-line systems).

5. Storage of Quality Control information on the 20 most recent assays.

6. Storage of up to 30 protocols per technique.

7. Paper tape or format utility to define paper tape format for data organization before it is entered into the system.

8. Quench Curve I.D. identification of an established curve used to calculate correction factors.

9. Graphic display of the Standard Curve on the video display (CRT). Points may be deleted at user's discretion.

MINIMUM REQUIRED EQUIPMENT: WCS/20 (8K, 6I/O slots, 2226, 2270-1, stand and desk), 2203, and 2231W-1.
or
2200S (8K), Options 20 and 22, 2220, 2203, and 2231W-1.

PACKAGE NO.: 195-1028-1(-3)

LICENSE FEE: Refer to current price list.

CENTRAL LIBRARY NO.: W22-510.35-00225

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TITLE: SERUM IRON-BINDING CAPACITY LOG SHEET

AUTHOR: David Buzzee, St. Elizabeth Hospital, Covington, Kentucky

ABSTRACT:

This program calculates the concentration of iron in serum and the value of iron-binding capacity in serum, using bathophenanthroline. Absorbance of patient serum is compared against the absorbance of a 200 ng standard to calculate iron and binding capacity. The results print out in a log book format.

Also see "Streamlining Clinical Chemistry Tests in the Hospital Laboratory," PROGRAMMER magazine, pp. 18 to 25, December 1975, Vol. 9, No. 4.

MINIMUM REQUIRED EQUIPMENT: 2200B and 2222/2201.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: M.25-10.3

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TITLE: TRIGLYCERIDE CALCULATION AND LOG SHEET

AUTHOR: David Buzzee, St. Elizabeth Hospital, Covington, Kentucky

ABSTRACT:

This program calculates the concentration of triglycerides in serum using the BMC assay kit. Input data can be in the form of % transmittance or absorbance of the final reaction, taken before and after incubation to allow for individual blank correction. The results print out in a log book format.

Also see "Streamlining Clinical Chemistry Tests in the Hospital Laboratory," PROGRAMMER magazine, pp. 18 to 25, December 1975, Vol. 9, No. 4.

MINIMUM REQUIRED EQUIPMENT: 2200B and 2222/2201.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: M.23-10.3

Pharmacology (510.45)

TITLE: PHARMACY PRESCRIPTION SYSTEM

AUTHOR: Master Software Systems

ABSTRACT:

This system maintains patient profiles, fills Medicaid forms, automatically writes labels and prescriptions, generates statements for billing purposes, and can produce a customer record of drug purchases for income tax and insurance purposes. In effect, it eliminates the manual record keeping, label typing and form filling from the pharmacist's duties, and nearly doubles the number of prescriptions that can be filled. The system can be used to service hospitals, nursing homes or a walk-in business. It has a capacity of 10,000 Rx for 1000 patients with accounts receivable; add 4,000 more Rx without A/R.

MINIMUM REQUIRED EQUIPMENT: 2200C-3, 2231, 2216/2217, and 2230.

PRICE: $6,000 (sale restricted to end-users only).

CENTRAL LIBRARY NO.: V22-510.45-00246

Pulmonary (510.55)

TITLE: PULMONARY FUNCTION

AUTHOR: James H. Ellis, Jr., Veterans Administration Hospital, Denver, Colorado

ABSTRACT:

The program computes both predicted and measured values for static and dynamic lung volumes, airways resistance and diffusing capacity. It also checks for differences between predicted and obtained values and interprets these according to a specific, clinically useful set of data. The results are printed in a predetermined format.

See also March, 1976 PROGRAMMER magazine article, "The Programmable Calculator in the Pulmonary Function Laboratory," Vol. 10, No. 1, pages 18 to 25.

Known Program Anomalies:

A provision has yet to be made for the occasional instance in which the primary abnormality is early small airways disease (MEFR) but secondary borderline low normal lung volumes (FEV & TLC) also exist. "VA" - has three parts: "VA", "VA2", "VA3".

MINIMUM REQUIRED EQUIPMENT: 2200B-3 and output device.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: M.19-10.2

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TITLE: PULMONARY FUNCTION

AUTHOR: Pulmonary Diagnostic Consultants

ABSTRACT:

Pulmonary Function processes data obtained in a Pulmonary Function Laboratory. Predicted values for measurements are generated by regression equations published in scientific literature.

Diagnostic comments based on the data are also part of the output. Included are programs for Basic Spirometry, Single Breath Nitrogen, Nitrogen Washout, Diffusion, Blood Gases and Box Plethysmography.

MINIMUM REQUIRED EQUIPMENT: 2200B-2, 2216/17, 2231, and 2222 with option for 2242.

PRICE: $2000 plus $100 per month for maintenance, customization and updates.

CENTRAL LIBRARY NO.: V22-510.55-00027

UNCLASSIFIED MEDICAL APPLICATIONS (590.00)

TITLE: BLOODGAS

AUTHOR: Paul Laska, Path Lab, Inc., Portsmouth, New Hampshire

ABSTRACT:

This program is designed to:

(1) Compute important acid-base parameters given the PH and PCO2 of arterial blood.

(2) Evaluate the above data to provide a short English interpretation.

(3) Evaluate oxygenation status of arterial blood given the PO2 and the PH.

(4) Maintain individual patient records of sequential blood gas reports.

Known Program Anomalies:

Select appropriate disk in line 10. Select the appropriate printer in line 120; 1240 bytes remain in an 8K machine for further customizing. Venous blood gas data can be handled if changes are made in the code level subroutine (FC, H1, H2, H3), interpretation array AR( ), and all output formats.

MINIMUM REQUIRED EQUIPMENT: 2200B-2, single floppy disk and any printer.

MEDICAL APPLICATIONS

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: M.29-10.4

CHAPTER 4
PUBLIC SERVICE (600.00-690.00)
2200 SERIES

GOVERNMENT APPLICATIONS (600.00)

TITLE: STAR TRAC POLICE RADIO ACTIVITY SYSTEM

AUTHOR: Joseph W. Larimore & Associates

ABSTRACT:

This system is a dispatch tool designed to record incident information as it happens and to eliminate most of the clerical work in the dispatch center. The system keeps track of the availability of up to 28 patrol units. A glance at the screen tells the dispatcher what each unit is doing and what units are available. The system maintains officer duty information and prints a duty log. It can also print a list of incidents that require reports and assign case numbers automatically. It logs and retrieves all messages from control units, other agencies, and command personnel. Activity data is stored on disk and can be retrieved and displayed at any time on the screen. Searches can be made by officer, date, unit, and incident. (This is Phase I of the three-phase STAR TRAC system.)

MINIMUM REQUIRED EQUIPMENT: 2200T (12K), disk, and printer.

PRICE: $10,000 to $25,000 for the entire STAR TRAC system (all three phases).

CENTRAL LIBRARY NO.: V22-600.00-00247

CHAPTER 5
SCIENCE, ENGINEERING AND MATHEMATICS (700.00-790.00)
2200 SERIES

ENGINEERING APPLICATIONS (700.05-700.45)

Aeronautical (700.05)

TITLE: A FLIGHT PLANNING AID FOR MULTIPLE SEGMENT GREAT CIRCLE ROUTES

AUTHOR: Howard J. Talley, Jr., Hq. TAC/XPSY, Langley AFB, Virginia

ABSTRACT:

This program calculates great circle distances (nautical miles) and times along a route defined by a series of points chosen from a base list created by the user. Incremental and cumulative times and distances are calculated for each geographic point along the route. Aircraft speed in knots and segment winds are input by the user.

MINIMUM REQUIRED EQUIPMENT: 2200B-4K.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: S.426-9.8

Chemical (700.15)

TITLE: STATISTICS/ENGINEERING GENERAL PROGRAM LIBRARY GLBR22A

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

This package provides descriptions, operating instructions, and examples for various programs in statistics and engineering in the following areas:

1. Chemical (Engineering) - program applicable to Chemical Engineering is Oil Well Depletion.

2. Civil and Sanitary - programs applicable to Civil and Sanitary Engineering are: Bernoulli's Equation, Head Loss in a Pipe, Manning's Formula, and Talbot's Formula.

3. Electrical - programs applicable to Electrical Engineering are: Characteristic Generator Resistance and Source EMF Voltage, "Erlang B" Equation, and Network Impedance - Finding a Series or Parallel Circuit.

4. Structural - programs applicable to Structural Engineering are: Pressure due to Surface Loads, Point Loads, Finite or Infinite Line Loads, Beam, and Warping Stress due to Temperature Differential.

5. Statistics - programs applicable to Statistics are: Linear Regression: Y = A+BX; Multiple Linear Regression; Nth Order Regression; Exponential Regression: $Y = Ae^{BX}$; Geometric Regression: $Y = AX^{B}$; Linear Correlation; Correlation Matrix; One and Two-Way Analysis of Variance; Analysis of Variance - Latin Squares; Chi-Square Test and Distribution; Chi-Square Analysis; T-Test; Wilcoxon Matched-Pairs Signed-Ranks Test; Mann-Whitney Test; Normal Frequency and Distribution Function; Negative Binomial Distribution; Binomial Distribution; Poisson Distribution; F-Value, T-Value, Random Normal Deviates; Mean, Variance, Standard Deviation; Geometric Mean and Standard Deviation; Cross and Auto-Covariance of Time Series; System Reliability; and Error Function.

MINIMUM REQUIRED EQUIPMENT: 2200A-1 (A-2 for #5), 2215 or 2222, 2216/2217, and output device (if hardcopy is desired).

PACKAGE NO.: 195-0006-1 (195-0008-2(-3)(-8): Includes also Finance/Utilities/Games General Program Library (p. 6) and General Mathematics Program Library (p. 92).)

LICENSE FEE: $50.00 for 195-0006-1 and $100 for 195-0008-2(-3)(-8)

CENTRAL LIBRARY NO.: W22-700.15-00029

(See Also: ASSETS ACCOUNTING (100.15), abstract "Finance/Utilities/Games, General Program Library GLBR22B", #7, p. 6.)

Civil and Sanitary (700.20)

TITLE: C PATH (A CRITICAL PATH ANALYSIS)

AUTHOR: Joel G. Ehrlich, Naval Ship Weapons Systems Engineering Station, Port Hueneme, California

ABSTRACT:

This is a program to analyze a project by use of Critical Path Methods using the "Bubble-Path" approach (PERT). Limits of 75 events and 150 activities are readily modified to larger amounts, depending upon the amount of available core. The program works with the usual 2200 output devices providing, from an input of predecessor and successor events for each activity, a list of earliest and latest event times and actual and maximum activity times and indicates which events and activities are on a Critical Path.

Known Program Anomalies:

At least one activity is required. Events and activities must be ordered.

MINIMUM REQUIRED EQUIPMENT: 2200B-3 w/OP1, 2201/2221, 2231, 2261, 2217 and 2222/2215.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: B.58-9.10

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TITLE: GC PATH (CRITICAL PATH ANALYSIS)

AUTHOR: Joel G. Ehrlich, Naval Ship Weapons Systems Engineering Station, Port Hueneme, California

ABSTRACT:

This is a Critical Path Method Program which analyzes a task by the so-called "Arrow Path" method. Up to 75 events and 150 activities may be handled (the program may be modified to increase these limits) and requires entry of the preceding and successor activities for each event. It provides a list of event times and a list of activity times, printing the earliest and latest time for each and inidicating which are on a critical path.

Known Program Anomalies:

Jobs must be numeric and should be ordered.

MINIMUM REQUIRED EQUIPMENT: 2200B-3 w/OP1, 2222/2215/2223, 2201/2221/2261, 2216 and 2217.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: B.59-9.10

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TITLE: GCPMI (A CRITICAL PATH ANALYSIS)

AUTHOR: Joel G. Ehrlich, Naval Ship Weapons Systems Engineering Station, Port Hueneme, California

ABSTRACT:

This EVENT-ORIENTED Critical Path Method program uses the "Bubble-Chart" method of network analysis to determine the critical path through a project. Input requirements are the list of activities and the successors for each with the time on each activity prior to the start of each of its successors. The program provides a list of events, each with earliest and latest start time and slack time for that event. All jobs on critical paths are indicated and one path is shown. The program is designed to permit a revision of the network to determine impact to the critical path(s).

MINIMUM REQUIRED EQUIPMENT: 2200B-5 w/option 1, 2222/2215/2223, 2201/2231/2221/2261, 2216 and 2217.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: B.57-9.10

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TITLE: HARDY CROSS METHOD FOR SOLVING FLOWS IN PIPE NETWORKS

AUTHOR: James D. Stauffer, Brundage, Baker & Stauffer, Ltd., Cincinnati, Ohio

ABSTRACT:

The programs within S.435-9.9, together, incorporate a method of controlled trial and error developed by Hardy Cross. Three basic theorems must be observed: (1) At each junction of pipes, the sum of flows leaving the junctions must be equal to the flows entering the junction; (2) In each loop or circuit the sum of the head losses must be equal to zero; (3) In each pipe, the headloss is equal to $H=KQ^n$. When balancing heads by correcting assumed flows, there must be basic formulations employed consistently throughout the network. Such things as this would be arbitrarily assigning positive signs to clockwise flows and headlosses. It should be noted that the arbitrary assigning of positive and negative flows and headlosses as stated have been used in this program series. Generally by observing the few rules as stated above, a network of pipes can be balanced rapidly and accurately by these programs.

See also article in December, 1975 issue of PROGRAMMER magazine, Vol. 9, No. 4, "Civil Engineering Firm Uses 2200 for Water Distribution Analyses."

MINIMUM REQUIRED EQUIPMENT: 2200-A (4K)/2201.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: S.435-9.9

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TITLE: PROGRAM HARDY CROSS

AUTHOR: Rhys A. Sterling

ABSTRACT:

PROGRAM HARDY CROSS is a water distribution system analysis and design program written for the Wang System 2200-B (or equal) computer. This program is written especially for the consulting firm which has little or no expertise in computer programming but requires a system which can quickly and easily analyze complex water distribution problems at minimum cost.

The complete program, including network setup guidelines, is documented in a report entitled "WATER DISTRIBUTION NETWORK ANALYSIS BY COMPUTER." Ample sample network systems are analyzed with network setup, program input and program output completely explained. The program consists of three major sections: flow allocation based on initially assigned inputs and junction (node) drawoffs, Hardy Cross balance of loop flows, and five various junction pressure routines. The five types of pressure routines available are: (1) a straight network balance and the output of the corresponding junction pressures; (2) for a specified junction pressure, the pressure required by a single source input may be calculated; (3) for a specified junction pressure, the required input pressure from the primary source of a multiple source input system may be calculated; (4) increasing a storage tank elevational head in predetermined increments and analyzing any one specified junction pressure desired; and (5) study the relative rate of descent of a one or two tank system and analyzing any one specified junction pressure at predetermined time increments.

This program includes capabilities of simulating centrifugal pumps operating on their characteristic operating curves in conjunction with elevated storage reservoirs. One of the series of programs in this package is designed to calculate the pump operating curve function from information supplied from the manufacturer's pump literature. Included in this series of programs are routines for the initial saving of data on cassette tape (or disk), editing data and listing data. Therefore, all system data is entered only once and stored for future editing - a major time saver.

MINIMUM REQUIRED EQUIPMENT: A 2200-B with 12K bytes of free working memory will suffice to simulate a network with 150 pipes, 50 loops (with 20 pipes per loop max) and 105 junctions (with 5 tributary pipes per junction max). Each additional 4K will allow another 100 pipes, 33 loops and 67 junctions. The program will allow the use of a selectric typewriter or high speed line printer as output devices. The program is designed to remain on cassette tape (its original form) or may be copied to disk for use with a dual disk drive system.

PRICE: $300.00 (A report entitled "WATER DISTRIBUTION NETWORK ANALYSIS BY COMPUTER" is available at no cost.)

CENTRAL LIBRARY NO.: V22-700.20-00199

(See Also: CHEMICAL (ENGINEERING) (700.15), abstract "Statistics/Engineering General Program Library GLBR22A", #2, p. 74.)

Electrical (700.25)

TITLE: GNETFL (NETWORK FLOW ANALYSIS)

AUTHOR: Steve T. Higashi (submitted by Joel G. Ehrlich) Naval Ship Weapons Systems Engineering Station, Port Hueneme, California

ABSTRACT:

This program analyzes and finds the minimum and/or maximum feasible-cost flow through a network of nodes and arcs. The nodes are assigned arbitrary integer numbers from 1 to 100, the numbers not being much more than labels. The arcs of the network run from one node to another, each having a flow within a specified range (the upper and lower bounds). There is also an associated cost for each unit of flow of a specific arc. The only other restriction is that the total flow into a node must equal the total flow coming out of the node. Given the description of such a network, the program options the output of the "Solution" to the CRT, line printer, and/or typewriter.

For a better understanding of the techniques used in this program refer to "linear Programming".

Known Program Anomalies:

Entries should be integers.

MINIMUM REQUIRED EQUIPMENT: 2200B-6, 2222/2223 and 2201/2231.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: S.449-10.3

TITLE: HIGH & LOW PASS FILTER DESIGN

AUTHOR: Joel G. Ehrlich, Naval Ship Weapons Systems Engineering Station, Port Hueneme, California

ABSTRACT:

This program is used to design high and low pass active filters. A standard circuit is used and the number of sections and values of components are determined based upon cutoff frequency and slope.

MINIMUM REQUIRED EQUIPMENT: 2200B-1, 2222/2215/2223 and 2216/2217.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: S.453-10.6

(See Also: CHEMICAL (ENGINEERING)(700.15), abstract "Statistics/Engineering General Program Library GLBR22A", #3, p. 74.)

Mechanical (700.30)

TITLE: FLOATING HEAD FLANGE PER ASME CODE, SEC. VIII, DIV. 1, PARA. UA-6 & TEMA

AUTHOR: M.J. Hedemark

ABSTRACT:

This program computes the loads, lever arms, moments, and geometry for a Floating Head Flange per ASME Code, Sec. VIII, Div. 1, para. UA-6 and TEMA.

The design procedure is as follows:

1. The design conditions are entered via the keyboard.

2. The flange geometry is established.

3. The bolting quantity and diameter is established such that area requirements, maximum spacing, and minimum spacing criterion are satisfied. Bolt quantities are multiples of four.

4. The selected gasket width is compared to the calculated minimum gasket width.

5. If the selected width is inadequate, then the gasket width is increased by 1/16" and steps 2, 3, and 4 above are repeated.

6. Loads, lever arms, moments, and flange thicknesses are computed for the atmospheric and the external operating condition. The largest of these two thicknesses is selected for the flange thickness.

7. The selected flange thickness (from 6 above) is compared with the minimum flange thickness and is set equal to this minimum if it is not larger.

8. The total moment due to internal operating conditions is computed. If this moment is positive or zero (≥ 0), then the flange thickness due to this moment is computed and the larger of this thickness and the selected flange thickness (from 7 above) is the floating head flange thickness. If this moment is negative (< 0) and the flange thickness due to the absolute value of this moment is less than or equal to the selected flange thickness (from 7 above), then the floating head flange thickness is that which was established in 7 above. On the other hand, if the flange thickness due to the absolute value of this moment is greater than the selected flange thickness (from 7 above), then the floating head is moved towards the flange centroid (in increments of 1/16") until this condition no longer controls the design of the flange thickness.

MINIMUM REQUIRED EQUIPMENT: 2200(4K), 2216, 2201, 2215, and 2217.

PRICE: Terms and prices quoted upon request.

CENTRAL LIBRARY NO.: V22-700.30-00031

TITLE: INTEGRAL TYPE (HUB) FLANGE PER ASME CODE, SEC. VIII, DIV. 1 & TEMA

AUTHOR: M.J. Hedemark

ABSTRACT:

This program computes the stresses, lever arms, moments, geometry, and associated tubesheet and channel cover thicknesses for an Integral Type (Hub) Flange per ASME Code, Sec. VIII, Div. 1, Para. UA-45 through UA-52 and UG-34, and TEMA. Two solutions are given. The first is the least weight rectangular section from which a flange may be machined; the second is the least finished weight flange. Both solutions are optimized using a finite sampling technique. The design procedure is as follows:

1. The design conditions are entered via the keyboard.

2. The basic flange geometry is established.

3. The bolting quantity and diameter is established such that area requirements and minimum spacing criterion are satisfied. Bolt quantities are multiples of four.

4. The selected gasket width is compared to the calculated minimum gasket width.

5. If the selected width is inadequate, then the gasket width is increased to the minimum required, "rounded-up" to the nearest 1/16", and steps 2, 3, and 4 above are repeated.

6. Loads, lever arms, moments, and "shape constants" are computed for the atmospheric and operating conditions. A flange thickness is computed to satisfy both conditions.

7. If the bolt spacing exceeds the maximum per TEMA, then the flange thickness is increased if the atmospheric condition controls the design of flange thickness. On the other hand, if the operating condition controls the design of flange thickness, then bolts are added and steps 3 through 6 above are repeated.

8. Tubesheet (pull-thru and U-tube) and channel cover (Code and TEMA) thicknesses are computed.

9. Flange weights are calculated and compared to the weights from the previous "best" solution. If the current solution is a better solution weight-wise, then the current solution replaces the prior "best" solution and is used for future comparisons.

10. The finite sampling technique employed allows G, g_1, and h to be bounded independent variables. Depending upon the previous solution, one of these variables is modified and steps 3 through 9 above are repeated.

11. After G, g_1, and h have been used in all possible combinations, within the limits of the design conditions, the "best" solutions (weight-wise) are printed.

MINIMUM REQUIRED EQUIPMENT: 2200(4K), 2216, 2201, 2215, and 2217.

PRICE: Terms and prices quoted upon request.

CENTRAL LIBRARY NO.: V22-700.30-00032

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TITLE: INTEGRAL TYPE (HUB) MATING FLANGE (TUBESHEET CONNECTION) PER ASME CODE, SEC. VIII, DIV. 1 & TEMA

AUTHOR: M.J. Hedemark

ABSTRACT:

This program computes the stresses, lever arms, forces, moments, and geometry for a flange where the number of bolts, bolt diameter, bolt circle, gasket load reaction diameter G, and the gasket width N are established from the mating high pressure flange, per ASME Code, Sec. VIII, Div. 1, Para. UA-45 through UA-52 and UG-34, and TEMA. Two solutions are given. The first is the least weight rectangular section from which a flange may be machined; the second is the least finished weight flange. Both solutions are optimized using a finite sampling technique. The design procedure is as follows:

1. The design conditions are entered via the keyboard.

2. The basic flange geometry is established.

3. The given bolt quantity and diameter are checked to insure that area requirements and minimum spacing criterion are satisfied.

4. The given gasket width is compared to the calculated minimum gasket width and the TEMA minimum gasket width.

5. The given gasket load reaction diameter G is checked to insure that it is neither too small, with respect to the inside diameter of the shell B, nor too large, with respect to the given bolt circle.

6. Loads, lever arms, moments, and "shape constants" are computed for the atmospheric and operating conditions. A flange thickness is computed to satisfy both conditions.

7. If the bolt spacing exceeds the maximum per TEMA, then the flange thickness is increased.

8. Flange weights are calculated and compared to the weights from the previous "best" solution. If the current solution is a better solution weight-wise, then the current solution replaces the prior "best" solution and is used for future comparisons.

9. The finite sampling technique employed allows g and h to be bounded independent variables. Depending upon the previous solution, one of these variables is modified and steps 3 through 8 above are repeated.

10. After g_1 and h have been used in all possible combinations, within the limits of the design conditions, the "best" solutions (weight-wise) are printed.

MINIMUM REQUIRED EQUIPMENT: 2200(4K), 2216, 2201, 2215, and 2217.

PRICE: Terms and prices quoted upon request.

CENTRAL LIBRARY NO.: V22-700.30-00034

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TITLE: LINE DIGITIZING

AUTHOR: Paul Cohen, Cohen Shoe Machinery, Salem, Massachusetts

ABSTRACT:

Based on the 520/600 library program 1001-Z-ST3 (Non-Linear Regression), this program finds the best curve for each set of 3 points based on the equation $y = ax^2+bx+c$ and stores the strings of coefficients. It then finds the total length of the line by using a calculus formula on each 3 point segment. When the length is found, it asks for the number of individual points desired as output and then responds with the number of points per inch that it will output. If this is acceptable, the machine, by means of a half-interval search, finds the position of each point and displays it on the CRT. When done, it will print out both input and output points as well as number each line. S.446-10.2 can be easily changed to run without a printer and has correction routines for all input. This program is good for N/C machines without interpolation.

Known Program Anomalies:

Line must be broken down to segments with mainly horizontal motion or mainly vertical motion. Results are unpredictable if a line radically changes direction. At least 3 input points per line are required.

MINIMUM REQUIRED EQUIPMENT: WCS/20 (12K) and 2221W (by reducing number of input and/or output points allowed, it may fit into 8K).

PRICE: Available to SWAP members only, nominal charge.

SWAP LIBRARY NO.: S.446-10.2

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SCIENCE, ENGINEERING AND MATHEMATICS

TITLE: NOZZLE REINFORCEMENT PER ASME CODE, SEC. VIII, DIV. 1 & TEMA

AUTHOR: M.J. Hedemark

ABSTRACT:

This program computes the reinforcement of an opening in a cylinder or a head per ASME Code, Sec. VIII, Div. 1, Para. UG-27, UG-36, UG-37, UG-40, UG-41, UG-43, UG-45, UW-12, and UW-16, and TEMA. The design procedure is as follows:

1. The design conditions are entered via the keyboard.

2. The design conditions allow the initial solution to be a pipe, LWN, or heavy wall stub.

3. The cylinder or head is checked to insure that it is of sufficient thickness to withstand the given pressure and corrosion allowance. The excess thickness in the cylinder or head available for reinforcement is computed.

4. If the solution is to be a pipe design, then a pipe wall is selected such that it will withstand the given pressure and corrosion allowance and satisfy UG-45. If the solution is to be a LWN or heavy wall stub, then the wall thickness is checked to insure that it is sufficient to withstand the given pressure and corrosion allowance. The excess thickness in the nozzle wall available for reinforcement is computed.

5. A minimum attachment fillet weld is computed per UW-16.

6. The limits of reinforcement are computed per UG-40 and within these limits, the area available for reinforcement in the shell or head is computed.

7. The stress ratio of the nozzle stress to the shell or head stress is computed per UG-41.

8. The area available for reinforcement in the nozzle wall is computed within the limits of reinforcement per UG-40 and adjusted by the stress ratio.

9. The area available for reinforcement in the fillet weld is computed and adjusted by the stress ratio.

10. If the solution is to be a heavy wall stub, then the area available for reinforcement in the reinforcing element is computed and adjusted by the stress ratio.

11. The total area of available reinforcement is compared to the required area. If sufficient, a solution is printed. If not sufficient, then for a pipe design, the fillet weld is first increased, the pipe wall is increased, and then the shell or head thickness is increased. For a LWN design, the fillet weld is first increased, the LWN bore is reduced, and then the shell or head thickness is increased. For a heavy wall stub design, the outside diameter of the stub is increased.

12. Following the first solution, options are available allowing for optimization.

MINIMUM REQUIRED EQUIPMENT: 2200(4K), 2216, 2201, 2215, and 2217.

PRICE: Terms and prices quoted upon request.

CENTRAL LIBRARY NO.: V22-700.30-00005

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TITLE: OPTIONAL TYPE (LOOSE TYPE) FLANGE WITH MATING FLANGE (TUBESHEET CONNECTION) PER ASME CODE, SEC. VIII, DIV. 1 & TEMA

AUTHOR: M.J. Hedemark

ABSTRACT:

This program computes the geometry, forces, lever arms, moments, stress, and associated tubesheet and channel cover thicknesses for an Optional Type (Loose Type) Flange per ASME Code, Sec. VIII, Div. 1, Para. UA-45 through UA-52 and UG-34, and TEMA. Three solutions are computed: a low G, high G, and intermediate G. Once the three solutions are printed, the designer has the option of terminating the run, computing another flange design, or computing a matching flange to any one of the three initial solutions. The design procedure is as follows:

1. The design conditions are entered via the keyboard.

2. Weld sizes and basic flange geometry are computed.

3. The bolting quantity and diameter is established such that area requirements and minimum spacing criterion are satisfied. Bolt quantities are multiples of four.

4. The selected gasket width is compared to the calculated minimum gasket width.

5. If the selected width is inadequate, then the gasket width is increased by 1/16" and steps 3 and 4 are repeated.

6. Forces, lever arms, moments, and "shape constants" are computed for the atmospheric and operating conditions. A flange thickness is established to satisfy both conditions.

7. If the bolt spacing exceeds the maximum per TEMA, then the flange thickness is increased if the atmospheric condition controls the design of flange thickness. On the other hand, if the operating condition controls the design of the flange thickness, then bolts are added and steps 3 through 6 are repeated.

8. Tubesheet (pull-thru and U-tube) and channel cover (Code and TEMA) thicknesses are computed.

9. Flange weights, net and gross, are computed.

10. The flange solution is stored in a 3 x 42 matrix. Then G is modified and steps 3 through 9 are repeated. This procedure is continued until three solutions (high G, low G, and intermediate G) are obtained and then the three solutions are printed.

11. At this point the designer may terminate the run, compute another set of flange solutions, or compute a mating flange to one of the solutions in 10 above.

12. If the mating flange option is selected, then a flange is designed maintaining the critical dimensions using the same basic procedure stated above.

MINIMUM REQUIRED EQUIPMENT: 2200(4K), 2216, 2201, 2215, and 2217.

PRICE: Terms and prices quoted upon request.

CENTRAL LIBRARY NO.: V22-700.30-00038

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TITLE: TUBE VIBRATION ANALYSIS FOR SHELL & TUBE HEAT EXCHANGERS

AUTHOR: M.J. Hedemark

ABSTRACT:

This program computes the maximum allowable shell-side fluid velocity using an analysis defined in Nelms and Segaser, "Survey of Nuclear Reactor System Primary Circuit Heat Exchangers", Oak Ridge National Laboratory Report No. ORNL-4399, April 1969, and two dimensionless numbers (Baffle-Type Damage Number and Collision-Type Damage Number) using an analysis defined in Thorngren, "Predict Exchanger Tube Damage", Hydrocarbon Processing, April 1970, so that damage to heat exchanger tubes due to flow induced vibration, fatigue at the baffle hole, and tube collision may be avoided. The design procedure is as follows:

1. The design conditions are entered via the keyboard.

2. The effective weight of the tube is computed.

3. The transverse-spacing and longitudinal-spacing ratios are computed.

4. The Stroubal Number obtained from Y.E. CHEN, "Flow Induced Vibration and Noise in Tube-Bank Heat Exchangers Due to Von Karman Streets", ASME Paper 67-VIBR-48, March 1967, Figure 3 or 13 is entered via the keyboard.

5. Queries pertaining to the method of tube support, whether or not the tube span under consideration is a U-bend, and the length of the unsupported tube span are displayed on the CRT and responded to via the keyboard.

6. The natural frequency of the tube and the maximum allowable shell-side fluid velocity are computed.

7. If the tube span under consideration is a straight section, then the lift force on the tube, maximum tube deflection, maximum tube bending moment, and maximum tube-wall bending stress are computed.

8. If the tube span under consideration is a straight section supported on each end by baffles, then the Baffle-Type Damage Number and Collision-Type Damage Number are computed.

9. Once the first solution has been computed and printed out, there are various options available for other solutions.

MINIMUM REQUIRED EQUIPMENT: 2200(4K), 2216, 2201, 2215 and 2217.

PRICE: Terms and prices quoted upon request.

CENTRAL LIBRARY NO.: V22-700.30-00008

Structural (700.40)

TITLE: STRUCTURAL ENGINEERING SYSTEMS (S.E.S.-1)

AUTHOR: Ecom Associates

ABSTRACT:

The software consists of several programs that can be used independently or linked together to complete the major design and analysis portion of a project.

FA-1 CONTINUOUS FRAME ANALYSIS (MOMENT DISTRIBUTION)

The program analyzes a continuous beam or single level frame without sidesway with variable or constant moment of inertia members, with or without cantilevers at ends. Various loading conditions (concentrated, partial uniform and checkerboard loading) may be included.

FA-2 MULTI-STORY FRAME ANALYSIS

The program analyzes a multi-story rigid frame consisting of non-prismatic members for gravity, wind, and seismic loads.

FA-4 SINGLE BEAM SPAN ANALYSIS

The program calculates shears, moments, and deflections at specified points in a constant or variable-section single beam span. (May be used to analyze a single simply-supported beam with or without cantilevers, or for any span of continuous construction if end moments have been determined previously.)

SD-1 STEEL BEAM DESIGN

The program analyzes or designs braced or unbraced steel beams according to the 1969 AISC Specification. Sections are selected or checked from a data file containing W6 through W36 Sections, S-shapes, and channel sections. Maximum moments are calculated automatically from the loading input. A shear stress check is included also.

SD-2 STEEL COLUMN DESIGN (WITH BIAXIAL BENDING)

The program analyzes and designs a steel column subjected to biaxial bending according to the 1969 AISC Specification. Selections are from W6 through W36 sections. It also designs base plates for axially loading columns.

CD-1 CONCRETE BEAM DESIGN

The program designs continuous reinforced concrete beams of variable depth and width according to provisions of ACI-318-7L, using either the working stress or ultimate strength design method. The program also may be used just for the selection of flexural steel for beam selections.

CD-3 FLAT SLAB ANALYSIS AND DESIGN

The program analyzes and designs flat slab systems including flat plates, flat slabs and waffle slabs for vertical loads per ACI 318-71. Systems may include spandrel beams and cantilevers. A single frame line including columns above and below the floor is examined.

DF-1 FRAME ANALYSIS DATA FILE TAPE (USED WITH FA-1, FA-4, and CD-1)

The tape is used for storage of data generated by the continuous frame analysis program FA-1. This stored data may be used in the beam span analysis program (FA-4), the reinforced concrete design program (CD-1), or reused in program (FA-1) to do a revised continuous frame analysis.

MINIMUM REQUIRED EQUIPMENT: 2200A (8K), 2216/2217 and 2222. Different program versions are available for each of the following output devices: 2201, 2241, 2221 and 2231.

PRICE:

NUMBER	TITLE (S.E.S.-1)	INDIVIDUAL PROGRAM PRICE
FA-1	Continuous Frame Analysis	$400.00
FA-2	Multi-Story Frame Analysis	$450.00
FA-4	Single Beam Span	$210.00
SD-1	Steel Beam Design	$150.00
SD-2	Steel Column Design (with Biaxial Bending)	$240.00
CD-1	Concrete Beam Design	$400.00
CD-3	Flat Slab Analysis and Design	$500.00
DF-1	Frame Analysis Data File Tape (used with FA-1, FA-4, CD-1)	$ 50.00

*The above listed eight programs (S.E.S.-1), if purchased in entirety are priced at $2300 through Wang Laboratories, Inc. Prices include the program on magnetic tape cassette, a user's manual for the program purchased, and post paid delivery to the purchaser's address.

CENTRAL LIBRARY NO.: V22-700.40-00036

TITLE: STRUCTURAL ENGINEERING SYSTEM (S.E.S.-2)

AUTHOR: Structural Programming, Inc.

ABSTRACT:

The software consists of several programs that can be used independently or linked together to complete the major design and analysis portion of a project.

SA-1 FRAME ANALYSIS

The basic system consists of a frame analysis program (stiffness method of analysis with "STRESS" formatting) along with separate steel and concrete design programs. The frame program is capable of analyzing a plane frame with no more than 140 members. The maximum permissable number of joints depends on the shape of the structure, the way the joints are numbered and the capacity of the machine. Program output includes joint displacements; X,Y rotation; and member forces.

SS-1 STEEL DESIGN

This program uses the forces at each end of the member, the loads on the member, the member length, its bending axis and the effective length factor K to determine six acceptable wide flange shapes. Input to the program can be either by keyboard or from a tape created by the frame analysis program. The program designs both columns and beams according to the 1970 AISC code.

SCIENCE, ENGINEERING AND MATHEMATICS

SC-1 CONCRETE COLUMN DESIGN

This program uses user-specified concrete and steel strength. The column dimensions and the applied load and moment for the design of rectangular or circular concrete columns are according to the 1971 ACI code. Input to the program may either be by keyboard or by a tape created by the frame analysis program.

SC-3 CONCRETE SLAB DESIGN

This program uses user-specified concrete and steel strength. Slab dimensions and the number of slab supports for the design of solid or waffle two-way slabs are according to the 1971 ACI code. The maximum number of spans that can be handled by the program is 10, and the additional loading input to the program must be from a tape created by the frame analysis program.

MINIMUM REQUIRED EQUIPMENT: 2200A (12K), 2216/17, and 2222 (2221, 2231 or 2261).

PRICE:

NUMBER	TITLE (S.E.S.-2)	INDIVIDUAL PROGRAM PRICE
SA-1	Frame Analysis	$1000.00
SS-1	Steel (Wide Flange) Design (Beam U Column)	800.00
SC-1	Concrete Column Design (Round and Rectangular)	500.00
SC-3	Concrete Slab Design (Flat Plate, Drop Panel and Waffle)	600.00

*The above listed four programs (S.E.S.-2), if purchased in entirety, are package priced at $2300 through Wang Laboratories, Inc. Prices include the programs on magnetic tape cassette and a user's manual.

CENTRAL LIBRARY NO.: V22-700.40-00033

(See Also: CHEMICAL (ENGINEERING) (700.15), abstract "Statistics/Engineering General Program Library GLBR22A", #4, p. 74.)

Surveying (700.45)

TITLE: A BASIC PROGRAM FOR QUANTITY SURVEYORS

AUTHOR: Lai Pang Fee, Chartered Surveyors, Singapore, Malaysia

ABSTRACT:

Program prints out data lists of Item No., Unit, Length, Breadth, Height, reduced quantities, accumulated reduced quantities, rate, extension and accumulated total cost. See also September 1975 PROGRAMMER magazine, Vol. 9, No. 3, "A BASIC Computer Language Program for Quantity Surveyors."

MINIMUM REQUIRED EQUIPMENT: 2200-1/2201

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: S.436-9.9

TITLE: TDS-22 SERIES OF LAND SURVEYING SYSTEMS

AUTHOR: Holguin-Clarke

ABSTRACT:

These software packages provide a progression of capability levels for surveying calculations. Each system consists of a minimum of two Major Modules, Coordinate Geometry and Traverse, plus a set of miscellaneous utility programs such as Profiles, Cut and Fill, Curve Staking, Stadia Reduction, Level Circuits, etc. The differences in the systems are reflected in Point Storage, additional program capabilities and an ascending level of minimum hardware configurations.

TDS-22/1

ABSTRACT:

150 Points may be stored in memory at one time and can be transferred to tape.

MINIMUM REQUIRED EQUIPMENT: 2200A-3, 2216/2217, 2222 and 2241.

PRICE: $1000

TDS-22/2

ABSTRACT:

Point storage is 3500 on tape. Additional program capabilities are: Sophisticated Data Management System, Point Protection, and Define Distance Capability.

MINIMUM REQUIRED EQUIPMENT: 2200B-3, 2216/2217, 2222 and 2241.

PRICE: $1500

TDS-22/3

ABSTRACT:

Point Storage is 6000 on disk. Program has all of TDS-22/2, plus automatic lot printout sequence capability.

MINIMUM REQUIRED EQUIPMENT: 2200B-3, 2216/2217, 2222, 2241 and 2243.

PRICE: $2500

TDS-22/3P

ABSTRACT:

Point Storage is 6000 on disk. Program has all of TDS-22/3, plus complete manual and automatic plotting and labeling system for 2232A Plotter.

MINIMUM REQUIRED EQUIPMENT: 2200B-3, 2216/2217, 2222, 2232A, 2241, and 2243.

PRICE: $4000

CENTRAL LIBRARY NO.: V22-700.45-00037

MATHEMATICAL APPLICATIONS (710.05-710.15)

Differential/Integral Equations (710.05)

(See: GENERAL MATHEMATICS (710.10), abstract "General Mathematics Program Library GLBR22", #1, below.)

General Mathematics (710.10)

TITLE: GENERAL MATHEMATICS PROGRAM LIBRARY GLBR22

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

This package provides descriptions, operating instructions, and examples for various programs in mathematics in the following areas:

1. Differential/Integral Equations - programs applicable to Differential/ Integral Equations are: Simpson's Rule, Numerical Integration (Romberg's Method), RUNGE-KUTTA, Gaussian Quadrature (20 Point), Derivative (Difference Quotients), Explicit Second Degree Equation, Second Degree Equation II, Bessel Function, Gamma Function, Fourier Analysis (Defined Function), and Fourier Analysis (Tabulated Function).

2. General Mathematics - programs applicable to General Mathematics are: Roots of a Quadratic: $AX^2 + BX + C = 0$; Roots of a Polynomial: $P(X) = A_0 + A_1 X + \ldots + A_n X^n$; Half-Interval Search for Roots; Real Roots of a Polynomial: $A_1 X^N + A_2 X^{N-1} + \ldots + A_N X + A_N + 1 = 0$; Matrix Inversion (Gauss-Jordan Elimination Method); Matrix Inversion (Gauss-Jordan Done In Place); Eigenvalue and Eigenvector; Vector Operations; Vector Analysis; Solution of Simultaneous Equations (Gauss-Jordan); Matrix Addition, Subtraction, and Scalar Multiplication; Matrix Multiplication; Solution of Simultaneous Equations (Gauss-Seidel); Linear Programming (Simplex Method); Complex Determinant; Hyperbolic Functions and Inverse Hyperbolics; Sin, Cos, Tan, Sinh, Cosh, Tanh-Complex Argument; Angle Conversion I; Angle Conversion II; Trigonometric Polynomial; Plane Triangle Solution; Coordinate Change; Area of Rectilinear Surface; Linear Interpolation; Langrangian Interpolation; Greatest Common Divisor of Two Integers; Prime Factorization of Integers; Log B to Base A; Second Degree Equation I; Algebra of Complex Numbers; Hypergeometric Function; Square Root of a Complex Number; Fourier Analysis (Defined Function); and Fourier Analysis (Tabulated Function).

3. Statistics - program applicable to Statistics is: Permutations and Combinations.

MINIMUM REQUIRED EQUIPMENT: 2200A-1, 2215 or 2222, 2216/2217, and output device (if hardcopy is desired).

PACKAGE NO.: 195-0005-1 (195-0008-2(-3)(-8): Includes also Finance/Utilities/Games General Program Library (p. 6) and Statistics/Engineering General Program Library (p. 74).)

LICENSE FEE: $50.00 for 195-0005-1 and $100 for 195-0008-2(-3)(-8)

CENTRAL LIBRARY NO.: W22-710.10-00039

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TITLE: GOLDEN DIMENSION

AUTHOR: Lee R. Morse, and Larry R. Kingler, Scott Electronics Corporation, Orlando, Florida.

ABSTRACT:

This program generates the Fibonacci series (0,1,1,2,3,5,...) and also prints the value for phi, as phi is the convergent value of the series.

MINIMUM REQUIRED EQUIPMENT: 2200 with a 2201.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.37-8.5

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TITLE: INVERT

AUTHOR: Miguel M. Soriano, Data S.A., Mexico

ABSTRACT:

This program inverts a matrix which cannot be inverted because it is too large for the memory of the computer. It can be used to invert up to double the size of a normal inversion program.

MINIMUM REQUIRED EQUIPMENT: 2200A-1.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: S.437-9.9

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TITLE: PRIMES

AUTHOR: Richard E. Jones, Lynnfield High School, Lynnfield, Massachusetts

ABSTRACT:

This program computes and prints prime numbers. It works by checking for primes in a large array (it eliminates the non-prime numbers from this array). The data is used to help speed up the calculations for numbers less than 1361^2.

Known Program Anomalies:

Prints the first 8 primes if the first number is less than 20.

MINIMUM REQUIRED EQUIPMENT: 2200A-1 and any output device.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: S.456-10.9

Statistics (710.15)

TITLE: ANALYSIS OF VARIANCE (ANOVA)

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The Analysis of Variance (ANOVA) Package consists of 11 programs to determine whether test observations, subject to one, two, or more factors simultaneously, differ only by random error. Observations are repeated for each condition or combination of conditions of different factors. One or more F-values are computed and used to determine whether the differences between test observations are too great to be random error. If they are, the factors then are assumed to have an affect. In each of the eleven ANOVA programs, observations are entered through the keyboard, stored on a tape cassette or disk, read back into memory at a later time, and used to compute Sums of Squares, Mean Squares, and F-Values, which are printed in an ANOVA table.

The ANOVA package not only permits fast data entry and execution, but also provides data verification to ensure accuracy. Entered observations are displayed for editing or correcting individually or in groups before they are stored on tape cassette or disk. In the disk version only, after data files are stored, they may be recalled for editing, and in some programs, items may be deleted or added to keep pace with current experiments.

In the disk version only, five utilities are provided to ease data and program management. These utilities provide the capability to copy and verify existing files, to eliminate unwanted data files, to provide a printed copy of the catalog index, to modify the arrays on the System Disk to best utilize memory, and to transfer from the ANOVA system to another application while retaining the start-up information.

The Analysis of Variance (ANOVA) System contains the following routines:

1-way ANOVA (equal or unequal groups)
2-way ANOVA (one observation/cell)
2-way ANOVA (m observations/cell)
2-way ANOVA (m observations/cell, m can be unequal)
Latin Squares
3-way ANOVA (m observations/cell)
3-way ANOVA (m observations/cell, m can be unequal)
2-factor ANOVA (equal or unequal cell frequency)
2-factor ANOVA (with repeated measures on factor B)
3-factor ANOVA (equal or unequal cell frequency)
3-factor ANOVA (with repeated measures on factor C)

MINIMUM REQUIRED EQUIPMENT: Tape: 2200A/B/C (12K) or S-2, 2222, and 2216/17.
Disk: 2200T-2 (2200S-2 with Option 24), 2270-2, CRT, Keyboard and Line Printer.

PACKAGE NO.: 2200A:195-1007-1
2200S:195-1006-1
2200T:195-1006-2(-3)

LICENSE FEE: $200 (Annual Support Contract: $100.00)

CENTRAL LIBRARY NO.: W22-710.15-00181

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TITLE: ANALYSIS OF VARIANCE AND COVARIANCE

AUTHOR: Rose E. Dellamary (submitted by A.K. Burditt, Jr.), USDA, ARS, Subtropical Horticulture Research Unit, Miami, Florida

ABSTRACT:

Block 1 of program S.395-9.1 analyzes a Two-Way table with a single observation per cell, computes the F-probability, and optionally, Duncan's Multiple Range Test.

Block 2 of this program uses a One-Way Analysis of Covariance, up to 130 treatments with any number of replicates. The F-Probability is calculated.

Known Program Anomalies:

Size limit of table is 20 x 20, which can be easily changed for memory larger than 4K.

MINIMUM REQUIRED EQUIPMENT: 2200-A (4K).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: S.395-9.1

TITLE: NON-LINEAR REGRESSION ANALYSIS

AUTHORS: D. L. Horwitz and Louis D. Homer (submitted by Dennis Nelson), Naval Medical Research Institute, Bethesda, Maryland

ABSTRACT:

This program is a general utility program for fitting experimental data to a large variety of linear and non-linear model equations. The model to be fitted must be coded in subroutine 1000. The fitting algorithm is based on the method of Marquardt and represents a compromise between the Taylor series method and the method of steepest descent. The algorithm is very stable and works well with many non-linear equations. (Draper, N.R. and Smith, H., Applied Regression Analysis, New York: John Wiley & Sons, Inc., 1966).

Known Program Anomalies:

The number of parameters to be fitted and internal point storage can be modified to fit available core.

MINIMUM REQUIRED EQUIPMENT: 2200B-8 and OP-1.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: S.448-10.3

TITLE: NONPARAMETRIC STATISTICS

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The Nonparametric Statistics Library contains a number of programs commonly used in statistics and is intended to be a "set-it-and-forget-it" system. The user loads the desired programs into the System 2200 memory, enters the values relevant to his problem, and allows the System 2200 to do the rest.

The major reference suggested and used in the development of this fully automated system was Siegel's "Nonparametric Statistics for the Behavioral Sciences." Thus, any of the techniques given in Siegel's text are fully automated with this Library.

The Nonparametric Statistics contains 26 programs:

Utility Program
Binomial Test
Chi-Square One-Sample Test
Kolmogorov-Smirnov One-Sample Test
One-Sample Runs Test
McNemar Test for The Significance of Changes
Sign Test
Wilcoxon Matched-Pairs Signed-Ranks Test
Walsh Test
Fisher Exact Probability Test
Chi-Square Test for Two Independent Samples
Median Test
Mann-Whitney U Test
Kolmogorov-Smirnov Two-Sample Test
Wald-Wolfowitz Runs Test
Cochran Q Test
Friedman Two-Way Analysis of Variance by Ranks Test
Chi-Square Test for k Independent Samples
Extension of The Median Test (Median Known)
Extension of The Median Test (Median Unknown)
Kruskal-Wallis One-Way Analysis of Variance by Ranks Test
Contingency Coefficient, C
Spearman Rank Correlation Coefficient, r_s
Kendall Rank Correlation Coefficient, r
Kendall Partial Rank Correlation Coefficient, $\tau_{XY.Z}$
Kendall Coefficient of Concordance, W

MINIMUM REQUIRED EQUIPMENT: 2200A/B/C or S (8K), 2222, and 2216/17.

PACKAGE NO.: 2200A:195-1012-1
2200S:195-1011-1

LICENSE FEE: $200 (Annual Support Contract: $100.00)

CENTRAL LIBRARY NO.: W22-710.15-00184

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TITLE: REGRESSION ANALYSIS

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The Regression Analysis Package consists of 12 analytical programs which perform different statistical functions. Observations are entered through a keyboard, stored on a tape cassette or disk, read back into memory at a later time, and used to produce results such as standard deviation, mean, residual sums, regression coefficient, T-value, covariance values, and a plot of the data and regression line, among others, in report quality form.

Data entry and correction is fast and easy. Observations entered are displayed for verification before the items are stored on tape cassette or disk to ensure data integrity, thereby reducing errors in entry and calculation. Stored data can be recalled for editing or correction and data files may be expanded and deleted (also merged on the disk version only) to keep an up-to-date record of research.

In the disk version only, seven utilities are provided to ease data and program management. These utilities provide the capability to copy and verify existing files, delete obsolete data files and individual observations, redimension the system disk to best utilize available memory, merge data files, scale or transform existing data files to create new files, and transfer from the Regression Analysis system to another application while retaining the start-up information.

The Regression Analysis System contains the following routines:

Simple Linear Regression Analysis
Geometric Least Squares
Exponential Least Squares
Curve Fitting (by summation of two exponentials)
Curve Fitting (by summation of three exponentials)
Polynomial Regression Analysis
Polynomial Regression (for coefficients only)
Stepwise Polynomial Regression Analysis
Multiple Linear Regression Analysis
Multiple Linear Regression (for coefficients only)
Stepwise Multiple Linear Regression
General Multiple Linear Regression Analysis

MINIMUM REQUIRED EQUIPMENT: Tape: 2200A/B/C or S-2, 2222, and 2216/17.
Disk: 2200T-2 (2200S-2 with Option 24), CRT, and Keyboard; Line Printer and Plotter (Optional).

PACKAGE NO.: 195-1010-1(-2)(-3)

LICENSE FEE: $200 (Annual Support Contract: $100.00)

CENTRAL LIBRARY NO.: W22-710.15-00183

TITLE: SEQUENTIAL ANALYSIS

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

Sequential Analysis consists of eight chapters describing seven independent operations on the System 2200. Each operation consists of two programs: one to create graphs and one to allow data entered through the keyboard to be printed on one of the graphs - the Acceptance-Rejection Region Graph. Chapter titles give the names of the types of distributions available.

This is intended to be a "set-it-and-forget-it" system. The user loads the appropriate program into the computer's memory, enters the values relevant to his problem, and allows the computer to do the rest.

The system produces six kinds of output.

The minimum output consists of the value keyed in, plus three numbers labeled "slope", "h0", and "h1". The acceptance and rejection numbers are linear functions of j, the observation number; the three values are their (common) slope and their respective intercepts.

The table of acceptance/rejection numbers gives critical values of the test statistic, the a(j) and r(j). There is also a message stating the formula for the test statistic.

A graph of the acceptance and rejection lines is available.

A graph of the Operating Characteristic (OC) function is available. The OC function gives the probability of accepting the null hypothesis H0 for a range of "true" values of the parameter being tested.

A graph of the Average Sample Number (ASN) function is available. The ASN function is the expected or average value of the (variable) sample size for a range of "true" values of the parameter being tested.

After the program has completed its run, the user can calculate from his data and plot the value of the test statistic. By using the graph of the acceptance and rejection lines, he can obtain both pictorial and numerical display of the direction his data is taking.

The Sequential Analysis package handles seven common cases of testing a simple null hypothesis H0 against a simple alternative H1:

NORMAL I	$\mu = \mu_0$	vs.	$\mu = \mu_1$	$\{\mu_0 < \mu_1\}$	$,\sigma^2$ known
NORMAL II	$\sigma = \sigma_0$	vs.	$\sigma = \sigma_1$	$\{\sigma_0 \quad \sigma_1\}$	$,\mu$ known
NORMAL III	$\sigma = \sigma_0$	vs.	$\sigma = \sigma_1$	$\{\sigma_0 < \sigma_1\}$	$,\mu$ unknown
NORMAL IV	$\mu = \mu_0$	within δ			$,\sigma^2$ known
BINOMIAL	$\rho = \rho_0$	vs.	$\rho = \rho_1$	$\{\rho_0 < \rho_1\}$	
NEGATIVE BINOMIAL	$m = m_0$	vs.	$m = m_1$	$\{m_0 < m_1\}$	,k known
POISSON	$\mu = \mu_0$	vs.	$\mu = \mu_1$	$\{\mu_0 < \mu_1\}$	

The Program Descriptions show how a composite hypothesis may be reformulated into a simple hypothesis.

MINIMUM REQUIRED EQUIPMENT: 2200B/C or S (8K), 2222, and 2216/17.

PACKAGE NO.: 2200B:195-1009-1
2200S:195-1008-1
2200T:195-1016-2(-3)

LICENSE FEE: $175 (Annual Support Contract: $100.00)

CENTRAL LIBRARY NO.: W22-710.15-00177

TITLE: TWO-WAY ANALYSIS OF VARIANCE FOR MULTIVALUED CELLS

AUTHOR: Steve Wampler, University of Arizona Medical Center, Tucson, Arizona

ABSTRACT:

This program computes F-values of rows, columns and interaction of rows and columns for tabled data with more than one value per table cell. If there is only one value per cell, the program computes F-values for rows and columns only. A summary table is displayed, as well as F-values and respective degrees of freedom. Probabilities for F-values are displayed. Program S.439-9.10 is based upon Chapter 37 of John T. Roscoe's "Fundamental Research Statistics for the Behavioral Sciences", Holt, Rinehart and Winstow, 1969.

Known Program Anomalies:

Empty cells not permitted. Unlimited rows, columns limited to ≤ 10 (changing one line varies this restriction to suit machine size).

MINIMUM REQUIRED EQUIPMENT: 2200B-1, 2216/2217, 2222 or 2215.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: S.439-9.10

(See Also: (1) ASSETS ACCOUNTING (100.15), abstract "Finance/Utilities/Games General Program Library GLBR22B", #8, p. 6; (2) CHEMICAL (ENGINEERING) (700.15), abstract "Statistics/Engineering General Program Library GLBR22A", #5, p. 74; (3) GENERAL MATHEMATICS (710.10), abstract "General Mathematics Program Library GLBR22", #3, p. 92; and (4) GRAPHICS AND PLOTTING (800.30), abstracts (a) "Model 2202 Plotting Output Writer Utility Routines", (b) "Model 2212 Analog Flatbed Plotter Utility Routines", and (c) "Model 2232A Digital Flatbed Plotter Utility Routines", pp. 114-115.)

PHYSICAL SCIENCES (720.05-720.30)

Biology (720.10)

TITLE: DETERMINATION OF MAXIMUM VELOCITY AND MICHAELIS CONSTANT FOR ENZYMIC REACTIONS

AUTHOR: William T. Hay (submitted by Joel G. Ehrlich), Naval Ship Weapons Systems Engineering Station, Port Hueneme, California

ABSTRACT:

This program calculates the maximum velocity V, the Michaelis Constant K, the ratios K/V, V/K, 1/V, and their corresponding standard errors, weighting factors for further analysis for K, V, K/V, 1/V, V/K and the experimental variance (residual least square) S_2 for enzymic reactions.

This program has been converted from the 700 Series Wang Program No. 1047A/GS2. Technical documentation from the original program is included.

MINIMUM REQUIRED EQUIPMENT: 2200B-2 (2201 or 2221 optional).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: S.438-9.10

OPERATIONS RESEARCH AND MANAGEMENT SCIENCE (730.05 - 730.20)

Mathematical Programming (730.10)

TITLE: CRITICAL PATH

AUTHOR: David A. Velez McCaskey (submitted by Miguel M. Soriano), Data S.A., Mexico

ABSTRACT:

This program calculates the critical path of a schedule of activities, using the Ford-Fulkerson algorithm. The Ford-Fulkerson algorithm can be divided in two phases. The first, where dij represents the duration of the operation which begins at the event i and ends at event j, and secondly, where TPi is defined equal to zero for every i, proceeding in the following manner:

if: dij = TPj - TPi, the last value of TPj is replaced by:
TPj = TPi = dij,

and if: dij $\leq$ TPj - TPi, the last value of TPj is preserved.

The total list of activities is then examined applying said equations until no TPi is modified; the maximum value of the TPi will proportion the minimum duration in the accomplishment of the project.

If after a certain number of iterations equal to the number of activities still one TPi has been modified, the network contains at least one circuit. Therefore, the net of activities is closed.

In the second phase of the algorithm, the TLi are then defined equal to the maximum value of the TPi for every i, following an identical process as the one used in the first phase, applying the following equations until necessary for every one of the activities:

dij $\geq$ TIj - TIi, TLI = TIj - dij, and if dij $\leq$ TIj - TLi, the last value of TIi is preserved.

Once the two phases are concluded, the earliest starting time and the latest finishing times are known. With that information, the earliest finishing times, the latest finishing times and the totals and free slacks can be calculated using the following equations:

TTPI = TPI + dij, TILi = TLj - dij, HTij = TIj - TPi - dij, and
HLij = TPj - TPi - dij.

MINIMUM REQUIRED EQUIPMENT: 2200B-4, OP-2 ROM, 2234 and 2221.

PRICE: Available to SWAP members only - nominal charge.

SWAP Library No.: B.56-9.9

Simulation Models and Games (730.20)

TITLE: THE GAME OF LIFE - A SIMULATION APPROACH

AUTHOR: Stephen B. Wampler, Arizona Medical Center, Tucson, Arizona

ABSTRACT:

This program simulates genetic patterns through the use of John Horton Conway's genetic laws.

MINIMUM REQUIRED EQUIPMENT: 2200B-1, 2222, 2216/2217 (readily adaptable to 2200A-1).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.33-8.3

UNCLASSIFIED SCIENCE, ENGINEERING AND MATHEMATICS APPLICATIONS (790.00)

TITLE: ENHANCED CALCULATOR FEATURE FOR SCIENTIFIC USE

AUTHOR: Paul Chow, California State University at Northridge, Northridge, California.

ABSTRACT:

This program provides 32 commonly used scientific functions, such as hyperbolic functions, complex algebra, error function, integration, roots of a quadratic, change of coordinate system, and more; these functions are accessible through the 32 special function keys on the keyboard.

MINIMUM REQUIRED EQUIPMENT: 2200A, 2215/2222, and 2216/2217.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: S.341-8.4

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TITLE: TIME/VELOCITY MANIPULATION - PACKAGE I

AUTHOR: Geoconcepts, Inc.

ABSTRACT:

This is a basic utility package designed to permit collection, editing and display of time, velocity and depth data in most forms needed by geophysicists.

Velocities and seismic sections can be digitized and converted to depth. Velocity data can be displayed and edited in several forms. Isochrons, isopachs and interval velocities can be computed and tabulated. Time splicing and dix computations are handled automatically from data tapes. Package also includes map digitizing and plotting routine for storage and rescaling.

MINIMUM REQUIRED EQUIPMENT: 2200B(24K), 2232, 2231, 2216/2217, and 2222.

PRICE: $4400.00, net 30 days.

CENTRAL LIBRARY NO.: V22-790.00-00298

- -

TITLE: PROSPECT ANALYSIS - Package II

AUTHOR: Geoconcepts, Inc.

ABSTRACT:

A diverse package designed to provide various specific tools to assist geophysicists in interpretive problems. Package includes log v/log d plots, curve fitting, synthetic seismograms, synthetic profiles, contouring and 3D projections. Synthetic routines are designed to assist in correlation of well data, stratigraphic analysis, and bright spot interpretation.

MINIMUM REQUIRED EQUIPMENT: 2200B(24K), 2232, 2231, 2216/2217, and 2222.

PRICE: $6300.00, net 30 days.

CENTRAL LIBRARY NO.: V22-790.00-00299

- -

TITLE: 2D EARTH MODEL - PACKAGE III

AUTHOR: Geoconcepts, Inc.

ABSTRACT:

Package consists of a series of six programs which accept data from an interpreted cross-section of the earth and through normal incidence ray tracing procedures generates a complete synthetic seismic section.

Input data are defined in terms of continuously variable depths, velocities, and densities. Travel times are computed and stored for later use. An edit step, a CDP sort routine, collects data from ray tracing and reflection coefficient computations. These sorted data are convolved with a ricker wavelet to generate the final seismic profile. Model handles most structural and stratigraphic situations and computation time is a function of model size.

MINIMUM REQUIRED EQUIPMENT: 2200B(24K), 2232, 2231, 2216/2217, and 2222.

PRICE: $7000.00, net 30 days.

CENTRAL LIBRARY NO.: V22-790.00-00300

CHAPTER 6
UTILITIES (800.00 - 890.00)
2200 SERIES

DATA MANAGEMENT APPLICATIONS (800.05-800.50)

File Generation and Maintenance (800.20)

TITLE: SYSTEM 2200 DISK UTILITY KEYED FILE ACCESS METHOD 3 (KFAM-3)

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

KFAM-3 is also a new version of the KFAM disk file management system. ("KFAM" is an acronym for "Keyed File Access Method".) KFAM-3 enables the user to access and update catalogued files on any 2200 Series disk with only a relatively few lines of user-generated program text. All of the complex and messy housekeeping operations typically associated with the maintenance of large disk-based files are handled by KFAM internally, and are transparent to the user's software. The data file is maintained with the aid of a specially designed companion index file, called the Key File, which contains keys and pointers to all records in the data file. The "B-Tree" technique employed in the Key File's organization enables the system to access any record with a minimum number of searches and disk accesses. KFAM-3 provides stand-alone utilities for the creation and reorganization of the Key File, along with nine resident subroutines which are called by the user's program to access, delete, or insert records in the data file. Average direct access time for a record in a 20,000-record file on a fixed/removable disk is typically less than one second. For flexible disk drives, the average access time is somewhat longer. KFAM-3 is somewhat faster and more efficient than KFAM-2, and permits a maximum key length of 30 bytes, while KFAM-2 restricts the key length to 12 bytes. KFAM-3 also requires Option-5 (the Sort ROM). Finally, KFAM-3 provides a special routine for converting Key Files created with the original KFAM to the format required by the new system.

MINIMUM REQUIRED EQUIPMENT: 2200B or C (12K) with any 2200 series disk drive and line printer, and Option 5.

PACKAGE NO.: 195-0015 -2 (-3) (-7)

LICENSE FEE: $100

CENTRAL LIBRARY NO.: W22-800.20-00182

TITLE: SYSTEM 2200 DISK UTILITY KEYED FILE ACCESS METHOD 3/4 (KFAM-3/4)

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

KFAM-3/4 is the newest version of the KFAM disk file management system. ("KFAM" is an acronym for "Keyed File Access Method".) It enables the user to access and update cataloged files on any 2200 Series disk with only a relatively few lines of user-generated program text. All of the complex and messy housekeeping operations typically associated with the maintenance of large disk-based files are handled by KFAM internally, and are transparent to the user's software. The data file is maintained with the aid of a specially designed companion index file, called the Key File, which contains keys and pointers to all records in the data file. The "B-Tree" technique employed in the Key File's organization enables the system to access any record with a minimum number of searches and disk accesses.

Of the two versions of KFAM included in this package, KFAM-3 (see the preceding abstract) is the general purpose KFAM system for use when a file is to be accessed by only one CPU at a time. KFAM-4 is a modification of the KFAM-3 system designed for a multiplexed disk environment, in which up to four CPU's may wish to access a file simultaneously. The Key File structures built by KFAM-3 and KFAM-4 are identical and operations performed by the utilities and subroutines are very similar. The chief difference is that KFAM-4 includes special protective procedures to prevent destructive conflict by different CPU's. Though the main functions performed by KFAM-4 software are very similar to those of KFAM-3, once a file is organized under one version, only the software associated with that version may be used on it. A conversion program is provided to convert a KFAM-3 Key File to a KFAM-4 Key File. Utility programs also are provided to convert to KFAM-3 from KFAM-1 and KFAM-2.

MINIMUM REQUIRED EQUIPMENT:

KFAM3: 2200 CPU(12K)-either a C with Option 5 or S with Option 24, dual disk handling capability, and printer (optional, but strongly recommended).

KFAM4: 2200 CPU(16K)-either a C with Options 2 and 5 or S with Option 24, dual disk handling capability, and printer (optional, but strongly recommended).

PACKAGE NO.: 195-0025-2(-3)(-7)

LICENSE FEE: $200

CENTRAL LIBRARY NO.: W22-800.20-00435

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TITLE: SYSTEM 2200 DISK UTILITY KEYED FILE ACCESS METHOD 5 (KFAM-5)

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The Key File Access Method 5 (KFAM-5) consists of the following utility programs:

1. INITIALIZE KFAM FILE - calculates the required size of the Key File based on the estimated maximum number of records to be stored in the User File (data file), and catalogs and allocates the required space for the Key File. It stores vital information about the User File in the Key File, based on parameters supplied by the operator. It optionally catalogs and allocates space for the User File, if none exists.

2. KEY FILE CREATION - is run after Initialize KFAM File when the User File contains data records. (Acceptable record formats include unblocked records occupying one or multiple sectors, array blocked records, and contiguous blocked records accessible in "DC" or "BA" modes.) It reads the User File and creates in the Key File an entry for each User File record. After completing Key File Creation with a User File containing data, or after running Initialize KFAM File with a User File containing no data records, KFAM subroutines may be used to add, delete, and update User File records and their corresponding entries in the Key File.

3. REORGANIZE UTILITIES - although the KFAM subroutines are the heart of the KFAM system and perform most file maintenance, the Reorganize Utilities also may be required to delete spaces left by deleted records and rearrange the order of the User File records according to the ascending order of their keys. A new Key File which reflects the new User File is then constructed. There are two Reorganize Utilities:

   REORGANIZE SUB-SYSTEM - a program-controlled standalone routine which reorganizes a file by outputting a new and reorganized User File and Key File. The old Key File and User File are left intact. It is called by a user written set-up module which provides parameters for the reorganization.

   REORGANIZE IN PLACE - a utility program which reorganizes the User File and Key File in place. It is used only when a file is so large that adequate output files could not be mounted when the file is reorganized.

4. ISS COPY/VERIFY and REALLOCATE KFAM FILE SPACE UTILITIES - used together to copy a KFAM file and to increase or decrease the amount of disk space allocated to the file. Use of Reallocate KFAM File Space is required after any KFAM file (User File and Key File) is copied by Copy/Verify. The Reorganize Sub-system may also be used to copy, change file space allocation, change the file name, and reorganize a KFAM File.

5. PRINT KEY FILE - prints the complete contents of the multiplexed Access Table and the current contents of the Key File with the appropriate labeling of data. It can be useful as a diagnostic tool, and helpful to advanced programmers who may wish to examine the Key File structure.

6. RECOVERY UTILITIES - the KEY FILE RECOVERY utility is provided to reconstruct a Key File in the event of its accidental destruction. The User File must be intact for this program to operate successfully.

   For multiplexed files, there is an additional recovery utility called RESET ACCESS TABLE. KFAM-5 maintains, in the User File trailer record, information which indicates the CPU's operating on a file. This information is called the "Access Table" and its contents may be printed by PRINT KEY FILE. This Access Table will contain erroneous information when a CPU fails to CLOSE a file it has opened, due to power failure or program error. The RESET ACCESS TABLE utility is provided to clear this erroneous information from the Access Table.

7. KFAM CONVERSION UTILITIES - provided to convert files from KFAM-3 to KFAM-5 and from KFAM-4 to KFAM-5.

8. BUILD SUBROUTINE MODULE - subroutines may be selected from this program and written to disk in a program (module) file. The subroutines are marked subroutines that automatically perform most maintenance tasks. Unlike similar access methods, records may be added to KFAM files in random order of their keys; the Reorganize Utilities may be used then to reorganize a KFAM file's key order to ascending record key order if key sequence access is required.

   General Purpose KFAM Subroutines:

OPEN	Opens specified User File and companion Key File.
CLOSE	Closes User File and companion Key File.
RE-OPEN	Changes the access mode of a currently-open multiplexed KFAM File.

WRITE RECOVERY INFORMATION	Without closing a file, writes current file END record at the end of active data in the User File, and recovery information in the next-to-last sector. Both would normally occur only when a file is closed.
SET-UP	Required with BUILD SUBROUTINE MODULE which breaks up subroutines into various modules. SET-UP initializes KFAM internal common variables, and is required before any subroutines are called.

Random Access Subroutines:

FINDOLD	Locates a specified key in the Key File and sets the User File Current Sector Address to the record in the User File with that key.

Key Sequence Access KFAM Subroutines:

FINDFIRST	Locates the record with the lowest key in the User File and sets the User File Current Sector Address to that sector.
FINDPREVIOUS	Locates the previous record in the User File in logical key sequence and sets the User File Current Sector Address to that sector.
FINDNEXT	Locates the next record in the User File in logical key sequence and sets the User File Current Sector Address to that sector.
FINDLAST	Locates the record with the highest key in the User File and sets the User File Current Sector Address to that sector.

Add and Delete KFAM Subroutines:

FINDNEW	Adds a specified key to the Key File, allocates space for a new record in the User File, and sets the User File Current Sector Address to that sector. Adds one to record count.

FINDNEW(HERE)	Adds specified key to the Key File and sets the User File Current Sector Address to the sector where the new record is to be written. It must follow a DELETE, or else it is invalid. Adds one to the record count.
DELETE	Removes the specified key from the Key File and sets the User File Current Sector Address to the record that has the deleted key. Subtracts one from the record count.

Special Purpose KFAM Subroutines:

RELEASE	Allows a User File record, previously protected by one CPU, to be accessed by any CPU. Also releases hog mode.

KFAM-5 also provides a multiplexed file access system with four available access modes, security features including file Password protection and record protection in applicable access modes, and in general, rapid access to randomly-dispersed records. A non-multiplexed access mode is also provided.

KFAM-5 provides the following enhancements to the Key File Access Method system:

1. In the area of multiplexed (multiple CPU) file access, KFAM-5 supports one non-multiplexed mode and four multiplexed modes. Its non-multiplexed mode provides KFAM-3 characteristics within the framework of the same KFAM system that also supports enhanced multiplexed file access. KFAM-5 retains the Shared and Exclusive access modes found in KFAM-4, and also includes the Inquiry and Read Only access modes.

   A CPU which opens a file in the "Inquiry" mode may only read within the file specified, while other CPU's requesting the Inquiry (read), Read Only (read), or Shared (read/write) modes are granted access to the same file.

   A CPU which opens a file in the "Read Only" mode may only read within the file specified, while CPU's requesting the Inquiry (read) or Read Only (read) modes are also granted file access.

   A CPU which opens a file in the "Shared" mode may read and write within the file specified, while CPU's requesting the Inquiry (read) or Shared (read/write) modes are also granted file access.

   A CPU which opens a file in the "Exclusive" mode may read and write within the file specified. No other CPU may access the same file.

In access modes where (1) multiple CPU access to a KFAM file is not allowed (Exclusive and non-multiplexed access modes), or (2) writing in the file is not allowed (Read Only access), KFAM-5 need not be concerned with record protection and hog mode options (neither are available under the circumstances), and Key File integrity. Thus, throughput characteristics are better in the Read Only, Exclusive, or non-multiplexed access modes than in the Inquiry or Shared modes where such checking features are necessary.

In the Inquiry and Shared access modes where both multiple CPU access and writing in the file can occur, KFAM-5 employs a new technique using a busy/free flag that permits only one CPU to access the Key File at a time, thus preserving Key File integrity. Hog mode is therefore used by KFAM-5 for about 20% of average subroutine execution time (unlike 100% for KFAM-4). Record protection and hog mode options are available and the KDR (Key Descriptor Record) is read/written more frequently. Therefore, concurrent multiple CPU access to a file being updated (by one or more CPU's) is fully supported in the Inquiry or Shared access modes.

2. New subroutines have been added to the KFAM-4 set and include FINDPREVIOUS, RE-OPEN, WRITE RECOVERY INFORMATION, and SET-UP. The following ISS (Integrated Support System) Disk subroutines are also selectable from the "KFAM Build Subroutine Module" menu: Multiplex Open, Multiplex End, Multiplex Close, Set/Release Hog Mode, and Search Catalog Index.

3. Most KFAM-5 subroutines are identical to their KFAM-4 counterparts, whereas the following KFAM-5 subroutines require new argument lists and/or perform enhanced functions: Open, Delete, Findnew, Findnew(Here), Release, and Close.

4. The KFAM-5 version of Build Subroutine Module has been modified operationally. Subroutines are now selected from the displayed list and included in the output module (a program file) by depressing the appropriate Special Function key.

5. The "Disk Copy and Reorganize" Utility has been removed. Both Key Files and User Files now contain an END record (end-of-live-data) which is maintained by KFAM. Therefore, the ISS Utility Copy/Verify is used instead to copy and optionally reallocate file space, but it must be followed by the KFAM Utility "Reallocate KFAM File Space" to adjust internal KFAM (KDR) pointers. A backup disk copy may be obtained by using a COPY statement without using the Reallocate KFAM File Space Utility Program.

6. The Initialize KFAM File Utility allows blocked records written in BA mode as data file input (file type "B"). Minimum key length for any file is now two bytes. Scratched files may be initialized. END records are written in the User File and Key File. The other set-up utility program, "Key File Creation", similarly handles END records, and because of the presence of an END record in the User File, entry of the last key is usually not required. A file password is requested when creating a new file.

7. The two Reorganize utilities have also been modified. The KFAM Utility Program "Reorganize KFAM File" is now called "Reorganize In Place", but is essentially the same as in KFAM-4. The KFAM programmed-controlled routine "Reorganize Subsystem" does not require user hog mode selection and variables S3 and S4 have been changed.

8. The "Reallocate KFAM File Space" Utility has been simplified to reflect changes now handled by Copy/Verify.

9. The contents of the Key File's Key Descriptor Record (KDR), with the exception of the Key File busy/free flag, are now stored in the next-to-last sector of the User File for use by the Key File Recovery Utility, should the key file be accidentally destroyed. This recovery information is written upon closing a file if the "Close With Recovery Information" option was chosen during Build Subroutine Module, or after executing the "Write Recovery Information" subroutine. The KDR's contents have been changed.

10. "Print Key File" prints the current contents of the access table as well as the Key File. The access table is part of a multiplexed User File's catalog trailer record (last sector allocated). Any MOVE statement destroys this access table, which is used by KFAM files and multiplexed non-KFAM files as well, and thus destroys the file (use COPY or Copy/Verify instead).

MINIMUM REQUIRED EQUIPMENT: 2200C CPU (16K) with Options 2 and 5, dual platter handling capability with at least one Diskette, Flexible or Mini-diskette drive, and a Printer.

NOTE:

Multiple CPU's may access shared files through the use of a Multiplex Controller. However, only Hard disks are recommended for multiplexed file storage.

(Presently available only with I.S.S. Release 3.2; see page 128.)

LICENSE FEE: Refer to current price list.

CENTRAL LIBRARY NO.: W22-800.20-00444

Graphics and Plotting (800.30)

TITLE: MARQUE

AUTHOR: Ron Silver, Kelvin High School, Winnipeg, Manitoba, Canada

ABSTRACT:

This program prints letters 8 columns by 10 rows, each of which consists of the same letter repeated. The program stores the shape of the characters in an array T$() to which it assigns values before printing anything. The array T$() is 128 x 10 one byte elements in which are stored hexcodes, whose bit pattern is used to store the positions of the characters used for printing each letter.

E.g., The letter A is stored in T$(65,1) ⟶ T$(65,10)

These have values of 7E, FF, C3, C3, C3, C3, FF, FF, C3, C3, the bit patterns of which are:

7E	0	1	1	1	1	1	1	0
FF	1	1	1	1	1	1	1	1
C3	1	1	0	0	0	0	1	1
C3	1	1	0	0	0	0	1	1
C3	1	1	0	0	0	0	1	1
C3	1	1	0	0	0	0	1	1
FF	1	1	1	1	1	1	1	1
FF	1	1	1	1	1	1	1	1
C3	1	1	0	0	0	0	1	1
C3	1	1	0	0	0	0	1	1

The position of the 1 bits are where the character A would be printed. The 0 bits indicate where the blanks go.

Note: The program could probably be speeded up by the use of the boolian function and with a masking array in lines 910-913 and 947.

The program requires 8K to run.

Known Program Anomalies:

Limits: Maximum of 12 characters per line - each line is entered separately.

MINIMUM REQUIRED EQUIPMENT: 2200A and 2/2231.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.185-10.6

TITLE: MARQUE 1

AUTHOR: Ron Silver, Kelvin High School, Winnipeg, Manitoba, Canada

ABSTRACT:

MARQUE 1 does exactly the same job as MARQUE except that it uses the data file "LETTERS" to assign values to T$() and uses special function key 31 to save the data file.

Known Program Anomalies:

Limits of the program: (1) The program will print a maximum of 12 large letters per line.
(2) Each line is entered separately.

MINIMUM REQUIRED EQUIPMENT: 2200A-1 and 2231.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.186-10.6

TITLE: MARQUE 4

AUTHOR: Ron Silver, Kelvin High School, Winnipeg, Manitoba, Canada

ABSTRACT:

MARQUE 4 prints large letters as spaces on a page of asterisks, i.e., it is the negative of MARQUE and MARQUE 1. It requires 4K to run and uses the data file "LETTERS".

Known Program Anomalies:

The maximum characters per line is 11 and the right edge of asterisks is not straight.

MINIMUM REQUIRED EQUIPMENT: 2200A-1 and 2231.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.187-10.6

TITLE: MODEL 2202 PLOTTING OUTPUT WRITER UTILITY ROUTINES

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The Model 2202 Plotting Output Writer Utility Routines provide users of the Model 2202 Digital Plotter with full plotting capabilities. The routines are divided into Sections: the Plotter Program Package, and the Plotter Utility Package. The Plotter Program Package is a group of stand-alone programs which scale, plot and alphanumerically label rectangular, parametric or polar equations; bar charts; pie charts; point plots; and line graphs. The user can select either linear logarithmic or polar scales for special plots. No technical programming background is necessary to produce graphs. For the user with knowledge of System 2200 BASIC programming techniques, the Plotter Utility Package is a listing and description of the various internal subroutines used in the Plotter Program Package to perform the plotting functions. It is provided as an aid to the programmer who wants to develop a custom program package.

MINIMUM REQUIRED EQUIPMENT: 2200B-2, 2215 or 2222, 2216/2217, and 2202.

PACKAGE NO.: 195-0009-1

LICENSE FEE: $100

CENTRAL LIBRARY NO.: W22-800.30-00049

TITLE: MODEL 2212 ANALOG FLATBED PLOTTER UTILITY ROUTINES

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The Model 2212 Analog Flatbed Plotter Utility Routines consist of two parts: the Plotter Program Package and the Plotter Utility Package. The Plotter Program Package, provided on a tape cassette, is a group of stand-alone programs which scale, plot and alphanumerically label rectangular, parametric, or polar equations; bar charts; pie charts; point plots; and line graphs. The user can select either linear, logarithmic or polar scales for special plots. No technical programming knowledge is necessary to produce graphs. Full instructions are provided. The Plotter Utility Package has a listing and detailed description of the various internal subroutines used to perform the plotting functions in the Plotter Program Package. It is provided for the user with knowledge of System 2200 BASIC programming techniques who wants to develop a custom program package.

MINIMUM REQUIRED EQUIPMENT: 2200B-2, 2215 or 2222, 2216/2217 and 2212.

PACKAGE NO.: 195-0010-1

LICENSE FEE: $100

CENTRAL LIBRARY NO.: W22-800.30-00050

TITLE: MODEL 2232A DIGITAL FLATBED PLOTTER UTILITY ROUTINES

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The Model 2232A Digital Flatbed Plotter Utility Routines consist of two parts: the Plotter Program Package and the Plotter Utility Package. The Plotter Program Package, provided on a tape cassette, is a group of stand-alone programs which scale, plot and alphanumerically label rectangular, parametric, or polar equations; bar charts; pie charts; point plots; and line graphs. Full alphanumeric labeling in any size, rotated to any angle. No technical programming knowledge is necessary to produce the graphs. Full instructions are provided. The Plotter Utility Package has a listing and detailed description of the various internal subroutines used to perform the plotting functions in the Plotter Program Package. It is provided for the user with knowledge of the System 2200 BASIC programming techniques who wants to develop a custom program package.

MINIMUM REQUIRED EQUIPMENT: 2200B-3, 2215, 2216/2217, and 2232A.

PACKAGE NO.: 195-0011-1

LICENSE FEE: $100

CENTRAL LIBRARY NO.: W22-800.30-00051

TITLE: THE MFI-TNO PLOT ROUTINES PLUP 22/MFI

AUTHOR: Karel H. Wesseling, Institute of Medical Physics, Utrecht, Netherlands

ABSTRACT:

The MFI-TNO plot routines PLUP 22/MFI use the original Wang plot utilities and regression routines from the Stat./Engin. package.

The present plot package differs from the original routines described in the Model 2212 Reference Manual on the following points.

(1) The routines are interactive, fit an 8K machine, and chaining (when necessary) is automatic.

(2) Data input may be selected to come from keyboard, disk or tape. A special automatic "savedata" program saves data in a standard format. A chained "loaddata" program then loads data automatically from either medium (up to 500 datapoints). To save space on the data/tape, these routines used the array redimensioning capabilities provided by the matrix option ROM.

(3) The six programs are basically similar to the ones provided in the original Wang package, with the following exceptions:

a) The point plot features 4 regression types (9 total), plus plotting of the regression curves and the possibility to compute the summed regression for data which is entered in different batches. Also, the point plot may plot characters as well as points.

b) The linegraph may plot marking characters on, above or below the line.

c) The histogram (bar chart) plots positive as well as negative bars; it also features a special logarithmic vertical scale version.

d) The pie chart fits a 4K memory.

(4) All programs have self explanatory display messages, with some protection against erroneous data entry.

(5) A tape and a disk version are both available.

MINIMUM REQUIRED EQUIPMENT: 2200B-8K, 2215/2222, 2212 and 2216/2217.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.189-10.8

- -

TITLE: PLOT

AUTHOR: Peter P. Smith, University of Utah, Salt Lake City, Utah

ABSTRACT:

This program allows the user to conveniently plot data points, least squares fits to data points, analytic functions of the form y=f(x), or any combination of the above. Relevant parameters are also determined and printed out for the user.

MINIMUM REQUIRED EQUIPMENT: 2200C/2201, and 2212.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.171-9.11

(See Also: ASSETS ACCOUNTING (100.15), abstract "Finance/Utilities/Games General Program Library GLBR22B", #9, p. 6.)

Information Retrieval (800.35)

TITLE: MENU FOR SERIES OF PROGRAMS ON TAPE

AUTHOR: Harold Shair, White Plains Public Library Consultant, Rye, New York

ABSTRACT:

The program forms a menu (index) to the programs on the remainder of the tape.

MINIMUM REQUIRED EQUIPMENT: 2200B (8K).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.179-10.2

- -

TITLE: TITLE

AUTHOR: Joel G. Ehrlich, Naval Ship Weapons Systems Engineering Station, Port Hueneme, California

UTILITIES

ABSTRACT:

This program is a general utility program that punches titles in readable text at the beginning of punched paper tapes. Program is designed to use any punch that can be interfaced to a 2200 by either a 2207/2207A or a 2250, with most (if not all) parameters established by the interactive program.

Known Program Anomalies:

Current version does not punch lowercase letters.

MINIMUM REQUIRED EQUIPMENT: 2200B-3, 2207A/2250 and Punch.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.169-9.10

Utilities (800.50)

TITLE: CARD READER UTILITIES

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The 2234A/2244A Card Reader Utilities facilitate the transferring of card images in Hollerith, mark sense, binary, GEAC, and Wang formats to a tape or disk unit and/or an output printer or typewriter. The utilities contain the following programs: Card Image Out, Card Image Dump, Card Image To Printer, and Card Program List.

CARD IMAGE OUT (CIMAGOUT)

This program reads Hollerith, program or Binary formats into memory. From memory the card images are transferred to an output buffer in blocks of 2000 or less bytes. The output buffer then is written onto a disk platter or a tape cassette.

CARD IMAGE DUMP (CIMAGDMP)

This program reads either a card in Hollerith, Wang or binary formats or a card image from tape or disk which has been created by the CIMAGOUT program. The output produced by this program contains a line number, the record size, and the card image.

CARD IMAGE TO PRINTER

This program reads card images from the card reader or a tape or disk unit. The user defines the fields he wants to print. This program allows column headings with print starting in a specific position and summations on fields.

CARD PROGRAM LIST (CPRGLIST)

This program lists program cards out with automatic page control on a high speed printer or selectric typewriter. To terminate Card Program List under program control, an E must be placed in column 80 of the final card of a Hollerith deck or an END verb in the final card of a GEAC/Wang deck.

MINIMUM REQUIRED EQUIPMENT: 2200B-2, 2234A or 2244A, 2221 or 2201, and 2240 (2270-2) or 2218.

PACKAGE NO.: 195-0016-1(-2)(-3)

LICENSE FEE: $75.00

CENTRAL LIBRARY NO.: W22-800.50-00191

TITLE: MODEL 2262 X-Y DIGITIZER UTILITIES

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The Model 2262 X-Y Digitizer utility package consists of 12 programs and includes the following routines:

1. Menu Definition - permits the operator to digitize and define his own menu, and store it out on tape or disk.

2. Area Utility - computes and displays the area of a plane figure in scaled units.

3. Image Storing - establishes disk or tape files which enable the operator to store off coordinates of a digitized image.

4. Equal Scaling - computes equal scaling factors for the X and Y axes, and converts digitizer coordinates to a user-defined real coordinate system.

5. Unequal Scaling - computes different scale factors for the X and Y axes, and converts digitizer coordinates to a user-defined real coordinate system.

6. Coordinate Transformation - converts digitizer coordinates to a user-defined real coordinate system.

7. Image Plotting - plots out one or more sections of the image digitized and stored with Image Storing. The image can be replotted to any scale, with a resolution factor specified by the operator.

8. Direction & Distance - computes and displays the distance between two digitized points, and the angular direction of a point from the real X axis.

9. Inquiry/List - enables the operator to display and/or print the file names of data files created with Image Storing.

10. Regression - utilizes digitizer input for polynomial regression computations (coefficients only), with an option for producing plotted output.

11. Interpolation - interpolates the values of digitized points lying on a line between two known reference points.

12. Back-Up - provides the capability to utilize a tape cassette drive to produce back-up copies of data disks in systems with only a single disk drive.

MINIMUM REQUIRED EQUIPMENT: 2200B-3 or C-3 (12K of memory), 2262, single flexible disk or diskette drive and/or tape cassette drive, and a 2202, 1212 or 2232A (output device if hardcopy is desired). (System 2200S needs either Option 22, 23, or 24.)

PACKAGE NO.: 195-0012-1(-2)(-3)

LICENSE FEE: $100

CENTRAL LIBRARY NO.: W22-800.50-00185

- -

TITLE: THE DISK SORT UTILITY

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The Disk Sort Utility has been prepared to enhance and make more effective the disk sorting capabilities of a Wang system. The utility uses Sort statements and can be run on any of the Wang disk units. The program is stored for transmittal to the user on a tape cassette, and must be copied to a disk before being run. Part of the procedure used for copying the program to a disk includes modifications to tailor the program to the specific equipment configuration used. In addition to the usual input and output files, the program requires that a "sort-work file" be specified; this is an interim file used by the program for storing intermediate results. All three of these files must be unique. The program file and all the data files must be mounted at the start of each program run and all must remain mounted until its end.

Depending upon the size of the records to be sorted and the available machine configuration, either a full-record or key sort is performed. The choice of which type of sort to perform is made by the program. In general, with short records, a full-record sort is faster than a key sort. In a full-record sort, the entire input record is reformatted so that the record can be efficiently moved. When the sort and merge operations take place, the entire input record is used. After all records have been sorted on the final merge pass, the records are reformatted to the input format before being written out on the output file.

In a key sort, only the sort key is extracted from each input record and carried, with a pointer to the input record, as the sort record. The sort records are sorted internally and are used to form sorted strings which are merged until all records have been used. At the end of program execution, the sort records are read in order, the appropriate input records are found (with the pointers), and the output file is created. This method will generally be used if the file is too large to be sorted in a single pass, given the size of the sort records and the amount of memory available for sort buffers, e.g., with long records and when the record length is more than twice as long as the sort key length.

MINIMUM REQUIRED EQUIPMENT: 2200B/C (8K - 32K), 2240 or 2270 or 2230 or 2260, and 2216/17.

PACKAGE NO.: 195-0013-1

LICENSE FEE: $100

CENTRAL LIBRARY NO.: W22-800.50-00250

- -

TITLE: SYSTEM 2200 GENERAL UTILITIES VOLUME II

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

This manual provides descriptions and operating instructions for a number of utility routines that have been prepared for users of the Wang System 2200. Programs included are: Compression Program, Decompression and Cross Reference Program, Listing Program, Disk and Tape Dump, Disk Sort, Tape Sort, Tape/Disk and Display Utilities, Scratch Volume Initialization and Date Routines.

MINIMUM REQUIRED EQUIPMENT:

Compression - 2200B-3, 2215, 2216/2217, and Tape/Disk.
Decompression and Cross Reference - 2200B-3,2215, 2216/2217, and printer (optional).
Listing - 2200B-2, 2215, 2216/2217, and printer (optional).
Dump - 2200B-2, 2215, 2216/2217, and printer (optional).
Sort - 2200B-2, 2215, 2216/2217, and Tape/Disk.

PACKAGE NO.: 195-0002-1

LICENSE FEE: $125.00

CENTRAL LIBRARY NO.: W22-800.50-00053

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TITLE: SYSTEM 2200 GENERAL UTILITIES III

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

General Utilities Volume III provides descriptions and operating instructions for a number of utility routines that have been prepared for users of the Wang System 2200. All the utilities in this package are independent of any other program. Programs included are: Copy/Verify Utility Start-up, Tape to Tape Copy/Verify, Tape to Disk Copy/Verify, Disk to Tape Copy/Verify, Disk to Disk Copy/Verify, Sort Disk Catalog, Tape File List, Disk Sector Condense, 1200/2200 Translation 1, 1200/2200 Translation 2, and Tape Structure List.

MINIMUM REQUIRED EQUIPMENT: 2200B (8K).

PACKAGE NO.: 195-0003-1

LICENSE FEE: $75

CENTRAL LIBRARY NO.: W22-800.50-00035

- -

TITLE: 2200 INTEGRATED SUPPORT SYSTEM (RELEASE 2)

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The 2200 Integrated Support System (ISS) is a concatenation of software designed to make easier the job of creating and running a disk-based computing system. It provides utility programs to do some of the standard tasks of the system, and subroutines to do some of the standard tasks of programs. It ties together support and application software. A common system setup tests the CPU, and then begins the processing day by requesting standard system data. Beneath this common setup, a hierarchy of accessways links all parts of the system and makes the standard system data universally available.

Since its first release, ISS has undergone major revision and expansion. ISS Release 2 incorporates these changes, and now replaces ISS Release 1.

NEW FEATURES OF ISS RELEASE 2

1. The ISS diskettes may be mounted at any desired disk device address by designating the desired address as the ISS standard loading address. (Previously ISS diskettes had to be mounted at address 310.)

2. The ISS diskettes may all be copied to a single rigid disk. This automatically activates a new highest level menu, which provides access to the software previously stored on four separate diskettes.

3. For most ISS Utilities, the parameter entry phase has been substantially improved. At the start of each utility, a complete set of default parameters is offered for inspection. The operator may then make any necessary changes to these parameters, or may accept them as shown. If they are changed, the operator is given the choice of saving the new parameters as the default parameters for the utility.

4. Two new ISS Utilities have been added: The List Utility and the Reconstruct Disk Index Utility. The Condense Disk Utility is no longer offered.

5. The capabilities of the ISS Copy/Verify Utility have been considerably expanded and improved.

6. A new version of KFAM called KFAM-4 has been added. KFAM-4 is similar to KFAM-3 in function, but is designed specifically for a multiplexed disk environment, in which more than one CPU may access a single KFAM file. KFAM-4 software duplicates all KFAM-3 functions; however, application programs must undergo slight modifications to operate with KFAM-4 subroutines. A conversion program is provided to convert KFAM-3 Key Files to KFAM-4 Key Files.

7. A system for reconstructing a Key File, in the event of its accidental destruction, is included in both versions of KFAM. The system entails having the CLOSE subroutine save certain critical key file information in an unused portion of the User File. A new stand-alone utility program is then used to reconstruct the Key File from information in the User File. The User File must be intact. Unlike KEY FILE CREATION, the key file recovery utility does not require that the operator know the key of the last record in the User File.

   This recovery system has required modifications to nearly all KFAM utilities and subroutines. However, the changes are strictly upward compatible, that is, all of the Release 2 KFAM-3 software can operate on files created by software from previous KFAM-3 releases. If the new Key File recovery capability is desired for files created with previous versions of KFAM-3, then Release 2 subroutines may be directly substituted in application programs for the previously released subroutines. DELETE'd records must be flagged with HEX(FF) in the first byte of the key. To preserve the recovery capability, only Release 2 subroutines and utilities may then be allowed to operate on the file.

8. A new system for reorganizing KFAM files has been added. Named the "REORGANIZE SUBSYSTEM", it is called by a user written setup module. It executes four to five times faster than the old REORGANIZE utility. Unlike the old utility, it requires a large work file, about the size of the User File. The old REORGANIZE utility is still included, for use when disk space is scarce.

9. A new utility has been added that builds a module of selected KFAM subroutines. By choosing only the KFAM subroutines that are actually needed for a particular file operation, the memory "overhead" attributable to KFAM subroutines may be reduced.

10. The amount of memory used by the Screen/Disk subroutine "DATA ENTRY" has been substantially reduced.

11. A completely new system for sorting disk files has been added. Called SORT-3, it is described in detail in the latter part of this abstract.

SUMMARY OF ISS SOFTWARE

The Integrated Support System is a collection of software designed to make it easier for users to create and run a disk-based Wang 2200 system. ISS resides on four functionally organized diskettes. It includes two types of software, system access software and support software.

System Access Software

Under ISS, a daily system start-up routine tests the CPU, and then begins the processing day by requesting standard system data. Beneath this start-up routine a hierarchy of menus links all parts of the system, and makes standard system data universally available.

The start-up module, called "IPL", is executed once at the beginning of each day. It first performs a brief, 30-45 second, CPU diagnostic. If no hardware malfunction is detected, it begins the processing day by requesting keyboard entry of the date. The date is saved in Gregorian alphanumeric format and in Julian numeric format, for use by any part of the system. IPL then passes control to START.

The START modules are the key links of the system. They offer easy menu access to the support software on their respective diskettes, as well as transfer routes to the other START modules and to application software. They execute an intra-system CPU initialization that makes standard data available to all software in the system. At the end of execution, each user program or ISS routine offers a route back to a START module. START is a major system-integrating module that puts all the elements of a system at the fingertips of the operator.

ISS provides for entry of the CPU memory size and makes this information available for use by any part of the system.

ISS is designed so that application programs may be integrated into it with the minimum constraint of those programs. In addition, all four ISS diskettes may be copied to a single rigid disk. This automatically brings a new highest-level menu into the system and preserves the system software access routes.

Support Software

ISS Utilities

The ISS Utilities are stand-alone utility programs that perform tasks frequently required in a disk-based data processing system. Their functions are summarized below:

1. COPY/VERIFY - Copies files from one disk to another and verifies the copy. Additional sectors may be added to the copied files. Copied files may be renamed, or may replace existing files on the output disk. Files to be copied may be specified directly, during operation of the utility, or indirectly by means of a COPY/VERIFY Reference File.

2. SORT DISK CATALOG - Prints a disk catalog index, sorted alphabetically by file name, or numerically by starting sector address.

3. DISK DUMP - Prints the hexadecimal and character equivalents of the contents of any disk file.

4. DECOMPRESS - Copies a program file and in doing so breaks up all multi-statement lines, assigning a unique line number to each BASIC statement.

5. LIST/CROSS REFERENCE - Prints a list of a program file with each BASIC statement appearing on a separate line. For each input program file, it prints three cross-reference tables: one which associates referenced line numbers with the lines which refer to them, one which associates all variables with the lines in which they appear, and one which associates all DEFFN' subroutines with the lines which refer to them.

6. COMPRESSION - Reduces the size of source program files by eliminating REM lines, extra spaces, and inessential line numbers.

7. LIST - Prints a list of a program file with each BASIC statement on a separate line.

8. RECONSTRUCT INDEX - Reconstructs a disk catalog index in the event of its accidental destruction.

9. CREATE REFERENCE FILE - Creates a reference file for use by the COPY/VERIFY utility.

KFAM

KFAM is a software system designed to produce, search, and maintain an index to the records in a disk-based data file. The index is kept as a cataloged file on disk. KFAM includes subroutines that are incorporated into user-written application programs. These subroutines perform all the routine operations on the index: random access search, sequential access search, adding and deleting entries. KFAM also includes utility programs that set up a new KFAM index, and other programs which carry out a variety of occasional maintenance tasks on a file.

There are two versions of KFAM in ISS. KFAM-3 is a powerful general purpose version for use when a file is to be accessed by only one CPU. KFAM-4 is designed for use in a multiplexed disk environment, in which several CPU's may wish to access a file simultaneously.

The ISS Disk Sort Utility

The ISS Disk Sort Utility is a stand-alone system designed to rapidly sort the records in a cataloged disk data file. It has two components. One component is used to calculate the size of the work file needed for execution; the other performs the actual sorting. For maximum efficiency the system uses the "extended" BASIC statements described in SORT STATEMENTS (Publication #700-3559A).

Screen/Disk Subroutines

The Screen/Disk subroutines perform standard tasks relating to operator-to-CPU and disk-to-CPU interaction. They include the following:

1. Search Catalog Index: This subroutine examines the Disk Catalog Index to see if a particular file has been cataloged.

2. Allocate Data File Space: This subroutine opens a data file on any selected disk, and allocates to it the available sectors between the current end and the end of the cataloged area. It checks the index to ensure the uniqueness of the file name; it allows a minimum acceptable file size to be specified.

3. Free Unused Sectors: This subroutine examines the last file in a catalog area, de-allocates those sectors between the DATASAVE DC END trailer and the end of the file, and repositions the end of file control sector. The de-allocation may be restricted by specifying that a minimum number of extra sectors be maintained in the file.

4. Data Entry: This subroutine accepts a keyboard entry, using the KEYIN statement, and checks the entry to ascertain whether it is within a specified range, and whether its length, and number of places before and after the decimal, is acceptable. It also displays a prompt, and creates an appropriate entry mask.

5. Open/Close Output: These subroutines open for output, or close, data files containing certain, special purpose, software header and trailer records.

6. Open/Close Input: These subroutines open for input, or close, data files containing certain, special purpose, software header and trailer records.

7. Alphanumeric Input: This subroutine displays a prompt on line 1 of the CRT, and a series of prompting dashes on line 2 indicating the maximum field size to be entered. The entered alphanumeric information replaces the prompting dashes.

8. Numeric Input: This subroutine displays a prompt on line 1, and, on line 2, a series of prompting dashes indicating the maximum number of digits to be entered before and after the decimal point. The entered numeric data replace the prompting dashes.

9. Position Cursor: This subroutine moves the cursor to any point on a 16 by 64 CRT and, optionally, erases characters to the right of the new cursor position, and lines below it.

10. Date: This is a group of routines which converts and manipulates dates in Gregorian and Julian form. It includes a routine for operator entry of the date.

11. Operator Wait: This subroutine displays the message "KEY RETURN(EXEC) TO RESUME" and waits on an INPUT instruction for depression of RETURN(EXEC).

Translation Tables

The Translation Table subroutines set up a table (an alphanumeric array) for use with the BASIC statement $TRAN. Four subroutines are provided which assign the proper hex codes for the following translations:

EBCDIC	TO	ASCII
ASCII	TO	EBCDIC
2200	TO	1200
1200	TO	2200

SORT-3

SORT-3 is a subsystem for sorting the records in a disk data file. It is loaded from disk by a user-written setup program. The setup program provides the parameters for the sort, and thereby eliminates a lengthy screen dialog that would otherwise be required for operator entry of the sort parameters. When sorting is complete, SORT-3 can load a specified application program module. It offers the following operational features:

1. For maximum efficiency it uses the extended BASIC statements described in SORT STATEMENTS (Publication #700-3559A).

2. Four input file formats are accepted.

   a) an ordinary cataloged data file,
   b) a BAS-1 data file,
   c) a KFAM-3 file, and
   d) a data file opened and closed with ISS OPEN/CLOSE subroutines.

3. The sort key can contain up to 10 fields. They may be alphanumeric or numeric, with a total combined length of up to 64 bytes. Sort order may be specified as ascending or descending for each field.

4. The sort keys may be partial fields, that is, an STR() function of an alphanumeric variable.

5. Under certain conditions, the mounting of the output platter may be deferred until the last pass, at which time the input platter may be removed. This permits the sorting of a full disk platter in a dual platter system.

6. The programmer may write a special input procedure, to be overlaid in the sort to process or screen individual records before input to the sort.

7. The programmer may write a special output procedure to be used instead of the normal one. Such an output procedure can be used to screen, print, or output sorted records to other media.

MINIMUM REQUIRED EQUIPMENT:

1. ISS requires dual disk handling capability with at least one diskette drive.

2. ISS requires a Wang 2200C processor that is equipped with Options 2 and 5.

3. All the ISS Utilities require 8K of memory, except List/Cross Reference and Compression, which require 12K. The KFAM-3 stand-alone utilities require 12K; the KFAM-4 stand-alone utilities require 16K. The SORT-3 system requires 8K, except if a KFAM file is being sorted in which case 12K is required.

4. The following ISS programs require a printer (address 215):

   Disk Dump
   List/Cross Reference
   List Program
   KFAM-3 and KFAM-4 stand-alone utilities

   (With minor programming changes, described in the ISS manual, the printer may be omitted for KFAM.)

5. With the exception of the KFAM-4 system, ISS software is not designed for use in a disk multiplex environment.

PACKAGE NO.: 195-0004-2(-3)

LICENSE FEE: $350.00 (Annual Support Contract: $250.00)

CENTRAL LIBRARY NO.: W22-800.50-00198

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TITLE: INTEGRATED SUPPORT SYSTEM (ISS) RELEASE 3.2

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

Since the release of ISS Release 2, ISS has undergone major revision and expansion. ISS Release 3.2 incorporates these changes.

OVERVIEW

The Integrated Support System Release 3.2 minimizes the programming costs necessary to extend and customize the data handling capabilities of a Wang 2200 CPU equipped with a direct access storage device such as disk, diskette, or mini-diskette, by providing a comprehensive set of standard functions typically required in a disk- or diskette-based data processing and programming environment. It consists of 45 marked subroutines, 21 utility programs, 2 subsystem routines, and system access software that links ISS software components and user application programs. ISS software is available on diskette, flexible disk and mini-diskette, and may be copied to a single hard disk (if available) from any issued medium for efficient disk-resident program storage and loading.

Programming Support

Marked subroutines eliminate repetitious, detailed programming tasks otherwise required of an application programmer and provide a simple interface between user application programs and a wide range of potentially complex disk-related or operator-related tasks.

Utility programs provide the ability to list, cross reference, compress, and decompress files containing program text (program files) and compare two program files on a line-by-line basis. Also, the presence of other supplied utility software eliminates the need for creating user-written programs to perform those functions.

A unique indexed sequential access method, called KFAM-5 (Key File Access Method), is available for data files where records must be rapidly accessed in non-sequential (random) order. KFAM-5 marked subroutines handle file access, record additions/deletions, random record access by key, and record access in key sequence. KFAM performs most file maintenance tasks automatically with each marked subroutine call. Data files meeting KFAM-5 record requirements are easily converted to KFAM-5 files using a supplied utility program.

Sorting disk file records is accomplished by a highly versatile subsystem called SORT-4. A short user-written set-up module loads the SORT-4 subsystem and provides the necessary sort parameters. Three types of sorts including tag, key, and full-record sorts are available. Input records can be included in or excluded from sorted output, and up to ten ascending or descending order sort key fields control output record order. A variety of input record and input file formats are fully supported.

ISS functions in conjunction with (1) the 2200 CPU's multiple file access capabilities (device table), (2) Automatic File Catalog Statements and 2200 disk data hierarchy (3) programming in the powerful, high-level Extended BASIC language, and (4) the automatic polling performed by multiplex controller hardware (if applicable).

Multiplexed File Access

Files residing on a multiplexed disk drive may be concurrently accessed by multiple CPU's. Marked subroutines provide a controlled CPU file access system with four available access modes and password protection for both KFAM and non-KFAM files. KFAM supports record protection which allows concurrent CPU access to a file being updated. Features normally associated with small computer data-base management systems are thus provided by ISS in conjunction with 2200 hardware without the complexity of an operating system.

NEW FEATURES OF ISS RELEASE 3.2

Those not familiar with ISS Release 2 should read "FUNCTIONAL SUMMARY" (on a following page) before reading the following text.

System Access Software

Enhancements to ISS system access software include the following:

1. Operational CPU start-up procedures allow selection of either (1) a Warm Start, whereby existing system information is not updated, or (2) a Cold Start, whereby the data and other system information may be changed. Cold Start Information, such as disk or printer addresses, is used by ISS and KFAM Utility Programs. (The ISS menu hierarchy has changed slightly.)

2. The CPU memory diagnostic is bypassed if the CPU is a 2200VP and optional on other CPU's.

3. Messages can be sent to a specific CPU or all CPU's in the same multiplexed environment, after which conversation-like message transfer may occur.

4. Application programs may have any program file name.

ISS Utility Programs

Enhancements to the ISS Utility Programs include the following:

1. The List Utility has been removed because the same functions are available with the List/Cross Reference Utility. The Disk Sort Utility has been removed because of similar functions available with SORT-4. The following ISS Utility Programs have been added and provide functions supporting multiplexed environments, program development, and media conversion: (a) File Status Report, (b) Program Compare, and (c) Copy Tape to Disk.

2. Copy/Verify, Decompress, List/Cross-Reference, Compress, and Program Compare allow file name specification within entered alphabetic limits (RANGE). Copy/Verify input files are now specified by an INPUT MODE selection; also, whether the output files REPLACE existing files, or are ADDed to the output disk, or both, is determined by the OUTPUT MODE. The List and the Cross Reference options of List/Cross Reference have also been improved, and have BASIC-2 (2200VP) compatibility.

3. Sort Disk Catalog now allows the disk catalog index to be sorted by index sector sequence. The summary of disk space USED, FREE, and ALLOCATED is now output for the chosen file category in sectors. Up to 340 files may be output per list.

Key File Access Method Release 5 (KFAM-5)

Improvements to the Key File Access Method (KFAM) system include the following:

1. KFAM-5 provides major enhancements in the area of multiplexed (multiple CPU) file access. KFAM-5 supports one non-multiplexed mode and four multiplexed modes. Its non-multiplexed mode provides KFAM-3 characteristics within the framework of the same KFAM system that also supports enhanced multiplexed file access. KFAM-5 retains the Shared and Exclusive access modes found in KFAM-4, and also includes the Inquiry and Read Only access modes.

   A CPU which opens a file in the "Inquiry" mode may only read within the file specified, while other CPU's requesting the Inquiry (read), Read Only (read), or Shared (read/write) modes are granted access to the same file.

   A CPU which opens a file in the "Read Only" mode may only read within the file specified, while CPU's requesting the Inquiry (read) or Read Only (read) modes are also granted file access.

   A CPU which opens a file in the "Shared" mode may read and write within the file specified, while CPU's requesting the Inquiry (read) or Shared (read/write) modes are also granted file access.

   A CPU which opens a file in the "Exclusive" mode may read and write within the file specified. No other CPU may access the same file.

   In access modes where (1) multiple CPU access to a KFAM file is not allowed (Exclusive and non-multiplexed access modes), or (2) writing in the file is not allowed (Read Only access), KFAM-5 need not be concerned with record protection and hog mode options (neither are available under the circumstances), and Key File integrity. Thus, throughput characteristics are better in the Read Only, Exclusive, or non-multiplexed access modes than in the Inquiry or Shared modes where such checking features are necessary.

In the Inquiry and Shared access modes where both multiple CPU access and writing in the file can occur, KFAM employs a new technique using a busy/free flag to permit only one CPU access to the Key File at a time, thus preserving Key File integrity. Hog mode is therefore used by KFAM for only about 20% of average subroutine execution time (unlike KFAM-4's 100%). Record protection and hog mode options are available and the KDR (Key Descriptor Record) is read/written more frequently. Therefore, concurrent multiple CPU access to a file being updated (by one or more CPU's) is fully supported in the Inquiry or Shared access modes.

2. New subroutines have been added to the KFAM-4 set and include FINDPREVIOUS, RE-OPEN, WRITE RECOVERY INFORMATION, and SET-UP. Also, the following ISS Disk subroutines are also selectable from the KFAM "Build Subroutine Module" menu: Multiplex Open, Multiplex End, Multiplex Close, Set/Release Hog Mode, and Search Catalog Index.

3. Most KFAM-5 subroutines are identical to their KFAM-4 counterparts, whereas the following KFAM-5 subroutines require new argument lists and/or perform enhanced functions: Open, Delete, Findnew, Findnew(Here), Release, and Close.

4. The KFAM-5 version of Build Subroutine Module has been modified operationally. Subroutines are now selected from the displayed list and included in the output module (a program file) by depressing the appropriate Special Function Key.

5. The "Disk Copy and Reorganize" Utility has been removed. Both Key Files and User Files now contain an END record (end-of-live-data) which is maintained by KFAM. Therefore, the ISS Utility Copy/Verify is used instead to copy and optionally reallocate file space, but must be followed by the KFAM Utility "Reallocate KFAM File Space" to adjust internal KFAM (KDR) pointers. A back-up disk copy may be obtained by using a COPY statement without using the Reallocate KFAM File Space Utility Program.

6. The Initialize KFAM File Utility allows blocked records written in BA mode as data file input (file type "B"). Minimum key length for any file is now 2 bytes. Scratched files may now be initialized. END records are written in the User File and Key File. The other set-up utility program, "Key File Creation", similarly handles END records, and because of the presence of an END record in the User File, entry of the last key is usually not required. A file password is requested when creating a new file.

7. The two Reorganize utilities have also been modified. The KFAM Utility Program "Reorganize KFAM File" is now called "Reorganize In Place", but is essentially the same as in KFAM-4. The KFAM program-controlled routine "Reorganize Subsystem" does not require user hog mode selection and variables S3 and S4 have been changed.

8. The "Reallocate KFAM File Space" Utility has been simplified to reflect changes now handled by Copy/Verify.

9. The contents of the Key File's Key Descriptor Record (KDR), with the exception of the Key File busy/free flag, are now stored in the next-to-last sector of the User File for use by the Key File Recovery Utility, should the key file be accidentally destroyed. This recovery information is written upon closing a file if the "Close With Recovery Information" option was chosen during Build Subroutine Module, or after executing the "Write Recovery Information" subroutine. The KDR's contents have been changed.

10. "Print Key File" prints the current contents of the access table as well as the Key File. The access table is part of a multiplexed User File's catalog trailer record (last sector allocated). Any MOVE statement destroys this access table, which is used by KFAM files and multiplexed non-KFAM files as well, and thus destroys the file (use COPY or Copy/Verify instead).

ISS Subroutines

1. The general category of the ISS Screen/Disk subroutines still applies. However, now they are subdivided into the Screen, Disk, and Translate Table Subroutines, each with their own menu. All use a subroutine selection operating procedure, nearly identical to that used by KFAM's Build Subroutine Module.

2. The Screen subroutine Position Cursor has been modified to accommodate both 16 by 64 character and 24 by 80 character display screens. Data Entry provides operator Special Function Keys for reentering the current field, and has been enhanced to provide for numeric default value use. New Screen subroutines include Reenter and Print.

3. The Disk subroutine Search Index now provides a return code identifying the file requested as active or scratched, data or program, or not found. Free Unused Sectors updates the end-of-catalog as well as end-of-file when the file is the last file in the catalog area. Limits Next has been added, and returns the name of the next file in index sector sequence (same order as LIST DC command) and the file's status as scratched or active, data or program, or not found.

4. Disk subroutines, designed for shared file/multiple CPU use on multiplexed disk drives, are called the Multiplexed File Open/End/Close Subroutines. Access modes include Inquiry, Read Only, Shared, and Exclusive. Each access method's rules about reading/writing in the file, provided with KFAM-5, do not apply. However, rules about a CPU being granted or denied file access based on its access mode and access modes already granted to other CPU's do apply.

5. Translate table subroutines are identical to their ISS-2 counterparts, with one exception: variable T0$ ( ) is now Q9$ ( ).

SORT-4

SORT-4 enhancements include:

1. File formats supported now include both KFAM-4 and KFAM-5 files. TC (Telecommunication) Files are supported by variable length record formats.

2. Input record formats supported by SORT-4 include, in addition to the DC mode, array-type blocking supported by SORT-3, packed arrays, contiguous packed arrays, and certain variable length records.

3. SORT-4 allows a full-record sort on records up to 256 bytes, packed. It also allows a full-record sort with partial fields as sort keys.

4. SORT-4 will do a tag sort, which produces as its output, the pointers to the original input records, instead of full records. The output file for the tag sort may be the sort work file, thus eliminating the need for a separate output file. Therefore, SORT-4 does not provide for a special output procedure.

FUNCTIONAL SUMMARY

A brief summary of functions available with each ISS Software category is as follows:

System Access Software

To reduce the possibility of an operator entering the wrong CPU number during the ISS start-up operation, a unique CPU number of 1, 2, 3, or 4 should be assigned to each CPU in an installation. A label showing the assigned CPU number, type of CPU, and memory size should be placed near the CPU console screen for easy operator reference. Similarly, all peripherals should be labeled with their respective device addresses for operator reference purposes.

Each CPU must complete ISS start-up operation after the CPU is powered on, for instance, at the beginning of the processing day. To begin ISS start-up operation, the program module "START" is loaded from an ISS platter (disk, flexible disk, diskette, or mini-diskette). START uses operator "prompts" to request entry of the CPU number and other information which might include the peripheral addresses associated with this CPU's system configuration. CPU information, including the system configuration, is automatically maintained by ISS for each possible CPU (1-4). After successful entry of all requested start-up information, the ISS system menu is displayed.

The system menu allows easy selection of several displayed options, and links ISS software components and user application programs as well. System menu options allow the user to:

load ISS support software contained on that or another ISS platter, such as a utility program or a group of marked subroutines.

- load other ISS system access software, for example, to send a message to one or all CPU's in the same multiplexed environment.

- load an application program.

CPU start-up information ensures, for example, that a platter address entered during the operation of a utility program is a valid address. Other CPU information includes the date, which appears on printouts and the printer address, which determines if the output is listed on a hard copy printer device or the CRT screen.

ISS Utility Programs

ISS Utility Programs are operator-controlled routines. Each processing operation performed by ISS Utility Programs (except Disk Dump) can be performed on multiple files. All are compatible with multiplexed files. Their functions are summarized below:

1. COPY/VERIFY - Copies files from one disk platter to another and verifies the copy. Media conversion can occur during copy by merely specifying the appropriate device addresses of the disk, diskette, flexible disk, or mini-diskette drives. Additional sectors may be added to the copied files. Copied files may be renamed, or may replace existing files on the output platter. Files to be copied may be specified directly during Copy/Verify operation, indirectly by means of a reference file, or by means of alphabetical file name limits. Also, all files may be copied from a platter.

2. CREATE REFERENCE FILE - Creates a reference file which contains pairs of file name entries for indirect use by the Copy/Verify or Program Compare Utility Programs.

3. SORT DISK CATALOG - Prints a disk catalog index report, with files sorted (1) alphabetically by file name, (2) numerically by starting sector address, or (3) by file sequence in the index.

4. DISK DUMP - Prints the hexadecimal code and graphic character equivalents of the contents of any one disk file. In addition, the data file's contents may be printed with a field-by-field description.

5. DECOMPRESS - Copies a program file and in doing so breaks up all multi-statement lines, assigning a unique line number to each BASIC statement. Files may be specified by file name or by alphabetical file name limits. Also, all program files on a platter may be decompressed.

6. LIST/CROSS REFERENCE - Prints a list of a program file with each BASIC statement printed on a separate line. For each input program file, it prints four cross-reference tables: one which associates referenced line numbers with the lines which refer to them, one which associates all variables with the lines in which they appear, one which identifies where marked subroutines are located, and one which associates all marked subroutines with the lines which refer to them. Files may be specified by file name or by alphabetic file name limits. Also, all program files on a platter may be listed/cross referenced.

7. COMPRESS - Reduces the size of source program files by eliminating REM (remark) lines, extra spaces, and inessential line numbers. Files may be specified by file name, or by alphabetic file name limits. Also all program files on a platter may be compressed.

8. RECONSTRUCT INDEX - Reconstructs a disk catalog index in the event of its accidental destruction.

9. FILE STATUS REPORT - Performs several functions tailored to a multiplexed disk environment, including closing one or all files open to a CPU, printing the CPU status of one or all files, and printing all files currently open to a CPU.

10. PROGRAM COMPARE - Compares two program files on a line-by-line basis, and indicates statements that do not match, if a statement number exists in one program but not in the other, if one program ends before the other, and whether they end with the same statement (statement numbers, device addresses, and file names are listed). The pairs of program files to be compared reside on different platters and may be specified directly by file name, indirectly by a reference file, by alphabetic file name limits, or by all program files. With the latter two, files of the same name are compared.

11. COPY TAPE TO DISK - One to 99 files may be copied from cassette to disk. Up to 99 tape-resident files may be skipped before the first file is copied. Additional sectors may be added.

Key File Access Method (KFAM-5)

The Key File Access Method (KFAM-5) consists of the following utility programs:

1. INITIALIZE KFAM FILE calculates the required size of the Key File based on the estimated maximum number of records to be stored in the User File (data file), and catalogs and allocates the required space for the Key File. It stores vital information about the User File in the Key File, based on parameters supplied by the operator. It optionally catalogs and allocates space for the User File, if none exists.

2. KEY FILE CREATION should be run after Initialize KFAM File if the User File contains data records. (Acceptable record formats include unblocked records occupying one or multiple sectors, array blocked records, and contiguous blocked records accessible in both "DC" and "BA" modes.) It reads the User File and creates in the Key File an entry for each User File record. After completing Key File Creation with a User File containing data, or after running Initialize KFAM File with a User File containing no data records, KFAM subroutines may be used to add, delete, and update User File records and their corresponding entries in the Key File.

3. Although the KFAM subroutines are the heart of the KFAM system and perform most of the file maintenance, the REORGANIZE UTILITIES also may be required. Reorganize Utilities delete spaces left by deleted records and rearrange the order of the User File records according to ascending order of their keys. A new Key File which reflects the new User File is then constructed. There are two Reorganize Utilities:

   The REORGANIZE SUB-SYSTEM is a program-controlled standalone routine which reorganizes a file by outputting a new and reorganized User File and Key File. The old Key File and User File are left intact. It is called by a user-written set-up module which provides parameters for the reorganization, and may load a program upon its completion.

   REORGANIZE IN PLACE is a utility program which reorganizes the User File and Key File in place. It is used only when a file is so large that adequate output files could not be mounted when the file is reorganized.

4. The ISS Copy/Verify Utility and the REALLOCATE KFAM FILE SPACE Utility can be used together to copy a KFAM file and increase or decrease the amount of disk space allocated to the file. Use of Reallocate KFAM File Space is required after any KFAM file (User File and Key File) is copied by Copy/Verify. The Reorganize Sub-System may also be used to simultaneously copy, change file space allocation, change the file name, and reorganize a KFAM file.

5. PRINT KEY FILE: This utility prints the complete contents of the multiplexed Access Table and the current contents of the Key File with appropriate labeling of data. It can be useful as a diagnostic tool, and helpful to advanced programmers who may wish to examine the Key File structure.

6. Recovery Utilities: The KEY FILE RECOVERY utility is provided to reconstruct a Key File in the event of its accidental destruction. The User File must be intact for this program to operate successfully.

For multiplexed files there is an additional recovery utility called RESET ACCESS TABLE. KFAM-5 maintains in the User File trailer record information which indicates the CPU's accessing the file. This information is called the "Access Table" and its contents may be printed by PRINT KEY FILE. This Access Table contains erroneous information when a CPU fails to CLOSE a file it has opened, due to power failure or program error. The RESET ACCESS TABLE utility is provided to clear this erroneous information from the access table.

7. The KFAM Conversion Utilities: These utility programs are provided to convert files from KFAM-3 to KFAM-5, and from KFAM-4 to KFAM-5.

8. KFAM Subroutines may be selected from the BUILD SUBROUTINE MODULE Utility Program. The selected subroutines are written to disk in a program (module) file. KFAM subroutines are marked subroutines that automatically perform most maintenance tasks. Unlike similar access methods, records may be added to KFAM files in random order of their keys; the Reorganize Utilities may be used to reorganize a KFAM file's key order to ascending record key order if key sequence access is required.

   General Purpose KFAM Subroutines:

OPEN	Opens specified User File and companion key File.
CLOSE	Closes User File and companion Key File.
RE-OPEN	Changes the access mode of a currently-open multiplexed KFAM File.
WRITE RECOVERY INFORMATION	Without closing a file, writes current file END record at the end of active data in the User File, and recovery information in the next-to-last sector. Both would normally occur only when a file is closed.
SET-UP	Required with BUILD SUBROUTINE MODULE which breaks up subroutines into various modules. SET-UP initializes KFAM internal common variables, and is required before any subroutines are called.

   Random Access Subroutines:

FINDOLD	Locates a specified key in the Key File and sets the User File Current Sector Address to the record in the User File with that key.

Key Sequence Access KFAM Subroutines:

FINDFIRST	Locates the record with the lowest key in the User File and sets the User File Current Sector Address to that sector.
FINDPREVIOUS	Locates the previous record in the User File in logical key sequence and sets the User File Current Sector Address to that sector.
FINDNEXT	Locates the next record in the User File in logical key sequence and sets the User File Current Sector Address to that sector.
FINDLAST	Locates the record with the highest key in the User File and sets the User File Current Sector Address to that sector.

Add and Delete KFAM Subroutines:

FINDNEW	Adds a specified key to the Key File, allocates space for a new record in the User File, and sets the User File Current Sector Address to that sector. Adds one to record count.
FINDNEW(HERE)	Adds specified key to the Key File and sets the User File Current Sector Address to the sector where the new record is to be written. It must follow a DELETE, or else it is invalid. Adds one to the record count.
DELETE	Removes the specified key from the Key File and sets the User File Current Sector Address to the record that has the deleted key. Subtracts one from the record count.

Special Purpose KFAM Subroutines:

RELEASE	Allows a User File record, previously protected by one CPU, to be accessed by any CPU. Also releases hog mode.

KFAM-5 also provides a multiplexed file access system with four available access modes, security features including file Password protection and record protection in applicable access modes, and in general, rapid access to randomly-dispersed records. A non-multiplexed access mode is also provided.

ISS Subroutines

The general category of ISS Screen/Disk subroutines includes three groups of marked subroutines: Disk, Screen, and Translate Table Subroutines. They are loaded into memory from displayed menus.

Disk subroutines, which simplify disk-related programming tasks, include the following:

1. Search Index: This Disk subroutine examines the Disk Catalog Index to determine if a particular file: (1) has been cataloged, (2) is scratched or active, and (3) is a data or program file.

2. Allocate Data File Space: This Disk subroutine opens a data file on any selected disk, and allocates to it the available sectors between the current end and the end of the cataloged area. It checks the index to ensure the uniqueness of the file name and allows a minimum acceptable file size to be specified.

3. Free Unused Sectors: This Disk subroutine examines a selected file in a catalog area, de-allocates those sectors between the END trailer record and the end of the file, and repositions the end of file control sector. The de-allocation may be restricted by specifying that a minimum number of extra (reserved) sectors be maintained in the file area.

4. Open/Close output: These Disk subroutines open for output, or close, data files containing certain special purpose, software header and trailer records.

5. Open/Close Input: These Disk subroutines open for input, or close, data files containing certain, special purpose, software header and trailer records.

6. Limits Next: This Disk subroutine returns the name of the next file in the order of file entries in the disk catalog index. It also indicates whether the file is a program or data file and an active or scratched file.

7. Multiplexed File Open/End/Close: These Disk subroutines provide a controlled file access system for data files on a multiplexed disk drive. This access system is made possible by maintaining file access information in the file's (hardware-generated) catalog trailer record. Four access modes are available including Exclusive file access. Multiplexed file Open/End/Close subroutines support creation of a new file, accession of an existing file, changing access modes without closing a file, writing an END record, closing a file, and file password protection. A set/release hog mode subroutine is also included.

Screen subroutines which simplify operator-related programming tasks, include the following:

1. Data Entry: This Screen subroutine accepts a keyboard entry, using the KEYIN statement, and checks the entry to ascertain whether it is within a specified range and whether its length and number of places before and after the decimal is acceptable. It also displays a prompt and an appropriate entry mask or default value.

2. Alphanumeric Input: This Screen subroutine displays a prompt on line 1 of the CRT, and a series of prompting dashes on line 2, indicating the maximum field size to be entered. The entered alphanumeric information replaces the prompting dashes.

3. Numeric Input: This Screen subroutine displays a prompt on line 1, and on line 2 a series of prompting dashes indicating the maximum number of digits to be entered before and after the decimal point. The entered numeric data replaces the prompting dashes.

4. Position Cursor: This Screen subroutine moves the cursor to any point on the CRT and, optionally, erases characters to the right of the new cursor position and also the lines below it. Both 64 x 16 and 80 x 24 character display screens are supported. Usually a PRINT or INPUT statement follows cursor positioning.

5. Date: This group of Screen subroutines converts and manipulates dates in Gregorian and Julian form. It includes a subroutine for operator entry of date.

6. Operator Wait: This Screen subroutine displays the message "KEY RETURN(EXEC) TO RESUME" and waits on an INPUT instruction for depression of RETURN(EXEC).

7. Print: This Screen subroutine allows a specified character to be printed a specified number of times.

8. Re-Enter: This (internal) Screen subroutine displays RE-ENTER to indicate invalid operator entries.

The Translation Table subroutines set up a table (an alphanumeric array) for use with the BASIC statement $TRAN. Four subroutines are provided which assign the proper hex codes for the following translations:

EBCDIC	TO	ASCII
ASCII	TO	EBCDIC
2200	TO	1200
1200	TO	2200

SORT-4 Subsystem (Disk Sort Standalone Routine)

SORT-4 is loaded from disk by a user-written set-up program. The set-up program provides the parameters for the sort, and thereby eliminates a lengthy screen dialogue that would otherwise be required for operator entry of the sort parameters. When sorting is complete, SORT-4 can load a specified application program module, and therefore can be used as a subsystem to an application program with its program linkage capabilities. It requires very little operator attention.

SORT-4 offers the following operational features:

1. For maximum efficiency, it uses the extended BASIC statements described in SORT STATEMENTS (Publication #700-3559).

2. The programmer may specify whether a key sort or a full-record sort is to be performed, or permit SORT-4 to decide. Both the key sort and full-record sort provide sorted output records which resemble their input record counterparts. In addition, a tag sort may be specified, in which case only the pointers to each input record's position in the input file are written onto the output (or work) file, and not the records themselves.

3. SORT-4 operates in a multiplexed environment, under ISS-3.2 conventions.

4. Six input file formats are accepted:

   a) an ordinary cataloged data file,

   b) a BAS-1 data file,

   c) a data file opened and closed with ISS OPEN/CLOSE subroutines,

   d) a KFAM-3 file,

   e) a KFAM-4 file, and

   f) a KFAM-5 file.

5. The sort key can contain up to 10 fields. They may be alphanumeric or numeric, but their total length must not exceed 64 bytes (not counting control bytes). Sort order may be specified as ascending or descending for each field and Sort keys may be partial fields, that is, a STR () function of an alphanumeric variable.

6. Input record formats supported include, in addition to the DC mode array-type blocking, the following record formats:

   a) Packed arrays, where the array-type blocking is packed for writing on disk, and written in either DC or BA mode.

b) Contiguous packed records, where each individual record is packed into a contiguous space within an alphanumeric array, and written on disk in either DC or BA mode.

c) Variable length records, packed into an alphanumeric array with either a one-byte length indicator (block size up to 256) or a two-byte length indicator (block size greater than 256). The block may be written in either DC or BA mode. TC (Telecommunication) files are supported as variable length records.

d) Individual alphanumeric fields in records written in unpacked format, blocked or unblocked, may contain sub-fields.

In the above record formats, the field form of $PACK is supported. However, the internal and delimiter forms of $PACK are not supported. One $PACK array is supported per record. In addition to the formats defined for the field form of $PACK, Wang packed decimal formats, signed and unsigned, are also supported; exponential is not supported as defined in the PACK statement.

Any combination of record format and file format is permitted, with the exception of the BAS-1 format, which is allowed only with array-type blocking or packed arrays. Although KFAM itself does not support variable length records, SORT-4 will sort a KFAM file with variable length records.

7. When output files are written to a non-multiplexed disk drive after a full-record sort was specified, the mounting of the output platter may be deferred until the last pass, at which time, the input platter may be removed. With a tag sort, deferred mounting is also allowed when the output file is not written to a multiplexed disk drive, and is not the work file. This permits sorting a full disk platter in a dual platter system.

8. The programmer may write a special input procedure, to be overlaid in Pass 1, to process or screen individual records before input to the sort.

9. SORT-4 treats arrays in input records as arrays. An input record may contain up to 255 fields, with each array element counting as one field, provided the record can be described in not more than 60 table entries.

10. SORT-4 allows a full-record sort on records up to 256 bytes, packed. It also allows a full-record sort with partial fields as sort keys. In most cases a full-record sort will be faster than a key sort on the 2200VP.

11. Sorting of KFAM files should be faster with SORT-4 than SORT-3, because special-purpose subroutines have been written to access a KFAM file in FINDFIRST/FINDNEXT sequence. However, it is still not as fast as accessing the KFAM file sequentially.

12. A starting and ending key may be specified for sorting a KFAM file, instead of a starting record number and the number of records to be sorted.

MINIMUM REQUIRED EQUIPMENT: 2200 CPU (16K) with Options 2 and 5, dual platter handling capability with at least one Diskette, Flexible or Mini-diskette drive, and a printer.

NOTES:

All ISS utility programs require 12K memory, with the exceptions of Program Compare and KFAM-5 which require 16K. The SORT-4 systems require 8K, unless a KFAM file is being sorted, in which case 12K is required.

A printer is recommended for all utility programs, but is only required for the Disk Dump and List/Cross Reference ISS utility programs and for the KFAM-5 utility programs. Other hard copy output devices may be used, but because top-of-form use is not supported, multi-page output is not recommended.

Only hard disk (fixed/removable disk drive) is recommended as a storage medium for multiplexed files.

An ECN (engineering) change is required for the Multiplex Controller.

PACKAGE NO.: 195-0032-2(-3)(-8)

LICENSE FEE: Refer to current price list.

CENTRAL LIBRARY NO.: W22-800.50-00198

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TITLE: (MODEL 2209) NINE-TRACK TAPE DRIVE UTILITIES

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The Nine-Track Tape Utilities consist of a number of routines created for processing nine-track tapes to be read or written on a Model 2209 Nine-Track Tape Drive at 800 bpi.

The routines operate at four levels:

1. A LOADER to load all nine-track routines and subroutines into memory, and to provide a user 'menu' to simplify program selection.

2. A Physical I/O Control System (Physical IOCS) containing the subroutines which perform physical operations on tape such as rewinding, backspacing, writing a file mark (EOF), etc.

3. Logical I/O Control System (Logical IOCS) containing the subroutines which perform logical I/O operations including opening and closing of files, translations from ASCII to EBCDIC (and vice versa), and creating or updating internal tape labels.

4. A set of primary routines to initialize or write and update volume labels, to read or write data and to transfer data from tape to disk, disk to tape, card to tape and Nine-Track to Print (Dump the Tape Contents).

MINIMUM REQUIRED EQUIPMENT: 2200 with at least 12K of user RAM and the General I/O Statements (Option 2 or Option 23); 2209; 2234A/2244A and/or 2240, 2242, 2243, 2230 or 2260 (to transfer data from card reader, or disk to tape or from tape to disk); and a printer (to dump data from tape).

PACKAGE NO.: 195-0017-1(-2)(-3)

LICENSE FEE: $150.00

CENTRAL LIBRARY NO.: W22-800.50-00196

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TITLE: 2200 PLOTTER UTILITIES

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The Wang Plotter Utilities Package consists of a group of ten utility programs designed to perform certain commonly-used plotting operations, and to simplify general plotter control for the application programmer. The utility programs are written not as stand-alone programs (although they can be accessed directly from the keyboard via the Special Function keys), but as subroutines which can be called from a user-supplied mainline program.

The subroutines perform a variety of functions. One routine permits the user to define a portion of the plotting surface within which all plotting will take place (the "active plotting area"). Separate routines perform such commonly used operations as plotting a straight line, plotting a circle, plotting a coordinate grid, and plotting an alphanumeric character string within the defined plotting area. A generalized routine called the "Plot Instruction Emulator" simulates nine plotting instructions and is a powerful and versatile tool for writing customized plotter routines.

Wang manufactures several different types of plotters, each with its own unique characteristics and idiosyncrasies. The plotter utilities are compatible with all Wang plotters. The utilities have been designed to obviate, to the extent possible, all dependence on individual plotter hardware. Of the ten utility programs, only one, the Plotter Control Routine, directly accesses the plotter, and is directly hardware dependent. The remaining nine routines are totally independent of the hardware, and function identically for all plotters.

The following is a brief summary of each of the ten plotter utility programs:

1. SET PLOTTER BOUNDARIES (DEFFN'19)

   This routine is used to define the boundaries of the "active plotting area." The "active plotting area" is that portion of the plotting surface available for plotting. Once defined, this area is recognized by all subsequent plotter utilities, and no plotting is permitted beyond its boundaries.

2. LOAD CHARACTER GENERATION ARRAY (DEFFN'22)

   This routine loads a previously created character generation array from disk into memory. The character generation array is created initially by the START module during system startup, and is stored out on disk at that time. It must be loaded into memory prior to plotting a character string.

3. PLOT CHARACTER STRING (STRAIGHT LINE) (DEFFN'20)

   This routine plots a string of alphanumeric characters relative to a specified point in the active plotting area. The characters are defined in the character generation array, which must be resident in memory to run this routine. The character size is specified by the user, as are the slant and rotation of the character string relative to the plotter axes.

4. PLOT CHARACTER STRING (ON A CIRCLE) (DEFFN'21)

   This routine plots a string of alphanumeric characters on the circumference of a circle. The center point and radius of the circle are determined by the user, as are the character size and slant of the character string. The character string is plotted relative to a selected reference point on the circle.

5. PLOT LINE BETWEEN TWO POINTS (DEFFN'25)

   This routine plots a straight line between two points whose coordinates are specified by the user. The line may be solid, dashed, dotted, or dashed/dotted.

6. PLOT COORDINATE GRID (DEFFN'26)

This routine plots a coordinate grid of horizontal and vertical grid lines in the active plotting area. The origin point of the grid, as well as the increments between successive horizontal grid lines and between successive vertical grid lines are specified by the user.

7. PLOT CIRCLE (DEFFN'27)

This routine plots a circle whose origin point and radius length are defined by the user. The size of the straight-line segments used in approximating the circle must also be specified by the user.

8. PLOT BOARDER AROUND ACTIVE PLOTTING AREA (DEFFN'28)

This routine plots a boarder around the active plotting area, defined in the Set Plotter Boundaries routine. The boarder may be plotted as a solid line, or as a dashed, dotted, or dashed/dotted line.

9. PLOT INSTRUCTION EMULATOR (DEFFN'29)

This utility is a generalized routine which simulates nine basic plot instructions. In every case, the user is required to pass a maximum of three parameters: a delta X and delta Y, or an X and Y coordinate, depending on the option chosen, and an instruction code. The following instructions are provided:

1. Send Plotter Home
2. Move Delta X, Delta Y (Tacit Move)
3. Move to X,Y (Tacit Move)
4. Move Delta X, Delta Y (Actual Move)
5. Move X,Y (Actual Move)
6. Move Delta X, Delta Y, Plot Point
7. Move to X,Y Plot Point
8. Plot Line Delta X, Delta Y
9. Plot Line to X,Y

10. PLOTTER CONTROL ROUTINE (DEFFN'30)

The plotter control routine is the only routine which addresses the plotter directly, and is the device-dependent routine. It is called by the Plot Instruction Emulator to execute the plotter operations simulated by the instructions in the Emulator. Two versions of the Plotter Control Routine are provided: one version controls the Models 2212 and 2232A plotters, and a second version controls the Model 2202 plotter. The Plotter Control Routine is not designed to be directly accessed by the user.

MINIMUM REQUIRED EQUIPMENT: 2200 (8K), Options - Sort Statements and Disk Statements, any disk unit, and any plotter.

PACKAGE NO.: 195-0021-2(-3)

LICENSE FEE: 100.00 (Annual Support Contract: $100.00)

CENTRAL LIBRARY NO.: W22-800.50-00251

TITLE: REPORT PROGRAM LANGUAGE

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The Report Program Language utilizes a high-level instruction set for the purpose of generating programs to print reports from existing files. The three basic components of this operation are the system program, the source program, and the object program. The system program contains the logic to create the source and object programs. The source program, written in Report Language, is compiled, producing object programs in BASIC. The object program then is executed to produce the report desired.

The Report Language provides capabilities to format numeric data, edit or update source programs, append BASIC subroutines to the object program, define working variables, and utilize partial fields (string functions). These capabilities, plus the ease of programming, make Report Language a tool for even the marginally experienced programmer.

Report Language supports one input file, which may be a sequential catalog file, a BAS-1 (Basic Accounting System-1) file, a KFAM-3 (Keyed File Access Method-3) file, or a multi-volume file. Records may be selected for printing, depending on the value or values of specified fields within a record, and also may be sorted in any indicated order prior to printing.

The report format is determined by the user. Several statements are available to provide DETAIL lines (one line or group of lines per record selected), page headers, and up to 9 levels of totals. Totals may be accumulated automatically for any number of numeric data items, at any combination of levels (maximum of 30 accumulations). Page breaks and group totals are handled automatically.

MINIMUM REQUIRED EQUIPMENT: 2200T (or 2200S with Option 24), a CRT, a keyboard, a Model 2270-2, and a line printer.

PACKAGE NO.: 195-0019-2(-3)

LICENSE FEE: $200.00 (Annual Support Contract: $150.00)

CENTRAL LIBRARY NO.: W22-800.50-00206

TITLE: SUPERSORT

AUTHOR: Richard F. Hill, Hilltop Enterprises, Inc., Fort Lee, Virginia

ABSTRACT:

This program demonstrates a very efficient Sort subroutine. One hundred data elements may be sorted in about 30 seconds. The subroutine is designed to sort alphanumeric data, but numeric data may be readily converted prior to sorting. If desired, the subroutine can be easily modified to accept only numeric data. As written, the subroutine occupies 1171 bytes (uncompressed). The remainder (2638 bytes) is for demonstration purposes.

MINIMUM REQUIRED EQUIPMENT: 2200S-2.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.182-10.3

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TITLE: TAPE COPY PROGRAM

AUTHOR: Richard Turner, Unidyne Corp., Norfolk, Virginia

ABSTRACT:

This program copies and verifies either programs or data onto blank tape cassettes.

MINIMUM REQUIRED EQUIPMENT: 2200B-1, 2215/2222, 2216/2217, and 2218, if more tape drives are desired.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.124-8.6

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TITLE: TEXT EDITING UTILITIES PACKAGE

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

Designed for use by an operator with a minimum of training, this package allows a user to add text editing capabilities to a Wang computer system. It contains utilities that create and edit text, store text on disk, maintain the disk, and print out stored text.

The disk (hard disk or floppy diskette) has random access. Any document can be retrieved directly without a time-consuming search.

A volume (or diskette) can hold up to 200 records, each containing 15 lines of 64 characters or 80 characters, depending on the size of the CRT.

Text is entered via the 2200 keyboard and saved directly onto a disk. Text to be edited is displayed on the CRT, and with the use of several text editing keys on the keyboard, the cursor can be easily located anywhere within the displayed text for corrections, insertions, and deletions.

The Text Editing Utilities Package consists of the following programs:

MENU PROGRAM - the primary program of the package. After performing any of the utility programs in this package, the system always returns to this program. The menu lists each of the various programs available in the package on the CRT, and by simply pressing the appropriate Special Function Key, any of these word processing-type functions can be initiated.

LOG ON/OFF - run prior to executing a CLEAR command or turning the power off to clear the terminal number from the "active" file on the system or to return to system start-up. Failure to log off before clearing memory prevents logging on with that same terminal number without using a restart procedure.

INITIALIZE VOLUME - creates a volume (a cataloged data file of 1007 sectors containing a Table of Contents and necessary pointers to store one or more documents) for storing text on a disk.

TEXT EDITOR - used for inputting text directly into the system or for correcting text already stored on disk. Basically, five types of operations are available: text entry, positioning the cursor, inserting text, deleting text, and disk operations.

1. Text Entry: used for inputting text onto a disk. (The computer keyboard is used like a regular typewriter keyboard.)

2. Positioning the Cursor: moves the cursor up or down one line, left or right one letter, diagonally up or down one line and two spaces over, ten spaces to the right, to the top left-hand corner of the CRT, to the start of the word to the left of the cursor, to the start of the next word in the text, to the first character of the current line, to the start of the next paragraph, and one space to the right of the next period found in the text.

3. Inserting Text: inserts a single character, a word, a sentence, or a paragraph into the text.

4. Deleting Text: deletes characters, words, lines or sentences from the text.

5. Disk Operations: causes the next page (15 lines) to be read from the disk and displayed on the CRT, stores a page of text on a disk after inserting or making corrections, displays the original page on the CRT prior to changes, and searches for a word or phrase from the disk or CRT.

DISK TABLE OF CONTENTS - lists out the Table of Contents for a disk so that it can be determined what information is stored on a disk. The document names are listed in alphabetical order. Next to each name are listed the amount of space taken up on the volume by a particular document (space is shown in records), the line size of all the documents (64 or 80), and the number of records left on the disk available for storing information.

COPY TEXT - copies the contents of an entire volume (for backup protection), a single document, or part of a document giving it a new name.

MOVE TEXT - moves sections of text within a document. Sections of text may be a line, a paragraph, or many paragraphs.

GLOBAL REPLACE - a text editing program that either automatically replaces every instance of a specified character string with another, or stops at every instance of the specified string with the option of replacing it or leaving it unchanged.

DELETE A DOCUMENT - removes obsolete documents from a disk while providing space for new ones.

DOCUMENT/LETTER ASSEMBLY - assembles paragraphs and/or documents, or creates form letters to be printed out.

PRINT ADDRESSES - gives the operator the option of saving and printing names and addresses.

PRINT A DOCUMENT - produces formatted or unformatted printed output of text stored on disk. Formatted output centers lines, tabs, indents, and right justifies. Unformatted output prints out the text on paper as it appears on the screen, and is used primarily for draft copies.

DATA CONVERSION - copies text from old diskettes used with original version onto volumes created by the revised version.

MINIMUM REQUIRED EQUIPMENT: 2200 CPU (16K)-C with Options 2 and 5, WCS 20, or 2200 T; dual floppy disk (up to four systems may be multiplexed to disk unit); upper/lowercase CRT recommended (aids in accessing files and viewing documents); 2223 Keyboard; and printer, if printed output desired (2201 Output Writer is not recommended).

PACKAGE NO.: 195-0018-2 (-3)

LICENSE FEE: $600 (Annual Support Contract: $250.00)

CENTRAL LIBRARY NO.: W22-800.50-00226

(See Also: COMMUNICATIONS AND TELEPROCESSING MONITORS AND SUPPORT (850.05), abstracts "2228/2780 Emulation Utilities" and "TC Support Utilities 1", pp. 168-170.)

DEMONSTRATIONS (810.00)

TITLE: ODD-ORDER MAGIC SQUARES

AUTHOR: Chin-Yeang Lim, College of Our Lady of the Elms, Chicopee, Massachusetts

UTILITIES

ABSTRACT:

This program prints magic squares of odd orders. It is written to print magic squares of orders 3, 5, 7 , 9. It can be modified easily to print other higher order magic squares.

MINIMUM REQUIRED EQUIPMENT: 2200A (4K), 2201 and 2216/17.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.52-8.10

- -

TITLE: PERPETUAL CALENDAR

AUTHOR: Chin-Yeang Lim, College of Our Lady of the Elms, Chicopee, Massachusetts.

ABSTRACT:

This program prints the calendar for a chosen year (=1752) making use of Zeller's Congruence. Although it is written for a hardcopy output, with only minor modifications, it can be used to get an output on the CRT.

MINIMUM REQUIRED EQUIPMENT: 2200A/2201.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.42-8.8

(See Also: GENERAL MATHEMATICS (710.10), abstract "Golden Dimension", p. 93.)

GAMES (820.00)

TITLE: BACKTRACKING

AUTHOR: Werner Balser and Axel Schreiner, Universitat Ulm, Ulm, West Germany

ABSTRACT:

These are four examples of backtracking algorithms: BALSER, a solution to the Journey of the Knight (Wang PROGRAMMER, September, 1974); QUEENS-E, a solution with 'equivalence point' backtracking to the Eight Queen's problem; QUEENS, a solution with full backtracking to the Eight Queen's problem; and QUEENS-A, a tutorial display illustrating the full backtracking technique in the Eight Queen's problem. The implementation is described in the December, 1975 PROGRAMMER Magazine.

MINIMUM REQUIRED EQUIPMENT: 2200B-1/2222.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.87-9.10

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TITLE: BANNER

AUTHOR: Modified by R. D. Hawkins, Wang Laboratories, Inc. and Michael Taylor, Muzzey Junior High School, Lexington, Massachusetts

ABSTRACT:

This program prints banners consisting of any size letters. Height, width and margin in inches are input by the user. Each giant letter is constructed from many uppercase letters of the same kind. For example, a giant "A" is printed as a matrix of many A's.

MINIMUM REQUIRED EQUIPMENT: 2200-2/2221 (easily modified for any output device).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.97-10.3

- -

TITLE: BASEBALL

AUTHOR: Joel G. Ehrlich, Naval Ship Weapons Systems Engineering Station, Port Hueneme, California

ABSTRACT:

A fast and simple-to-play version of the game of baseball mechanized for the computer. It is a hitting and batting version where as a batter, you decide whether or not to 'take' a pitch (randomization takes care of what happens if you swing), and as a pitcher, you decide what pitch to throw (randomization determines again what happens).

MINIMUM REQUIRED EQUIPMENT: 2200B-2 and 2222/2215/2223.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.95-10.3

- -

TITLE: BASEBALL

AUTHOR: John McAlpine (submitted by William L. Miklovic), Caro Community Schools, Caro, Michigan

ABSTRACT:

This is a baseball game played with two players. The pitcher has four (4) choices of pitches. The batter has a choice of whether to swing or not. The scoreboard keeps an accurate record. Runners are shown advancing on the basepaths. Statistics are kept in almost all possible areas.

MINIMUM REQUIRED EQUIPMENT: 2200A-1, 2216/2217 and CRT.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D. 89-9.11

TITLE: BATTLE OF NUMBERS

AUTHOR: Richard Turner, NAV SEC NOR DIV, Norfolk, Virginia

ABSTRACT:

In this game, the player challenges the System 2200; a pile of objects is available, from which more than 0 and less than K (determined by a random number generator) objects must be removed at each turn. The player who removes the last object loses.

MINIMUM REQUIRED EQUIPMENT: 2200, 2215/2222, and 2216/2217.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.26-8.3

TITLE: BINARY BOWLING

AUTHOR: R. L. McCracken, Naval Electronics Laboratory Center, San Diego, California

ABSTRACT:

This program allows a person to bowl, using random numbers to determine the number of pins hit on each roll. The player is told when to roll the first ball and, where if necessary, the second ball. Frame by frame scores are displayed, as well as a wrap-up summary.

MINIMUM REQUIRED EQUIPMENT: 2200 (8K).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D. 94-10.3

TITLE: BIORHYTHM ANALYSIS (BIOSIN)

AUTHOR: Harold Shair, White Plains Public Library Consultant, Rye, New York

ABSTRACT:

Analysis of the 3 Biorhythmic Cycles are performed by the 2200. The "physical cycle" is 23 days long, the "sensitivity cycle" is 28 days long, and the "intellectual cycle" is 33 days long. When one of your cycles crosses the median line - WATCH OUT!!

MINIMUM REQUIRED EQUIPMENT: 2200B (8K).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: S.447-10.2

- -

TITLE: CALENDAR-M

AUTHOR: Michael Taylor, Muzzey Junior High School, Lexington, Massachusetts

ABSTRACT:

This program prints a 12-month 1976 calendar. Sufficient REM statements are included to easily modify for any year. Number of days used and remaining in year are printed.

Known Program Anomalies:

Programmed for leap year.

MINIMUM REQUIRED EQUIPMENT: 2200-1/2221 (easily modified for any output device).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D. 99-10.3

- -

TITLE: CHASE

AUTHOR: Joel G. Ehrlich, Naval Ship Weapons Systems Engineering Station, Port Hueneme, California

ABSTRACT:

A not too complex program in which the operator attempts to intercept a target traveling at a fixed speed in random directions. A "difficulty code" permits the operator to 'tailor' his game. This is not at all an easy game to play - the operator must have a good head for vector algebra and must have the ability to visualize relative positions. It is fun, but frustrating; although with practice, it does become a little easier (but never too easy).

Known Program Anomalies:

None noted except that a 2216A CRT is required due to some of the characters selected for the display.

MINIMUM REQUIRED EQUIPMENT: 2200B-2/2222 or 2215, and 2216A.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.88-9.10

- -

UTILITIES

TITLE: COMPUTER READER & ADVISOR

AUTHOR: Harold Shair, White Plains Public Library, Rye, New York

ABSTRACT:

The Wang 2200 becomes Dear Abby as it supplies answers to life's most perplexing problems. Great interactive fun. Modified from HELLO 101 Basic Computer Games.

MINIMUM REQUIRED EQUIPMENT: 2200B (8K).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.111-10.9

- -

TITLE: FLYING SAUCERS

AUTHOR: Harold Shair, White Plains Public Library, Rye, New York

ABSTRACT:

Up to four players can compete to see how many space mines they can destroy. The saucers scoot all over the screen to reach the coordinates that have been set by the Special Function keys.

MINIMUM REQUIRED EQUIPMENT: 2200B (8K).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.102-10.3

- -

TITLE: 4-PROGRAM GAME PACKAGE

AUTHOR: Michael Taylor, Muzzey Junior High School, Lexington, Massachusetts

ABSTRACT:

1. GUESS - The computer randomly picks a number from 1 to 100 and the user has six guesses to determine the number. After each guess, the computer informs you whether you are high or low.

2. HEADS - Version (a): Player vs. player: Computer randomly flips coin ten times and players guess how many heads will turn up. Closest guess wins a point and computer keeps score until decision is made to end game. Version (b): Same as version (a), except player vs. machine.

3. HURKLE - Computer displays 10x10 grid on CRT within which it hides a treasure. Player tries to guess where treasure lies by keying in x, y coordinates.

4. CRAPS - Keeps track of your winnings until you go broke.

MINIMUM REQUIRED EQUIPMENT: 2200-2/CRT.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.98-10.3

- -

TITLE: GRAN PRIX

AUTHOR: Joel G. Ehrlich, Naval Ship Weapons Systems Engineering Station, Port Hueneme, California

ABSTRACT:

This is a conversion of a nicely written program. It places you in control of a sports racing car of your choice - your opponent is the 2200 in a car also of your choice. The 3200-yard course is rough and fast - you control acceleration and brakes with slides, spin-outs and crashes to reward your poor judgment. A hardcopy output device is the only way to get a course layout.

Known Program Anomalies:

It is extraordinarily difficult to beat the 2200, since the lead/lag of the 'other' car is based upon your last increment of speed change.

MINIMUM REQUIRED EQUIPMENT: 2200B-3, 2222/2223, and 2201/2221/2231/2241/2261.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.90-9.12

- -

TITLE: HOCKEY

AUTHOR: Ted Babine, Wang Laboratories, Inc., Lowell, Massachusetts

ABSTRACT:

This program is a game which is similar to the tennis games that are played in Penny Arcades and Amusement Centers. The "puck" starts out at the center of the CRT and can go out in 18 directions. When the "puck" hits the boards, it bounces off at a refracted angle which is random. After a score, the "puck" goes back to the center for a "face-off". Each period takes approximately 5 minutes with the stats displayed on the CRT after each period. The operating instructions are included in the source listing.

MINIMUM REQUIRED EQUIPMENT: 2200B-3, OP 2 & 5, 2216, 2217, and 2222.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.91-9.12

TITLE: HORSES

AUTHOR: Charlie Singer, Lynnfield High School, Lynnfield, Massachusetts

ABSTRACT:

Up to 5 horse races with odds are taken into account. Up to 5 people can bet on the horses and be paid off by the odds. Sorry, but no money for place and show. Horses run up the track and back, and even move their legs!

Known Program Anomalies:

Impossible to stop playing once you start.

MINIMUM REQUIRED EQUIPMENT: 2200A-1.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.107-10.6

TITLE: INTRODUCTION TO COMPUTERS

AUTHOR: Harold Shair, White Plains Public Library, Rye, New York

ABSTRACT:

For people who have never seen a computer, this is an introduction to the PUBLIC COMPUTER at the White Plains Library. With modifications, it is suitable for open houses where the Wang 2200 is on display. It tells about computers, plays a little game, and then signs people up for a programming course.

MINIMUM REQUIRED EQUIPMENT: 2200B (8K).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.101-10.3

TITLE: KING

AUTHOR: Joel G. Ehrlich, Naval Ship Weapons Systems Engineering Station, Port Hueneme, California

ABSTRACT:

This is a game somewhat like the French game of "Sumer" (often called 'hamurabi' in English) but somewhat more complex. The purpose is the same - to rule your nation and have it prosper. You have more variables with which to cope - foreign industry, tourists and pollution, in addition to the usual harvest problems. This is a much more difficult game than "Sumer".

MINIMUM REQUIRED EQUIPMENT: 2200B-2, 2216/2216A, 2217 and 2222/2215/2223.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.105-10.5

TITLE: MATRIX (GAMES THEORY DEMONSTRATION)

AUTHOR: Joel G. Ehrlich, Naval Ship Weapons Systems Engineering Station, Port Hueneme, California

ABSTRACT:

This "GAME" is a demonstration of the theory of games. Its play should not be attempted without some understanding of the games theory, as it is not likely to be understood otherwise. The game is played by the player entering the number of strategies (matrix dimensions) for himself and for the 2200. The player then enters the values of the matrix with which play is to be made. Thereafter, the player selects the row of the matrix with which he will play and the 2200 selects the column (this is done for each play). The 2200 evaluates the result and scores it. Study references are cited in the self-descriptive program.

MINIMUM REQUIRED EQUIPMENT: 2200B-5, OP-1, and 2222/2223.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.96-10.3

TITLE: MAZE

AUTHOR: Paul Cohen, Cohen Shoe Machinery, Salem, Massachusetts

ABSTRACT:

The program randomly sets up a maze pattern on the CRT and then randomly picks a starting point on the left side of the screen. A player must bounce the ball over to the right side of the screen within 30 bounces or the ball goes poof! The special function keys serve as a steering mechanism. You may push them once and watch as the ball ricochets off the maze and outside, or you may keep changing direction by hitting different buttons.

Known Program Anomalies:

Can be habit forming.

MINIMUM REQUIRED EQUIPMENT: WCS/20 (4K).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.104-10.4

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TITLE: PIZZA DELIVERY GAME

AUTHOR: Harold Shair, White Plains Public Library Consultant, Rye, New York

ABSTRACT:

Teaches students (elementary level) the concept of coordinates by asking them to deliver pizzas to customers in the imaginary city of Black Hills. You take orders for pizzas. Then, armed with a map of the city, you must tell a delivery boy the address where the pizza is to be delivered. (From Pizza 101 BASIC Computer Games.)

MINIMUM REQUIRED EQUIPMENT: 2200B (8K).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.93-10.1

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TITLE: POETIC TIC-TAC-TOE (DR. SEUSS VERSION)

AUTHOR: Harold Shair, White Plains Public Library, Rye, New York

ABSTRACT:

Play four games of tic-tac-toe against Mr. COMPUT-O-MAT, Every remark is a rhyme.

MINIMUM REQUIRED EQUIPMENT: 2200B (8K).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.103-10.3

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TITLE: QUBIC 3D TIC TAC TOE

AUTHOR: Joel G. Ehrlich, Naval Ship Weapons Engineering Station, Port Hueneme, California

ABSTRACT:

This is a game of 3D TIC-TAC-TOE played on a 4 by 4 board. There are five difficulty levels (the 2200 becomes 'smarter' as the difficulty level goes up). The game is fully interactive and the entire board is displayed on the CRT at all times (with the positions occupied by both players always indicated). An easy game at level one - it can become frustrating at level five!

Known Program Anomalies:

The harder levels of play run more slowly due to the need to go through more logic.

MINIMUM REQUIRED EQUIPMENT: 2200B-3.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.113-10.9

- -

TITLE: RONA

AUTHOR: Mark Musen, Brown University, Providence, Rhode Island

ABSTRACT:

This program turns the System 2200 into a "gossipist". All information must be taught to Rona, who will answer almost any question you ask with as many appropriate answers as she can find.

MINIMUM REQUIRED EQUIPMENT: 2200A-1, 2215/2222, and 2216/2217.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.29-8.3

- -

TITLE: RUMMY

AUTHOR: Robert Benbow & Carl W. Schlaphoff, Colorado Mountain College, Leadville, Colorado.

ABSTRACT:

Rummy is a program which plays a game of four card rummy with the operator. The operator must have four of a kind to win. The strategy is to accumulate a hand of four like cards as quickly as possible. Sorry, no straights allowed for a win.

PROGRAM DESCRIPTION

First an array is set up for the card deck. Its dimensions are four by thirteen for suits and cards. Subroutine '00 fills each element of the array with a "C", which means there is a card in that position in the array. Two hands of four cards then are dealt and the top card is displayed. The top row of cards are Mac's (the machine's) and as in any card game his opponent only sees the back of Mac's cards. Stu's (the operator) cards are displayed in the bottom row face up. The top card is between the two rows in what shall be the discard pile for the rest of the game. Subroutine '01 picks a random position in the deck array and then replaces the "C" with an "E" to show that the card has been taken out of the deck. The row and column positions are used then to give the card a recognizable name such as 2D, KH, etc. in subroutine '02.

Stu is given first chance at the top card. If he doesn't take it, Mac checks to see if he wants it. If not, a new card is displayed to Stu. If Stu doesn't want the new card, it becomes Stu's discard. If Stu wants it, he must discard. Subroutine '08 checks to see if Stu's discard is in Stu's hand. Subroutine '09 replaces Stu's discard with the new card. In case of an illegal discard, subroutine '10 prints out "Does not compute" and the information is asked for again. When it is Mac's turn, subroutine '04 is used to see if Mac wants a card and to replace and discard the appropriate card. Since Mac cannot see very well, his cards must be arranged with all like cards put at the end of his hand. The two subroutines used for this are '11 and '12. This way Mac, by the use of subroutine '20, tells his opponent who won.

Subroutine '06 arranges a card description in a standard 3-digit form. The display during the game is accomplished by Subroutine '03. Subroutine '22 is used to pause.

MINIMUM REQUIRED EQUIPMENT: 2200A-1/4K.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.44-8.9

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TITLE: SIMULATION OF STOCK MARKET WITH COMMISSIONS

AUTHOR: John Collins, Collins Engineering Co., Ft. Walton Beach, Florida

ABSTRACT:

In this simulation of the stock market, the operator specifies how many shares of speculative stock, preferred stock, warrants, and bonds he wishes to buy or sell. In this way, he controls his "fortune" in the stock market; the simulation of price movement is controlled by a random number generator.

MINIMUM REQUIRED EQUIPMENT: 2200, 2215/2222, and 2216/2217.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: B.40-8.3

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TITLE: SIMULATION OF THE TV GAME: HIGH ROLLERS

AUTHOR: Tim Shafer, Meadville Area Senior High School, Meadville, Pennsylvania

ABSTRACT:

As the title implies, this program is a simulation of the number game used in the television show "High Rollers". It follows the game exactly, except that no extra turn is given for a roll of doubles. The program cannot tell when a move is impossible, so if such a case arises, one may try to cheat his way out of the situation by leaving the normal course of the program run. As our Math Lab has an auxiliary output device in the way of a remote TV monitor which outputs only 55 characters per line, it was necessary to adapt the program to meet its requirements.

The program includes instructions for running the program. The only problem that the user may face is that of failing to hit the "EXECUTE" key, or failure to use the COMMA when inputting more than one number. To avoid printing the instructions each time the program is RUN, use the command, RUN 100.

The random number generator is used to simulate the tossing of the dice.

Known Program Anomalies:

The program cannot tell when a move is impossible.

MINIMUM REQUIRED EQUIPMENT: 2200S-2, CRT or external TV monitor.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO: G/D.110-10.8

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TITLE: SNAKE CAN GAME

AUTHOR: Harold Shair, White Plains Public Library, Rye, New York

ABSTRACT:

From the children's TV Show "Wonderama", a player must pick the one can out of ten with the bouquet of flowers. The rest of them have snakes.

MINIMUM REQUIRED EQUIPMENT: 2200B (8K).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D. 112-10.9

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TITLE: 3-DIMENSIONAL TIC-TAC-TOE

AUTHOR: Marinus Blomme, Wang Laboratories, Inc., Tewksbury, Massachusetts

ABSTRACT:

The object of the game is to put 4 X's or 4 O's in a row. A row is defined as any straight line in three dimensions which passes through four squares.

The cube which makes up the playing volume is displayed as four planes or levels which are divided into four rows and four columns. The levels are marked but the rows and columns are not. They are numbered from top to bottom and the columns are numbered from left to right. When specifying a square, the level is given first, the row second and the column last. Thus 4, 3, 2 is the fourth level, the third row, and the second column.

There are three modes of play: Player vs. 2200 (the player goes first), 2200 vs. Player (the 2200 goes first), or Player vs. Player (player named first moves first).

Each position is specified by keying the numbers 1 through 4 and is displayed by the 2200. One is then asked 'Y or N?'. If the position is correct, key anything except 'N'; if incorrect, key 'N'.

The game is begun by keying either 'RUN CR/LF' or S.F.#14.

Known Program Anomalies:

Program has 2 files - a program file and a datafile named "MOVEDATA".

MINIMUM REQUIRED EQUIPMENT: 2200B, Options 2 and 5 (12K).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.100-10.3

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TITLE: $25,000.00 KENO

AUTHOR: Joel G. Ehrlich, Naval Ship Weapons Systems Engineering Station, Port Hueneme, California

ABSTRACT:

This is a version of the game of KENO as played in Las Vegas. It is a version of the game that is intended to be played by one person only, but follows all other rules. Maximum winnings per game are limited to $25,000.

MINIMUM REQUIRED EQUIPMENT: 2200B-3/2216 and 2222/2215/2223.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.92-9.12

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TITLE: 2200 GAME PACKAGE

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

This package contains ten games:

1. Arith: this program can be used as a learning tool for arithmetic problems, including addition, subtraction, multiplication, and division.

2. Arty: this game is an interactive artillery game.

3. Blackjack: the System 2200 deals this game.

4. Crypto: the System 2200 tests your talent with Cryptograms.

5. Football: this game can be played against the System 2200 or against a friend.

6. Horse: this horse race game uses a random number generator to determine the winner.

7. Life: John Conway's genetic laws are explored in this game.

8. Ten Pin: a bowling game is simulated by the System 2200, with the players taking turns.

9. Ten Pin B: this is a modification of Ten Pin in which you try to reach a score of 300.

10. Kalah: this is an April Fool version of the ancient game.

MINIMUM REQUIRED EQUIPMENT: All programs require the following equipment: 2216/2217, and 2215/2222.

See below for individual System 2200 sizes:

1,7,9: 2200B-8K
2,6,10: 2200A-4K
3,4,5,8: 2200A-8K

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: G/D.41-8.5

(See Also: (1) ASSETS ACCOUNTING (100.15), abstract "Finance/Utilities/Games General Program Library GLBR22B", #10, p. 6; and (2) GENERAL MATHEMATICS (710.10), abstract "Golden Dimension", p. 93.)

HARDWARE MANAGEMENT APPLICATIONS (830.05-830.20)

Diagnostic Monitors (830.05)

TITLE: DUMP

AUTHOR: Paul Cohen, Cohen Shoe Machinery, Salem, Massachusetts

ABSTRACT:

This program will "DUMP" or LIST in both character and HEX form, the records of any specified cataloged file.

Known Program Anomalies:

Limit of 25 files can be dumped. This can be changed for a larger machine.

MINIMUM REQUIRED EQUIPMENT: WCS-20-4K, (2220 with GIO), 2221 and 1 floppy.

PRICE: Available to SWAP members ony - nominal charge.

SWAP LIBRARY NO.: T.183-10.4

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TITLE: THE 2200 HARDWARE DIAGNOSTIC SYSTEM

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

The 2200 Hardware Diagnostic System is a software system designed to help maintain the maximum efficiency of your Wang system. It contains programs which exhaustively test the hardware components of the system and which attempt to pinpoint any malfunctions. The nature of these programs forces their operation outside the processing day, as that is defined for users of the 2200 Integrated Support System (ISS).

The diagnostic programs resident of this system should be executed:

1. once every 60 to 80 hours of operation,

2. whenever a hardware malfunction is suspected, and

3. whenever a Wang Service Representative requests their execution.

In addition, the memory diagnostic should be executed whenever the IPL (Initial Program Load) memory diagnostic of ISS detects a problem.

It is best to execute diagnostic routines as close as possible to the time of observation of a suspected problem. This ensures that the environmental conditions of the test most closely resemble those under which the problem may occur.

Six basic diagnostics are offered: Memory, CPU, Printer, Disk Instructions, Disk, and Disk Platter Verify. There are two types of memory and disk diagnostic known as the System Diagnostic and the Burn-In Diagnostic. These differ in the number of times each part of the subject system is tested. The Burn-In diagnostic performs the tests many more times than the System Diagnostic and is recommended when an intermittent system problem appears to have eluded the System Diagnostic.

The Disk Platter Verify is provided for the purpose of testing disk platters and diskettes not currently in use in the system.

The Disk, Disk Instructions, and Disk Platter diagnostics require occasional operator attention. The other diagnostic routines do not, and may be left to operate outside of normal system working hours. The approximate execution times for representative diagnostics are given below.

TEST	CONFIGURATION	TIME
Memory (system diagnosis)	8K	10 min
	16K	17 min
	24K	24 min
CPU	Not Significant	13 min
Printer	2221W	6 min
Disk Instructions	Not Significant	4 min
Disk (system diagnosis)	Single Drive Diskette	38 min
	2230-3	2 hr, 22 min
Disk Platter/Verify	diskette	8 min

The diagnostics output results to a printer or display. The detailed output exceeds the capacity of the display, and therefore, if the display output option is chosen, the diagnostic results are reported merely as pass/fail. Whenever a printer is available, it is recommended that the hardcopy option be elected.

After all tests are executed, a pass/fail summary of the results is displayed. At this point, the operator has the option of passing control to the IPL module of an ISS diskette or returning to the 2200 Hardware Diagnostic System master menu.

MINIMUM REQUIRED EQUIPMENT: 2200T CPU with a keyboard, CRT, 8K of memory and a single diskette drive.

PACKAGE NO.: 195-0020-2(-3)

LICENSE FEE: $50 (Automatic Enclosure)

CENTRAL LIBRARY NO.: W22-830.05-00200

Peripheral Device Support Systems (830.15)

TITLE: COPYTAPE

AUTHOR: Miguel Soriano, Bufete Matematico Actuarial, S.C., Mexico

ABSTRACT:

This program copies programs or data files from one tape to another, orders files from one or more tapes onto the first tape, changes file names, and adds a DATASAVE END if wanted.

Known Program Anomalies:

When changing a file's name, the program does not check for names greater than 8 characters.

MINIMUM REQUIRED EQUIPMENT: 2200B-1, 2216 and 2217(2).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.170-9.11

SOFTWARE MANAGEMENT (850.05-850.15)

Communications and Teleprocessing Monitors and Support (850.05)

TITLE: 2228/2780 EMULATION UTILITIES

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

Wang's IBM 2780 Emulation Utilities Package for the Model 2228 Communications Controller provides the capability to generate many turnkey communications programs, each of which is suited to a particular choice of I/O devices for data transmission/reception and other options.

An outstanding feature of the terminal emulator package is a program called SYSGEN (System Generation). SYSGEN interrogates the user's preferences with respect to a set of options and then automatically constructs a communications program fulfilling the user's specifications. Thus, in response to a set of questions appearing on the CRT, the user is permitted to designate I/O peripherals and other information such as the type of modem to be used for data transmission/reception. SYSGEN then automatically generates a customized communications program having the following modules:

- an initialization/loader module called TCSTART,
- a microcode data module related to the BSC line discipline,
- a CPU/controller interface module related to the specified I/O configuration, and

. a code translation module.

The generated communications program includes such features as operator prompts, special function key control of transmission and reception, error messages, and modem status information, all provided with a primary objective in mind -- operational simplicity requiring minimal training of non-programming personnel responsible for data transmission/reception.

With SYSGEN residing on a master diskette, no programming effort is required when a facility wishes to change the designated I/O peripherals or other available options for a communications application. By running SYSGEN again, another program can be generated for a different set of options.

MINIMUM REQUIRED EQUIPMENT: 2200 CPU, CRT, Keyboard, and 2228. CPU and I/O peripheral requirements are discussed as follows:

To run the SYSGEN program, the following CPU's with 12K bytes of memory can be used:

1. a 2200B with Options 2 and 5,
2. a 2200C with Options 2 and 5,
3. a 2200S with Option 24, or
4. a 2200T.

However, only 8K bytes of memory are necessary to run some communications programs, depending upon the I/O configuration and the disk file opening and closing method, as shown in the following table.

Memory Requirements for 2780 Emulation Programs

Input Device	Output Device	Disk File Method	Minimum Memory	Remarks
Card Reader	Printer	--	8K	
	Disk	1 (On Error)	8K	Not for 2200B
		2 (Srch Catlg)	12K	
	Disk & Printer	2 (Srch Catlg)	12K	
	Dummy/Testing	--	8K	
Disk	Printer	1 or 2	8K	
	Disk	1 (On Error)	8K	Not for 2200B
		2 (Srch Catlg)	12K	
	Disk & Printer	2 (Srch Catlg)	12K	
	Dummy/Testing	1 or 2	8K	
Dummy/Testing	Printer	--	8K	
	Disk	1 (On Error)	8K	Not for 2200B
		2 (Srch Catlg)	12K	
	Disk & Printer	2 (Srch Catlg)	12K	
	Dummy/Testing	--	8K	

PACKAGE NO.: 195-0022-2(-3) (-7)

LICENSE FEE: $200

CENTRAL LIBRARY NO.: W22-850.05-00231

- -

TITLE: TC SUPPORT UTILITIES 1

AUTHOR: Wang Laboratories, Inc.

ABSTRACT:

TC Support Utilities 1 includes three programs called Data Entry 1, Atomize, and De-atomize which perform special functions related to the preparation or processing of TC formatted disk files. The programs support the TC format as defined in the 2780, 3780, and 3741 Emulation Utilities for the Model 2228 Communications Controller and as defined in the Teletype Emulation Utilities for both the Model 2227B Buffered Asynchronous Communications Controller and the Model 2228 controller.

The programs (essentially standalone in nature) and their purposes are as follows:

Data Entry 1 - Allows the user to create a new disk data file in TC format, or to edit, delete, rearrange, insert, and list records in an existent TC formatted disk data file -- as well as perform global searches for specified character strings. Most importantly, disk files prepared via Data Entry 1 can be transmitted without change via Wang's utility systems for asynchronous or binary synchronous communications protocols.

De-atomize - Allows the user to de-atomize a BASIC language program currently stored on disk in Wang's standard program file format, and also convert the program file into a TC formatted disk data file suitable for subsequent transmission to a remote system.

Atomize - Allows the user to atomize a BASIC language program previously received from a remote system and currently stored as a TC formatted disk data file; furthermore, the TC format is automatically converted into Wang's standard program file format.

MINIMUM REQUIRED EQUIPMENT: 2200T or equivalent CPU (16K), CRT, Keyboard, and Dual Disk Drive. (Data Entry 1 requires a printer.)

PACKAGE NO.: 195-0026-2(-3)(-7)

LICENSE FEE: $200 (Annual Support Contract: $100)

CENTRAL LIBRARY NO.: W22-850.05-00430

Software Library Services (850.15)

TITLE: 2200 TAPE LIBRARY CLASSIFICATION SYSTEM

AUTHOR: John Maunder, Highways Department, Adelaide, South Australia

ABSTRACT:

Because no organization can spend an unlimited amount of time on program development, it would be greatly advantageous for all users to avoid duplication of programs by maintaining a library file which would:

a) List and describe all programs within the organization, that is, all programs written by, or obtained by, personnel within the organization and to have all such programs immediately accessible.

b) List and describe all programs available within the locality of the user and available at short notice.

c) List and describe all programs available from SWAP.

This program enables the custodian of a Wang 2200 to maintain a library file to execute all the above.

See also the article "2000 Tape Library and Classification System," September 1975 PROGRAMMER magazine, Vol. 9, No. 3.

MINIMUM REQUIRED EQUIPMENT: 2200B (4K) with program modifications.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.165-9.9

SYSTEM DESIGN MANAGEMENT APPLICATIONS (860.05-860.35)

Cross-Referencing (860.05)

TITLE: "CROSSREF"

AUTHOR: Robert Marinelli, Mobil Shipping & Transportation Co., New York, New York

ABSTRACT:

Given any System 2200 program, this program lists the desired program, along with a cross referenced variable listing.

MINIMUM REQUIRED EQUIPMENT: 2200B-2, and 2221.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.125-8.6

- -

TITLE: CROSSREF/2

AUTHOR: Andres Loo, Software Consultant, Vancouver, B.C., Canada

ABSTRACT:

This is a 2200B program to list and cross-reference other 2200 programs. It was developed from SWAP Program T.125-8.6 "CROSSREF", written by Robert J. Marinelli, but is faster and of greater capacity than CROSSREF. CROSSREF 2 would list all references in an 8K program with 500 references present in 15 minutes; CROSSREF would list only the first 254 references of the same program in 30 minutes. CROSSREF 2 does not use sorts, but stores occurrences of variables as linked record chains.

By removing the option to list a program, at least 700 additional references can be handled for any given size machine. Approximate machine capacities of CROSSREF 2 are:

Storage	With Listing	Without Listing
8K	(must be compressed)	630 references
12K	910 references	1610 references
16K	1960 references	2660 references

etc., adding 1024 references for each 4K additional memory capacity.

Program T.139-9.4 as submitted has 700-reference capacity, on 12K, and runs on a 2230 disk and high speed printer (device 215), but can be modified to run on a tape drive or a 2240 disk, or any output device. Reference table capacity can easily be modified. Disk and high speed printer are recommended for optimum performance.

Known Program Anomalies:

Like program T.125-8.6, this program will interpret certain command elements as variable, e.g., F, R, T in disk statements, F, R, O, M in UNPACK () FROM, and exponentials (e.g., 1E7, etc.). Hex codes and (), POS(), etc. will be printed out as variables.

MINIMUM REQUIRED EQUIPMENT: Can be modified for 2200B(8K).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.139-9.4

Documentation Aids (860.10)

TITLE: BITPACK

AUTHOR: Marvin M. Engel, TAISSA, New York, New York

ABSTRACT:

One subroutine packs dichotomous data (yes-no, true-false), into individual bits. Any data coded as 0 or 1 may be stored into a quarter of the space used by the pack statement. Responses to 32 true or false questions would require 4 bytes. The second subroutine unpacks and reconstructs the data in standard form so that it may be used in the normal way.

MINIMUM REQUIRED EQUIPMENT: 2200B (4K), and any printer.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.180-10.2

- -

TITLE: CATALOG

AUTHOR: Axel Schreiner, Universitat Ulm, Ulm, West Germany

ABSTRACT:

CATALOG is a program that maintains a program library on tape. It provides for the cataloging (i.e., listing) of all named program files on a tape, and for convenient access to these programs.

This revised version allows accessing programs on a write-protected tape, and is less hampered by tape-drive problems than was the original.

Known Program Anomalies:

None. The program may damage other programs if the tape drive (2217) fails.

MINIMUM REQUIRED EQUIPMENT: 2200B (4K), 2215, 2216 and 2217.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.173-9.12

- -

TITLE: CROSSRF/CROSSRFO

AUTHOR: Tyler Olsen, Wang Laboratories, Inc., Lowell, Massachusetts

ABSTRACT:

This is a program documentation aid. Program T.180-10.2 has evolved from the CROSSREF program, T.126-8.6, submitted to SWAP by Robert J. Marinelli. This program creates decompressed program listing with optional annotation of variables and special functions on 8 1/2" x 11" pages. Features include: (1) Grouping of Logical program segments, (2) Page formatting and expanded print comments, (3) Summary of variables used (with meanings), special functions, and line references. Input is program files from cassette or disk.

Program T.180-10.2 may easily be changed for systems 16K to 32K.

MINIMUM REQUIRED EQUIPMENT: 2200B/C with OP-5 or 2200T or WCS (16K).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.181-10.2

- -

TITLE: FORMAT

AUTHOR: Axel Schreiner, Universitat Ulm, Ulm, West Germany

ABSTRACT:

FORMAT is a program that produces a decompressed listing of a program file on tape. Multiple statements are listed on separate lines; indentation of FOR-NEXT, special margins for REM statements, line-width and number of lines per output page can all be specified.

FORMAT is like the Wang utility LIST - but it fits into a 4K machine.

Known Program Anomalies:

None. As yet unused HEX codes for BASIC words are represented by their HEX value.

MINIMUM REQUIRED EQUIPMENT: 2200B-4K/2215, 2216, 2217 and 2231.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.174-9.12

- -

TITLE: FORMAT/D

AUTHOR: Axel Schreiner, Universitat Ulm, Ulm, West Germany

ABSTRACT:

FORMAT/D is a program that lists the contents (or produces a summary-listing of the contents) of each data block produced by a DATASAVE statement. Free space in a data block is also reported.

FORMAT/D is similar to one function of the Wang utility Tape & Disk Dump - but it fits into a 4K machine.

MINIMUM REQUIRED EQUIPMENT: 2200B (4K), 2215, 2216, 2217 and 2231.

PRICE: Availale to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.176-9.12

TITLE: LABELIST

AUTHOR: Juan Manual Daviia (submitted by Miguel M. Soriano), Data S.A., Mexico

ABSTRACT:

This program lists and numbers the labels of files recorded in a given cassette, indicating the file is either a program or a data file.

MINIMUM REQUIRED EQUIPMENT: 2200B-1/2201.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.166-9.9

TITLE: LINEREF

AUTHOR: Axel Schreiner, Universitat Ulm, Ulm, West Germany

ABSTRACT:

LINEREF is a program that produces a cross-reference listing of all line numbers and of all references to lines in a program file on tape. It is thus possible to detect compressible, and inaccessible or unused lines.

LINEREF is similar to one function of the Wang utility DECOMPRESS/CROSS-REFERENCE - but it fits into a 4K machine.

Known Program Anomalies:

As coded, 100 line-numbers and 255 references to lines can be handled. More cannot be done in 4K.

MINIMUM REQUIRED EQUIPMENT: 2200B-4K, 2215, 2216, 2217, and 2231.

PRICE: Availale to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.175-9.12

TITLE: LISTPROG

AUTHOR: Miguel Soriano, Data S.A., Mexico City, Mexico

ABSTRACT:

This program lists a FORTRAN or COBOL program punched on cards or any other program language or data punched in any code.

MINIMUM REQUIRED EQUIPMENT: 2200B-1, OP-2 ROM, 2221 and 2234.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.178-10.1

TITLE: LIST 8080

AUTHOR: Luis Ignacio Raudon (submitted by Miguel M. Soriano), Data S.A., Mexico

ABSTRACT:

This program reads ASCII code cards and prints them on the line printer, with or without page control.

MINIMUM REQUIRED EQUIPMENT: 2200B-1, 2234, and 2221.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.167-9.9

TITLE: PROGCOMP

AUTHOR: Tyler Olsen, Wang Laboratories, Inc., Lowell, Massachusetts

ABSTRACT:

This program compares two program files and lists the differences. Programs may be either cassette or diskette resident. Output is either to CRT or the line printer (80 column pages). The program files to be compared may be either on cassette or on diskette. The two files compared cannot both be on cassette.

MINIMUM REQUIRED EQUIPMENT: 2200B-16K, OP-5, Printer, CRT, or WCS 20/30 (16K) with Printer or CRT output.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.192-10.9

TITLE: PROGVERB

AUTHOR: Tyler Olsen, Wang Laboratories, Inc., Lowell, Massachusetts

ABSTRACT:

PROGVERB analyzes a program or group of program files on cassette or disk. Output is a listing of the statements containing certain 2200/WCS verb atoms. A summary list displays the verb used, the line numbers containing those verbs, and the Wang system containing those verbs. Two variations of the program are initiated by depressing the special function keys:

(1) Determine configuration: this entry lists each multi-statement line containing a SELECT, PLOT, op 1, op 2, or op 5 verb. The summary lists which non-2200 A/S verbs are used and locates those lines using SELECT, PLOT, or disk verbs, and all option 1, 2, or 5 verbs.

(2) Search for specific verbs: this entry lists each statement containing the verbs requested. The summary lists each verb selected and where it is referenced.

MINIMUM REQUIRED EQUIPMENT: 2200B-16K, OP-5, or WCS 20/30 both with printer.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.193-10.9

- -

TITLE: SIMPLE FILE MANAGEMENT SYSTEM FOR THE WANG 2200B

AUTHOR: Karel H. Wesseling, Institute of Medical Physics; Utrecht, Netherlands

ABSTRACT:

The program package consists of 10 utilities to perform various file manipulation tasks. In arbitrary order they are named:

SAVEDATA	(to manually input data and store them in a file on disk or tape).
SAVE 1080	(to save data in the standard way).
INSPECTF	(to inspect, list and correct files).
MOVEFILE	(to move a file from one location to another: SAFE to SAFE, disk to tape, etc.).
COPYDKTP	(to copy files from disk to tape, especially useful for contiguous files).
COPYTKDK	(to copy files from tape to disk, especially contiguous files).
LOADFILE	(to load a file from disk or tape into memory for further manipulation; LOADFILE and SAVE 1080 form a pair in between which other programming may be done).
ADDCOLUM	(adds one or more columns to an already existing table and stores it in another place on disk or tape).
ADDROW	(adds one or more rows to a table and stores it).

LOADDATA (loads a table into memory and selects one or two columns for plot purposes).

MINIMUM REQUIRED EQUIPMENT: 2200B-8K, Matrix ROM, tape and/or disk.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.188-10.7

TITLE: SORTCAT

AUTHOR: Tyler Olsen, Wang Laboratories, Inc., Lowell, Massachusetts

ABSTRACT

SORTCAT allows the Wang user to sequence listings of program or data file names residing on disk. The program may be loaded from either cassette or disk into a Wang WCS or 2200 system. (Program faster than SORTCATB.)

MINIMUM REQUIRED EQUIPMENT: 2200B-16K, OP-5, Keyboard, CRT and Disk. A printer is optional.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.190-10.9

TITLE: SORTCATB

AUTHOR: Tyler Olsen, Wang Laboratories, Inc., Lowell, Massachusetts

ABSTRACT:

SORTCATB allows the Wang user to sequence listings of program or data file names residing on disk. The program may be loaded from either cassette or disk into a Wang WCS or 2200 system.

MINIMUM REQUIRED EQUIPMENT: 2200B-12K, Keyboard, CRT and Disk. A printer is optional.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.191-10.9

TITLE: WANG 2200 VARIABLES AND SUBROUTINES CHECKOFF SHEET PRINTER

AUTHOR: Andres Loo, Vancouver, British Columbia

ABSTRACT:

This program prints out five different kinds of checkoff sheets for: numeric variables, numeric arrays, alpha variables, alpha arrays, and subroutines. These sheets can be used for program documentation and can be used in conjunction with the documentation forms in the System 2200 Programming Tools Manual.

MINIMUM REQUIRED EQUIPMENT: 2200A-1, 2215/2222, 2216/2217, and 2201/2221.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.114-8.4

Flowcharters (860.15)

TITLE: FLOWPROG

AUTHOR: Tyler Olsen, Wang Laboratories, Inc., Lowell, Massachusetts

ABSTRACT:

This program creates flowcharts from a BASIC program tape.

MINIMUM REQUIRED EQUIPMENT: 2200B (16K).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.140-9.4

Programmer Aids (860.20)

TITLE: POSX

AUTHOR: R.P. Gustalson, Cominco American Inc., Spokane, Washington

ABSTRACT:

This subroutine is used to locate matching strings and can be described as a variation of the POS function for the Wang 2200. Unlike POS(, the relational operator is limited to =, but the character sought is extended to be an alphanumeric variable. This subroutine is analagous to the INSTR function of the DEC PDP 11 minicomputers. Trailing blanks in either string will be ignored.

MINIMUM REQUIRED EQUIPMENT: 2200A.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.168-9.9

- -

TITLE: WANG 2200-2230 PROGRAM SCANNER

AUTHOR: Andres Loo, Vancouver, British Columbia

ABSTRACT:

This program scans for and prints specified hex codes or string of hex codes. This programming aid can be used to analyze, document, and prove programs.

MINIMUM REQUIRED EQUIPMENT: 2200B-1, 2215/2222, 2216/2217, and hardcopy device, if hardcopy desired.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.113-8.4

UNCLASSIFIED UTILITIES (890.00)

TITLE: BRAILLE 2 and BRAILLE LIST

AUTHORS: Michael S. Inoue, Oregon State University, Corvallis, Oregon and Wang Laboratories Programming Department, Lowell, Massachusetts

ABSTRACT:

BRAILLE 2 was originally written by Dr. Inoue and subsequently compressed and modified to operate on 2K of core by Wang Laboratories. The Wang programming department also developed the BRAILLE LIST program which allows the user to obtain a listing of his program statements in Braille.

BRAILLE 2 converts 2200B and 2202 into a Braille printer. After loading the program and depressing RUN, execute, an entry from the keyboard will produce Braille imprints that are legible by a visually-impaired individual. Capital alphabets, numerals, selected symbols, and spacing and return are included. The program is open-ended to allow additional Braille characters for a system with more than 4K bytes of memory. An attractive feature for a non-blind operator is an English printing below the Braille. The printing occurs from right to left so that Braille protrusion occurs left to right. The program automatically returns carriage when the line is filled.

See also March 1975 PROGRAMMER article "Training of the Visually Impaired," Vol. 9 No. 1, pp. 3 to 6.

Known Program Anomalies:

None. The selectric head should be set to 5 for maximum impression. It is recommended that two sheets of backing paper be used for optimum impressions, with selectric head set to 7.

MINIMUM REQUIRED EQUIPMENT: 2200B (4K)/2202.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.138-9.4

- -

TITLE: DISK CATALOG LOADER

AUTHOR: Giles Bilodeau, Arsenault, Garneau, Villeneuve et Associes, Montreal Canada.

ABSTRACT:

This program saves any disk catalogued area on a tape cassette. The required tape length is fixed by the program. The only manual input needed is "F" or "R", according to the catalog to be saved. The reloading of the catalog on disk is done automatically, the loader program having been recorded at the beginning of the data cassette. If one cassette is not sufficient to save the whole catalog, use T.126-8.7 program to complete after the "End of Tape" error.

MINIMUM REQUIRED EQUIPMENT: 4K-2200B and 2230-1.

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.134-8.10

- -

TITLE: PACK

AUTHOR: Kenneth R. Parker, Department of the Army, Washington, D.C.

ABSTRACT:

Program PACK eliminates all scratched catalogued files and unused space within a program file while rebuilding the index on the selected Disk (user has a choice between FIXED or REMOVABLE Disk). Active DATA files remain untouched in length even though the entire file may not be in use. Similar to Wang's MOVE verb which transfers all unscratched files from one Disk to the other, PACK works only on the desired Disk and thus requires ONLY ONE Disk.

Known Program Anomalies:

Depressing the RESET button during program execution may bring unpleasant expletives from co-workers who just lost their files.

MINIMUM REQUIRED EQUIPMENT: 2200/2230-1 (uses 6097 bytes).

PRICE: Available to SWAP members only - nominal charge.

SWAP LIBRARY NO.: T.137-8.10.

APPENDIX A: LIST OF VENDORS

Cogebec Information Inc.
2024 Chemin Saint Louis
Sillery, Quebec G1T 1P1
Canada

Creative Software Department
6415 Dean Hill Drive - Suite 8
Knoxville, Tennessee 37919

ECOM Associates/Computerized Structural Design
Engineering Computer Software
660 East Mason Street
Milwaukee, Wisconsin 53202

Felkins Consulting & Data Processing
P.O. Box 177
Jonesboro, Arkansas 72401

Joel Filler
113 Cherokee Road
Nashville, Tennessee 37205

Financial Statistics, Inc.
2001 Bryan Tower, Suite 320
Dallas, Texas 75201

Ignacy Fonberg
600 Orange Street
New Haven, Connecticut 06511

Geoconcepts, Inc.
Suite 214
6420 Hillcroft
Houston, Texas 72036

M.J. Hedemark
5480 Louisiana Drive
Concord, California 94521

Holguin-Clark, Inc.
2820 North Station
El Paso, Texas 77902

Jinkins Associates
114 Andover Circle
Oak Ridge, Tennessee 37830

Joseph W. Larimore & Associates
8630 Delmar Avenue, Suite 205
St. Louis, Missouri 63124

Lavan Systems, Inc.
P.Z. Weiss
4702 Farragut Road
Brooklyn, N.Y. 11203

Andres Loo
Software Consultant
2398 W. 34th Avenue
Vancouver, British Columbia
Canada, V6M 1G7

Master Software Systems
3687 Philsdale Avenue
Memphis, Tennessee 38111

Mr. Labe Mell
Moody Nursing Home
4115 Glenwood Rd.
Decatur, Georgia 30032

Niakwa Management Services Ltd.
575 St. Mary's Road
Winnipeg 8, Manitoba
Canada

Pendarvis Construction Corporation
P.O. Box 594
Marietta, Georgia 30061

Perrault & Perrault, Inc.
Consulting Engineers
1968 Dallas Drive
Baton Rouge, Louisiana 70806

Portland Cement Association
Old Orchard Road
Skokie, Illinois 60076

Process Equipment Design Corp.
P.O. Box 7150, Stewart Sta.
Richmond, Virginia 23221

Pulmonary Diagnostic Consultants
Prestonsburg Community College
Prestonsburg, Kentucky
Att: Ken Buick

RCB Services, Inc.
5700 Northwest Grand Blvd.
Oklahoma City, Oklahoma 73112

APPENDIX A: LIST OF VENDORS

REAL SHARE INC.
Pacific Trade Center
190 S. King Street, Suite 890
Honolulu, Hawaii 96813

Real-Time Engineering Systems, Ltd.
49 East Downer Place, Suite 601
Aurora, Illinois 60505

Rhys A. Sterling
S. 11825 Player Drive
Spokane, Washington 99203

Stern, Bernstein Associates
361 East 49th Street
New York, New York 10017

Structural Programming, Inc./Mitchell Systems
2 Militia Drive
Lexington, Massachusetts 02173

Technical Programs, Inc.
604 Park Drive
University Park
Boca Raton, Florida 33432

James W. Veenstra, MD
Department of Pathology
Clovis Memorial Hospital
Clovis, New Mexico

Viacomp Systems
8630 Delmar Boulevard
St. Louis, Missouri 63124

APPENDIX B: EQUIPMENT LIST

Model	Description
2200S-1	CPU including 4096 bytes of random access memory (RAM) & +3 I/O Ports.
2200T-1	CPU including 8192 bytes of random access memory (RAM) & +3 I/O Ports.
WCS/10	Computer System with 8192 bytes of random access memory (RAM)+, Integrated Keyboard, Tape Drive and CRT Display, Stand and 3 I/O ports.
WCS/20	Computer System with 8192 bytes of random access memory (RAM)+, 12" CRT & Keyboard Console, single diskette Drive/Desk, and 6 I/O Ports.
WCS/30	Computer System with 16,384 bytes of random access memory (RAM)+, 12" CRT & Keyboard Console, single diskette Drive/Desk, 5-Megabyte Disk Drive/Stand, 132-column Printer/Stand, and 6 I/O Ports.
2200VP	CPU including 16, 384 bytes of random access memory (RAM) + & 9 I/O Ports.
-	Additional 8192 bytes of random access memory (RAM)+ .

Compatible CPU									Model	Description
					WCS					
A	B	C	S	T	10	20	30	VP		
										CPU Options
	**	**		*					OP-1	Matrix Statements
	X	X		*	X	*	*	*	OP-2	General I/O Statements
X	X	*	*	*	*	*	*	*	OP-3	Character Edit Feature
	**	**		*		*	*	*	OP-5	Sort Statements
			X	X	X				OP-20	Up to 6 I/O Ports for 2200S,T, or WCS10 CPU
			X	X	X	X	X	*	OP-20A	Up to 9 I/O Ports for 2200S,T or WCS CPU
			X	*	X	*	*	*	OP-21	Matrix Statements
			X	*	X	*	*	*	OP-22	Advanced Programming & Matrix Statements
			X	*	X	*	*	*	OP-23	General I/O, Advanced Programming & Matrix Statements
			X	*	X	*	*	*	OP-24	Disk, General I/O, Advanced Programming Sort & Matrix Statements
X	X	X							2219	Extended Chassis for 2200A/B/C CPU
X	X	X	X	X				X	2290	CPU/Peripheral Stand
										Input Peripherals
	X	X		X		X	X	X	2203	Punched Tape Reader
X	X	X	X	X	X	X	X		2214	Mark Sense Card Reader
X	X	X	X	X	X	X	X	X	2234A	Hopper-Feed Punch Card Reader with Controller
X	X	X	X	X	X	X	X	X	2244A	Hopper-Feed Mark Sense/Punch Card Reader with Controller

APPENDIX B: EQUIPMENT LIST

X	X	X	X	X	X	X	X	X	2262-1	Digitizer 20" x 20" Tablet
X	X	X	X	X	X	X	X	X	2262-2	Digitizer 30" x 40" Tablet
X	X	X	X	X	X	X	X	X	2262-3	Digitizer 30" x 48" Tablet
X	X	X	X	X	X	X	X	X		Annunciator Option for Digitizer
										Output Peripherals
X	X	X	X	X	X	X	X	X	2201	Output Writer (156 column/15 CPS)
	X	X		X		X	X	X	2202	Plotting Output Writer (13 CPS)
	X	X		X		X	X	X	2212	Analog Flatbed Plotter (10" x 15")
X	X	X	X	X	X	X	X	X	2221W	Wang Line Printer (132 column/200 CPS)
X	X	X	X	X	X	X	X	X	2231W-1	Line Printer (112 column/120 CPS)
X	X	X	X	X	X	X	X	X	2231W-2	Wang Line Printer (132 column/120 CPS)
	X	X		X		X	X	X	2232A	Digital Flatbed Plotter (31" x 48")
	X	X		X		X	X	X	2232BM	Metric Digital Flatbed Plotter
X	X	X	X	X	X	X	X	X	2251	110 CPS Printer, 40 Characters/line
X	X	X	X	X	X	X	X	X	2261	High Speed Printer (132 column/330 CPS)
	X	X		X		X	X	X	2272-1	Wang Drum Plotter, 16" Wide, Single Pen
	X	X		X		X	X	X	2272-2	Wang Drum Plotter, 16" Wide, Triple Pens
	X	X		X		X	X	X		Wang Line Printer Controller
	X	X		X		X	X	X	2291	Digital Flatbed Plotter Stand
										Interface Controllers
X	X	X	X	X	X	X	X	X	2207A	I/O Interface Controller (RS-232-C) Selectable BPS
X	X	X	X	X	X	X	X	X	2227	Asynchronous Telecommunications Controller
	‡	‡	‡	X	‡	X	X	X	2227B	Buffered Asynchronous Communications Controller
X	X	X	X	X	X	X	X	X	2227N	Null Modem
	‡	‡	‡	X	‡	X	X	X	2228	Communications Controller
X	X	X	X	X	X	X	X	X	2250	I/O Interface Controller (8 bit parallel)
X	X	X	X	X	X	X	X	X	2252A	Scanning Input Interface Controller (BCD 1-10 digit parallel)
	‡	‡	‡	X	‡	X	X	X	2254	IEEE-488 Interface Controller
										Keyboard/Display Peripherals
X	X	X	X	X	X	X	X	X	2215	BASIC Keyword Keyboard
X	X	X	X	X	X	X	X	X	2216	CRT Executive Display
X	X	X	X	X	X	X	X	X	2216A	Upper/Lowercase CRT Display
X	X	X	X	X	X	X	X		2216/17	Combined CRT Executive Display/Single Tape Cassette Drive
X	X	X	X	X	X	X	X		2216A/17	Combined Upper/Lowercase CRT Display/ Single Tape Cassette Drive
X	X	X	X	X	*	X	X		2220	Console-9 in. CRT/Keyboard/Single Tape Cassette
X	X	X	X	X	X	X	X	X	OP-30	Upper/Lowercase for 2220 CRT
X	X	X	X	X	X	X	X	X	2222	Alpha-Numeric Typewriter Keyboard
X	X	X	X	X	X	X	X	X	2223	Alpha-Numeric/BASIC Keyword Keyboard

X	X	X	X	X		*	*		2226	12 in. CRT/Alpha-Numeric/BASIC Keyword Keyboard
X	X	X	X	X	X	X	X	X	OP-4	Audio Signal for 2216 & 2216A CRT
X	X	X	X	X	X	X	X	X	OP-31	Audio Signal for 2220 & OP-30 CRT
X	X	X	X	X	X	X	X	X	OP-32	Keyboard Clicker
X	X	X	X	X	X	X	X	X	OP-33	24x80 CRT
X	X	X	X	X	X	X	X	X	2292	Auxiliary Display w/25' cable
										Mass Storage Peripherals
	‡	‡	‡	X	‡	X	X	X	2209	Nine-Track Tape Drive
X	X	X	X	X	X	X	X		2217	Single Tape Cassette Drive
X	X	X	X	X	X	X	X		2218	Dual Tape Cassette Drive
	X	X	‡	X	‡	X	X	X	2224-2	Disk Multiplexer (2 Station)
	X	X	‡	X	‡	X	X	X	2224-3	Disk Multiplexer (3 Station)
	X	X	‡	X	‡	X	X	X	2224-4	Disk Multiplexer (4 Station)
	X	X	‡	X	‡	X	X	X	2230-1	Fixed/Removable Disk Drive 1,228,800 bytes
	X	X	‡	X	‡	X	X	X	2230-2	Fixed/Removable Disk Drive 2,457,600 bytes
	X	X	‡	X	‡	X	*	X	2230-3	Fixed/Removable Disk Drive 5,013,504 bytes
	X	X	‡	X	‡	X	X	X	2230MXA	Daisy-Chain Type Disk Multiplexer (1st CPU)
	X	X	‡	X	‡	X	X	X	2230MXB	Daisy-Chain Type Disk Multiplexer (2nd, 3rd, or 4th CPU)
	X	X	‡	X	‡	X	X	X	2260B-1/4	Fixed/Removable Disk Drive (2.5 meg)
	X	X	‡	X	‡	X	X	X	2260B-1/2	Fixed/Removable Disk Drive (5 meg)
	X	X	‡	X	‡	X	X	X	2260B	Fixed/Removable Disk Drive (10 meg)
	X	X	‡	X	‡	X	X	X	2260B-2	Dual 10 Meg Disk System (20 meg)
	X	X	‡	X	‡	*	*	X	2270-1	Single Removable Diskette Disk Drive 262,144 bytes
	X	X	‡	X	‡	X	X	X	2270-2	Dual Removable Diskette Disk Drive 524,288 bytes
	X	X	‡	X	‡	X	X	X	2270-3	Triple Removable Diskette Disk Drive 786,432 bytes

* A standard feature.

** OP-1 and OP-5 may not be ordered together.

+ RAM in Model 2200VP is expendable to 64K bytes. RAM in Models T and WCS 10/20/30 are expandable to a maximum 32K bytes. Ram in Model S is expandable to a maximum 16K bytes (32K with Option 24). Additional Memory Blocks are ordered in 8K byte increments over and above initial 8K bytes included with CPU (System S is upgraded to 8K before adding additional memory blocks).

‡ Certain Option(s) required.

Note:

Since the 2240, 2242, and 2243 Flexible Disk Drives are no longer available, the chart below gives a comparable substitution for them:

	Flexible Disk Drives	Diskette Drives
one drive	2242	2270-1
dual drive	2240	2270-2
triple drive	2243	2270-3

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