SUBROUTINES • PROGRAMS • USERS' PROGRAMS

FOR

RECOMP III

INDEX

AUTONETICS, DATA SYSTEMS DIVISION
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PART II

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RECOMP III PROGRAMS

and

RECOMP USERS' PROGRAMS

NUMERICAL LISTING OF SUBROUTINES

PROGRAMS AND USERS' PROGRAMS

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1	LOAD/START	To provide means for starting a program, for loading of command format, alphanumeric format, or relocatable format program tapes, for output of command format, for alphanumeric information on tapes, and for basic debugging aids.	L. H. Halprin	General Utility
2	RECOMP III FORTRAN	A one-pass arithmetic compiler using the FORTRAN II language. The output of this compiler consists of a machine language program.	R. A. Mailander, L. H. Halprin, and Programming Staff	Compiler
3	RAID (RECOMP AID IN DEBUGGING) FOR RECOMP III	Raid will furnish the RECOMP III programmer with a tool for isolating program errors with the help of the computer. This program will trace and print selected pertinent information about the logical flow of a RECOMP III program.	L. H. Halprin	Utility
4	RELOCATABLE TAPE GENERATOR	To provide a means for generating a relocatable tape of a program stored in memory and to provide a means of verifying this tape.	L. H. Halprin	General Utility
5	PROGRAM PRINTER	To list RECOMP III programs and data in a symbolic instruction format more nearly resembling programming sheet formats.	L. H. Halprin	Utility

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
6	START PROGRAM	To be able to transfer or halt and transfer to any desired memory location. This program is useful when the load/start program (R3P-1) is not in memory and only bootstrap tapes are being used.	L. H. Halprin	General Utility
7	BOOTSTRAP MEMORY DUMP	To provide a means of dumping a portion of memory in alphanumeric format (with checksum included) that is to be later entered by the computer's bootstrap procedure and to provide a means of verifying these tapes.	L. H. Halprin	General Utility
8	RECOMP II FORMAT TAPE INPUT	To allow the RECOMP III to read directly the 5-channel Baudot coded tapes that are prepared by the RECOMP II computer, the Versatape, or the RECOMP II off-line Flexowriter.	L. H. Halprin	Utility
9	TRANSFER TRACE	This program is intended as a debugging aid. It will execute each instruction in the program being debugged and will list the contents of each register including the location counter, command register and overflow alarm after each transfer instruction is executed.	L. H. Halprin	General Utility

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NO.	TITLE	DESCRIPTION	AUTHOR	LASSIFICATION
10	ZERO MEMORY	To set selected areas of memory to minus zero.	L. H. Halprin	General Utility
11	LOGIC DEMONSTRATION PACKAGE	1. To provide a convenient compilation of several game-type demonstrations with a single calling sequence. 2. To provide for a choice of several automatic demonstrations of the RECOMP III for use at computer demonstrations where an operator is not always present. 3. To provide a choice of several demonstrations of the RECOMP III that allows for active participation by any non-programmer/operator.	L. H. Halprin	Demonstration
12	BLACKJACK WITH THE RECOMP III	To demonstrate the RECOMP III's logical ability by playing the game of Blackjack against many players at once.	L. H. Halprin	Demonstration
13	NUMBER FACTORER (PRIME NUMBERS)	To demonstrate the logical capability of the RECOMP III by factoring a given number into its prime multiples. The number may be manually entered or generated automatically in a random pattern.	L. H. Halprin T. M. Hertz	Demonstration

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
14	ALPHANUMERIC VISUAL PUNCH PROGRAM	1. To demonstrate the computer's logical ability and the Facit punching equipment by punching visually readable characters on tape. 2. To enable a tape to be labeled with a visual pattern of punches. 3. To serve as an Alphanumeric Visual Punch output subroutine.	L. H. Halprin	Demonstration
15	ROMAN NUMERALIZER	To demonstrate the logical ability of the RECOMP III by converting binary numbers to Roman Numerals. Numbers may be manually entered, entered by a subroutine calling sequence, or automatically and randomly generated.	L. H. Halprin	Demonstration
16	RIP-3000	To provide the scientist and engineer with a programming tool which will enable him to utilize the RECOMP III effectively with a minimum of instruction.	G. Howell	Interpreter
17	RECOMP III SIMULATING A DESK CALCULATOR	To demonstrate the RECOMP III's ability to quickly and easily solve problems like those which would be run on a calculator.	L. Laubscher	Demonstration

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
18	PLOTTER PRINTER PROGRAM	To demonstrate the RECOMP III's ability to print letters and characters on the plotter.	L. Laubscher	Demonstration
19	D. M. DEMONSTRATION	To present an unique demonstration of the RECOMP III Flexowriter.	L. H. Halprin	Demonstration
20	RECOMP III SUBROUTINE PACKAGE (FLOATING POINT)	In order to assist programmers in using the RECOMP III as efficiently as possible, the RECOMP III Subroutine Package is provided. It consists of a tape containing the most frequently used subroutines placed in fixed locations in memory as well as several other features to facilitate programming.	L. Laubscher	Service
21	RIP-3000 QUICK CHECK	To provide a rapid means of determining whether or not RIP-3000 (R3P-16) is in the computer.	G. Howell	Service
22	MORTGAGE AMORTIZATION PROGRAM	To demonstrate the RECOMP III's ability to solve problems in practical economics.	L. Laubscher	Demonstration
23	NON-ZERO MEMORY DUMP	To selectively punch or print from designated areas of memory only those words which are not -0.	L. Laubscher	General Utility

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
24	NUCOM (Numerical Control Compiler)	1. To allow the RECOMP III to generate a control tape for the Milwaukee-Matic numerically controlled machine tool from a part description stated in a convenient symbolic language. 2. To allow the RECOMP III to generate a control tape for the Burgmaster numerically controlled machine tool from a part description stated in a convenient symbolic language. 3. To generate an operator's listing of the resulting control tape. 4. Provide a means of checking and correcting symbolic language tapes. 5. Provide a means of generating and/or reading of Friden coded tapes.	L. H. Halprin	Compiler
25	MEMORY AREA SEARCH	To provide a means for searching a selected area of memory for any reference to a second area of memory and listing locations and contents of all such references.	L. H. Halprin	Utility
26	BREAKPOINT PROGRAM	To aid in debugging a RECOMP III machine language program by simulating the "Breakpoint" or "Pre-set Stop" feature found on many computers.	L. H. Halprin	Utility

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
27	MEMORY BLOCK LISTER	To aid in listing or verifying large areas of memory by listing this area in command format in addressed blocks of 8 words each.	L. H. Halprin	Utility
28	QUADRATIC EQUATION SOLUTION	To find the roots of the general quadratic equation: $ax^2+bx+c=0$	G. Howell	Demonstration
29	SHADED SINE WAVE PLOT	To demonstrate the RECOMP III's ability to plot accurately over the entire range of the plotter at maximum speed.	G. Howell	Demonstration
30	NUCOM LINE TRACE PROGRAM	To aid in debugging logical flow of symbolic part programs written in NUCOM's symbolic language.	L. H. Halprin	NUCOM/Utility
31	NUCOM TAPE MEASURE PROGRAM	To give timing information necessary to optimize a part program generated for the Milwaukee-Matic numerically controlled machine tool.	L. H. Halprin	NUCOM/Utility

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
*32	NUCOM PLOTTER DEMONSTRATION	To demonstrate the potential usefulness of using the plotter in support of a NUCOM installation by having the plotter produce a 2-view working drawing for the part programs given in examples 1, 4, 5, and 6 of the NUCOM write-up. (R3P-24)	L. H. Halprin	Demonstration
*33	NUCOM SYMBOLIC TAPE CORRECTOR	To provide a means of correcting errors in a NUCOM symbolic language program tape by specifying the appropriate line number(s) and the type of correction (insertion, replacement, or deletion).	L. H. Halprin	NUCOM/Utility
*34	TAPE PARITY CHECKER	To check any width paper tape (5, 6, 7, or 8 channels) for proper parity. Either odd or even parity may be checked for.	L. H. Halprin	Utility
*35	RECOMP III TO STANDARD FLEXOWRITER PAPER TAPE CODE CONVERSION	To convert RECOMP III alphanumeric codes (either keyboard entry or paper tape entry) to its equivalent standard Flexowriter codes and punch these codes on 1" paper tape.	L. H. Halprin	Utility
*36	STANDARD FLEXOWRITER TO RECOMP III PAPER TAPE CODE CONVERSION	To convert a tape punched in standard Flexowriter codes to its equivalent RECOMP III codes and to either type or punch these converted codes.	L. H. Halprin	Utility

* These programs are contained in R3P-24 NUCOM program.

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
37	PERPETUAL CALENDAR	To demonstrate the logical ability of the RECOMP III.	F. D. Murray	Demonstration
38	FIRST ORDER POLY-NOMIAL LEAST SQUARES CURVE FIT	To compute the coefficients of the function y=ax+b which best describe a series of X and Y coordinates by the method of least squares and to print the original coordinates, a new Y coordinate for each X, and the variance between the original Y and the "best fit" Y.	F. D. Murray	General
39	RIP-3000 (FLOATING POINT MODIFIED)	To provide the scientist and engineer with a programming tool which will enable him to utilize the RECOMP III effectively with a minimum of instruction.	G. Howell	Interpreter
40	SCHEDULE CRITICAL PATH	Given the estimated times to complete individual tasks within a work schedule, to compute the total time required for each phase of the job and as a result, for the entire job. To also provide an indication of the latest time that individual tasks or phases may be completed without affecting the schedule. The Critical Path is the sequence of Events which determine the total time for the job.	F. D. Murray	General

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
41	COMMAND FORMAT CARD INPUT AND VERIFY PROGRAM	To read or verify decks of RECOMP III command format cards which have been punched in the format described by RECOMP III, Technical Bulletin No. 9. The cards may be punched manually off line or by the computer through the use of R3P-42.	L. Laubscher	Service
42	COMMAND FORMAT CARD OUTPUT PROGRAM	To produce RECOMP III command format cards punched from specified memory locations in the format described by RECOMP III, Technical Bulletin No. 9. These cards may then be read into the computer through the use of R3P-41.	L. Laubscher	Service
43	RECOMP III INTERNAL SORT	To demonstrate the ability of the RECOMP III to re-arrange alphabetic and/or numeric data in ascending sequence.	F. D. Murray	Demonstration
44	VARIABLE FORMAT FIXED POINT OUTPUT G FUNCTION FOR RIP	To provide a program for use with RIP-3000 to output a number in variable fixed point format using Standard Rip Commands.	L. Laubscher	Service

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
46	CARD INPUT/OUTPUT DEMONSTRATION PROGRAM	To demonstrate card input/output capabilities of the RECOMP III, either by punching characters input through the Flexowriter on cards, and/or by reading cards and typing the information contained on them.	L. Laubscher	Demonstration
47	CONVERSION OF BAUDOT CODE TO BINARY CODE	This program is to convert a RIP-3000 program sent over teletype (Baudot Code) for use in RECOMP III (Binary Code). This program will also convert a command format tape sent over teletype (Baudot Code) to a command format tape for use in RECOMP III (Binary Code).	M. VonEhrensmann	Utility
48	CONVERSION OF BINARY CODE TO BAUDOT CODE	This program is to allow numerical answers in either fixed or floating point to be converted from a RECOMP tape (Binary Code) to a teletype tape (Baudot Code).	M. VonEhrensmann	Utility
49	TRANSFORMER DESIGN	To demonstrate RECOMP III's ability to do transformer design computations. (Using RIP-3000.)	M. Von Ehrensmann	Demonstration

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
50	FILTER DESIGN	To demonstrate RECOMP III's ability to do filter design computations (using RIP-3000).	M. Von Ehrensmann	Demonstration
51	MEAN, VARIANCE, STANDARD ERRORS, AND CONFIDENCE INTERVALS	To compute statistics necessary for testing hypotheses about the universe of values from which the sample was drawn.	Young C. Lim	General
52	GENERAL MATRIX INVERSION AND SIMULTANEOUS LINEAR EQUATION SOLUTION	This program allows the operator to invert given matrices and to obtain solutions to given sets of simultaneous equations. It relieves the operator of the bookkeeping associated with the input and output of matrices. A flexible input procedure simplifies the entry of the matrices and a flexible output procedure allows the output of the result in an easily read fixed or floating point form.	L. Laubscher	General

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
53	BINARY TAPE LISTER	To obtain a command format listing with octal locations of any binary fixed location format tape. This is most helpful in obtaining a listing of a correction tape which may have a lot of non-sequential data on the tape. To obtain a command format listing with relocation data of any binary relocatable format tape. An option is available which will generate a relocation matrix tape while typing a listing.	L. H. Halprin	General
54	SIMPLE CORRELATION COEFFICIENTS	Given: a set of m variates, each having n values. Compute the simple correlation coefficients relative to each pair of variates.	Young J. Lee	General
55	SINE WAVE RESPONSE	To compute the frequency response of an optical system with incoherent light from a knowledge of the pupil function of the system.	Young J. Lee	
56	RECOMP III FORTRAN TRACE	To help the FORTRAN programmer find errors in his logic by typing the decimal contents of the accumulator after each store instruction (one per arithmetic statement executed), or by typing the decimal contents of any variable or constant storage location.	L. H. Halprin	

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
57	RECOMP III FORTRAN PLOTTER PROGRAM	To provide the RECOMP III FORTRAN compiler with the capability of plotting computed data directly on the Calcomp Plotter attached to the RECOMP III computer.	L. H. Halprin	
58	LEAST SQUARES POLYNOMIAL CURVE FIT	This program permits the fitting of polynomials of order 15 or less through a maximum of 617_{10} points in the X-Y plane by the method of least squares with weights.	C. Hsu	
59	ROOTS OF POLYNOMIALS	This program uses the "down hill" method to find the roots of a given polynomial of order 127 with real coefficients.	Catherine Hsu	
60	RECOMP III FORTRAN FLOATING POINT SIMULATOR AND TRACE	The RECOMP III FORTRAN User who does not have floating point hardware and wishes to obtain a trace of his object program may use this trace instead of R3S-020.1 to run the FORTRAN generated object program.	L. H. Halprin R. Mailander	

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
61	CARD TO TAPE CONVERSION FORTRAN SOURCE PROGRAM	To convert a FORTRAN source program from Hollerith Card format to punched tape.	W. Yackey,III	
62	TAPE TO CARD CONVERSION FORTRAN	To convert a FORTRAN source program from tape to Hollerwith card format.	W. Yackey, III	
63	FORTRAN SOURCE TAPE CORRECTOR	Automatically make corrections to a FORTRAN source tape when given a list of the desired changes or additions.	W. Yackey, III	

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1000	NUMBER OF SIGNIFICANT FIGURES IN RIP OUTPUT	This program allows the operator to specify, by typing only one character, the number of significant digits output by any RIP program. The program changes the checksum word in the RIP Quick-Check so that the operator can use the quick-check, no matter how many output digits are specified.	Alex S. Zachor Mithras, Inc.	Executive Routine
1001	RIP SUBROUTINE G 8	This RIP subroutine computes the compressibility z, the dimensionless entholpy $\frac{ZH}{RT}$, and the dimensionless entropy $\frac{ZS}{R}$, for a given pressure p and temperature T.	Alex S. Zachor Mithras, Inc.	Executive Routine
1002	PRESSURE DROP IN CIRCULAR PIPES	To calculate the pressure drop of flowing non-compressible fluids in circular pipes. Both turbulent and laminar flow are considered. The normal input data are fluid density, viscosity, pipe roughness, flow rate, and pipe inside diameter. Output is velocity and pressure drop. This program may be used for compressible fluids where the pressure drop in the section of pipe considered does not exceed 20% of the total pressure.	Robert L. Johnson The Dow Chemical Co. Midland, Michigan	General

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1002	(continued)	A variation has been programmed which calculates the flow rates and pressure drops for a series of velocities (1. --100. 0 ft. / sec.) at the given pipe size. Language Used: RIP-3000		
1003	SPRINT PROGRAM-LOADING ROUTINE	To provide a means to load verified instruction lists, numerical data, and alphanumeric information directly into the RECOMP III.	D. R. Petersen Executive &/Control Chemical Research Lab. The Dow Chemical Co. Midland, Mich.	
1004	RECOMP III PROGRAM FOR EQUILIBRIUM FLASH CALCULATIONS	This program will calculate the amount vaporized, compositions of both liquid and vapor phases, and the pounds of each component in each phase from a given feed composition, mol weights, and equilibrium K values.	R. L. Johnson General Dow Chemical Co.	
1005	DESIGN OF STRUCTURAL STEEL FLOOR SYSTEM	This program will design simple beams subjected to any combination of concentrated and uniform loading. The number designed will conform to the applicable provisions of the latest revision of the AISC specification for type and construction.	D. A. Fulty The Dow Chemical Co. Bldg. 47, Midland, Mich.	

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1006	VIBRATION ANALYSIS FOR STRUCTURAL FLOOR SYSTEMS	This program provides the structural engineer a means of eliminating harmonic resonance in floor systems due to vibrating machinery. The beam frequency, frequency safety factor, and the undamped dynamic deflection are calculated for individual beams in a floor system. The method used is presented in A. S. C. E., Structural Division, Journal No. ST7, Vol. 87, October, 1961 by L. R. Burkhardt.	D. A. Fulty The Dow Chemical Co. Bldg. 47 - Midland, Mich.	
1007	BINARY DISTILLATION	Given the compositions of feed, distillate and bottoms streams, relative volatility data, and feed quality to: 1. Find feed stage and total stages for a given reflux ratio. 2. Find the minimum stages and "minimum" reflux required for the separation and calculate the number of stages for a series of reflux ratios based on the "minimum". 3. Find the reflux required and optimum feed location for a given number of total stages.	Robert L. Johnson Engineering & Construction Dept. The Dow Chemical Co. Midland, Mich.	

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1008	COMPLEX ARITHMETIC (FLOATING POINT)	To perform the four basic arithmetic operations with complex numbers.	Dr. Herbert C. Kranzer Adelphi College	
1009	MOVING AVERAGE	To smooth time incremented data for plotting on X-Y coordinates.	L. V. Parent Trunkline Gas Co.	
1010	TAPE DUPLICATION AND VERIFY PROGRAM	To duplicate and verify tape with the RECOMP III.	F. E. Wilder Autonetics, Inertial Navigation T.E.	
1011	NUMERICAL COMPILER AND ASSORTER FOR PROGRAMMATIC-1	To facilitate programming for the Program-Matic Drilling Machine by implementing a floating zero, assorting coordinates in most logical order, and making a physical verification on the plotter for inspection purposes.	F. E. Wilder Autonetics, Inertial Navigation, T.E.	
1012	CONVERSION PROGRAM	(1) To modify tool code numbers and "Z" motion of a Milwaukee-Matic machine tape (Friden coded). (2) To make a listing (Friden coded) of all tool code numbers changed with difference in set length.	F. E. Wilder Autonetics, Inertial Navigation, T.E.	
1013	PLOTTER COORDINATE FINDER	To move the plotter pen to an X & Y coordinate given as a (3) place decimal multiplied by 1000 and at a binary point of 39.	F. E. Wilder Autonetics, Inertial Navigation, T. E.	

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1014	OUTPUT OF NUMBER IN FRIDEN CODE	To output a number to the punch in Friden code.	F. E. Wilder, Autonetics Inertial Navigation, T. E.	
1015	INPUT OF FRIDEN CODED NUMBER	To allow input from tape reader of Friden coded numbers.	F. E. Wilder, Autonetics Inertial Navigation, T. E.	
1016	BURGMASTER VERIFICATION PROGRAM	To facilitate the checking of a Burgmaster 2 BHT or 2 BHTL program by simulating the machine tool movements to the extent of plotting the coordinates in the machine language tape on the RECOMP Plotter.	F. E. Wilder, Autonetics Inertial Navigation, T. E.	

FOR INTERNAL USERS' ONLY

MAIL THIS REQUEST FOR PROGRAMS TO:
RECOMP CENTER, BLDG. 221 - LOBBY
ANAHEIM, OR CALL EXT. 2678

DATE ______________________

NAME ______________________

DEPT. ______________________

BLDG. ______________________

PROGRAM NO.(NOS.) ______________________

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