

RECOMP II  
INDEX OF  
SUBROUTINES . PROGRAMS . USERS' PROGRAMS  
AND

ADDENDUM DATED NOVEMBER 1, 1962

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## I N T R O D U C T I O N

The Program Index classification is based on SHARE classification. The Index itself contains programs developed by Autonetics and the Users, as well as subroutines. Each program and subroutine is listed in Part II under the relevant subject. In Part III, the programs are listed in numerical order starting with subroutines, followed by programs and Users' programs.

Part I      PROGRAM INDEX CLASSIFICATIONS

Part II    - PROGRAM AND SUBROUTINE LISTING  
            ACCORDING TO THE CLASSIFICATION

Part III - NUMERICAL LISTING OF PROGRAMS,  
            USERS' PROGRAMS AND SUBROUTINES

It is hoped that this arrangement will help all Users to utilize the available library to its best advantage.

P A R T I

INDEX OF SUBROUTINES  
RECOMP II PROGRAMS  
and  
RECOMP USERS' PROGRAMS

PROGRAM INDEX  
CLASSIFICATIONS

# P A R T I

## PROGRAM INDEX CLASSIFICATIONS

### Classification Codes

- A. Programmed Arithmetic
  - 1. Real
  - 2. Complex
  - 3. Decimal
  
- B. Elementary Functions
  - 1. Trigonometric
  - 2. Hyperbolic
  - 3. Exponential - Logarithmic
  - 4. Roots and Powers (of quantities, not polynomials)
  
- C. Polynomials and Special Functions
  - 1. Evaluation of Polynomials
  - 2. Roots of Polynomials
  - 3. Evaluation of Special Functions
  - 4. Simultaneous Non-Linear Algebraic Equations
  
- D. Operations on Functions and Solutions of Differential Equations
  - 1. Numerical Integration
  - 2. Numerical Solution of ordinary D. E.'s
  - 3. Numerical Solution of partial D. E.'s
  - 4. Numerical Differentiation
  
- E. Interpolation, Approximations and Smoothing
  - 1. Table look up and interpolation
  - 2. Curve fitting
  - 3. Smoothing
  
- F. Operations on Matrices, Vectors and Simultaneous Linear Equations
  - 1. Matrix Operations
  - 2. Eigenvalues and Eigenvectors
  - 3. Determinants
  - 4. Simultaneous Linear Equations

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G. Statistical Analysis and Probability

1. Data Reduction
2. Correlation and Regression Analysis
3. Sequential Analysis
4. Analysis of Variance
5. Random Number Generators

H. Operations Research and Linear Programming

I. Input

1. Fixed Point Decimal
2. Floating Point Decimal
3. Alphanumeric

J. Output

1. Fixed Point Decimal
2. Floating Point Decimal
3. Alphanumeric

K. Internal Information

1. Relocation
2. Program Preparation

L. Executive Routines

1. Assembly
2. Complex Compiler
3. Automatic Operations

M. Information Processing

1. Sorting
2. Conversion

N. Debugging Routines

1. Tracing, trapping
2. Dumps
3. Search
4. Breakpoint printing

- 
- O. Simulation Routines
  - P. Diagnostics (to check for malfunctions of computer or components)
  - Q. Service
    - 1. Check sum programs
    - 2. Clear memory
  - Z. All Others
    - 1. Engineering Applications
    - 2. Demonstration
    - 3. Experimental, Research
    - 4. Customer Support
    - 5. Contract

P A R T II

INDEX OF SUBROUTINES  
RECOMP II PROGRAMS  
and  
RECOMP USERS' PROGRAMS

PROGRAM LISTING ACCORDING TO  
THE PROGRAM CLASSIFICATION





P A R T I

PROGRAM LISTING ACCORDING TO

THE PROGRAM CLASSIFICATION

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A. PROGRAMMED ARITHMETIC

A.1 R. U. P. No. 1074 - Radial Error Subroutine (Relocatable)

A.2 R. P. No. 35 - Complex Arithmetic Abstraction.

B. ELEMENTARY FUNCTIONS

B.1 AN-012.1 - Sine-Cosine Subroutine (Floating Point)

AN-017.2 - Sine-Cosine Subroutine (Floating Point, Relocatable)

AN-018.1 - Arc-Tangent Subroutine

AN-019 - Arc-Tan Y/X, Floating Point

AN-020 - Arc Sin-Cos X, Floating Point

R. U. P. No. 1094 - Fast Sine-Cosine Subroutine (Floating Point)

B.2 AN-039 - Relocatable Hyperbolic Sine and/or Cosine

B.3 AN-037 - Logarithm X Subroutine, to Base 2, e, or 10 (Floating Point)

AN-044 - Exponential Subroutine ( $2^x$ ,  $e^x$ , or  $10^x$ ), Floating Point

C. POLYNOMIALS AND SPECIAL FUNCTIONS

C.1 AN-028 - Division of a Polynomial by a Quadratic in Floating Point

R. P. No. 6 - Evaluation of

$$A_0 + A_x X + A_y Y + A_z Z + A_t T + A_{xy} XY$$

$$A_{xz} XZ + A_{tt} T^2 + A_{yy} Y^2 + A_{zz} Z^2$$

R. P. No. 52 - Chebyshev Polynomial Economization

R. U. P. No. 1064 - Polynomial Ratio Program

## PROGRAM LISTING ACCORDING TO PROGRAM CLASSIFICATION

Program No. 2

C.2	AN-059	- Solution of Quadratic Equation
	R. P. No. 39	- Solution of a Cubic Equation
	R. U. P. No. 1039	- Roots of a Polynomial
C.3	AN-021	- Gaussian Normal Probability Function Ordinate Subroutine (Fixed Point)
	AN-022	- Gaussian Normal Probability Integral Subroutine (Fixed Point)
	AN-055	- Relocatable Bessel Function of the First Kind, Order Zero Subroutine (Floating Point)
	AN-056	- Relocatable Bessel Function of the First Kind, Order One Subroutine (Floating Point)
	AN-057	- Relocatable Gamma Function Subroutine (Floating Point)
	AN-058	- Relocatable Beta Function Subroutine
	AN-064	- Factorial Subroutine (Floating Point)
	R. P. No. 31	- Beta Function Program
	R. P. No. 34	- Gamma Function Program
	R. P. No. 36	- Bessel Function of the First Kind, Order Zero Program
	R. P. No. 37	- Bessel Function of the First Kind, Order One Program
	R. U. P. No. 1059	- Modified Bessel Function of the First Kind $I_0(x)$ , Floating Point (Relocatable)
	R. U. P. No. 1060	- Modified Bessel Function of the First Kind $I_1(x)$ , Floating Point (Relocatable)
	R. U. P. No. 1099	- RECOMP II Bessel Function of the Second Kind, Order Zero Subroutine (Floating Point, Relocatable)

PROGRAM LISTING ACCORDING TO PROGRAM CLASSIFICATION  
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- C.3 R. U. P. No. 1100 - RECOMP II Bessel Function of the Second Kind, Order One Subroutine (Floating Point, Relocatable)
- D. OPERATIONS ON FUNCTIONS AND SOLUTIONS OF DIFFERENTIAL EQUATIONS
- D.1 AN-005 - Runge-Kutta-Gill
- AN-006 - Trapezoidal Rule for Integration
- R. U. P. No. 1052 - Subroutine K (k)
- D.2 R. U. P. No. 1049 - Solution of System of Differential Equations
- R. U. P. No. 1102 - 125-R First Order System
- E. INTERPOLATION, APPROXIMATIONS AND SMOOTHING
- E.1 R. U. P. No. 1067 - Binary Table Lookup ("BTLU") Subroutine (Relocatable)
- R. U. P. No. 1076 - Maximum, Minimum, Medium (Sorter) Subroutine (Relocatable)
- E.2 R. P. No. 45 - Least Squares Polynomial Curve Fit
- R. P. No. 48 - Least Squares Curve Fit for the Exponential Logarithmic and Power Functions
- R. U. P. No. 1110 - Least Squares Polynomial Approximation Program No. 2
- F. OPERATIONS ON MATRICES, VECTORS AND SIMULTANEOUS LINEAR EQUATIONS
- F.1 AN-060 - Matrix Inverse Subroutine
- R. P. No. 12 - Matrix Inversion and Solution of Simultaneous Equations
- R. P. No. 18 - Matrix Abstraction
- R. P. No. 27 - Matrix Inversion (42 X 42)
- R. P. No. 33 - 42 X 42 Matrix Inverse Output and Simultaneous Equation Solver
- R. P. No. 40 - Symmetric Matrix Inversion

## PROGRAM LISTING ACCORDING TO PROGRAM CLASSIFICATION

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- |   |                   |  |
|---|-------------------|--|
| F.1   | R. U. P. No. 1017 | - Matrix Row and Column Addition   |
|   | R. U. P. No. 1056 | - Multiplication of Matrices (Relocatable)                                 |
|   | R. U. P. No. 1066 | - Floating Point Matrix Multiplying Subroutine                             |
|   | R. U. P. No. 1087 | - Block Printout of a Matrix, Floating Point Arithmetic (PRIMATRIX)        |
| F.2   | R. U. P. No. 1068 | - Program for Eigenvalues and Eigenvectors of A Real Symmetric Matrix      |
|   | R. U. P. No. 1069 | - AGC-109 Eigenvalues and Eigenvectors by Jacobi's Method (Floating Point) |
| F.3   | R. P. No. 17      | - Determinant Evaluation   |
| F.4   | AN-061            | - Solution of Simultaneous Overdetermined Linear Equations                 |
|   | AN-062            | - Normal Equations, Relocatable Subroutine                                 |
|   | R. U. P. No. 1043 | - Solution of Linear Simultaneous Equations                                |
|   | R. U. P. No. 1085 | - Solution of Simultaneous Linear Equations                                |
|   | R. U. P. No. 1101 | - Simultaneous Equations Program for the Modified RECOMP II                |
| <br>G. STATISTICAL ANALYSIS AND PROBABILITY |                   |  |
|   | R. P. No. 15      | - Life Curve Identification  |
|   | R. U. P. No. 1092 | - AGC-157 Probability  |
| G.1   | R. P. No. 44      | - Mean, Variance, Standard Errors, and Confidence Intervals                |
| G.2   | R. P. No. 30      | - Simple Correlation Coefficients  |
|   | R. P. No. 46      | - Multiple Linear Regression and Correlation Analysis                      |
|   | R. U. P. No. 1093 | - Stepwise Multiple Linear Regression and Correlation Analysis             |

## PROGRAM LISTING ACCORDING TO PROGRAM CLASSIFICATION

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- |  |                   |   |
|--|-------------------|---|
| G.3  | R. U. P. No. 1090 | - Sequential Analysis Program   |
| G.4  | R. P. No. 41      | - 2-Way Analysis of Variance  |
| G.5  | AN-067            | - Pseudo Random Numer Generator Subroutine  |
|  | R. U. P. No. 1029 | - Random Number Generator   |
| <b>H. OPERATIONS RESEARCH AND LINEAR PROGRAMMING</b> |                   |   |
|  | R. P. No. 8       | - Linear Programming, Simplex Method<br>(unrevised) ( $m \leq 20$ ; $n \leq 31$ ) |
|  | R. P. No. 23      | - Linear Programming Data Preparation   |
|  | R. P. No. 24      | - Linear Program, Revised Simplex Method  |
|  | R. P. No. 47      | - Transportation Problem  |
|  | R. P. No. 51      | - A Monte Carlo "Proof"   |
|  | R. U. P. No. 1086 | - Operations Research Subroutine Problem  |
| <b>I. INPUT</b>                                      |                   |   |
|  | AN-008            | - Fixed Point Octal Input   |
|  | R. P. No. 55.C1   | - Console Keyboard Data Input   |
|  | R. P. No. 55.C2   | - Angle Input Subroutine  |
|  | R. P. No. 55.C3   | - Two Address Input   |
|  | R. P. No. 55.C4   | - Single 5-Digit Address Input  |
|  | R. P. No. 55.C5   | - Octal Digit Input   |
|  | R. P. No. 55.C6   | - Four Digit Address Input  |
|  | R. P. No. 55.C7   | - Octal/Decimal Integer Input   |
|  | R. U. P. No. 1005 | - Number Input from Typewriter or<br>Control Console                              |
|  | R. U. P. No. 1079 | - Decimal Input Routine   |

PROGRAM LISTING ACCORDING TO PROGRAM CLASSIFICATION  
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## I. INPUT

- |     |                   |   |
|-----|-------------------|---|
| I.1 | AN-002            | - Decimal Typewriter Input (Fixed Point)        |
|     | R. P. No. 55.I3   | - Typewriter Integer Input (Fixed Point)        |
| I.2 | AN-007.1          | - Typewriter Floating Point Input Subroutine    |
|     | AN-031            | - Floating Decimal Input Subroutine             |
|     | R. P. No. 55.I1   | - Typewriter Data Input (Floating Point)        |
|     | R. P. No. 55.I2   | - Typewriter Numeric Input (Floating Point)     |
|     | R. U. P. No. 1046 | - Floating Point Input                          |
|     | R. U. P. No. 1055 | - Keyboard Floating Point Input Subroutine      |
|     | R. U. P. No. 1081 | - Floating Point Number Input from Console      |
| I.3 | AN-049            | - Alphabetic Input                              |
|     | R. P. No. 55.I4   | - Alphanumeric Word Input Subroutine            |
|     | R. P. No. 56.L    | - Alphanumeric Input                            |
|     | R. U. P. No. 1096 | - SAIL (Subroutine Alphanumeric Input Luebbert) |

## J. OUTPUT

- |  |                 |                              |
|--|-----------------|------------------------------|
|  | AN-009          | - Location Output Subroutine |
|  | R. P. No. 55.D1 | - Integer Display Subroutine |
|  | R. P. No. 55.P2 | - Visual Punch Data Output   |

## PROGRAM LISTING ACCORDING TO PROGRAM CLASSIFICATION

## J. OUTPUT

	R. P. No.	55.T3	- Integer Data Output
	R. P. No.	55.T4	- Fractional Data Output
	R. P. No.	55.T5	- Dollars and Cents Data Output
	R. P. No.	55.T6	- Address or Instruction Typing
	R. P. No.	55.T7	- Angle Output Subroutine
	R. U. P. No.	1106	- 141-R Pagation Routine
	R. U. P. No.	1109	- Output Subroutine
<b>J.1</b>		AN-003	- Relocatable Angle Output Subroutine
		AN-015.2	- Floating Point to Fixed Point Decimal Output Subroutine
		AN-016	- Decimal Output Subroutine (Fixed Point)
	R. U. P. No.	1084	- Fixed Point Output Subroutine
<b>J.2</b>		AN-014	- Floating Decimal Point Output Subroutine
	R. P. No.	55.D2	- Floating Point Display
	R. P. No.	55.T1	- Floating Point Data Output
	R. P. No.	55.T2	- Floating Point Utility Data Output
	R. U. P. No.	1003	- Floating Decimal Output
	R. U. P. No.	1018	- Floating Binary to Floating Decimal Output
	R. U. P. No.	1047	- A Relocatable Floating Binary to Floating Octal Output Subroutine
	R. U. P. No.	1048	- Relocatable, Fixed Point Mixed Decimal to Floating Binary, Conversion Subroutine
	R. U. P. No.	1088	- Block Printout, Floating Point Arithmetic

PROGRAM LISTING ACCORDING TO PROGRAM CLASSIFICATION  
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## J. OUTPUT

- J.3                    AN-051                    - Alphabetic Output
- R. P. No. 55.P1               - Alphanumeric Visual Punch Program
- R. P. No. 55.T8               - Alphanumeric Typing Output
- R. U. P. No. 1097              - IAOS (Luebbert Alphanumeric Output Subroutine)
- R. U. P. No. 1105              - 140-R Alphanumeric Printer

## K. INTERNAL INFORMATION

- K.1                    AN-004.1                    - Subroutine Relocation Utility Routine
- R. P. No. 56.H               - Master Tape Generator
- R. P. No. 56.J               - Relocation Routine
- R. U. P. No. 1000              - Relocator
- R. U. P. No. 1057              - AGC-031 Relocation Utility Program
- R. U. P. No. 1075              - Relocator, Revised AN-004.1
- R. U. P. No. 1078              - Relocation Matrix Maker
- R. U. P. No. 1082              - Tape Relocator
- R. U. P. No. 1089              - DTAMOVE, Fixed or Floating Point Mode
- R. U. P. No. 1103              - 126-R Relocatable Tape Punch
- K.2                    R. P. No. 50                 - Program Preparation Package No. 2
- R. P. No. 56.K               - Floating Point Data Loader
- R. P. No. 62                 - Simulated Index Register
- R. U. P. No. 1038              - Simulated Index Registers
- R. U. P. No. 1065              - Program to Prepare VERDAN Tape



PROGRAM LISTING ACCORDING TO PROGRAM CLASSIFICATION  
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## L. EXECUTIVE ROUTINES

- |     |                   |   |
|-----|-------------------|---|
| L.1 | R. P. No. 7       | - Autonetics Symbolic Assembly Program                    |
|     | R. P. No. 11      | - Autonetics Symbolic Pre-Assembly Program                |
|     | R. U. P. No. 1033 | - Signal Corps RECOMP Assembly Program<br>SCRAP II        |
|     | R. U. P. No. 1108 | - 100-R "APPLE" Input Routine                             |
| L.2 | R. U. P. No. 1034 | - Signal Corps Algebraic Translator, SALT                 |
|     | R. U. P. No. 1040 | - Symbolic to Numeric Assembly Program, SNAP              |
|     | R. U. P. No. 1091 | - Flexo Simulator for SNAP Input<br>(Aurora Revised)      |
| L.3 | R. P. No. 63      | - SCOPAC  |
|     | R. U. P. No. 1058 | - Expanded RECOMP Algebraic Formula Translator<br>RAFT IV |

## M. INFORMATION PROCESSING

- |     |                   |   |
|-----|-------------------|---|
| M.1 | AN-065            | - Sort Subroutine, Floating Point<br>(Relocatable)  |
|     | AN-068            | - Positive Fixed Point Sort Subroutine              |
| M.2 | AN-001            | - Float Subroutine (Relocatable)                    |
|     | AN-038            | - Angle Normalization Subroutine,<br>Floating Point |
|     | AN-063            | - Floating Point Pack and Unpack Subroutine         |
|     | AN-066            | - VERSATAPE Input Conversion Routine                |
|     | R. P. No. 32      | - LGP-30 Interpreter                                |
|     | R. U. P. No. 1004 | - AN to AFIT Key Word Conversion                    |

PROGRAM LISTING ACCORDING TO PROGRAM CLASSIFICATION  
-----

## M. INFORMATION PROCESSING

- M.2 R. U. P. No. 1053 - Subroutine INTF(X)  
 R. U. P. No. 1098 - AGC-209 Baudot to Decimal Conversion  
 (Floating or Fixed Point)

## N. DEBUGGING ROUTINES

- N.1 R. P. No. 56.N - RECOMP II Trace  
 N.2 R. P. No. 25 - Typewriter Memory Dump  
 R. P. No. 26 - Punch Memory Dump  
 R. P. No. 38 - Selective Memory Dump, Utility Program  
 R. P. No. 56.A - Memory Dump  
 R. P. No. 56.B - Alphanumeric Memory Dump Subroutine  
 R. P. No. 56.C - Basic Command Format Dump  
 R. P. No. 56.D - Basic Alphanumeric Format Dump  
 R. P. No. 56.I - Master Tape Duplicator  
 R. P. No. 56.G.1 - Program Printer  
 R. U. P. No. 1001 - Memory Dump  
 R. U. P. No. 1002 - Code Sheet Type-Out  
 R. U. P. No. 1045 - Dale Henry Memory Zero and Alpha Dump  
 R. U. P. No. 1051 - Relocatable Bit Dump  
 R. U. P. No. 1062 - Alpha Dump Routine, Relocatable  
 R. U. P. No. 1070 - AGC-84 Instruction Format Tape Punch  
 with Locations  
 AGC-84R Instruction Format Tape Punch  
 with Locations (Relocatable by RUG 1057)  
 R. U. P. No. 1077 - Command Typeout Routine  
 R. U. P. No. 1083 - AGC-148R Memory Print

## PROGRAM LISTING ACCORDING TO PROGRAM CLASSIFICATION

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N. DEBUGGING ROUTINES

- |     |                   |  |
|-----|-------------------|--|
| N.3 | AN-069            | - Binary Search Subroutine             |
|     | R. P. No. 56.E    | - RECOMP II Memory Search              |
|     | R. P. No. 56.F    | - Basic Data Search                    |
|     | R. U. P. No. 1042 | - Memory Search for Occupied Locations |
|     | R. U. P. No. 1080 | - Memory Search                        |
| N.4 | R. P. No. 56.G    | - RECOMP II Memory Search              |

## O. SIMULATION ROUTINES

## P. DIAGNOSTICS (To check for malfunctions of computer or components)

- |  |              |   |
|--|--------------|---|
|  | R. P. No. 9  | - Photoreader Diagnostic Test for Data Record Input Tapes |
|  | R. P. No. 49 | - Test Routines   |

## Q. SERVICE

- |  |                |                          |
|--|----------------|--------------------------|
|  | R. P. No. 21   | - Zero Memory Routine    |
|  | R. P. No. 56.M | - RECOMP II Memory Clear |

## Z. ALL OTHERS

- |     |                   |  |
|-----|-------------------|--|
| Z.1 | R. P. No. 22      | - Multi-Story Frame Analysis   |
|     | R. P. No. 28      | - Traverse Closure and Adjustment  |
|     | R. U. P. No. 1050 | - Operating Instructions for Moment Method Circuit Analysis on the RECOMP II |
|     | R. U. P. No. 1061 | - S-Plane Frequency Response   |
|     | R. U. P. No. 1071 | - Airborne Tellurometer - Trilateration Method                               |
|     | R. U. P. No. 1072 | - Short-Range Positioning Problem  |

PROGRAM LISTING ACCORDING TO PROGRAM CLASSIFICATION  
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## Z. ALL OTHERS

- |     |                   |   |
|-----|-------------------|---|
| Z.1 | R. U. P. No. 1073 | - Airborne Tellurometer Computations Line Crossing Method |
|     | R. U. P. No. 1104 | - 137-R Standard Atmosphere Routine                       |
| Z.2 | R. P. No. 1       | - Slide Rule  |
|     | R. P. No. 2       | - Prime Factors of Fixed Point Integer                    |
|     | R. P. No. 3       | - Coin Flip   |
|     | R. P. No. 5       | - High Speed Loop Demonstration                           |
|     | R. P. No. 10      | - Mortgage Amortization Routine                           |
|     | R. P. No. 13      | - Transformer Design Optimization                         |
|     | R. P. No. 14      | - Moments of Inertia of Right Circular Cylinder           |
|     | R. P. No. 16      | - Heat Transfer in Homogeneous Solids                     |
|     | R. P. No. 29      | - Golf Computations                                       |
|     | R. P. No. 42      | - Tic-Tac-Toe Game  |
|     | R. P. No. 43      | - Automated RECOMP Quiz                                   |
|     | R. P. No. 60      | - Meridional Optical Ray Trace                            |
|     | R. U. P. No. 1013 | - Radioactive Decay Demonstration for RECOMP II Computer  |
|     | R. U. P. No. 1015 | - NIM   |
|     | R. U. P. No. 1016 | - Student Grade Point Average Routine                     |
|     | R. U. P. No. 1032 | - Demonstration, Game of Craps (Dice)                     |
|     | R. U. P. No. 1035 | - Point Shift Game  |
|     | R. U. P. No. 1037 | - Punch Letter Program                                    |

**PROGRAM LISTING ACCORDING TO PROGRAM CLASSIFICATION**

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**Z. ALL OTHERS**

- |            |                          |   |
|------------|--------------------------|---|
| <b>Z.2</b> | <b>R. U. P. No. 1041</b> | <b>- Miles Per Gallon Cost Per Mile</b>       |
|            | <b>R. U. P. No. 1044</b> | <b>- Tic-Tac-Toe</b>                          |
|            | <b>R. U. P. No. 1107</b> | <b>- 102-P Calculation of P1</b>              |
| <b>Z.3</b> | <b>R. P. No. 57</b>      | <b>- Manpower Load Forecasting</b>            |
|            | <b>R. P. No. 58</b>      | <b>- Schedule of Critical Path</b>            |
|            | <b>R. P. No. 61</b>      | <b>- Critical Path Special Output Program</b> |
|            | <b>R. U. P. No. 1095</b> | <b>- Critical Path Data Check</b>             |



P A R T III

INDEX OF SUBROUTINES

RECOMP II PROGRAMS

and

RECOMP USERS' PROGRAMS

NUMERICAL LISTING OF SUBROUTINES

PROGRAMS AND USERS' PROGRAMS

I N D E X

of

SUBROUTINES

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- AN-001 RECOMP II, Float Subroutine (Relocatable)
- AN-002 RECOMP II, Decimal Typewriter Input (Fixed Point)
- AN-003 RECOMP II, Relocatable Angle Output Subroutine (Floating Point)
- AN-004 RECOMP II, Subroutine Relocation Utility Routine
- AN-005 RECOMP II, Subroutine; RUNGE - KUTTA - GILL Method for Solution of Simultaneous Ordinary Differential Equations
- AN-006 RECOMP II, Subroutine; Trapezoidal Rule (Equal Intervals) for Integration
- AN-007.1 RECOMP II, Typewriter Floating Point Input Subroutine, Variable Format
- AN-008 RECOMP II, Fixed Point Octal Input
- AN-009 RECOMP II, Location Output Subroutine
- AN-012 RECOMP II, Sine-Cosine Subroutine (Floating Point, Relocatable)
- AN-014 RECOMP II, Floating Decimal Point Output Subroutine
- AN-015.2 RECOMP II, Floating Point to Fixed Point Decimal Output Subroutine
- AN-016 RECOMP II, Decimal Output Subroutine (Fixed Point)
- AN-017.2 RECOMP II, Sine-Cosine Subroutine (Floating Point, Relocatable)
- AN-018.1 RECOMP II, Arc-Tangent Subroutine
- AN-019 RECOMP II, Subroutine; Arc Tan  $Y/X$ , Floating Point
- AN-020 RECOMP II, Subroutine; Arc Sin - Arc Cos  $X$ , Floating Point
- AN-021 RECOMP II, Gaussian Normal Probability Function Ordinate Subroutine (Fixed Point)



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- AN-022 RECOMP II, Gaussian Normal Probability Integral Subroutine  
(Floating Point)
  - AN-028 RECOMP II, Division of a Polynomial by a Quadratic in Floating  
Point
  - AN-031 RECOMP II, Floating Decimal Input Subroutine (Tape or Typewriter)
  - AN-037 RECOMP II, Logarithm X Subroutine, To Base 2, e, or 10 (Floating  
Point)
  - AN-038 RECOMP II, Angle Normalization Subroutine, Floating Point
  - AN-039 RECOMP II, Relocatable Hyperbolic Sine and/or Cosine Subroutine  
(Floating Point)
  - AN-044 RECOMP II, Exponential Subroutine, ( $2^X$ ,  $e^X$ , or  $10^X$ ), Floating  
Point
  - AN-049 RECOMP II, Subroutine Alphabetic Input
  - AN-051 RECOMP II, Subroutine Alphabetic Output
  - AN-055 RECOMP II, Relocatable Bessel Function of the First Kind, Order  
Zero Subroutine (Floating Point)
  - AN-056 RECOMP II, Relocatable Bessel Function of the First Kind, Order  
One Subroutine (Floating Point)
  - AN-057 RECOMP II, Relocatable Gamma Function Subroutine (Floating Point)
  - AN-058 RECOMP II, Relocatable Beta Function Subroutine (Floating Point)
  - AN-059 RECOMP II, Solution of Quadratic Equation
  - AN-060 RECOMP II, Solution of Simultaneous Linear Equations, Relocatable  
Subroutine
  - AN-061 RECOMP II, Solution of Simultaneous Overdetermined Linear  
Equations
  - AN-062 RECOMP II, Normal Equations, Relocatable Subroutine
  - AN-063 RECOMP II, Floating Point Pack and Unpack Subroutine
  - AN-064 RECOMP II, Factorial Subroutine (Floating Point)

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- AN-065 RECOMP II, Sort Subroutine, Floating Point (Relocatable)
- AN-066 VERSATAPE Input Conversion Routine
- AN-067 RECOMP II, Pseudo Random Number Generator Subroutine, Fixed Point
- AN-068 RECOMP II, Positive Fixed Point Sort Subroutine
- AN-069 RECOMP II, Binary Search Subroutine

**I N D E X**

**of**

**RECOMP II PROGRAMS**

**January 1962**



I N D E X  
of  
RECOMP II PROGRAMS  
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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1	SLIDE RULE	Provide an on-line, visual demo. of RECOMP's ability to simulate operations usually performed on a slide rule.	M. F. Berman Programming & Training Autonetics	Demonstration Routine
2	PRIME FACTORS OF FIXED POINT INTEGER	To demonstrate the typewriter as an input/output device on RECOMP II and engender a familiarity with the computers operation by encouraging the novice to do the manual entry of information.	R. L. Homer Programming & Training Autonetics	Demonstration Routine
3	COIN FLIP	To demonstrate RECOMP's ability to communicate with the User and to make simple decisions.	G. Howell Programming & Training Autonetics	Demonstration Routine
4	SELECTIVE MEMORY DUMP UTILITY PROGRAM	To dump all of available memory that is not minus zero.	M. F. Berman Programming & Training Autonetics	Service Routine
5	HIGH SPEED LOOP DEMONSTRATION	To demonstrate the difference in execution time between programming main memory and in the high speed loops.	M. F. Berman Programming & Training Autonetics	Demonstration Routine
6	EVALUATION OF	To demonstrate capabilities of RECOMP II to perform the following:	R. Engert Programming & Training Autonetics	Demonstration Routine
	$A_0 + A_x X + A_y Y + A_z Z + A_t T$ $+ A_{xy} XY + A_{xz} XZ + A_{tt} T^2 + A_{xx} X^2$ $+ A_{yy} Y^2 + A_{zz} Z^2$	<ol style="list-style-type: none"> <li>1. Provide an iterative solution of a multinomial for a variable argument.</li> <li>2. Present input and output data in a readable format with a minimum of machine manipulation on the operator's part.</li> </ol>		

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
7	AUTONETICS SYMBOLIC ASSEMBLY PROGRAM	This is an assembly program for RECOMP II. Its basic purpose is to translate symbolic coding into an absolute machine language code, which will be punched into paper tape. This program tape is then suitable for direct entry into, and execution by RECOMP II.	M. F. Berman and L. A. Raphael Programming & Training Autonetics	Executive and Control Routine
8	LINEAR PROGRAMMING, SIMPLEX METHOD (unrevised) ( $m \leq 20$ ; $n \leq 31$ )	To demonstrate the capacity of RECOMP II and to provide a tool for solution of systems not exceeding ( $m \leq 20$ ; $n \leq 31$ )	H. Judd and Z. Jelinski Programming & Training Autonetics	Demonstration Routine
9	PHOTOREADER DIAGNOSTIC TEST FOR DATA RECORD INPUT TAPES	To test the photoreader by reading pairs of identical records in the fill mode and comparing them	M. F. Berman and L. A. Raphael Programming & Training Autonetics	Diagnostic Routine
10	MORTGAGE AMORTIZATION ROUTINE	To obtain, after inputting principal, interest rate, and number of payments, the monthly payment of a loan and/or a complete amortization schedule including payment number, principal reduction, interest, and new principal balance of the loan.	R. Schlesinger Programming & Training Autonetics	Demonstration Routine
11	AUTONETICS SYMBOLIC PRE-ASSEMBLY PROGRAM	To provide an on-line method of preparing a symbolic ASAP assembly tape. Thereby eliminating the necessity of slower off-line methods (i.e., Flexowriter, etc.)	R. Schlesinger Programming & Training Autonetics	Executive and Control Routine

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
12	MATRIX INVERSION AND SOLUTION OF SIMULTANEOUS EQUATIONS	To invert a given matrix, or to solve simultaneous linear equations, in floating point. Input and output are included.	M. F. Berman Programming & Training Autonetics	General
13	TRANSFORMER DESIGN OPTIMIZATION	To determine the core area the number of turns needed in the design of a transformer.	L. A. Raphael Programming & Training Autonetics	Demonstration Routine
14	MOMENTS OF INERTIA OF RIGHT CIRCULAR CYLINDER	To compute the moments of inertia of a right circular cylinder.	L. A. Raphael Programming & Training Autonetics	Demonstration Routine
15	LIFE CURVE IDENTIFICATION	This program accepts as input failure test data and yields as output the appropriate distribution together with the expected failure rate.	H. L. Nelson Programming & Training Autonetics	General
16	HEAT TRANSFER IN HOMOGENEOUS SOLIDS	To determine the distribution of temperature in a solid at various times.	L. A. Raphael Programming & Training Autonetics	Demonstration Routine
17	DETERMINANT EVALUATION	To compute the value of the determinant of a given real, square, floating point matrix.	M. F. Berman Programming & Training	General
18	MATRIX ABSTRACTION	To provide a group of matrix subroutines that can be called from an input tape at execution time by pseudo-instructions using the trapping mode.	M. F. Berman Programming & Training Autonetics	General

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
19	PROGRAM PREPARATION PACKAGE NO. 1	To provide a tape containing the most frequently used subroutines.	G. Howell Programming and Training Autonetics	Service Routine
20	GENERAL SORT ROUTINE FIXED POINT	To allow a list of N fixed point numbers to be sorted in ascending order, regardless of their initial order (Max. N = 3760 <sub>10</sub> ).	R. Schlesinger Programming & Training Autonetics	General
21	ZERO MEMORY ROUTINE	To set all locations of memory to minus zero.	H. Nelson Programming & Training Autonetics	Service Routine
22	MULTI-STORY FRAME ANALYSIS	To compute the moments about each joint of a multi-story two-dimensional frame by Kani's method.	M. F. Berman Programming & Training Autonetics	General
23	LINEAR PROGRAMMING DATA PREPARATION	Accepts linear program data on the typewriter or on a flexowriter prepared tape and punches a tape acceptable to the Linear Programming Program (R.P. No. 24)	L. A. Raphael Programming & Training Autonetics	General
24	LINEAR PROGRAM, REVISED SIMPLEX METHOD	To find the solution to a given set of m equations in n unknowns which minimizes a given linear form.	L. A. Raphael Programming & Training Autonetics	General
25	TYPEWRITER MEMORY DUMP	To type parts or all of memory in command format.	G. Howell Programming & Training	Service Routine
26	PUNCH MEMORY DUMP	To punch parts or all of memory into paper tape in alphanumeric format.	G. Howell Programming & Training Autonetics	Service Routine



NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
27	MATRIX INVERSION (42 X 42)	To compute the inverse of a given matrix (symmetric or unsymmetric). (42 X 42)	G. E. Keerbs Programming & Training Autonetics	General
28	TRAVERSE CLOSURE AND ADJUSTMENT	To compute the error in closure of a measured traverse and distribute this error among the measurements by either compass rule, transit rule, or least squares adjustment.	G. E. Keerbs Programming & Training Autonetics	Demonstration Routine
29	GOLF COMPUTATIONS	To demonstrate RECOMP's ability to compute, evaluate, and process golf scores.	Stan Mitnick and J. Robert Davis Programming & Training Autonetics	Demonstration Routine
30	SIMPLE CORRELATION COEFFICIENTS	Given $m$ variates, to compute the correlation coefficient, $r_{ij}$ , between the $i^{\text{th}}$ and $j^{\text{th}}$ variate.	L. Raphael Programming & Training Autonetics	General
31	BETA FUNCTION PROGRAM	To compute the Beta function of two arguments $X$ and $Y$ which are input from the typewriter and print the result.	G. E. Keerbs Programming & Training Autonetics	General
32	IQP-30 INTERPRETER	To convert programs coded for the IGP-30 which are written in IGP interpretive language into RECOMP II machine code.	H. L. Nelson Programming & Training Autonetics	Executive and Control Routine

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
33	42 x 42 MATRIX INVERSE OUTPUT AND SIMULTANEOUS EQUATION SOLVER	To be used in conjunction with the Matrix Inverse Program (RECOMP Program No. 27) when it is desired to type the inverted matrix, punch the inverted matrix on tape for future use, or input a set of constants to be multiplied by the previously computed inverse and obtain a solution to a set of simultaneous equations.	G. E. Keerbs Programming & Training Autonetics	General
34	GAMMA FUNCTION PROGRAM	To compute the Gamma Function for a series of arguments input through the typewriter, photoreader, or console and print the results on the typewriter.	G. E. Keerbs Programming & Training Autonetics	General
35	COMPLEX ARITHMETIC ABSTRACTION	To provide a means of handling complex floating point numbers by means of a package of pseudo-instructions using the trapping mode.	M. F. Berman Programming & Training Autonetics	General
36	BESSEL FUNCTION OF THE FIRST KIND, ORDER ZERO PROGRAM	To compute the Bessel function ( $J_0$ ) of a series of arguments input through the typewriter, photoreader, or console and print the results on the typewriter.	G. E. Keerbs Programming & Training Autonetics	General
37	BESSEL FUNCTION OF THE FIRST KIND, ORDER ONE PROGRAM	To compute the Bessel function ( $J_1$ ) of a series of arguments input through the typewriter, photoreader, or console and print the results on the typewriter.	G. E. Keerbs Programming & Training Autonetics	General

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
38	SELECTIVE MEMORY DUMP UTILITY PROGRAM	To dump all available memory that is not equal to a given constant. (-00 00000 -00 00000)	H. L. Nelson Programming & Training Autonetics	Service Routine
39	SOLUTION OF A CUBIC EQUATION	To solve the cubic equation $Ax^3 + Bx^2 + Cx + D = 0$ where the coefficients A, B, C and D are real.	G. E. Keerbs Programming & Training Autonetics	General
40	SYMMETRIC MATRIX INVERSION	To compute the inverse of a given symmetric matrix. The order of the matrix must be less than or equal to 60.	L. A. Raphael Programming & Training Autonetics	General
41	2-WAY ANALYSIS OF VARIANCE	To compute the sums of squares and the F values for a 2-way analysis of variance.	G. Howell Programming & Training Autonetics	General
42	TIC TAC TOE GAME	To demonstrate RECOMP's ability to communicate with the user and to make simple decisions for playing a game of tic-tac-toe.	H. L. Nelson Programming & Training Autonetics	Demonstration Routine
43	AUTOMATED RECOMP QUIZ	To demonstrate RECOMP's ability to give timed programming examinations.	M. F. Berman Programming & Training Autonetics	Demonstration Routine

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
44	MEAN, VARIANCE, STANDARD ERRORS, AND CONFIDENCE INTERVALS	To reduce raw unordered data to sample mean, variance, standard deviation, sum of squares, standard error of mean, deviation, unbiased estimate of universe variance, and unbiased estimate of universe standard deviation. Confidence regions about the universe mean and standard deviation are computed.	R. S. Lynn Programming & Training Autonetics	General
45	MULTIPLE LINEAR REGRESSION AND CORRELATION ANALYSIS	Given $m$ variates, this program computes the correlation coefficients between each pair of variates, then computes the linear regression coefficients predicting the $i$ th variate in terms of the other $m-1$ variates.	L. A. Raphael Programming & Training Autonetics	General
46	MULTIPLE LINEAR REGRESSION AND CORRELATION ANALYSIS	Given $m$ variates, this program computes the correlation coefficients between each pair of variates, then computes the linear regression coefficients predicting the $i$ th variate in terms of the other $m-1$ variates.	L. A. Raphael Programming & Training Autonetics	General
47	TRANSPORTATION PROBLEM	To determine the least costly manner of distributing a commodity produced at several sources to a number of places of consumption.	G. E. Keerbs Programming & Training Autonetics	General

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
48	LEAST SQUARES CURVE FIT FOR THE EXPONENTIAL LOGARITHMIC AND POWER FUNCTIONS	To compute the coefficients of an exponential, logarithmic, or power function which best describe a series of X and Y.	G. E. Keerbs Programming & Training Autonetics	General
49	RECOMP II TEST ROUTINES	To assist users in finding machine errors and to provide a fast general test of computer functioning.	L. S. Laubscher Programming & Training Autonetics	Diagnostic Routine
50	PROGRAM PREPARATION PACKAGE NO. 2	<ol style="list-style-type: none"> <li>To provide a tape containing the most frequently used subroutines, with provision for simplified calling sequences.</li> <li>To enable the programmer to insert decimal constants, both in fixed and in floating point form; to insert alphabetic and octal information; to prepare a tape and a listing of his program; and to type out, in decimal, partial results or other data.</li> </ol>	G. Howell Programming & Training Autonetics	Service Routine
51	A MONTE CARLO "PROOF"	To demonstrate RECOMP II's ability to handle problems using Monte Carlo techniques.	G. Howell Programming & Training Autonetics	Demonstration Routine
52	CHEBYSHEV POLYNOMIAL ECONOMIZATION	To approximate a polynomial in (-1,1) by a polynomial of lower order and indicate the error introduced in so doing.	G. Howell Programming & Training Autonetics	General

## INDEX OF RECOMP II PROGRAMS

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
55	INPUT/OUTPUT SUBROUTINES	To provide a convenient grouping of independent, relocatable, special purpose subroutines that perform input or output functions for the RECOMP II computer.	L. Halprin Programming & Training Autonetics	Subroutines

TABLE OF CONTENTS:

55.C1	CONSOLE KEYBOARD DATA INPUT (FLOATING POINT)	To be used for console keyboard entry of a mixed decimal number. The display tubes will display the number as entered. (0077 words)
55.C2	ANGLE INPUT SUBROUTINE (FLOATING POINT)	To provide a means of entering from the console keyboard an angle of the form XXX YY.YYYY where X is degrees and Y is minutes. (0177 words)
55.C3	TWO ADDRESS INPUT	For entering two 4-digit octal addresses through the console keyboard at one time such as for a limit or boundary entry. Addresses are displayed while entering. (0037 words)
55.C4	SINGLE 5-DIGIT ADDRESS INPUT	For input from the console keyboard of a 5-digit address (4 octal, 1 binary digit). Address is displayed while it is being entered. (0047 words)
55.C5	OCTAL DIGIT INPUT	Used to input from the console keyboard a 1 to 7 digit octal number. Number is displayed during entry. (0037 words)
55.C6	FOUR DIGIT ADDRESS INPUT	For entering a 4-digit octal address from the console keyboard. The address is displayed as entered. (0037 words)

## INDEX OF RECOMP II PROGRAMS

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
TABLE OF CONTENTS (CONT'D)			L. Halprin Programming & Training Autonetics	Subroutines
55.C7	OCTAL/DECIMAL INTEGER INPUT	Used for entry of either an octal or a decimal integer. Output is in fixed point and the display tubes will display the number as entered. (0057 words)		
55.D	<u>DISPLAY TUBE OUTPUT:</u>			
55.D1	INTEGER DISPLAY SUBROUTINES	To convert a positive binary integer at 39 to binary coded decimal in a form suitable for displaying. (0017 words)		
55.D2	FLOATING POINT DISPLAY	To display (or type) a floating point number in either mixed number format, integer and decimal exponent format, or fraction and decimal exponent. (0177 words)		
55.D3	OCTAL DISPLAY	To convert an octal number of 8 to 13 digits to an equivalent BCD format and to display (or type) this number. (0037 words)		
55.I	<u>TYPEWRITER INPUT:</u>			
55.I.	TYPEWRITER DATA INPUT (FLOATING POINT)	Used where maximum error checking is necessary such as for demonstration, etc. (0167 words)		

## INDEX OF RECOMP II PROGRAMS

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
<b>TABLE OF CONTENTS: (CONT'D)</b>			L. Halprin Programming & Training Autonetics	Subroutines
55.I2	<b>TYPEWRITER NUMERIC INPUT (FLOATING POINT)</b>	A fast, short, floating point data input for entering positive integers. (0047 words)		
55.I3	<b>TYPEWRITER INTEGER INPUT (FIXED)</b>	A fast, short, fixed point data input for entering positive or negative integers. (0067 words)		
55.I4	<b>ALPHANUMERIC WORD INPUT SUBROUTINE</b>	For entry of words up to seven characters long. (Used to input answers to questions, descriptions, etc.) (0027 words)		
55.P	<b><u>PUNCH OUTPUT:</u></b>			
55.P1	<b>ALPHANUMERIC VISUAL PUNCH PROGRAM</b>	To provide a means of punching alphanumeric information on paper tape in a visual readable format. (0137 words)		
55.P2	<b>VISUAL PUNCH DATA OUTPUT</b>	To convert a binary integer at 39 to decimal and then punch this number in a visual readable format on paper tape. (0037 words)		
55.T	<b><u>TYPEWRITER OUTPUT:</u></b>			
55.T1	<b>FLOATING POINT DATA OUTPUT</b>	To convert floating point numbers to decimal and type as a mixed number. Restricted to 8 digit integers and 8 digit fractions. (0067 words)		



## INDEX OF RECOMP II PROGRAM

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
TABLE OF CONTENTS:(CONT'D)			L. Halprin Programming & Training Autonetics	Subroutines
55.T2	FLOATING POINT UTILITY DATA OUTPUT	To type a floating point number in the form -.XXXXXXXX+DD where X is a positive or nega- tive decimal fraction and D is a positive or negative power of 10. (0067 words)		
55.T3	INTEGER DATA OUTPUT	To convert a binary integer at 39 to up to 8 digits and type result. (0027 words)		
55.T4	FRACTIONAL DATA OUTPUT	To convert a binary fraction at 0 to up to 8 digits and type result. (0017 words)		
55.T5	DOLLARS AND CENTS DATA OUTPUT	To convert a binary integer at 39 that repre- sents pennies into dollars and cents and type the output in the format \$XXX.XX.(0037 words)		
55.T6	ADDRESS OR INSTRUCTION TYPING	To provide for typing left or right instructions in the format xx.xxxx.x or left or right addresses in the format xxx.x (0017 words)		
55.T7	ANGLE OUTPUT SUBROUTINE	To convert an angle from floating point radians to degrees and type the answer in the form XX XX.XXX (0117 words)		
55.T8	ALPHANUMERIC TYPING OUTPUT	To provide a convenient means of typing large amounts of alphanumeric data, headings, instructions, etc. (0017 words)		

## INDEX OF RECOMP II PROGRAM

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
56	RECOMP II UTILITY PROGRAMS	This package makes available in one convenient grouping of tapes a series of basic utility programs that might prove useful in assembly of programs, debugging of programs, and documentation of programs or subroutines.	L. Halprin Programming & Training Autonetics	Utility Routines

TABLE OF CONTENTS:

56.A	MEMORY DUMP	To punch or type the contents of any selected portions of memory. Typing is in command format, punching is in alphanumeric format. (0167 words)
56.B	ALPHANUMERIC MEMORY DUMP SUBROUTINE	To punch an area of memory on tape in alphanumeric format complete with location codes and a display of the location being punched. (0017 words)
56.C	BASIC COMMAND FORMAT DUMP	To provide a means of punching an area of memory on tape in command format (no location codes given) for off-line listing or data moving purposes. (0016 words)
56.D	BASIC ALPHA- NUMERIC FORMAT DUMP	To provide a means of punching an area of memory on tape in alphanumeric format (no location codes given) for data moving purposes. (0017 words)
56.E	MEMORY AREA SEARCH	To search all data between specified memory locations for any instructions referring to a specified area of memory and to list the address as well as the contents of each location found. (0127 words)

## INDEX OF RECOMP II PROGRAMS

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
TABLE OF CONTENTS: (CONT'D)			L. Halprin Programming & Training Autonetics	Utility Routines
56.F	BASIC DATA SEARCH	To provide a short, fast program capable of searching areas of memory for a given word, part of a word, address, or instruction. (0017 words)		
56.G.1	PROGRAM PRINTER	To type a stored program in a form more nearly resembling programming sheet format. (0377 words)		
<del>56.H</del> R.P-72	MASTER TAPE GENERATOR	To prepare a master tape of a program in a relocatable format complete with modifier code matrix and a relocation program. (0373 words)		
<del>56.I</del> R.P.73	MASTER TAPE DUPLICATOR	To punch duplicate copies of a relocatable library (master) tapes. (0043 words)		
<del>56.J</del> AN-076	RELOCATION ROUTINE	To punch a tape of a relocatable library program with a specified origin. (0037 words)		
56.K.1	FLOATING POINT DATA LOADER	To enter floating point constants or data into memory from the console keyboard in decimal format. The number is displayed as entered. (0117 words)		
56.L	ALPHANUMERIC INPUT	To allow for convenient entry of a large amount of alphanumeric header or label data into a program. Format is compatible with the alphanumeric output command or the alphanumeric output program 55.T8. (0157 words)		

## INDEX OF RECOMP II PROGRAM

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
<b>TABLE OF CONTENTS: (CONT'D)</b>				
			L. Halprin Programming & Training Autonetics	Utility Routines
56.M	MEMORY CLEAR	To clear memory and loops to - zero with the exception of location 0000 which is set to SAX 7777.0, HTR 0000.1 (0011 words)		
56.N.1	RECOMP II TRACE	To trace and print information about all instructions within selected limits. Floating point data is printed in decimal.		
57	MANPOWER LOAD FORECAST	Given a learning curve represented as an ogive pattern, the program will compute manpower loading for any number of units with a maximum of 2,542 units.	J. C. Smith Programming & Training Autonetics	General
58	SCHEDULE OF CRITICAL PATH	The program computes the shortest possible schedule for completing any given job consisting of many diversified tasks and taking varying amount of times to complete. This is especially useful when a deadline has to be met and contract money is involved.	H. L. Judd & G. Howell Programming & Training Autonetics	General
60	MERIDIONAL OPTICAL RAY TRACE	The meridional ray trace serves the useful purpose of tracing a ray through a system of lenses as applied to common problems encountered in optical design.	J. C. Smith Programming & Training Autonetics	Demonstration Routine

## INDEX OF RECOMP II PROGRAMS

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
61	CRITICAL PATH SPECIAL OUTPUT PROGRAM	This program provides additional or alternate output formats for input data and results computed by RECOMP Program No. 58, SCHEDULE OF CRITICAL PATH.	H. Judd Programming & Training Autonetics	General
62	SIMULATED INDEX REGISTER	This program provides a simulated index register in order to facilitate ease of address modification.	Programming Staff Industrial Products Autonetics	General
63	SCOPAC	SCOPAC is a compiling and assembling program which accepts the input of a number of types of statements and/or symbolic coding and generates an optimized machine language program (object program) in <u>one pass</u> .	H. D. Goddard Programming & Training Autonetics and T. J. Tobias U. S. Army Signal Engineering Agency, Arlington Hall Station Arlington, Virginia	Executive and Control



I N D E X

of

RECOMP USERS' PROGRAMS

January 1962

I N D E X

of

RECOMP USERS' PROGRAMS  
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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1000	AFIT 015 RELOCATOR	The RELOCATOR routine is designed to read the routine from a previously prepared tape into the new area beginning at IA, to distinguish between fixed and relative operand addresses, and to make the necessary changes.	Capt. Richard Wright-Patterson AFB Ohio	Service Routine
1001	AFIT 016 MEMORY DUMP	To punch or type in command form with locations, or to punch in alphanumeric form the contents of N consecutive memory locations, beginning at IA (initial address) and ending at FA (final address). $1 < N \leq 4080$ .	Capt. Richard Wright-Patterson AFB Ohio	Service Routine
1002	AFIT 017 CODE SHEET TYPE-OUT	This is a utility routine intended to type out the contents of a consecutive block of main memory locations starting at initial address IA and ending at final address FA, in the form commonly used for RECOMP coding sheets.	Prof. Harling Wright-Patterson AFB Ohio	Service Routine
1003	AFIT 019 FLOATING DECIMAL OUTPUT	This is a subroutine which converts RECOMP's floating binary numbers into floating decimal numbers for output on the typewriter. It is provided with a number of entries, so that it can deal with a single number, with a series of numbers to be typed in column, a series to be typed in tabular form, or with a fixed point number.	Prof. Harling Wright-Patterson AFB Ohio	Subroutine



NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1004	AFIT 020 AN to AFIT KEY WORD CONVERSION	Given an "AN Master Tape", to produce from it an "AFIT Relocatable Tape" of the same routine.	Prof. Harling Wright-Patterson AFB Ohio	Service Routine
1005	AFIT 021 NUMBER INPUT FROM TYPE- WRITER OR CONTROL CONSOLE	To input a number to any location in memory, either in Fixed or Floating Form. Trapping mode commands -64 W.0; -65 W.0 and -66 W.0 are used, where W is a four digit octal address at which the number is to be stored.	Prof. Harling Wright-Patterson AFB Ohio	Subroutine
1006	FM 003 RECOMP II MEMORY DUMP	To punch or type the contents of any selected portions of memory. Typing is in command format, punching is in alphanumeric format.	L. Halprin Fort Monmouth New Jersey	This program is not operative with the modified computer.
1007	FM 006 RECOMP II CONSOLE KEYBOARD DATA INPUT SUB- ROUTINE (F.P.)	To be used as a subroutine for console keyboard entry of a mixed decimal number. The output will be in floating point and the display tubes will display the number as entered.	L. Halprin Fort Monmouth New Jersey	Subroutine
1008	FM 004 RECOMP II, MEMORY SEARCH	To search selected memory areas for locations of instructions referring to a particular address or for data locations.	L. Halprin Fort Monmouth New Jersey	Service Routine

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1009	FM 012 RECOMP II TRACE	The program is designed to trace and print information about all instructions within selected limits; i.e., the printing of de-bugged running portions (such as subroutines) may be ignored. The printing includes instructions performed in the L and V loops if and only if they correspond to instructions within the selected limits. The primary objective is to be able to start tracing a program and continue with no further requirement imposed on the operator by the trace program.	R. Heistand Fort Monmouth New Jersey	Service Routine
1010	FM 010 RECOMP II ALPHANUMERIC REPOSITIONAL PROGRAM	To punch a tape in alphanumeric format of a relocatable library subroutine with a specified origin. Note: This program is included in every library subroutine master tape that was prepared by the "master tape generator" program FM 009.	L. Halprin Fort Monmouth New Jersey	This program is not operative with the modified computer.
1011	FM 009 RECOMP II MASTER RELOCATABLE TAPE GENERATOR	To prepare a master tape of a program in a relocatable format complete with modifier codes and a relocating program.	L. Halprin Fort Monmouth New Jersey	This program is not operative with the modified computer.
1012	FM 011 RECOMP II MASTER TAPE DUPLICATOR	To punch duplicate copies of a relocatable library subroutine (master) tape.	L. Halprin Fort Monmouth New Jersey	This program is not operative with the modified computer.

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1013	FM 151 RADIOACTIVE DECAY DEMONSTRATION FOR RECOMP II COMPUTER	After entering the time of the atomic explosion that caused the present radioactivity level, the computer will give upon command; (1) a report of all entered positions as to its location, its measured intensity and the time of measurement. (2) A report of any or all entered positions at any given time as to the remaining radiation level and if it is dangerous or not, and (3) The time when the radiation level will be safe if it is not already safe.	L. Halprin Fort Monmouth New Jersey	This program is not operative with the modified computer.
1014	SCRAP I	An Assembly Program which will convert symbolic coding into machine language coding.	T. Tobias U. S. Army Signal Engineering Agency	Executive and Control
1015	AFIT 052 - NIM	A demonstration program designed to play a game of NIM with the computer	J. Alderson AFIT	Demonstration Routine
1016	AFIT 051 STUDENT GRADE POINT AVERAGE ROUTINE	A demonstration program designed to compute student grade point average.	Professor Harling and students AFIT	Demonstration and Training
1017	AFIT 023 MATRIX ROW AND COLUMN ADDITION	This program will compute matrix 1, row and column addition.	Lt. J. F. Heye AFIT	General Topics
1018	AFIT 019 FLOATING BINARY TO FLOATING DECIMAL OUTPUT	A subroutine converting floating binary numbers to plus and floating decimal output.	Professor Harling AFIT	Subroutine

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1019	AFIT 022 SOLUTION OF A CUBIC EQUATION	This program will compute real and complex roots.	Capt. Martin Berkovitz AFIT	General Topics
1020	RECOMP II PROGRAM PRINTER	To type a stored program in a form more nearly resembling coding sheets.	L. Halprin Ft. Monmouth	Service Routine
1021	TWO ADDRESS INPUT SUBROUTINE	This subroutine allows for entering two addresses.	L. Halprin Ft. Monmouth	Subroutine
1022	SINGLE 5-DIGIT ADDRESS INPUT SUBROUTINE	This subroutine allows for entering a single 5-digit address input subroutine.	L. Halprin Ft. Monmouth	Subroutine
1023	OCTAL DIGIT INPUT SUBROUTINE	This subroutine allows for entering octal numbers.	L. Halprin Ft. Monmouth	Subroutine
1024	ADDRESS OR INSTRUCTION TYPING SUBROUTINE	This subroutine allows for entering address or instruction.	L. Halprin Ft. Monmouth	Subroutine
1025	INTEGER DATA OUTPUT SUBROUTINE	This subroutine allows for output of integers.	L. Halprin Ft. Monmouth	Subroutine
1026	RECOMP II ALPHA-NUMERIC MEMORY DUMP SUBROUTINE	This routine allows for dumping memory in alphanumeric format.	L. Halprin Ft. Monmouth	Subroutine
1027	DOLLAR AND CENTS DATA OUTPUT SUBROUTINE	This subroutine allows for type-out of numerical data as dollars and cents.	L. Halprin Ft. Monmouth	Subroutine

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1028	FRACTIONAL DATA OUTPUT SUBROUTINE	This subroutine allows for output of fractions.	L. Halprin Ft. Monmouth	Subroutine
1029	RANDOM NUMBER GENERATOR	This routine provides two options for generating of random numbers.	H. R. Knitter Ft. Monmouth	General
1030	FLOATING POINT DATA OUTPUT SUBROUTINE	This subroutine will output numbers as floating point numbers.	H. R. Knitter Ft. Monmouth	Subroutine
1031	RECOMP II MEMORY CLEAR	This subroutine will clear specified points of memory.	H. R. Knitter Ft. Monmouth	Service Routine
1032	DEMONSTRATION PROGRAM - GAME OF CRAPS (DICE)	A game of craps can be played with the RECOMP II computer.	L. Halprin Ft. Monmouth	Demonstration Routine
1033	SIGNAL CORPS RECOMP ASSEMBLY PROGRAM, SCRAP II	An assembly program designed to use mnemonic operation codes and symbolic, absolute, operand, or relative addresses.	T. J. Tobias U. S. Army Signal Engineering Agency	Executive and Control
1034	SIGNAL CORPS RECOMP ALGEBRAIC TRANSLATOR SALT	This is a two-pass compiler system which translates from algebraic statements into a SCRAP assembly language program.	T. J. Tobias U. S. Army Signal Engineering Agency	Executive and Control
1035	POINT SHIFT GAME	To demonstrate RECOMP output via typewriter, and to show its ability to communicate with the user by means of simple decisions.	G. L. Kiltz, U. S. Army Signal School Ft. Monmouth, N. J.	Demonstration Routine

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1036	RECOMP ALGEBRAIC FORMULA TRANSLATOR (RAFT)	To evaluate short, but also complex, equations which are time consuming and not easily evaluated by hand or desk calculator.	J. W. Camp Systems Engineer Autonetics	Interpretive Routine
1037	PUNCH LETTER PROGRAM	To demonstrate the ability of the RECOMP II computer to punch letters and sentences on tape.	J. W. Camp Systems Engineer Autonetics	Demonstration Routine
1038	SIMULATED INDEX REGISTERS	To simplify the coding of program loops.	Prof. R. T. Harling Wright-Patterson AFB Ohio	General
1039	ROOTS OF A POLYNOMIAL	Calculates and types the n roots of the polynomial equation.	Capt. C. Richard, Jr. Wright-Patterson AFB Ohio	General
1040	SYMBOLIC TO NUMERIC ASSEMBLY PROGRAM (SNAP)	To simplify and expedite the machine language coding system for the RECOMP II.	Kenneth P. Swallow Stanford Research Inst.	Executive and Control
1041	AFIT 050 - MILES PER GALLON COST PER MILE	A non-technical, simplified demonstration of RECOMP. Given trip miles, gallons and cost, the routine computes and types out miles per gallon and cost per mile.	Prof. R. T. Harling Wright-Patterson AFB Ohio	Demonstration Routine
1042	MEMORY SEARCH FOR OCCUPIED LOCATIONS	To find what memory areas are occupied by a given program tape.	Prof. R. T. Harling Wright-Patterson AFB Ohio	Utility

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1043	SOLUTION OF LINEAR SIMULTANEOUS EQUATIONS	To solve linear simultaneous equations and to type out the answers in decimal floating point form.	Capt. T. P. Crichton Wright-Patterson AFB Ohio	General
1044	TIC-TAC-TOE	To provide a routine to demonstrate RECOMP II's ability to "think".	Lt. Earle H. Comfort Wright-Patterson AFB Ohio	Demonstration Routine
1045	DALE HENRY MEMORY ZERO AND ALPHA DUMP	To set the entire memory to minus zero leaving a dump routine in the main memory loop addresses only.	Dale Henry for Woods Hole Oceanographic Institute	Service Routine
1046	FLOATING POINT INPUT	To convert a number from mixed decimal to floating point binary.	Don Kline for Woods Hole Oceanographic Institute	Subroutine
1047	RECOMP II, A RELOCATABLE FLOATING BINARY TO FLOATING OCTAL OUTPUT SUBROUTINE	A subroutine which converts floating binary numbers into floating octal numbers for printout.	Al Shue Autonetics	Subroutine
1048	RECOMP II RELOCAT- ABLE, FIXED POINT MIXED DECIMAL TO FLOATING BINARY, CONVERSION SUBROU- TINE	A subroutine which converts mixed decimal numbers to floating binary numbers.	Al Shue Autonetics	Subroutine

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1049	SOLUTION OF SYSTEMS OF DIFFERENTIAL EQUATIONS	To provide solutions of systems of differential equations.	R. J. Doyle Autonetics	General
1050	OPERATING INSTRUCTIONS FOR MOMENT METHOD CIRCUIT ANALYSIS ON THE RECOMP II	To present detailed operating instructions for the circuit subroutine generator (compiler) and the moment method computer programs which have recently been developed and checked out on the RECOMP.	A. Lechler M. Duffy J. E. Drennan Battelle Memorial Institute	General
1051	RELOCATABLE BIT DUMP	To type out bit configuration in a sequence of memory words, using any two characters to represent 0's and 1's.	Janet Tulloss Baird-Atomics, Inc.	Utility
1052	SUBROUTINE K(k)	Subroutine K(k) obtains the complete elliptic integral of the first kind of the floating parameter k.	J. N. Brooks Baird-Atomics, Inc.	Subroutine
1053	SUBROUTINE INTF(X)	Subroutine INTF(X) obtains the integral portion of the floating number X contained in A,R upon entering; the integral portion I(X) is contained in A,R when exiting from the subroutine.	J. N. Brooks Baird-Atomics, Inc.	Subroutine
1054	MODIFIED RECOMP ALGEBRAIC FORMULA TRANSLATOR (PAFT III)	The program interprets a symbolic equation which is written using twenty-seven (27) commands, fifty (50) data locations, and an effective accumulator. The commands indicate an operation or a function evaluation which is performed on the contents of the letter location which follows the command.	J. W. Camp Systems Engineering Autonetics	Interpretive Routine



NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1055	RECOMP II KEYBOARD FLOATING POINT INPUT SUBROUTINE, VARIABLE FORMAT	To input a decimal number from the console keyboard and convert it to floating binary. The number may be an integer, fraction, mixed number, or any of the aforementioned with decimal exponent.	F. Keefe, B. Metivier Melpar, Inc.	Subroutine
1056	MULTIPLICATION OF MATRICES (RELOCATABLE)	To compute in floating point form the product matrix $C = AB$ ; to compute in floating point form the product matrix $C = A^tB$ .	F. Keefe, B. Metivier Melpar, Inc.	Subroutine
1057	AGC-031 RELOCATION UTILITY PROGRAM	This program relocates a program from memory to another part of memory or punches it on tape or both. It distinguishes data from commands and commands with absolute addresses from those with relative addresses. Relative addresses are modified accordingly.	Marcella J. Wulff Aerojet-General Corp.	Service Routine
1058	EXPANDED RECOMP ALGEBRAIC FORMULA TRANSLATOR (RAFT IV)	This program is a modified version of RECOMP II Program No. 1054, RAFT III.	John W. Camp Autonetics	Executive and Control
1059	MODIFIED BESSEL FUNCTION OF THE FIRST KIND $I_0(x)$ , FLOATING POINT (RELOCATABLE)	To compute in floating point the modified Bessel function $I_0(x)$ .	M. Wartel Melpar, Inc.	General

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1060	MODIFIED BESSEL FUNCTION OF THE FIRST KIND $I_1(x)$ , FLOATING POINT (RELOCATABLE)	To compute in floating point the modified Bessel function $I_1(x)$ .	M. Wartel Melpar, Inc.	General
1061	S-PLANE FREQUENCY RESPONSE	To compute data for gain-phase, Bode and Nyquist plots from transfer functions in the s-plane.	C. L. Lutes Autonetics	General
1062	RECOMP II ALPHA DUMP ROUTINE, RELOCATABLE	To punch on tape in alphanumeric format with location a given block of memory, and, also, to display those locations being punched.	A. E. Sheue Information Processing Unit Autonetics	Service Routine
1063	RECOMP II PROGRAM TO COMPUTE AUTO- CORRELATION FUNC- TION	To compute the autocorrelation function of a random process.	R. E. Lytle Autonetics	General
1064	RECOMP II POLY- NOMIAL RATIO PROGRAM	It is often desired to compute a poly- nomial ratio with an indefinite number of terms; as when inverting Z transform func- tions. This program computes and types out the coefficient and exponent of each term of that ratio.	A. E. Sheue Autonetics	General
1065	RECOMP II PRO- GRAM TO PREPARE VERDAN TAPE	To utilize the RECOMP II computer to pre- pare tape, off-line, for the VERDAN com- puter.	A. E. Sheue Autonetics	Service Routine

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1066	FLOATING POINT MATRIX MULTIPLYING SUBROUTINE FOR RECOMP II	To multiply two matrices A and B, in one of four possible modes, to obtain the product matrix C. The four modes of operation are  $AB = C$ , $A^T B = C$ , $AB^T = C$ , or $A^T B^T = C$ where T superscript indicates transpose.	T. W. DeVries Autonetics	Subroutine
1067	BINARY TABLE LOOK- UP ("BTLU") RECOMP SUBROUTINE (RELOCATABLE)	To find the address in memory at which is stored a given piece of information.	T. B. Feigenbaum Autonetics	Subroutine
1068	PROGRAM FOR EIGEN- VALUES AND EIGEN- VECTORS OF A REAL SYMMETRIC MATRIX	To determine the Eigenvalues and Eigen- vectors of a real symmetric matrix.	Alice Hartley Litton Industries	General
1069	AGC-109 EIGEN- VALUES AND EIGEN- VECTORS BY JACOBI'S METHOD (FLOATING POINT)	This program uses an iterative procedure to find the eigenvalues and eigenvectors of a symmetric matrix for $3 \leq n \leq 27$ .	Mrs. Marcella J. Wulff Aerojet-General Corp.	General
1070	AGC-84 INSTRUCTION FORMAT TAPE PUNCH WITH LOCATIONS AGC-84R INSTRUCTION FORMAT TAPE PUNCH WITH LOCATIONS (RELOCATABLE BY RUG 1057)	This program dumps a tape in command for- together with relevant locations.	Donald S. Croxton Aerojet-General Corp.	Service Routine

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1071	AIRBORNE TELLURO- METER - TRILATERA- TION METHOD	To determine the position of an unknown point with reference to the positions of two known points by making a continuous record of slant ranges to the three stations from an aircraft flying along an intermediate path. Calculate the grid distances of this intermediate path using it as the base in the determination of the grid coordinates of the unknown station.	L. A. Gambino U. S. Army Engineer Research and Development Laboratories Surveying and Geodesy Branch	General
1072	SHORT-RANGE POSITIONING PROBLEM	Short-range positioning is computed.	L. A. Gambino U. S. Army Engineer Research and Development	General
1073	AIRBORNE TELLURO- METER COMPUTATIONS LINE CROSSING METHOD	For obtaining the slant ranges for two sides of a triangle whereby a triangle solution may be accomplished in order to derive the position of the unknown station at the vertex of the triangle. The slant ranges are fitted to a parabola by the method of least squares.	L. A. Gambino U. S. Army Engineer Research and Development Laboratories Surveying and Geodesy Branch	General
1074	RADIAL ERROR SUBROUTINE	This subroutine computes radial error of two variates $e = \sqrt{X^2 + Y^2}$	G. V. Roberts Autonetics	Subroutine
1075	RECOMP II RELOCATOR	This program relocates a subroutine and dumps it on tape in alpha mode. The subroutine must be prepared in accordance with the provisions in AN-004.	G. V. Roberts Autonetics	Subroutine

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1076	MAXIMUM, MINIMUM, MEDIAN SUBROUTINE	This subroutine will determine the maximum, minimum and median of a set of numbers. In addition, it will sort the set and arrange the numbers in order of magnitude from the maximum to the minimum.	G. V. Roberts Autonetics	Subroutine
1077	COMMAND TYPEOUT ROUTINE	To dump on a typewriter a selected portion of RECOMP memory in command format. 4-digit octal address is typed out at the same time.	T. B. Feigenbaum Autonetics	Service Routine
1078	RELOCATION MATRIX MAKER	To assist the programmer in preparing the relocation matrix used with the Autonetics relocater AN-004.	T. B. Feigenbaum Autonetics	Service Routine
1079	DECIMAL INPUT ROUTINE	This routine is used to permit a program to call for the manual entry of a decimal number during the course of the program.	W. Wellman Servomechanisms, Inc. Research Division	Subroutine
1080	MEMORY SEARCH	This routine searches all of memory (except for this program's instructions) to find any specified instruction and/or address.	W. Wellman Servomechanisms, Inc. Research Division	Utility Routine
1081	FLOATING POINT NUMBER INPUT FROM CONSOLE	Allows console keyboard to be used for direct entry of decimal numbers in floating point format. Features a visual display of the number as it is entered and small round-off errors and low storage requirements.	W. Wellman Servomechanisms, Inc. Research Division	Subroutine

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1082	TAPE RELOCATOR	Modifies Addresses and relocates specially prepared program tapes, such as those punched by SMI 126-R	W. Wellman Servomechanisms, Inc. Research Division	Utility Routine
1083	AGC-1148R MEMORY PRINT (RELOCATABLE BY RUG 1057)	To type the contents of a specified portion of memory in either command or floating point format, with locations given for each line.	Donald S. Croxton Aerojet-General Corp. Sacramento, Calif.	Service Routine
1084	FIXED POINT OUTPUT SUBROUTINE (RELOCATABLE)	To output, in fixed point format, normalized floating point numbers located in memory.	G. V. Roberts Autonetics	Subroutine
1085	PROGRAM FOR THE SOLUTION OF SIMULTANEOUS LINEAR EQUATIONS	To solve a set of simultaneous linear equations. The program handles a maximum of thirty-six equations with thirty-six unknowns. The equations are evaluated using the coefficients obtained from the solution, and these values are then printed and compared with the original input values.	J. W. Camp M. F. Berman Autonetics	General
1086	OPERATIONS RESEARCH SUBMARINE PROBLEM	To detect and identify submarines passing by a barrier submarine without the barrier submarine being detected.	Dr. W. B. Van Horne Autonetics	General
1087	BLOCK PRINTOUT OF MATRIX FLOATING POINT ARITHMETIC (PRIMATRIX)	To print out a matrix in the proper row and column conformation in floating point mode. In the case where the matrix is too large to be printed in exact form, it is divided into blocks.	Elizabeth L. Curl Woods Hole Oceanographic Inst. Woods Hole, Mass.	General
1088	BLOCK PRINTOUT, FLOATING POINT ARITHMETIC	To print out a block of floating point numbers in floating point mode according to a specified format.	Jacqueline Webster Woods Hole Oceanographic Inst. Woods Hole, Mass.	General

## INDEX OF RECOMP USERS' PROGRAM

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1089	DIAMOVE, FIXED OR FLOATING POINT MODE	To move a group of words from anywhere to anywhere in the memory.	Elizabeth L. Curl Woods Hole Oceanographic Inst. Woods Hole, Mass.	Subroutine
1090	SEQUENTIAL ANALYSIS	To tally pairs of events occurring in sequence.	R. G. Haygood Autonetics	Service Routine
1091	FLEXO SIMULATOR FOR SNAP INPUT (AURORA REVISED)	To simplify the preparation of input tapes needed for use with the SNAP assembly program. Besides speeding up the type-in of statements as compared to the original FLEXO, provisions are also included to allow making corrections on and listing of previous statements.	Aurora Gasoline Company	Executive and Control
1092	AGC-157 PROBABILITY	To determine the probability of M successes out of N trials in a learning sequence.	R. F. Gillogly E. J. Fenech L. Shenfil Aerojet-General Corp. Sacramento, Calif.	General
1093	STEPWISE MULTIPLE LINEAR REGRESSION AND CORRELATION ANALYSIS	This program allows data for correlation to be prepared on the versatape in a simple format. It allows any variables from the data tape to be selected for correlation, and computes any desired functions of the selected variables. The program allows any variable to be selected as a dependent variable and then computes the statistically significant multiple correlation between the dependent variable and the rest of the variables selected. As options the program will compute means, standard deviations and partial correlation coefficients.	S. J. Singer Aurora Gasoline Co.	General

## INDEX OF RECOMP USERS' PROGRAMS

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1094	FAST SINE-COSINE SUBROUTINE (FLOATING POINT)	To provide a subroutine to compute both the sine and cosine of a radian argument with a small relative error. Speed and precision, rather than memory requirements, are the primary objectives of this subroutine.	R. C. Wheeler Airborne Instruments Laboratory	Subroutine
1095	CRITICAL PATH DATA CHECK	When used in conjunction with RECOMP Program No. 58, SCHEDULE CRITICAL PATH, provides an automatic check for possible violations of data format restrictions. In addition, a provision has been made to allow deletion and/or insertion of activities and corresponding activity times.	J. McRae Autonetics	General
1096	SAIL (SUBROUTINE ALPHANUMERIC INPUT LUEBBERT)	To receive alphanumeric information from the typewriter, pack this information 8 characters per word, and store the packed words sequentially starting with the location L(S) specified in the calling sequence. This packed information can be read by use of the TYA instruction (+72 776x) or when appreciable amounts are to be read by use of the LAOS subroutine.	Maj. W. F. Luebbert Dept. of Electricity U. S. Military Academy West Point, New York	Subroutine
1097	LAOS (LUEBBERT ALPHANUMERIC OUTPUT SUBROUTINE)	To type out any amount of alphanumeric data stored in the computer memory in the 8 character per word format produced by the TYA instruction (+72 776X0), the SAIL Subroutine or the UPAI Utility Routine.	Maj. W. F. Luebbert Dept. of Electricity U. S. Military Academy West Point, New York	Subroutine



## INDEX OF RECOM 'S USERS' PROGRAMS

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1098	AGC-209 BAUDOT TO DECIMAL CONVERSION (FLOATING OR FIXED POINT)	A binary bit baudot code at a scale of 38 is converted to a fixed point number, also at a scale of 38, or to a floating point number.	Mrs. Marcella J. Wulff Aerojet-General Corp. Sacramento, Calif.	Subroutine
1099	RECOMP II BESSEL FUNCTION OF THE SECOND KIND, ORDER ZERO SUBROUTINE (FLOATING POINT, RELOCATABLE)	To compute the Bessel function of the second kind, order zero of a floating point argument, found in the A and R registers.	Philip Sheldon Sylvania Electronic Systems A Division of Sylvania Electric Products, Inc. Waltham, Mass.	Subroutine
1100	RECOMP II BESSEL FUNCTION OF THE SECOND KIND, ORDER ONE SUBROUTINE (FLOATING POINT, RELOCATABLE)	To compute the Bessel function of the second kind, order one of a floating point argument, found in the A and R registers.	Philip Sheldon Sylvania Electronic Systems	Subroutine
1101	SIMULTANEOUS EQUATIONS PROGRAM FOR THE MODIFIED RECOMP II	This program will solve up to 34 simultaneous linear algebraic equations. The number of equations and unknowns must be the same.	R. E. Chandos Autonotics	General
1102	125-R FIRST ORDER SYSTEM (FLOATING POINT)	To solve the equation, $c - r = (dr/dt)$  for r, where c is given as a function of time.	W. Wellman Servomechanisms, Inc.	Subroutine

## INDEX OF RECOMP USERS' PROGRAMS

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1103	RELOCATABLE TAPE PUNCH	Automatically punches relocatable tape containing desired program and all necessary control codes and coding for Address Modification Routines (SM/I 127-R, RUG #1082)	W. Wellman Servomechanisms, Inc. Research Division Goleta, Calif.	Service Routine
1104	STANDARD ATMOSPHERE	Calculates pressure from altitude, or vice-versa, assuming any model temperature-altitude profile and the perfect gas law.	W. Wellman Servomechanisms, Inc. Research Division Goleta, Calif.	General
1105	ALPHANUMERIC PRINTING	Accomplishes the simple task of typing out groups of words of Baudot letters, starting with an arbitrary beginning location, and ending with the character "blank".	W. Wellman Servomechanisms, Inc. Research Division Goleta, Calif.	Service Routine
1106	PACINATION! ROUTINE	To a simplify format control of tabular typewritten output.	W. Wellman Servomechanisms, Inc. Research Division Goleta, Calif.	Service Routine
1107	CALCULATION OF PI	For demonstration, this program calculates the value of $\pi$ from Pierce's algorithm.	W. Wellman Servomechanisms, Inc. Research Division Goleta, Calif.	Demonstration

INDEX OF RECOMP USERS' PROGRAMS

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NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1108	"APPLE" INPUT ROUTINE	The Apple routine serves to translate handwritten notes into punched tape that will utilize the Recomp II's functions. Simultaneously it delivers a typed version of the program actually entered. Among its more important functions are the conversion from mnemonic to octal codes, and binarization and entry of either floating or fixed point numbers.	W. Wellman Servomechanisms, Inc. Research Division Goleta, Calif.	Executive and Control
1109	OUTPUT SUBROUTINE	To provide an output subroutine which has fewer restrictions, is faster, and takes less space than AN-015.1 and AN-016.	J. R. Wall Aurora Gasoline Co.	Subroutine
1110	LEAST SQUARES POLYNOMIAL APPROXIMATION PROGRAM NO. 2	This program accepts up to 760 X-Y pairs and computes the mean of the Y values. It also computes the coefficients in the zeroth, first, and second order polynomial approximations to the curve defined by the X-Y points. In addition, for each of these polynomials, the standard deviation is computed.	R. E. Chandos Autonetics	General



ADDENDUM

INDEX OF SUBROUTINES

RECOMP II PROGRAMS

and

RECOMP USERS' PROGRAMS

NUMERICAL LISTING OF SUBROUTINES

PROGRAMS AND USERS' PROGRAMS

I N D E X  
of  
SUBROUTINES

AN-070	Plotter Subroutine: Line Generator (Fixed Point)
AN-071	Plotter Subroutine: Line Generator (Floating Point)
AN-072	Point Plotter Subroutine (Fixed Point)
AN-073	Point Plotter Subroutine (Floating Point)
AN-074	RECOMP II Subroutine, Floating Point Output
AN-075	Dollars and Cents Spelling Output
AN-076	Relocate Program

I N D E X  
of  
RECOMP II PROGRAMS

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
65	CRITICAL PATH OUTPUT PROGRAM NO. 2	To provide additional and alternate output formats for input data and results computed by RECOMP Program No. 58, SCHEDULE CRITICAL PATH. This program is useful only when used in conjunction with RECOMP Program No. 58.	H. L. Judd Autonetics	General
66	OPTICAL DESIGN PACKAGE NO. 1	Optical Design Package No. 1 has been developed to assist the optical designer in evaluating a given rotationally symmetrical optical system. The designer has at his disposal the third and fifth order aberrations subprograms and a general ray trace program for tracing of skew or meridional rays through the system. A parameter change routine is incorporated to conveniently change parameters of the system and execute utility functions such as the punching of lens data tapes and surface data printouts.	J. C. Smith Autonetics	General
68	RECOMP II MAGNETIC TAPE DEMONSTRATION PROGRAM	To demonstrate the RECOMP II's ability to handle information retrieval problems using magnetic tape.	L. Laubscher Autonetics	Demonstration
69	CIRCLE INTERSECTION	To find the intersection(s) (if any) of 2 circles.	G. Howell Autonetics	General
71	FLOATING POINT INPUT/OUTPUT PACKAGE	To provide a relocatable RECOMP II program for the input of floating point numbers from the typewriter, or for the output of floating point numbers on the typewriter. This may be done through a one word calling sequence or through manual operations from the keyboard.	G. Howell L. Halprin Autonetics	Subroutine Utility
72	RELOCATE TAPE GENERATOR	To provide an easy means of generating a relocatable tape of a debug program. The relocatable tape format of AN-076 is used.	L. Halprin Autonetics	Utility
73	RELOCATE TAPE DUPLICATOR MATRIX LISTER	(1) To generate copies of relocatable tapes that use the location format of AN-076. (2) To type a listing of the relocation Matrix from relocatable tapes that use the location format of AN-076.	L. Halprin Autonetics	Utility
74	RELOCATE TAPE CONVERTER	To convert relocatable tapes punched in the relocatable tape formats of AN-04, AN-041, RUG 1000, or RUG 1082 to the relocatable tape format of AN-076.	L. Halprin Autonetics	Utility
75	RECOMP II CODING SHEET TYPEOUT	To type listings of subroutines or programs for publication	G. Howell Autonetics	Service

I N D E X  
of  
RECOMP USERS' PROGRAMS

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1111	ROOT LOCUS	To produce a point by point root locus in the s-plane, when given a set of open loop poles and zeros. Up to 20 poles and 20 zeros may be accommodated.	Robert E. Chandos Autonetics	General
1112	BESSEL FUNCTION - $J_n(x)$ - SUBROUTINE (FLOATING POINT)	To provide a subroutine to compute for a given argument x, all significant orders of Bessel functions of the first kind $J_n(x)$ .	R. C. Wheeler Airborne Instruments Lab.	Subroutine
1113	TRACE		D. Karandanis Baird-Atomic	
1114	HALF-WORD STORAGE SUBROUTINE		D. Karandanis Baird-Atomic	
1115	URAL (UTILITY ROUTINE ALPHA - NUMERIC LUEBBERT	URAL is a general usage alphanumeric utility routine furnished in relocatable form. It may be used by itself to provide a convenient means for manual entry and readout of alphanumeric information packed 8 characters per word in a form compatible with and interchangeable with those required by mechanized machine commands such as RDY 776X0, RDZ 776X0 and TYA (or TYC) 776X0. It may also be used as a supplement to PPP-2, the alphanumeric input and output of which pack data 6 characters per word in a form which cannot be typed out by the TYA (+72 776X0) command.	Major Luebbert USMA	
1116	LAMP (LUEBBERT'S AID MACHINE PRO- GRAMMING)	This technical memorandum provides a technical description of the LAMP programming aid developed at the United States Military Academy to simplify the preparation and debugging of machine-language programs for the RECOMP II computer. The version presented here is that available 1 September 1961.	Major Luebbert USMA	Service
1117	AFCOR ALGEBRAIC COMPILER MANUAL	To translate Algebraic and control statements into symbolic coding which can then be assembled into machine language by AFAR (A Symbolic Assembly Program).	Broadview Research Corporation	Executive and Control
1118	AFAR SYMBOLIC ASSEMBLER MANUAL	To translate into machine language the symbolic coding generated by AFCOR (An Algebraic Compiler).	Broadview Research Corporation	Executive and Control
1119	CURVE GENERATION	To find the linear function of one curve which best approximates a second curve by the least mean squares method. The percent error of approximation is also determined.	Robert Quinichett Louis C. Fargel North American Aviation	General
1120	DATA PLOTTER, FLOATING POINT	To plot computed variables in graphical (rectangular) form using standard RECOMP II equipment.	T. W. Lawhorn	General



I N D E X

of

RECOMP USERS' PROGRAMS

(CONTINUED)

NO.	TITLE	DESCRIPTION	AUTHOR	CLASSIFICATION
1121	HOLLERITH TO BAUDOT CONVERSION	To read 12-bit Hollerith-coded characters from IBM cards, reduce them to their 5-bit Baudot equivalent, and pack these Baudot characters (up to 7) together to form a standard alphanumeric format word, such as is formed by the typewriter alphabetic input instruction, RDY 777X, ( $1 \leq X \leq 7$ ).	W. Wellman	Subroutine Servomechanisms
1122	BAUDOT TO HOLLERITH CONVERSION	To accept a word of Baudot characters, translate them to Hollerith coded characters, and punch them on IBM cards.	W. Wellman	Subroutine Servomechanisms
1123	DOLLAR AND CENT OUTPUT IN COLUMNS	To provide a fast, fixed format, data output on the typewriter in the format \$0000XXXX.XX or \$ XXXX.XX which can be typed in columns with the decimal points aligned.	L. F. Fenton	Service National Co., Inc.
1124	AGC-90C MODAL ANALYSIS	This program is used to compute natural frequencies and mode shapes for straight non-uniform beams represented by up to 30 bays.	D. S. Croxton	Eng. Aerojet-General Applications Corporation
1125	SPECIFIC VOLUME ANOMALY PROGRAM	To compute specific volume anomalies from oceanographic station data.	J. Webster D. McGill	General Woods Hole Oceanographic Test.
1126	PERT EXPENDITURE FORECAST	This program when used in conjunction with RECOMP II Program No. 58 (Critical Path Scheduling) will compute a weekly hours expenditure rate for a given PERT network.	P. M. Hasse S. & I. D. Downey	General

I N D E X  
of  
RECOMP II USERS' PROGRAMS

NO.	TITLE	DESCRIPTION	AUTHOR
1127	DYNAMIC HEIGHTS PROGRAM, FLOATING POINT ARITHMETIC	To compute dynamic heights from specific volume anomalies which have been computed from oceanographic data.	David McGill Woods Hole Oceanographic Institution
1128	PRICE BREAKDOWN PROGRAM	To compute and type a cost proposal price breakdown with variable contents; to accumulate any number of individual price breakdowns for deferred type-out.	James McRae Autonetics
1129	SUBROUTINES FOR USING MAGNETIC TAPE UNITS WITH RECOMP II (PART A)	To provide a simple and reliable method for utilizing the magnetic tape units with the RECOMP II computer. The subroutines simplify the programming for the magnetic tape units and correct for machine errors made by the magnetic tape units. They enable the programmer to write on tape, read from tape, and rewind tape. All reading and writing on tape is verified to insure against errors.	S. M. Chamberlain Autonetics
1130	SUBROUTINES FOR USING MAGNETIC TAPE UNITS WITH RECOMP II (PART B)	To provide a simple and reliable method for utilizing the magnetic tape units with the RECOMP II computer. The subroutines simplify the programming for the magnetic tape units and correct for machine errors made by the magnetic tape units. They enable the programmer to write on tape, read from tape, and rewind tape. All reading and writing on tape is verified to insure against errors.	S. M. Chamberlain Autonetics

I N D E X  
of  
RECOMP II USERS' PROGRAMS  
(Continued)

NO.	TITLE	DESCRIPTION	AUTHOR
1131	BLOCK TRANSFER PROGRAM FOR MAGNETIC TAPE UNITS WITH RECOMP II	To provide a rapid method for transferring blocks of information on magnetic tape to different blocks on the same tape or to another tape. The program uses the subroutines and procedure described in RUP No. 1129. This program can be put on magnetic tape.	S. M. Chamberlain Autonetics
1132	TYPE DUMP PROGRAM FOR MAGNETIC TAPE UNITS WITH RECOMP II	To provide a rapid method for typing out blocks of information from magnetic tape. This program must be used with the subroutines and procedures described in RUP No. 1129. This program can be put on magnetic tape.	S. M. Chamberlain Autonetics
1133	FLIP-FLOP IMPLEMENTATION FOR RECOMP II	Provides the RECOMP with 38 addressable conditional flip-flops. Any one or combination of these can be set or reset by other programs to "remember" the presence or absence of special conditions.	Lt. D. Brown, USASCS Fort Monmouth New Jersey
1134	ALPHANUMERIC MEMORY DUMP WITH DISPLAY (RELOCATABLE)	To punch on tape in alphanumeric format any preselected portions of memory; to provide, at users option, display of location being punched, typeout of first and last location dumped, and/or a tape leader.	R. E. Chandos Autonetics
1135	COST REDUCTION CURVE CALCULATIONS	To perform cost reduction curve calculations. This program contains instructions devised for cost reduction curve calculations based on the theory that when the quantity is doubled,	James McRae Autonetics

I N D E X  
of  
RECOMP II USERS' PROGRAMS  
(Continued)

NO.	TITLE	DESCRIPTION	AUTHOR
		<p>the average cost (or hours) decreases by the applicable "curve" percentage. The program essentially gives the operator the capability to perform three types of cost reduction (learning) curve calculations:</p> <ol style="list-style-type: none"> <li>1. Perform 71 calculations based on 16 basic types of problems,</li> <li>2. Calculate and type out cost reduction curve tables, and</li> <li>3. Determine first unit cost and applicable curve percentage by least squares correlation.</li> </ol>	
1136	SCO-MAT FORMATTING ROUTINE FOR SCOPAC COMPILER	To provide a simple, standard routine for printing numbers in a pre-selected format from SCOPAC compiled programs; facilitating columnar output of data, and allowing a more complete utilization of space per line than is possible with the SCOPAC Print instruction.	Wm. Spencer Worley The Gates Rubber Company
1137	CARD NUMERIC INPUT/ OUTPUT ROUTINE	To read Hollerith coded digits from card columns and convert that information to fixed point binary form for use by the RECOMP II. Also does the converse, punching card columns from binary integers.	W. Wellman Servomechanisms, Inc.
1138	LEAST SQUARES POLYNOMIAL CURVE FIT #3	To permit the fitting of polynomials of order 14 or less through up to 256 points in the X-Y plane.	R. E. Chandos Autonetics