

ALGY -- Algebraic Manipulation Program

Operating Instructions and Program Statistics

ALGY was designed to operate under the WDL executive system, MESS*. The program requires three magnetic tapes. USE 0 has been designated as the ALGY INPUT PROGRAM tape. The ALGY Input Program is transferred from cards to magnetic tape in CODE MODE. USE 1 is an intermediate scratch tape, the content of which is not saved, and USE 3 is the executive system's printer output tape. Write enable rings should be mounted on all three tapes used by the program. Please note that the program was written for MESS 1 which employs a USE table and USE number rather than logical numbers when programming for magnetic tapes.

There is no restart procedure and a successful finish is terminated with 'FINISH OF ALGY RUN' typed on the console flex and an exit to M/620(SC). A run may terminate by several error exits where the error will be typed on the console flex. These are:

'PROGRAM NOT ON TAPE' is indicated when a tape is mounted with no ALGY INPUT PROGRAM recorded on it.

* In order to operate the program outside the MESS system, without reassembly, it should be noted that the program locations M/600, M/601 and M/603 contain the tape numbers for input tape, scratch tape and output tape, respectively. In each instance the number is located at B23. The program itself will insert the numbers contained in these locations in the proper places in the body of the program. If the program is reassembled, card JR0016 assigns the locations of the USE table. By changing this card, locations other than M/600, M/601 and M/603 can be used. In addition, there are several jumps to M/620 which under MESS return control to the executive system. These may be located and changed without affecting the program.

'EXPRESSION NOT ON TAPE' is typed when an operation on a particular symbol is called for without having first defined the symbol with an EQAT..

'NUMBER TOO LARGE' occurs when a fixed point integer exceeds 2^{47} . Note all arithmetic is exact and hence round-off is not allowed.

'TABLE OVERFLOW AT XXXXX' is recorded when the working table beginning at octal XXXXX overflows with BCD information. The six working tables are, at present, each 1900 words in length. In the next version, this restriction will be eliminated by including an expandable table feature. This is not a severe limitation if the user programs his problem wisely so as not to allow the program to generate an algebraic expression larger than 1900 BCD words.

The time required for an ALGY run is difficult to estimate. Depending on how complex the input program is, it may take from a few minutes to several hours. Seven to forty minutes, however, is an average run for most problems programmed for ALGY.

The program is assembled at M/4000 and requires the remainder of a 16K machine. It uses 8 index registers and is core independent.

The present ALGY commands are:*

EQAT (Equate)

SBST (Substitute)

OPEN (Remove Parenthesis)

FCTR (Factor)

INQT (Internal Equate)

DONE (End of Preceding Run)

LAST (Finish of all Runs that are Stacked).

Card columns 1 thru 4 of ALGY input program cards are reserved for card sequencing since order is of the utmost importance. All other columns may be used for the program. Blank columns are ignored! The user MUST terminate each command followed by any expressions with a period to indicate to ALGY that this is the end of the present command. Several programs may be stacked on one tape for one run if they are separated by DONE commands. After the last program, twelve cards must follow with the code LAST in the first 4 cc of of each card. Note this includes cc 1-4.

* See ALGY - AN ALGEBRAIC MANIPULATION PROGRAM, M. Bernick, E.D. Callender, J. R. Sanford; Western Joint Computer Conference, Los Angeles, 1961.

ALGY

ROUTE LIST

Please read, check your name, date
and return to basket:

	<u>Date Read</u>
J. DUNN	_____
J. FRANZO	_____
B. FRIEDMAN	_____
B. MCCOY	_____
G. MECHALAS	_____
J. QUINN	_____

H. TAMANAHA	_____
W. WOOD	_____
C. LEVENTHAL	<u>7/21</u>

PHILCO
Government & Industrial Group
Computer Division

Western Computing Center
3875 Fabrian Way
Palo Alto, California

TP-WL-1
30 June 1961

Mr. John C. W. Cadoo, Jr.
TUG Executive Secretary
Phileo Corporation
Computer Division
3900 Welsh Road
Willow Grove, Pennsylvania

Dear John:

This letter transmits WL ALGY 1, an algebraic manipulation program for Phileo 2000 users.

Enclosed you will find a program write-up, symbolic listing, and operating instructions, all of which have been distributed to the TUG Membership. Under separate cover I am forwarding the symbolic cards.

Although ALGY is presently set up to run under MESS (the WDL operating system) it may be easily modified to run independently or under some other executive system.

Very truly yours,

David A. Stevenson
David A. Stevenson

DAS:ck

Enc. (3)

WESTERN JOINT COMPUTER CONFERENCE

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ALGY - AN ALGEBRAIC MANIPULATION PROGRAM

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Western Development Laboratories - Philco Corporation - Palo Alto, California

Summary

In a great variety of scientific problems, the reduction of complex analytical expressions is highly desirable but often such reductions, although straight forward, are extremely lengthy and laborious. The following paper describes a program written for a high-speed digital computer which accepts algebraic expressions as input and outputs a similar set of modified expressions. The description includes the definition of the ALGY operations used to obtain the desired results, followed by an explanation of the logical flow of the program, and concluding with a description of future operations which will be incorporated into the system.

Introduction

The kinds of problems which initiated interest in general purpose high-speed digital computers were, for the most part, problems which involved an extreme amount of arithmetic. Without computers, in many cases, no attempt could be made to solve them, as valuable as their solutions were deemed to be, not only because of the time required to perform the computations, but also because of the very small probability that the results after months of hand calculation would be correct. With the advent of the electronic computer, the arithmetic involved in these problems became a trivial matter and solutions were easily effected with a high degree of reliability.

Recently, an analogous difficulty has arisen in solving another kind of problem. We wish to solve systems of differential equations by perturbation methods. These problems, rather than involving arithmetic, required an overwhelming amount of algebraic manipulation. The only feasible way to handle this kind of problem is, again, to "let the computer do it", and it was for this purpose that the computer program called "ALGY" was developed.

ALGY is an interpretive routine through the use of which the programmer or mathematician may instruct the computer to perform certain algebraic manipulations. ALGY is basically an elaborate scheme for the manipulation of alphanumeric bit patterns. The input and output used with ALGY are alphanumeric algebraic statements. In this paper, we will give the definitions pertinent to the ALGY program, describe the currently available algebraic manipulations in a brief description of the flow of the ALGY program, demonstrate by use of an example an ALGY program, and, finally, give a brief outline of future algebraic operations and applications.

Definitions

In order to understand the manipulation which ALGY performs, it is necessary to define a few special terms. The basic building block in ALGY is the BCD character. These characters are combined in various ways into quantities. There are three types of quantities in an ALGY program: numeric, such as 51/725; special, such as plus, minus, period, parentheses, dollar sign, asterisk and quasi-alphabetic, such as cos 5X. Because it is desirable in algebraic manipulation to do exact arithmetic, all numbers are represented as fractions. The restriction on the numeric quantity is that the total number of decimal digits of the numerator and denominator must be less than or equal to 15. Under this restriction, arithmetic operations are exact. The quasi-alphabetic quantities, also, must have less than 16 characters in them and they must begin with a letter. Those restrictions are mechanical ones and could be removed by going to multiple arithmetic precision and using larger storages. Of course, in both numeric and quasi-alphabetic quantities, no special symbols can appear.

A group is an algebraic expression contained within a plus, minus or a parenthesis. It may contain several quantities, for example

$$-13/25 * X^2 * \sin 2X * \text{Coef}$$

is a group.

An expression is any algebraic combination of groups and/or quantities which are terminated by a period. Expressions are tagged with a name. This name may also be a quantity in another expression.

Throughout the remainder of this paper, reference will be made to different programs, the ALGY system and particular ALGY programs. The mathematician writes the ALGY program which is processed by the ALGY system. ALGY does not manipulate equations, but only expressions. However, it is easily seen that for algebraic manipulations, expression manipulation is sufficient.

ALGY Operations

There are a few general restrictions on the size and type of algebraic expression that ALGY can handle. Any expression can contain at most 4500 BCD characters. Also, all exponents must be positive integers and the only available symbols are the usual 64 BCD characters.

The currently available basic ALGY commands are EQAT, INQT, BUGG, OPEN, SBST, FCTR, TRGA and DONE. When the ALGY system was being designed, we felt that these commands constituted a minimal system to perform the algebraic manipulations that we were interested in performing. Following

is a brief description of each command. It is very easy to learn to use ALGY. Two hours of instruction are all that is usually required.

EQAT:

Equate merely records on tape the left and right hand sides of the equation. The algebraic expression on the right hand side of the equate symbol is always preceded by its name, that is, the symbol used on the left of the equate symbol. This method uniquely determines all expression recorded on the tape.

INOT:

Internal equate renames an expression already on tape, preserving the recorded name. This allows an algebraic expression to be re-equated without having to write the whole expression over again.

BUGG:

Bugg is essentially an "unequate" operation. It searches the tape for the tag that is to be "bugged" and deletes it. This is useful if the user wishes to define a particular variable several different ways during a single ALGY program.

OPEN:

Open removes parentheses from an algebraic expression. To do this, it performs all algebraic multiplication necessary, grouping identical terms, and sorting in a quasi-alphabetical manner.

SBST:

SBST substitutes one or more expression in a given expression. The routine inserts parentheses about each expression substituted.

FCTR:

FCTR factors a given expression with respect to a single variable, which may be exponentiated with the option of equating its coefficient to a given symbol for future reference. The expression may be factored with respect to several variables with the restriction that if a particular group contains two or more variables to be factored, it can be factored with respect to only one of the variables.

TRGA:

Trig A expands a product of sin and cos functions of a given argument to a sum of sin and cos functions of multiple angles. An exponentiated sin or cos function would fall under this category.

DONE:

Done is a control word which allows several independent problems to be processed during the same run.

Logical Flow of ALGY

ALGY accepts algebraic expressions as input, processes these expressions in the manner in which the user has programmed, and outputs a

similar set of expressions. To accomplish this, a logical sequence of events is followed.

The algebraic equations are coded in the ALGY format which in essence is simply rewriting them on coding sheets, using English letters instead of Greek symbols when applicable, followed by all the ALGY operations necessary to obtain the desired results. After the program is key punched it is submitted for recording on tape.

ALGY accepts the coded statements, printing and performing all operations directed by the input program. A very simple example follows to facilitate explaining the logical flow of ALGY. Consider

$$e(f,g) = (fg + 1)^3$$

$$f(x) = 1 + Ax + 1/2 A^2 x^2 + 1/6 A^3 x^3$$

$$g(x) = Bx - 1/6 B^3 x^3 + 1/120 B^5 x^5 - 1/5040 B^7 x^7$$

and suppose the factors of x^{11} , x^9 , x^7 , x^4 and x^3 of the function e are desired, neglecting all terms of order greater than 11. The ALGY input program would appear as follows:

$$\text{EQAT E} = (F * G + 1/1) \$ 3. \quad \text{ie(Equate E} = (FG + 1)^3 \text{)}$$

$$\text{EQAT F} = 1/1 + A * X + 1/2 * A \$ 2 + 1/6 * A \$ 3 * X \$ 3.$$

$$\text{EQAT G} = B * X - 1/6 * B \$ 3 + 1/120 * B \$ 5 * X \$ 5 - 1/5040 * B \$ 7 * X \$ 7.$$

$$\text{SBST E/F,G.} \quad \text{ie(Substitute in E, the expressions equal to F and G)}$$

$$\text{OPEN E.} \quad \text{ie(Remove all parentheses)}$$

$$\text{FCTR E/X} \$ 11, \text{E11/X} \$ 9, \text{E9/X} \$ 7, \text{E7/X} \$ 4, \text{E4/X} \$ 3, \text{E3/ER.}$$

ie(Factor E with respect to X\$11 and call the coefficient E11, factor the remainder of E with respect to X\$9 calling its coefficient E9, etc., tagging the remainder of E after all factoring is completed, ER)

$$\text{EQAT X} = 0/1.$$

$$\text{SBST E11/X.}$$

$$\text{OPEN E11.}$$

$$\text{DONE.}$$

ALGY will accept the first three EQAT commands, print and store the algebraic expressions on tape, where each expression is identified by its tag on the left-hand side of the equate symbol. It then accepts the SBST command, searches the tape for the expression equal to E and reads it into memory. The routine locates and reads the expression equal to F, and examines E, substituting the F expression with parentheses around it each time it appears in E. After F has been substituted, the same procedure is done for the expression G. The resulting substitution in E would appear in print as follows:

$$E = ((1/1 + A*X + 1/2*A^2*X^2 + 1/6*A^3*X^3)*(B*X - 1/6*B^3*X^3 + 1/120*B^5*X^5 - 1/5000*B^7*X^7) + 1/1)S3.$$

ALGY accepts the OPEN command and commences removing the parentheses in the E expression above. The results are printed and stored on tape. The system then enters FACTOR which will factor E with respect to each variable requested. It then prints and stores the coefficients of each factor as well as the new factored E expression as follows:

$$E11 = E11(X^n, A, B) \text{ where } n \text{ assumes all integers } 1 \text{ through } 19$$

$$E9 = E9(X, A, B)$$

$$E7 = E7(X, A, B)$$

$$E4 = E4(X, X^2, A, B)$$

$$E3 = E3(A, B)$$

$$ER = ER(X, X^2, A, B)$$

$$E = E11*X^11 + E9*X^9 + E7*X^7 + E4*X^4 + E3*X^3 + ER.$$

To eliminate all higher order terms in E11, simply EQAT x to zero, SBST x into E11 and then, $E11 = E11(A, B)$.

In this manner the coefficients of X^{11} and X^3 can be accurately determined with a minimum of effort on the part of the user. The computer cost of the solution for a few typical problems is less than 1/6 the cost of the solution obtained by manual labor, assuming that the man performing the algebraic manipulations is as reliable as the computer.

Below is a flow diagram for the ALGY system. Because of the logical complexity of each subroutine, detailed flow charts have not been included in this paper.

Future Operations

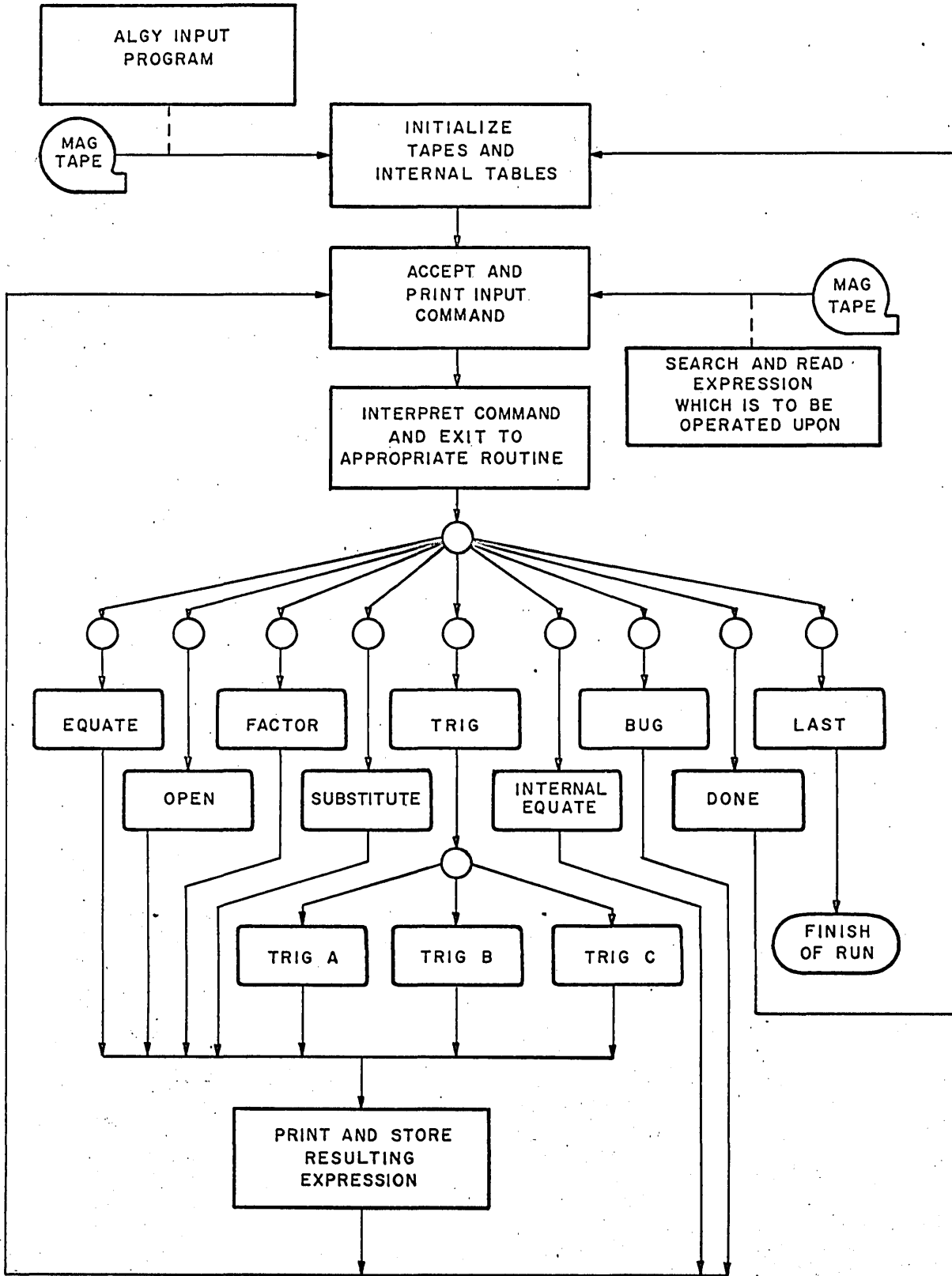
We will tremendously increase, during the next few years, the scope and number of allowable ALGY commands. Because of the specific problem in perturbation theory for which ALGY was originally designed, we will immediately develop two more trigonometric manipulations called TRIG B and TRIG C. TRIG B allows angle variables to be separated using the laws of addition for the sin and cos functions. TRIG C is, in a certain sense, the inverse operation to TRIG A. In TRIG C, sins and cos of multiple angles are reduced to powers of the sin and cos of the angle.

There are many algebraic operations that suggest themselves now that we have the basic tools for algebraic manipulation developed. Our future plans include differentiation, restrictive forms

of integration and solutions of linear systems using determinants. The restriction on the exponents will be lessened. We have already found several cases where "super" ALGY commands would be of value. For instance, it would be extremely desirable to have a command to generate a polynomial of given degree when only the i th term is given. There are also numerous form of factorization which suggest themselves. It should also be noted that the ALGY coded program is a straight-flow program just as the first numerical programs were. Undoubtedly, we will develop a loop technique for the ALGY system.

Conclusion

ALGY represents a first step in a new form of computer usage. ALGY is not a general problem solver. If the mathematician does not know how to algebraically manipulate his equations, ALGY can be of little help. But ALGY is an extremely powerful tool in the hands of an intelligent user. It enables the mathematician to consider and to solve problems that he would otherwise never consider because of the large amounts of algebraic manipulation necessary for a solution. It enables him to try different forms of a solution and use different approaches to the same problem, where before he was often committed to just one approach because of the large amount of time necessary to verify that one method.



ALGY -- Algebraic Manipulation Program
Operating Instructions and Program Statistics

Magnetic Tapes

OUT ALGY Input Program in code mode
1UT Intermediate scratch tape
3UT Printer output tape

All three tapes must have write enable rings.

Note: Program uses USE TAPE table in MESS (WDL Executive system).

Restart and Termination

Restart Procedure: None

Successful Terminations

A successful ALGY termination is indicated by 'FINISH OF ALGY RUN' on the console typewriter and an exit to M/620 in SC.

Other Terminations

A run may terminate by any of several error exits where one of the following is typed on the console typewriter:

'PROGRAM NOT ON TAPE' is indicated when a tape is mounted with no ALGY INPUT PROGRAM recorded on it.

'EXPRESSION NOT ON TAPE' is typed when an operation on a particular symbol is called for without having first defined the symbol with an EQAT.

'NUMBER TOO LARGE' occurs when a fixed point integer exceeds 2^{47} .

Note all arithmetic is exact and hence round-off is not allowed.

'TABLE OVERFLOX AT XXXXX' is recorded when the working table beginning at octal XXXXX overflows with BCD information. The six working tables are, at present, each 1900 words in length.

In the next version, this restriction will be eliminated by

including an expandable table feature. This is not a severe limitation if the user programs his problem wisely so as not to allow the program to generate an algebraic expression larger than 1900 BCD words.

Timing

The time required for an ALGY run is difficult to estimate. Depending on how complex the input program is, it may take from a few minutes to several hours. Seven to forty minutes, however, is an average run for most problems programmed for ALGY.

Input

The present ALGY commands are:*

- EQAT (Equate)
- SBST (Substitute)
- OPEN (Remove Parenthesis)
- FCTR (Factor)
- INQT (Internal Equate)
- DONE (End of Preceding Run)
- LAST (Finish of all Runs that are Stacked).

Card columns 1 thru 4 of ALGY input program cards are reserved for card sequencing since order is of the utmost importance. All other columns may be used for the program. Blank columns are ignored! The user MUST terminate each command followed by any expressions with a period to indicate to ALGY that this is the end of the present command. Several programs may be stacked on one tape for one run if they are separated by DONE commands. After the last program, twelve cards must follow with the code LAST in the first 4 cc of every 8 cc of each card. Note this includes cc 1-4.

* See ALGY - AN ALGEBRAIC MANIPULATION PROGRAM, M. Bernick, E. D. Callender, J. R. Sanford; Western Joint Computer Conference, Los Angeles, 1961.

TITLE: ALGY - An Algebraic Manipulation Program
 CONTACT: E. D. Callender
 PROGRAMMER: J. R. Sanford
 DATE: 30 June 1961
 SOURCE LANGUAGE: TAC
 MINIMUM MACHINE: 16K, 8 Index Registers, 3 Magnetic Tapes

ABSTRACT

ALGY - An Algebraic Manipulation Program for the Philco 2000
 Computer

This program performs the reduction of complex analytical
 expressions. It accepts as input alphanumeric algebraic
 statements, performs specified manipulations of the alphanumeric
 bit patterns and produces a modified set of algebraic
 statements.

JR0000	i	ALGY1	
JR0001	*	ALGY, AN ALGEBRAIC MANIPULATION PROGRAM FOR THE PHILCO 2000	
JR0002	*	PHILCO CORP., WESTERN DEVELOPMENT LABORATORIES	
JR0003	*	PALO ALTO, CALIFORNIA	
JR0004	*	MAY 1, 1961	
JR0005	*	JERALD R. SANFORD	
JR0006		AFEND 39\$	
JR0007		NAME JRS	
JR0008		SET M/4000	
JR0009		SAME S4,S1	
JR0010		SAME SUBSTA,MY	
JR0011		SAME SUBSTB,MN	
JR0012		SAME MP,MULTC	
JR0013		SAME T2,F1	
JR0014		SAME T3,F2	
JR0015		SAME SORTC,G	
JR0016		ASGN USE,M/600	
JR0017	OPEN	TJM OPNX	REMOVE PARENTHESES
JR0018		CM CTE	CLEAR FLAG AND FOLLOWING
JR0019		CM MFF1	FLAG FOR WITHIN PARA
JR0020		CM CTL	N TH ORDER COUNTER
JR0021		CM CTLP	RUNNING COUNTER
JR0022		TMD LC+2	SET OPENM
JR0023		TDM LV+2	
JR0024		TMD LC+5	SET E1
JR0025		TDM LV+5	
JR0026		TMD LC+8	SET MY
JR0027		TDM LV+8	
JR0028		TMD LC+9	SET MN
JR0029		TDM LV+9	
JR0030		TMD LC+22	SET MULTA
JR0031		TDM LV+22	
JR0032		TMD LC+23	SET MULTB
JR0033		TDM LV+23	
JR0034		TMD LC+24	SET MULTC
JR0035		TDM LV+24	FIND ORDER OF PARENTHESES
JR0036	YFB	TMD LV+2	BRING ON OPENM
JR0037		JMP B	
JR0038		TMD PTABL	END CODE
JR0039		JAED OPN2	
JR0040		TMD PTABL+5	(
JR0041		JAED YFD	
JR0042		TMD PTABL+6)
JR0043		JAED YFE	
JR0044	YFC	TIXZ 2,4X	NO
JR0045		JMP NBV	NEXT BRING ON OPENM
JR0046		JMP YFB+1H	
JR0047	YFD	TMA CNST+2	1B47
JR0048		AMS CTLP	LEFT PARA
JR0049		TMD LV+2	SAVE LOC IN OPENM
JR0050		TDM LW+6	
JR0051		JMP YFC	
JR0052	YFE	TMA CTL	FIND HIGHEST ORDER
JR0053		TMD CTLP	
JR0054		JAED YFF	
JR0055		JAGD YFF	
JR0056		TDM CTL	
JR0057		TMD LW+6	FIND LOC OF INNERMOST NEST
JR0058		TDM LW+7	
JR0059	YFF	CSM CNST+2	REDUCE FOR RIGHT PARA

JR0060		AMS	CTLP	
JR0061		JMP	YFC	
JR0062	OPN2	TMD	LC+2	ENTER,CTLP TO 0, CTL TO NTH
JR0063		TDM	LV+2	
JR0064		TMA	CTL	
JR0065		JAZ	YFG	
JR0066		JMP	OPNX+1H	NO
JR0067	YFG	TMD	Y44	
JR0068		TDM	LW+10	
JR0069		TMD	Y1	
JR0070		TDXLC	,4X	LW+10,4X 1/1 TO
JR0071		TDXRC	1H,5X	LV+22,5X MULTA
JR0072		JMP	BSQ	BRING STORE QUANTITY
JR0073		JMP	SLW-1H	END CODE MULTA
JR0074		TMD	Y2	
JR0075		TDXLC	,4X	LV+2,4X OPENM
JR0076		TDXRC	1H,5X	LV+23,5X MULTB
JR0077		JMP	BSE	BRING STORE EXPRESSION
JR0078		JMP	SLW-1H	END CODE MULTB
JR0079		JMP	MULT	MULTIPLY
JR0080		TMD	Y3	
JR0081		TDXLC	,4X	MULTC,4X
JR0082		TDXRC	1H,5X	OPENM,5X
JR0083		JMP	BLOCK	TRANSFER TABLE
JR0084	OPNX	JMP	(P)	EXIT OPEN
JR0085		TMD	LC+2	SET OPENM
JR0086		TDM	LV+2	
JR0087	YFI	TMD	LV+2	
JR0088		JMP	B	BRING ON OPENM
JR0089		TMD	LV+9	
JR0090		JMP	S	STORE IN MN
JR0091		TIXZ	9,5X	
JR0092		JMP	NSV	NEXT STORE ON MN
JR0093		TMA	LW+7	LOC INNER NEST
JR0094		TMD	LV+2	LOC OPENM
JR0095		JAED	YFU	IF EQUAL TO YFU
JR0096		TIXZ	2,4X	
JR0097		JMP	NBV	NEXT BRING ON OPENM
JR0098		JMP	YFI+1H	
JR0099	YFU	TMD	LV+9	SAVE LOC OF MN
JR0100		TDM	LW+8	SEARCH FOR EXPONENTIAL
JR0101		TMD	LC+24	SET MULTC
JR0102		TDM	LV+24	
JR0103	OPN5	TIXZ	7,4X	
JR0104		JMP	NBV	NEXT BRING ON OPENM
JR0105		JMP	B	BRING ON OPENM
JR0106		TMD	PTABL+6)
JR0107		JAED	YFK	
JR0108		TMD	LV+24	NO
JR0109		JMP	S	STORE IN MULTC
JR0110		TIXZ	24,5X	
JR0111		JMP	NSV	NEXT STORE IN MULTC
JR0112		JMP	OPN5	
JR0113	YFK	TIXZ	7,4X	
JR0114		JMP	NBV	NEXT BRING ON OPENM
JR0115		TIXZ	24,5X	
JR0116		JMP	SLWV	END CODE MULTC
JR0117		TMD	LW+7	
JR0118		JMP	B	BRING ON OPENM
JR0119		TMD	PTABL+4	\$

JR0120		JAED	YFL	
JR0121		JMP	YFM	NO
JR0122	YFL	TMD	Y4	
JR0123		TDXLC	,4X	MULTC,4X
JR0124		TDXRC	1H,5X	MULTB,5X
JR0125		JMP	BLOCK	TRANSFER TABLE
JR0126		TIXZ	7,4X	
JR0127		JMP	NBW	NEXT BRING ON OPENM
JR0128		TMD	LC+5	SET E1
JR0129		TDM	LV+5	
JR0130		TMD	Y2	
JR0131		TDXLC	,5X	LV+2,5X
JR0132		AIXO	3,5X	LV+5,5X
JR0133		JMP	BSQ	BSQ OPENM TO E1
JR0134		JMP	SLW-1H	END CODE E1
JR0135		TMD	LC+5	
JR0136		TDXLC	,3X	E1
JR0137		JMP	RT	BGD TO BINARY
JR0138		TMA	RTW+1	NUMBER AT B47
JR0139		TDM	CTE	N TH POWER
JR0140	YFN	TMD	CNST+2	1B47
JR0141		JAED	YFM	
JR0142		TMD	Y5	
JR0143		TDXLC	,4X	MULTC,4X
JR0144		TDXRC	1H,5X	MULTA,5X
JR0145		JMP	BLOCK	TRANSFER TABLE
JR0146		JMP	MULT	MULTIPLY
JR0147		CSM	CNST+2	1B47
JR0148		AMS	CTE	N-1ST POWER TO N
JR0149		JMP	YFN	
JR0150	YFM	TMD	LC+24	SET MULTC
JR0151		TDM	LV+24	
JR0152		TMD	Y6	
JR0153		TDXLC	,4X	LV+24,4X MULTC
JR0154		TDXRC	1H,5X	LW+8,5X MN
JR0155		JMP	BSE	BRING STORE EXPRESSION
JR0156		TMD	PTABL+6	BRING)
JR0157		TDM	T1	
JR0158		TMD	LW+8	
JR0159		JMP	S	STORE IN MN
JR0160		TIXZ	8,5X	
JR0161		JMP	NSW	NEXT STORE ON MN
JR0162		TMA	CTL	
JR0163		SM	CNST+2	1B47
JR0164		TAM	CTLP	REDUCE ORDER
JR0165	YFP	TMD	LW+7	BRING ON OPENM
JR0166		JMP	B	
JR0167		TMD	LW+8	
JR0168		JMP	S	STORE IN MN
JR0169		TIXZ	8,5X	
JR0170		JMP	NSW	NEXT STORE ON MN
JR0171		TMA	T1	
JR0172		TMD	PTABL	END CODE
JR0173		JAED	OPN4	
JR0174		TMD	PTABL+6)
JR0175		JAED	YFS	(
JR0176		TMD	PTABL+5	
JR0177		JAED	YFR	
JR0178	YFQ	TIXZ	7,4X	NO
JR0179		JMP	NBW	NEXT BRING ON OPENM

JR0180		JMP	YFP+1H	
JR0181	YFS	CSM	CNST+2	
JR0182		AMS	CTLP	REDUCE ORDER
JR0183		JMP	YFQ	
JR0184	YFR	TMA	CNST+2	
JR0185		AMS	CTLP	INC ORDER
JR0186		TMD	CTL	
JR0187		JAED	YFU+2H	
JR0188		TIXZ	7,4X	
JR0189		JMP	NBW	NEXT BRING ON OPENM
JR0190		JMP	YFP+1H	
JR0191	OPN4	TIXZ	8,5X	PREPARE TO REMOVE PARA
JR0192		JMP	SLWW	END CODE MN
JR0193		TMD	LC+2	SET OPENM
JR0194		TDM	LV+2	
JR0195		TMD	LC+5	SET E1
JR0196		TDM	LV+5	
JR0197		TMD	LC+8	SET MY
JR0198		TDM	LV+8	
JR0199		TMD	LC+9	SET MN
JR0200		TDM	LV+9	
JR0201		TMD	LC+22	SET MULTA
JR0202		TDM	LV+22	
JR0203		TMD	LC+23	SET MULTB
JR0204		TDM	LV+23	
JR0205		TMD	LC+24	SET MULTC
JR0206		TDM	LV+24	
JR0207		TMD	Y7	
JR0208		TDXLC	,4X	MN,4X
JR0209		TDXRC	1H,5X	OPENM,5X
JR0210		JMP	BLOCK	TRANSFER TABLE
JR0211		TMD	LV+2	SAVE LOC OPENM
JR0212		TDM	LW+11	
JR0213		CM	CTLP	
JR0214	OPN16	TMD	LV+2	
JR0215		JMP	B	BRING ON OPENM
JR0216		TMD	PTABL	END CODE
JR0217		JAED	OPN17)
JR0218		TMD	PTABL+6	(
JR0219		JAED	YFT1	
JR0220		TMD	PTABL+5	
JR0221		JAED	YFT2	
JR0222	YFT	TIXZ	2,4X	NO
JR0223		JMP	NBV	NEXT BRING ON OPENM
JR0224		JMP	OPN16+1H	
JR0225	YFT1	CSM	CNST+2	REDUCE RUNNING COUNTER
JR0226		AMS	CTLP	
JR0227		TIXZ	2,4X	
JR0228		JMP	NBV	NEXT BRING ON OPENM
JR0229		JMP	OPN16+1H	
JR0230	YFT2	TMA	CNST+2	INCREASE RUNNING COUNTER
JR0231		AMS	CTLP	
JR0232		TMD	CTL	
JR0233		JAED	(P)+2H	MULTIPLY TERM ON LEFT
JR0234		JMP	YFT	AND THEN ON RIGHT
JR0235		TMD	LV+2	
JR0236		TDM	LW+3	SAVE LOC OF LEFT PARA
JR0237		TIXZ	2,4X	
JR0238		JMP	NBV	NEXT BRING ON OPENM
JR0239	YFV	TMD	LV+2	

JR0240		JMP	B	BRING ON OPENM
JR0241		TIXZ	2,4X	
JR0242		JMP	NBV	NEXT BRING ON OPENM
JR0243		TMA	T1	
JR0244		TMD	PTABL+6)
JR0245		JAED	YFV1	
JR0246		TMD	LV+24	NO
JR0247		JMP	S	STORE IN MULTC
JR0248		TIXZ	24,5X	
JR0249		JMP	NSV	NEXT STORE ON MULTC
JR0250		JMP	YFV	
JR0251	YFV1	TIXZ	24,5X	
JR0252		JMP	SLWV	END CODE MULTC
JR0253		TMD	LV+2	SAVE LOC JUST PAST RIGHT
JR0254		TDM	LW+10	PARENTHESES
JR0255	OPN8	TMD	LC+23	
JR0256		TDM	LV+23	SET MULTB
JR0257		TMD	LV+2	
JR0258		JMP	B	BRING ON MULTB
JR0259		TMD	PTABL+3	ASTERICK
JR0260		JAED	OPN81	
JR0261		JMP	OPN10	NO
JR0262	OPN81	TIXZ	2,4X	
JR0263		JMP	NBV	NEXT BRING ON OPENM
JR0264		JMP	B	BRING ON OPENM
JR0265		TMD	PTABL+5	(
JR0266		JAED	YFW	
JR0267		JMP	YFW1	NO
JR0268	YFW	TMD	CNST+2	1B47
JR0269		TDM	MFF1	SET FLAG FOR WITHIN PARA
JR0270		TIXZ	2,4X	
JR0271		JMP	NBV	NEXT BRING ON OPENM
JR0272		JMP	B	BRING ON OPENM
JR0273	YFW1	TMD	PTABL	
JR0274		JAED	YFX	
JR0275		TMD	PTABL+1	+
JR0276		JAED	YFX	-
JR0277		TMD	PTABL+2	
JR0278		JAED	YFX	
JR0279		TMD	PTABL+5	
JR0280		JAED	OPN9A	
JR0281		TMD	PTABL+6)
JR0282		JAED	YGF	
JR0283	YFW2	TMD	LV+2	NO
JR0284		JMP	B	BRING ON OPENM
JR0285		TMD	LV+23	
JR0286		JMP	S	STORE IN MULTB
JR0287		TIXZ	23,5X	
JR0288		JMP	NSV	NEXT STORE ON MULTB
JR0289		JMP	YFW+2H	
JR0290	YFX	TMA	MFF1	
JR0291		TDM	T1	
JR0292		TMD	CNST+2	1B47
JR0293		JAED	YFW2	
JR0294		JMP	OPN9	NO
JR0295	YFX1	TIXZ	2,4X	
JR0296		JMP	NBV	NEXT BRING ON OPENM
JR0297		CM	MFF1	CLEAR FLAG
JR0298	OPN9	TMD	LV+2	SAVE LOC OF OPENM
JR0299		TDM	LW+10	

JR0300		TIXZ	24,5X	
JR0301		JMP	SLWV	END CODE MULTC
JR0302		SIXO	1,5X	END CODE MULTB
JR0303		JMP	SLW-1H	
JR0304		TMD	Y5	
JR0305		TDXLC	,4X	MULTC,4X
JR0306		TDXRC	1H,5X	MULTA,5X
JR0307		JMP	BLOCK	TRANSFER DATA TABLE
JR0308		JMP	MULT	ALGEBRAIC MULTIPLY
JR0309		JMP	OPN8	
JR0310	OPN9A	TIXZ	23,4X	
JR0311		JMP	DECKV	LAST STORE ON MULTB
JR0312		TIXZ	2,4X	
JR0313		JMP	DECKV	LAST BRING ON OPENM
JR0314		JMP	OPN9	
JR0315	OPN10	TMD	LC+23	
JR0316		TDM	LV+23	SET MULTB
JR0317		TIXZ	3,4X	
JR0318		JMP	DECKW	LAST BRING ON OPENM
JR0319		TMA	LW+3	
JR0320		TMD	Y8	OPENM-1,42
JR0321		JAED	YFYY	
JR0322		TAD		
JR0323		JMP	B	BRING ON OPENM
JR0324		TMD	PTABL+3	ASTERICK
JR0325		JAED	YFXX	
JR0326		TMD	PTABL+5	(
JR0327		JAED	YFYY	
JR0328		JMP	YFYY+2H	NO
JR0329	YFYY	TIXZ	3,4X	
JR0330		JMP	NBW	NEXT BRING ON OPENM
JR0331		TMD	LW+3	
JR0332		TDM	LW+5	SAVE LOCATION IN OPENM
JR0333		JMP	YGA	
JR0334	YFXX	TIXZ	3,4X	
JR0335		JMP	DECKW	LAST BRING ON OPENM
JR0336		TMA	LW+3	
JR0337		TMD	Y8	OPENM-1,42
JR0338		JAED	YFXX1	
JR0339		TMD	LW+3	
JR0340		JMP	B	BRING ON OPENM
JR0341		TMD	PTABL+1	+
JR0342		JAED	YFY	-
JR0343		TMD	PTABL+2	
JR0344		JAED	YFY	(
JR0345		TMD	PTABL+5	
JR0346		JAED	YFY	
JR0347		JMP	YFXX	NO
JR0348	YFXX1	TIXZ	3,4X	
JR0349		JMP	NBW	NEXT BRING ON OPENM
JR0350		TMD	LW+3	
JR0351		TDM	LW+5	
JR0352		JMP	YFY+4H	
JR0353	YFY	TMD	LW+3	
JR0354		TDM	LW+5	
JR0355		TIXZ	3,4X	
JR0356		JMP	NBW	NEXT BRING ON OPENM
JR0357		JMP	B	BRING ON OPENM
JR0358		TMD	PTABL+5	(
JR0359		JAED	YFZ	

JR0360		TMD	LV+23	NO
JR0361		JMP	S	STORE IN MULTB
JR0362		TIXZ	23,5X	
JR0363		JMP	NSV	NEXT STORE ON MULTB
JR0364		JMP	YFY+2H	
JR0365	YFZ	TIXZ	23,4X	
JR0366		JMP	DECKV	LAST STORE ON MULTB
JR0367		TIXZ	23,5X	
JR0368		JMP	SLWV	END CODE MULTB
JR0369		TMD	Y5	
JR0370		TDXLG	,4X	MULTC,4X
JR0371		TDXRC	1H,5X	MULTA,5X
JR0372		JMP	BLOCK	TRANSFER DATA TABLE
JR0373		JMP	MULT	ALGEBRAIC MULTIPLY
JR0374	YGA	TMA	LW+11	BRING EXPRESSION UP TO PARA
JR0375		TMD	LW+5	
JR0376		JAED	YGB	
JR0377		TMD	LW+11	
JR0378		JMP	B	BRING ON OPENM
JR0379		TIXZ	11,4X	
JR0380		JMP	NBW	NEXT BRING ON OPENM
JR0381		TMD	LV+9	
JR0382		JMP	S	STORE IN MN
JR0383		TIXZ	9,5X	
JR0384		JMP	NSV	NEXT STORE ON MN
JR0385		JMP	YGA	
JR0386	YGB	TMD	LC+24	
JR0387		TDM	LV+24	SET MULTC
JR0388		TMD	LV+24	
JR0389		JMP	B	BRING ON MULTC
JR0390		TMD	PTABL	END CODE
JR0391		JAED	OPN15	
JR0392		TMD	LW+11	
JR0393		JMP	B	BRING ON OPENM
JR0394		TMD	PTABL+5	(
JR0395		JAED	YGDD	
JR0396		TMD	PTABL+2	-
JR0397		JAED	YGG	
JR0398		JMP	YGD	NO
JR0399		TMD	LW+9	
JR0400		JMP	S	STORE
JR0401		TIXZ	9,5X	
JR0402		JMP	NSV	NEXT STORE
JR0403	YGD	TMD	LV+24	MULTC
JR0404		JMP	B	
JR0405		TMD	PTABL+2	-
JR0406		JAED	YGD2	
JR0407		TMD	PTABL+1	+
JR0408		JAED	YGD2	
JR0409		TDM	T1	
JR0410		TMD	LV+9	
JR0411		JMP	S	
JR0412		TIXZ	9,5X	
JR0413		JMP	NSV	
JR0414	YGD2	TMD	Y9	
JR0415		TDXLC	,4X	LV+24,4X MULTC
JR0416		TDXRC	1H,5X	LV+9,5X MN
JR0417		JMP	BSE	BRING STORE EXPRESSION
JR0418		JMP	OPN15	
JR0419	YGD1	TMD	LV+24	

JR0420		JMP	B	BRING ON MULTC
JR0421		TMD	PTABL	END CODE
JR0422		JAED	OPN15	
JR0423		TMD	PTABL+1	+
JR0424		JAED	YGC	-
JR0425		TMD	PTABL+2	-
JR0426		JAED	YGC1	
JR0427		JMP	YGC2	NO
JR0428	YGC	TMD	PTABL+2	-
JR0429		TDM	T1	PRESENT CHARACTER
JR0430		JMP	YGC2	
JR0431	YGC1	TMD	PTABL+1	+
JR0432		TDM	T1	PRESENT CHARACTER
JR0433	YGC2	TMD	LV+9	
JR0434		JMP	S	STORE IN MN
JR0435		TIXZ	9,5X	
JR0436		JMP	NSV	NEXT STORE ON MN
JR0437		TIXZ	24,4X	
JR0438		JMP	NBV	NEXT BRING ON MULTC
JR0439		JMP	YGD1	
JR0440	OPN15	TMD	LW+10	SAVE OPENM LOC
JR0441		TDM	LW+11	
JR0442		TMD	LC+5	
JR0443		TDM	LV+5	SET E1
JR0444		TMD	LC+8	
JR0445		TDM	LV+8	SET MY
JR0446		TMD	LC+22	
JR0447		TDM	LV+22	SET MULTA
JR0448		TMD	LC+23	
JR0449		TDM	LV+23	SET MULTB
JR0450		TMD	LC+24	
JR0451		TDM	LV+24	SET MULTC
JR0452		CSM	CNST+2	
JR0453		AMS	CTLP	REDUCE RUNNING COUNTER
JR0454		JMP	OPN16	
JR0455	OPN17	TMD	Y10	
JR0456		TDXLC	,4X	LW+11,4X OPENM
JR0457		TDXRC	1H,5X	LV+9,5X MN
JR0458		JMP	BSE	BRING STORE EXPRESSION
JR0459		JMP	SLW-1H	END CODE MN
JR0460		TMD	Y7	
JR0461		TDXLC	,4X	MN,4X
JR0462		TDXRC	1H,5X	OPENM,5X
JR0463		JMP	BLOCK	TRANSFER DATA TABLE
JR0464		JMP	OPEN+1H	
JR0465	YGF	TMA	MFF1	
JR0466		TDM	T1	
JR0467		JAZ	OPN9	
JR0468		JMP	YFX1	NO
JR0469	YGG	TMD	LV+24	
JR0470		JMP	B	BRING ON MULTC
JR0471		TMD	PTABL+1	+
JR0472		JAED	YGC	-
JR0473		TMD	PTABL+2	-
JR0474		JAED	YGC1	
JR0475		TMD	PTABL+2	NO,-
JR0476		TDM	T1	PRESENT CHARACTER
JR0477		TMD	LV+9	
JR0478		JMP	S	STORE IN MN
JR0479		TIXZ	9,5X	

JR0480		JMP	NSV	NEXT STORE ON MN
JR0481		JMP	YGD1	
JR0482	YGDD	TIXZ	11,4X	
JR0483		JMP	DECKW	
JR0484		TMA	Y8	
JR0485		TMD	LW+11	
JR0486		JAED	YGDD1	
JR0487		JMP	B-	
JR0488		TMD	PTABL+5	
JR0489		JAED	YGDD1	
JR0490		TDM	T1	
JR0491		JMP	NBV-2H	
JR0492		TMD	LV+9	
JR0493		JMP	S	
JR0494		TIXZ	9,5X	
JR0495		JMP	NSV	
JR0496		JMP	YGD	
JR0497	YGDD1	JMP	NBV-2H	
JR0498		JMP	YGD	
JR0499		PAGE		
JR0500	MULT	TJM	MULTX	ALGEBRAIC MULTIPLICATION
JR0501		TMD	LC+22	
JR0502		TDM	LV+22	SET MULTA
JR0503		TMD	LC+24	
JR0504		TDM	LV+24	SET MULTC
JR0505		TMD	LC+21	
JR0506		TDM	LV+21	SET SORTC
JR0507		TIXZ	24,5X	
JR0508		JMP	SLWV	END CODE MULTC
JR0509		TMD	LC+24	
JR0510		TDM	LV+24	SET MULTC
JR0511	MULT2	TMD	PTABL+1	+
JR0512		TDM	T1	PRESENT CHARACTER
JR0513		TMD	LC+25	
JR0514		JMP	S	STORE IN S3
JR0515		TMD	LC+23	
JR0516		TDM	LV+23	SET MULTB
JR0517		TMD	LV+22	
JR0518		JMP	B	BRING ON MULTA
JR0519		TIXZ	22,4X	
JR0520		JMP	NBV	NEXT BRING ON MULTA
JR0521		TMA	T1	
JR0522		TMD	PTABL+1	+
JR0523		JAED	MULT5	.
JR0524		TMD	PTABL+2	-
JR0525		JAED	YCA	
JR0526		TIXZ	22,4X	NO
JR0527		JMP	DECKV	LAST BRING ON MULTA
JR0528		JMP	MULT5	
JR0529	YCA	TMD	LC+25	
JR0530		JMP	S	STORE IN S3
JR0531	MULT5	TMD	LV+22	
JR0532		JMP	B	BRING ON MULTA
JR0533		TMD	PTABL	END CODE
JR0534		JAED	MULT4	
JR0535		TMD	LC+12	NO
JR0536		TDM	LV+12	SET SORTO
JR0537		TMD	Y11	
JR0538		TDXLC	,4X	MULTA,4X
JR0539		TDXRC	1H,5X	SORTO,5X

JR0540		JMP	BSG	BRING STORE GROUP
JR0541		TMD	PTABL+3	ASTERICK
JR0542		TDM	T1	PRESENT CHARACTER
JR0543		TMD	LV+12	
JR0544		JMP	S	STORE IN SORTO
JR0545		JMP	NSV-2H	NEXT STORE ON SORTO
JR0546		TMD	Y12	
JR0547		TDXLC	,4X	SORTO,4X
JR0548		TDXRC	1H,5X	SORTC,5X
JR0549		JMP	BLOCK	TRANSFER DATA TABLE
JR0550		TMD	S3	
JR0551		TDM	S2	
JR0552		TMD	LV+12	
JR0553		TDM	LW+4	
JR0554	MULT1	TMD	Y12	
JR0555		TDXRC	1H,4X	SORTC,4X
JR0556		TDXLC	,5X	SORTO,5X
JR0557		JMP	BLOCK	TRANSFER DATA TABLE
JR0558		TMD	S2	
JR0559		TDM	S3	
JR0560		TMD	LW+4	
JR0561		TDM	LV+12	
JR0562		TMD	LV+23	
JR0563		JMP	B	BRING ON MULTB
JR0564		TIXZ	23,4X	
JR0565		JMP	NBV	NEXT BRING ON MULTB
JR0566		TMA	T1	
JR0567		TMD	PTABL+1	+
JR0568		JAED	MULT6B	.
JR0569		TMD	PTABL+2	-
JR0570		JAED	YCC	
JR0571		TIXZ	23,4X	NO
JR0572		JMP	DECKV	LAST BRING ON MULTB
JR0573		JMP	MULT6	
JR0574	YCC	TMD	LC+25	
JR0575		JMP	B	BRING ON S3
JR0576		TMD	PTABL+1	+
JR0577		JAED	YCC1	
JR0578		TDM	T1	
JR0579		TMD	LC+25	
JR0580		JMP	S	STORE IN S3
JR0581		JMP	MULT6B	
JR0582	YCC1	TMD	PTABL+2	-
JR0583		TDM	T1	
JR0584		TMD	LC+25	
JR0585		JMP	S	STORE IN S3
JR0586	MULT6	TMD	LV+23	
JR0587		JMP	B	BRING ON MULTB
JR0588		TMD	PTABL	END CODE
JR0589		JAED	MULT2	
JR0590	MULT6B	TMD	Y13	NO
JR0591		TDXLC	,4X	MULTB,4X
JR0592		TDXRC	1H,5X	SORTO,5X
JR0593		JMP	BSG	BRING STORE GROUP
JR0594		JMP	SLW-1H	END CODE SORTO
JR0595		JMP	SORT	MULTIPLY LIKE TERMS
JR0596		JMP	GATHER	ADD LIKE TERMS
JR0597		JMP	MULT1	
JR0598	MULT4	TMD	LC+24	
JR0599		TDM	LV+24	SET MULTC

JR0600		JMP	B	BRING ON MULTC
JR0601		TIXZ	24,4X	
JR0602		JMP	NBV	NEXT BRING ON MULTC
JR0603		TMA	T1	
JR0604		TMD	PTABL	END CODE
JR0605		JAED	MULTX	TO EXIT
JR0606		TMD	LV+24	NO
JR0607		JMP	MULT4+2H	
JR0608	MULTX	JMP	(P)	EXIT MULT
JR0609		PAGE		
JR0610	SORT	TJM	SORTX	MULTIPLY LIKE TERMS
JR0611		TMD	LC+14	
JR0612		TDM	LV+14	SET SORTB
JR0613		TMD	LC+16	
JR0614		TDM	LV+16	SET N2
JR0615		TMD	LC+12	
JR0616		TDM	LV+12	SET SORTO
JR0617		TMD	CNST	1/1.....
JR0618		TDM	N2	
JR0619		TIXZ	14,5X	
JR0620		JMP	SLWV	END CODE SORTB
JR0621	STS1	TMD	Y14	
JR0622		TDXLC	,4X	LC+13,4X
JR0623		TDXRC	1H,5X	LV+13,5X
JR0624	R	RPTAA	8	SET 8 CONTROL WORDS
JR0625		TMD	1,4X	
JR0626		TDM	1,5X	
JR0627	STS2	TMD	LC+19	SET T2
JR0628		TDM	LV+19	
JR0629		TMD	LV+12	
JR0630		JMP	B	BRING ON SORTO
JR0631		TMD	PTABL	END CODE
JR0632		JAED	STS12	
JR0633		CM	T2	
JR0634		CM	T2+1	
JR0635		TMD	Y15	NO
JR0636		TDXLC	,4X	LV+12,4X SORTO
JR0637		TDXRC	1H,5X	LV+19,5X T2
JR0638		JMP	BSQ	BRING STORE QUANTITY
JR0639		JMP	SLW-1H	END CODE T2
JR0640		TMA	QFF	
JR0641		TDM	T1	PRESENT CHARACTER
JR0642		TMD	PTABL+2	-
JR0643		JAED	STS2	
JR0644		TMD	PTABL+3	ASTERICK
JR0645		JAED	STS3	
JR0646		TMD	LC+19	NO
JR0647		TDM	LV+19	SET T2
JR0648		TMD	LC+15	
JR0649		TDM	LV+15	SET N1
JR0650		TMD	Y16	
JR0651		TDXLC	,4X	LV+19,4X T2
JR0652		TDXRC	1H,5X	LV+15,5X N1
JR0653		JMP	BSQ	BRING STORE QUANTITY
JR0654		JMP	SLW-1H	
JR0655		JMP	NUMULT	NUMERIC FRACTION MULTIPLY
JR0656		JMP	STS2	
JR0657	STS3	TMD	LV+14	
JR0658		JMP	B	BRING ON SORTB
JR0659		TMD	PTABL	END CODE

JR0660		JAED	YBG	
JR0661		TMD	LC+20	NO
JR0662		TDM	LV+20	SET T3
JR0663		CM	T3	
JR0664		CM	T3+1	
JR0665		TMD	Y17	
JR0666		TDXLC	,4X	LV+14,4X SORTB
JR0667		TDXRC	1H,5X	LV+20,5X T3
JR0668		JMP	BSQ	BRING STORE QUANTITY
JR0669		JMP	SLW-1H	
JR0670		TMA	QFF	
JR0671		TDM	T1	
JR0672		TMD	PTABL+2	-
JR0673		JAED	STS9	
JR0674	YBB	TMA	T2	NO
JR0675		TMD	T3	
JR0676		JAED	(P)+3H	
JR0677		JAGD	STS9	
JR0678		JMP	STS10	
JR0679		TMA	T2+1	
JR0680		TMD	T3+1	
JR0681		JAED	STS4	
JR0682		JMP	YBB+3H	
JR0683	STS9	TMD	LC+20	
JR0684		TDM	LV+20	SET T3
JR0685		TMD	Y18	
JR0686		TDXLC	,4X	LV+20,4X T3
JR0687		TDXRC	1H,5X	LV+13,5X SORTA
JR0688		JMP	BSQ	BRING STORE QUANTITY
JR0689		TMD	LV+14	
JR0690		JMP	B	BRING ON SORTB
JR0691		TMD	PTABL+4	\$
JR0692		JAED	YBC	
JR0693		JMP	STS3	NO
JR0694	YBC	TMD	Y19	
JR0695		TDXLC	,4X	LV+14,4X SORTB
JR0696		TDXRC	1H,5X	LV+13,5X SORTA
JR0697		JMP	BSQ	BRING STORE QUANTITY
JR0698		JMP	BSQ	BRING STORE QUANTITY
JR0699		JMP	STS3	
JR0700	STS10	TMD	LC+19	
JR0701		TDM	LV+19	SET T2
JR0702		TMD	Y20	
JR0703		TDXLC	,4X	LV+19,4X T2
JR0704		TDXRC	1H,5X	LV+13,5X SORTA
JR0705		JMP	BSQ	BRING STORE QUANTITY
JR0706		TMD	LV+12	
JR0707		JMP	B	BRING ON SORTO
JR0708		TMD	PTABL+4	\$
JR0709		JAED	YBD	
JR0710		JMP	STS5	NO
JR0711	YBD	TMD	Y21	
JR0712		TDXLC	,4X	LV+12,4X SORTO
JR0713		TDXRC	1H,5X	LV+13,5X SORTA
JR0714		JMP	BSQ	BRING STORE QUANTITY
JR0715		JMP	BSQ	BRING STORE QUANTITY
JR0716	STS5	TMD	PTABL+3	ASTERICK
JR0717		TDM	T1	PRESENT CHARACTER
JR0718		TMD	LV+13	
JR0719		JMP	S	STORE IN SORTA

JR0720		TIXZ	13,5X	
JR0721		JMP	NSV	NEXT STORE ON SORTA
JR0722		TMD	LC+20	
JR0723		TDM	LV+20	SET T3
JR0724		TMD	Y18	
JR0725		TDXLC	,4X	LV+20,4X T3
JR0726		TDXRC	1H,5X	LV+13,5X SORTA
JR0727		JMP	BSG	BRING STORE GROUP
JR0728	STS7	TMD	Y19	
JR0729		TDXLC	,4X	LV+14,4X SORTB
JR0730		TDXRC	1H,5X	LV+13,5X SORTA
JR0731		JMP	BSG	BRING STORE GROUP
JR0732	STS8	TIXZ	13,5X	
JR0733		JMP	SLWV	END CODE SORTA
JR0734		TMD	Y22	
JR0735		TDXLC	,4X	SORTA,4X
JR0736		TDXRC	1H,5X	SORTB,5X
JR0737		JMP	BLOCK	TRANSFER DATA TABLE
JR0738		JMP	STS1	
JR0739	STS4	TMD	LC+19	
JR0740		TDM	LV+19	SET T2
JR0741		TMD	Y20	
JR0742		TDXLC	,4X	LV+19,4X T2
JR0743		TDXRC	1H,5X	LV+13,5X SORTA
JR0744		JMP	BSQ	BRING STORE QUANTITY
JR0745		TMD	LV+12	
JR0746		JMP	B	BRING ON SORTO
JR0747		TMD	PTABL+4	\$
JR0748		JAED	YBE	
JR0749		TMD	CNST+2	NO, 1B47
JR0750		TDM	T1	PRESENT CHARACTER
JR0751		TMD	LV+17	
JR0752		JMP	S	STORE IN EE1
JR0753		TIXZ	17,5X	
JR0754		JMP	NSV	NEXT STORE ON EE1
JR0755		JMP	YBE1	
JR0756	YBE	TIXZ	12,4X	
JR0757		JMP	NBV	NEXT BRING ON SORTO
JR0758		TMD	Y23	
JR0759		TDXLC	,4X	LV+12,4X SORTO
JR0760		TDXRC	1H,5X	LV+17,5X EE1
JR0761		JMP	BSQ	BRING STORE QUANTITY
JR0762	YBE1	JMP	SLW-1H	END CODE EE1
JR0763		TMD	LV+14	
JR0764		JMP	B	BRING ON SORTB
JR0765		TMD	PTABL+4	\$
JR0766		JAED	YBF	
JR0767		TMD	CNST+2	NO, 1B47
JR0768		TDM	T1	
JR0769		TMD	LV+18	
JR0770		JMP	S	STORE IN EE2
JR0771		TIXZ	18,5X	
JR0772		JMP	NSV	NEXT STORE ON EE2
JR0773		JMP	YBF1	
JR0774	YBF	TIXZ	14,4X	
JR0775		JMP	NBV	NEXT BRING ON SORTB
JR0776		TMD	Y24	
JR0777		TDXLC	,4X	LV+14,4X SORTB
JR0778		TDXRC	1H,5X	LV+18,5X EE2
JR0779		JMP	BSQ	BRING STORE QUANTITY

JR0780	YBF1	JMP	SLW-1H	END CODE EE2
JR0781		TMD	Y25	G/TMA,RTW+1C/AM,EE2
JR0782		JMP	EXPAD	EXPONENT ADD
JR0783		TMD	PTABL+4	\$
JR0784		TDM	T1	PRESENT CHARACTER
JR0785		TMD	LV+13	
JR0786		JMP	S	STORE IN SORTA
JR0787		TIXZ	13,5X	
JR0788		JMP	NSV	NEXT STORE ON SORTA
JR0789		TMD	LC+18	
JR0790		TDM	LV+18	SET EE2
JR0791		TMD	Y26	
JR0792		TDXLC	,4X	LV+18,4X EE2
JR0793		TDXRC	1H,5X	LV+13,5X SORTA
JR0794		JMP	BSQ	BRING STORE QUANTITY
JR0795		JMP	STS7	
JR0796	STS12	TMD	LC+13	
JR0797		TDM	LV+13	SET SORTA
JR0798		TMD	LC+14	
JR0799		TDM	LV+14	SET SORTB
JR0800		TMD	LC+16	
JR0801		TDM	LV+16	SET N2
JR0802		TMA	N2	
JR0803		TMQ	CNST	1/1.....
JR0804		JAEQ	SS1B	
JR0805	SS1	TMD	Y27	
JR0806		TDXLC	,4X	LV+16,4X N2
JR0807		TDXRC	1H,5X	LV+13,5X SORTA
JR0808		JMP	BSQ	BRING STORE QUANTITY
JR0809	SS1A	TMD	Y19	
JR0810		TDXLC	,4X	LV+14,4X SORTB
JR0811		JMP	BSG	BRING STORE GROUP
JR0812		JMP	SS4A	
JR0813	SS1B	TMA	N1	
JR0814		JAZ	SS3	
JR0815		TMD	LC+14	
JR0816		JMP	B	BRING ON SORTB
JR0817		TMD	PTABL	END CODE
JR0818		JAED	SS4	
JR0819		TIXZ	14,4X	NO
JR0820		JMP	NBV	NEXT BRING ON SORTB
JR0821		TMD	Y27	
JR0822		TDXRC	1H,5X	LV+13,5X SORTA
JR0823		JMP	SS1A	
JR0824	SS3	TIXZ	14,4X	
JR0825		JMP	NBV	NEXT BRING ON SORTB
JR0826		TMD	Y27	
JR0827		TDXRC	1H,5X	LV+13,5X SORTA
JR0828		JMP	SS1A+2H	
JR0829	SS4	TMD	Y27	
JR0830		TDXLC	,4X	LV+16,4X N2
JR0831		TDXRC	1H,5X	LV+13,5X SORTA
JR0832		JMP	BSQ	BRING STORE QUANTITY
JR0833	SS4A	JMP	SLW-1H	END CODE SORTA
JR0834		TMD	Y28	
JR0835		TDXLC	,4X	SORTA,4X
JR0836		TDXRC	1H,5X	SORTO,5X
JR0837		JMP	BLOCK	TRANSFER DATA TABLE
JR0838	SORTX	JMP	(P)	EXIT FROM SORT
JR0839	YBG	TMD	PTABL+3	ASTERICK

JR0840		TDM	T1	PRESENT CHARACTER
JR0841		TMD	LV+13	
JR0842		JMP	S	STORE IN SORTA
JR0843		TIXZ	13,5X	
JR0844		JMP	NSV	NEXT STORE ON SORTA
JR0845		TMD	LC+19	
JR0846		TDM	LV+19	SET T2
JR0847		TMD	Y20	
JR0848		TDXLC	,4X	LV+19,4X T2
JR0849		TDXRC	1H,5X	LV+13,5X SORTA
JR0850		JMP	BSQ	BRING STORE QUANTITY
JR0851		TMD	LV+12	
JR0852		JMP	B	BRING ON SORTO
JR0853		TMD	PTABL+4	\$
JR0854		JAED	GAT	
JR0855		JMP	STS8	NO
JR0856	GAT	TMD	Y21	
JR0857		TDXLC	,4X	LV+12,4X SORTO
JR0858		TDXRC	1H,5X	LV+13,5X SORTA
JR0859		JMP	BSQ	BRING STORE QUANTITY
JR0860		JMP	BSQ	BRING STORE QUANTITY
JR0861		JMP	STS8	
JR0862		PAGE		
JR0863	GATHER	TJM	GATHX	SUM IDENTICAL TERMS
JR0864		TMD	LC+12	
JR0865		TDM	LV+12	SET SORTO
JR0866		TMD	LC+13	
JR0867		TDM	LV+13	SET SORTA
JR0868		TMD	LC+14	
JR0869		TDM	LV+14	SET SORTB
JR0870		TMD	LC+15	
JR0871		TDM	LV+15	SET N1
JR0872		TMD	LC+16	
JR0873		TDM	LV+16	SET N2
JR0874		TMD	LC+24	
JR0875		TDM	LV+24	SET MULTC
JR0876		TMD	LC+25	
JR0877		TDM	LV+25	SET S3
JR0878		TMD	LC+28	
JR0879		TDM	LV+28	SET S4
JR0880		TMD	LV+12	
JR0881		JMP	B	BRING ON SORTO
JR0882		TMD	PTABL	END CODE
JR0883		JAED	GATHX	TO EXIT
JR0884		TMQ	CNST+4	0/12
JR0885		JAGQ	(P)+2H	
JR0886		JMP	GATH6A	
JR0887		TMD	CNST	NO
JR0888		TDM	N1	1/1.....
JR0889		JMP	GATH6+2H	
JR0890	GATH6A	TMD	Y29	
JR0891		TDXLC	,4X	LV+12,4X SORTO
JR0892		TDXRC	1H,5X	LV+15,5X N1
JR0893		JMP	BSQ	BRING STORE QUANTITY
JR0894		TMD	LV+12	
JR0895		JMP	B	BRING ON SORTO
JR0896		TMD	PTABL+3	ASTERICK
JR0897		JAED	GATH6B	
JR0898		JMP	GATH6	NO
JR0899	GATH6B	TIXZ	12,4X	

JR0900		JMP	NBV	NEXT BRING ON SORTO
JR0901	GATH6	TIXZ	15,5X	
JR0902		JMP	SLWV	END CODE N1
JR0903		TMD	LC+13	
JR0904		TDXLC	,7X	SORTA,7X
JR0905	L	RPTA	20	
JR0906		CM	1,7X	
JR0907		TMD	Y21	
JR0908		TDXLC	,4X	LV+12,4X SORTO
JR0909		TDXRC	1H,5X	LV+13,5X SORTA
JR0910		JMP	BSG	BRING STORE GROUP
JR0911		JMP	SLW-1H	END CODE SORTA
JR0912	GATH1	TMD	LV+24	
JR0913		TDM	LW+1	SAVE CONTENTS OF MULTC
JR0914		JMP	B	BRING ON MULTC
JR0915		TMD	PTABL	END CODE
JR0916		JAED	GATH4A	
JR0917		TMD	LV+28	NO
JR0918		JMP	S	STORE IN S4
JR0919		TIXZ	24,4X	
JR0920		JMP	NBV	NEXT BRING ON MULTC
JR0921		TMD	LV+24	
JR0922		JMP	B	BRING ON MULTC
JR0923		TMQ	CNST+4	0/12
JR0924		JAGQ	(P)+2H	
JR0925		JMP	YDA+1H	
JR0926		TMD	CNST	NO
JR0927		TDM	N2	1/1.....
JR0928	YDA	JMP	YDA2+2H	
JR0929		TMD	Y30	
JR0930		TDXLC	,4X	LV+24,4X MULTC
JR0931		TDXRC	1H,5X	LV+16,5X N2
JR0932		JMP	BSQ	BRING STORE QUANTITY
JR0933		TMD	LV+24	
JR0934		JMP	B	BRING ON MULTC
JR0935		TMD	PTABL+3	ASTERICK
JR0936		JAED	YDA1	
JR0937		JMP	YDA2	NO
JR0938	YDA1	TIXZ	24,4X	
JR0939		JMP	NBV	NEXT BRING ON MULTC
JR0940	YDA2	TIXZ	16,5X	
JR0941		JMP	SLWV	END CODE N2
JR0942		TMD	LC+14	
JR0943		TDXLC	,7X	SORTB,7X
JR0944	L	RPTA	20	
JR0945		CM	1,7X	
JR0946		TMD	Y31	
JR0947		TDXLC	,4X	LV+24,4X MULTC
JR0948		TDXRC	1H,5X	LV+14,5X SORTB
JR0949		JMP	BSG	BRING STORE GROUP
JR0950		JMP	SLW-1H	
JR0951	YDB	TMD	XWRD	
JR0952		TDXLC	,2X	SORTA-1
JR0953		TDXRC	1H,3X	SORTB
JR0954	YDB1	TMD	XWRD+1	SORTA+19,GATH7
JR0955		AIXJ	1,2X	
JR0956		JMP	GATH2	EQUAL GROUP JUMP
JR0957	GATH7	TMA	,2X	
JR0958		TMQ	,3X	
JR0959		JAEQ	YDB1	

JR0960		TMD	LC+14	
JR0961		TDM	LV+14	SET SORTB
JR0962		TMD	LC+16	
JR0963		TDM	LV+16	SET N2
JR0964		TMD	LC+28	
JR0965		TDM	LV+28	SET S4
JR0966		JMP	GATH1	
JR0967	GATH2	TMD	LV+24	
JR0968		JMP	B	BRING ON MULTC
JR0969		TIXZ	24,4X	
JR0970		JMP	NBV	NEXT BRING ON MULTC
JR0971		TMA	T1	
JR0972		TMD	PTABL	END CODE
JR0973		JAED	YDC	
JR0974		TMD	LW+1	NO
JR0975		JMP	S	STORE IN MULTC
JR0976		TIXZ	1,5X	
JR0977		JMP	NSW	NEXT STORE ON MULTC
JR0978		JMP	GATH2	
JR0979	YDC	JMP	NUMAD	ADD FRACTIONS
JR0980		TMD	LC+16	
JR0981		TDM	LV+16	SET N2
JR0982		TMD	LC+28	
JR0983		TDM	LV+28	SET S4
JR0984		JMP	GATH4	
JR0985	GATH4A	TMD	Y32	
JR0986		TDXLC	,4X	N1,4X
JR0987		TDXRC	1H,5X	N2,5X
JR0988		JMP	BLOCK	TRANSFER DATA TABLE
JR0989		TMD	LC+25	
JR0990		TDM	LV+28	SET S3 TO S4
JR0991	GATH4	TMD	LC+13	
JR0992		TDM	LV+13	SET SORTA
JR0993		TMD	LV+16	
JR0994		JMP	B	BRING ON N2
JR0995		JAZ	GATH3	
JR0996	YDD	TMA	CNST	NO,1/1.....
JR0997		TMD	N2	
JR0998		JAED	YDE	
JR0999		TMD	Y33	
JR1000		TDXLC	,4X	LV+28,4X S4
JR1001		TDXRC	1H,5X	LW+1,5X MULTC
JR1002		JMP	BSQ	BRING STORE QUANTITY
JR1003		TMD	Y27	
JR1004		TDXLC	,4X	LV+16,4X N2
JR1005		JMP	BSQ	BRING STORE QUANTITY
JR1006		TMD	LC+13	
JR1007		JMP	B	BRING ON SORTA
JR1008		TMD	PTABL	END CODE
JR1009		JAED	GATH3	
JR1010		TMD	PTABL+3	NO,ASTERICK
JR1011		TDM	T1	PRESENT CHARACTER
JR1012		TMD	LW+1	
JR1013		JMP	S	STORE IN MULTC
JR1014		TIXZ	1,5X	
JR1015		JMP	NSW	NEXT STORE ON MULTC
JR1016		JMP	GATH5	
JR1017	YDE	TMD	LC+13	
JR1018		JMP	B	BRING ON SORTA
JR1019		TMD	PTABL	END CODE

JR1020		JAED	GATH5A	
JR1021		TMD	Y33	NO
JR1022		TDXLC	,4X	LV+28,4X S4
JR1023		TDXRC	1H,5X	LW+1,5X MULTC
JR1024		JMP	BSQ	BRING STORE QUANTITY
JR1025	GATH5	TMD	Y27	
JR1026		TDXRC	1H,4X	LV+13,4X SORTA
JR1027		JMP	BSG	BRING STORE GROUP
JR1028		JMP	GATH3	
JR1029	GATH5A	TMD	Y33	
JR1030		TDXLC	,4X	LV+28,4X S4
JR1031		TDXRC	1H,5X	LW+1,5X MULTC
JR1032		JMP	BSQ	BRING STORE QUANTITY
JR1033		TMD	Y27	
JR1034		TDXLC	,4X	LV+16,4X N2
JR1035		JMP	BSQ	BRING STORE QUANTITY
JR1036	GATH3	TIXZ	1,5X	
JR1037		JMP	SLWW	END CODE MULTC
JR1038	GATHX	JMP	(P)	EXIT GATHER
JR1039		PAGE		
JR1040	FACTOR	TJM	FACX	FACTOR B FROM A
JR1041		JMP	OPEN	REMOVE PARENTHESES
JR1042		TMD	LC+10	
JR1043		TDM	LV+10	SET MP
JR1044		TMD	LC+35	
JR1045		TDM	LV+35	SET PROG
JR1046		TIXZ	35,4X	
JR1047		JMP	NBV	NEXT BRING ON PROG
JR1048		JMP	NBV-2H	NB
JR1049		JMP	NBV-2H	NB
JR1050		JMP	NBV-2H	NB
JR1051		TMD	LC+1	
JR1052		TDM	LV+1	SET FOT
JR1053		TMD	Y34	
JR1054		TDXLC	,4X	LV+35,4X PROG
JR1055		TDXRC	1H,5X	LV+1,5X FOT
JR1056		JMP	BSQ	BRING STORE QUANTITY
JR1057	FCTR11	TMD	LC+1	
JR1058		TDM	LV+1	SET FOT
JR1059		TMD	LC+2	
JR1060		TDM	LV+2	SET OPENM
JR1061		TMD	LC+3	
JR1062		TDM	LV+3	SET F1
JR1063		TMD	LC+4	
JR1064		TDM	LV+4	SET F2
JR1065		TMD	LC+5	
JR1066		TDM	LV+5	SET E1
JR1067		TMD	LC+8	
JR1068		TDM	LV+8	SET MY
JR1069		TMD	LC+9	
JR1070		TDM	LV+9	SET MN
JR1071		CM	F1	
JR1072		CM	F1+1	
JR1073		CM	F2	
JR1074		CM	F2+1	
JR1075		CM	EFF1	
JR1076		TMD	LV+35	
JR1077		JMP	B	BRING ON PROG
JR1078		TIXZ	35,4X	
JR1079		JMP	NBV	NEXT BRING ON PROG

JR1080		TMA	T1	
JR1081		TMD	PTABL	END CODE
JR1082		JAED	FCTRE	
JR1083		TMD	LV+35	NO
JR1084		JMP	B	BRING ON PROG
JR1085		TMD	PTABL+7	COMMA
JR1086		JAED	FCTR20	
JR1087		TMD	LC+3	NO
JR1088		TDM	LV+3	SET F1
JR1089		TMD	Y39	
JR1090		TDXLC	,4X	LV+35,4X PROG
JR1091		TDXRC	1H,5X	LV+3,5X F1
JR1092		JMP	BSQ	BRING STORE QUANTITY
JR1093		JMP	SLW-1H	END CODE F1
JR1094		TMD	LV+35	
JR1095		JMP	B	BRING ON PROG
JR1096		TMD	PTABL+4	\$
JR1097		JAED	FC2	
JR1098		TMD	CNST+2	1B47
JR1099		TDM	T1	
JR1100		TDM	EFF1	
JR1101		TMD	LV+5	
JR1102		JMP	S	STORE IN E1
JR1103		TIXZ	5,5X	
JR1104		JMP	NSV	NEXT STORE ON E1
JR1105	FC1	JMP	SLW-1H	
JR1106		TMD	Y40	
JR1107		TDXLC	,4X	E1,4X
JR1108		TDXRC	1H,5X	EE1,5X
JR1109		JMP	BLOCK	TRANSFER DATA TABLE
JR1110		TMD	LC+5	
JR1111		TDXLC	,3X	E1
JR1112		JMP	RT	BCD TO BIN
JR1113		TMD	RTW+1	
JR1114		TDM	E1	
JR1115		JMP	FACX+1H	
JR1116	FC2	TIXZ	35,4X	
JR1117		JMP	NBV	NEXT BRING ON PROG
JR1118		TMD	LC+5	
JR1119		TDM	LV+5	SET E1
JR1120	FC2A	TMD	LV+35	
JR1121		JMP	B	BRING ON PROG
JR1122		TMD	PTABL+8	/
JR1123		JAED	FC1	
JR1124		TMD	PTABL+7	COMMA
JR1125		JAED	FC1	
JR1126		TMD	LV+5	NO
JR1127		JMP	S	STORE IN E1
JR1128		TIXZ	5,5X	
JR1129		JMP	NSV	NEXT STORE ON E1
JR1130		TIXZ	35,4X	
JR1131		JMP	NBV	NEXT BRING ON PROG
JR1132		JMP	FC2A	
JR1133	FCTRE	TMD	LV+2	
JR1134		JMP	B	BRING ON OPENM
JR1135		TMD	PTABL	END CODE
JR1136		JAED	(P)+5H	
JR1137		TMD	Y112	
JR1138		TDXLC	,4X	LV+2,4X OPENM
JR1139		TDXRC	1H,5X	LV+10,5X MP

JR1140		JMP	BSE	BRING STORE EXPRESSION
JR1141	FCTEE	TIXZ	10,5X	
JR1142		JMP	SLWV	END CODE MP
JR1143		TMD	LC+10	
JR1144		TDM	LV+10	SET MP
JR1145		JMP	B	BRING ON MP
JR1146		TMD	PTABL	END CODE
JR1147		JAED	FACX	TO EXIT
JR1148		TMD	Y41	NO
JR1149		TDXLC	,4X	MP,4X
JR1150		TDXRC	1H,5X	OPENM,5X
JR1151		JMP	BLOCK	TRANSFER DATA TABLE
JR1152	FACX	JMP	(P)	EXIT FACTOR
JR1153		TMD	LC+7	
JR1154		TDM	LV+7	SET G
JR1155		TMD	LV+2	
JR1156		JMP	B	BRING ON OPENM
JR1157		TIXZ	2,4X	
JR1158		JMP	NBV	NEXT BRING ON OPENM
JR1159		TMD	LV+7	
JR1160		JMP	S	STORE IN G
JR1161		TIXZ	7,5X	
JR1162		JMP	NSV	NEXT STORE ON G
JR1163	FCTR14	TMD	LV+2	
JR1164		JMP	B	BRING ON OPENM
JR1165		TMD	PTABL	END CODE
JR1166		JAED	FCTR3	
JR1167		TMD	PTABL+1	+
JR1168		JAED	FCTR3	
JR1169		TMD	PTABL+2	-
JR1170		JAED	FCTR3	
JR1171		TMD	LC+4	NO
JR1172		TDM	LV+4	SET F2
JR1173		TMD	Y42	
JR1174		TDXLC	,4X	LV+2,4X OPENM
JR1175		TDXRC	1H,5X	LV+4,5X F2
JR1176		JMP	BSQ	BRING STORE QUANTITY
JR1177		JMP	SLW-1H	END CODE F2
JR1178		TMD	LC+4	
JR1179		TDM	LV+4	SET F2
JR1180	FC3	TMA	F1	
JR1181		TMD	F2	
JR1182		JAED	(P)+2H	
JR1183		JMP	FCTR6	
JR1184		TMA	F1+1	
JR1185		TMD	F2+1	
JR1186		JAED	FCTR2	
JR1187	FCTR6	TMD	Y43	
JR1188		TDXLC	,4X	LV+4,4X F2
JR1189		TDXRC	1H,5X	LV+7,5X G
JR1190		JMP	BSQ	BRING STORE QUANTITY
JR1191		CM	F2	
JR1192		CM	F2+1	
JR1193		JMP	FCTR14	
JR1194	FCTR3	TIXZ	7,5X	
JR1195		JMP	SLWV	END CODE G
JR1196		TMD	LC+7	
JR1197		TDM	LV+7	SET G
JR1198		JMP	B	BRING ON G
JR1199		TIXZ	7,4X	

JR1200		JMP	NBV	NEXT BRING ON G
JR1201		TMD	LV+9	
JR1202		JMP	S	STORE IN MN
JR1203		TIXZ	9,5X	
JR1204		JMP	NSV	NEXT STORE ON MN
JR1205		JMP	BSG	BRING STORE GROUP
JR1206	FCTR13	TMD	LV+2	
JR1207		JMP	B	BRING ON OPENM
JR1208		TMD	PTABL	END CODE
JR1209		JAED	FC4	
JR1210		JMP	FACX+1H	
JR1211	FC4	TMA	LV+8	ANYTHING STORED IN MY
JR1212		TMD	LC+8	
JR1213		JAED	FCTR11	NO
JR1214		TIXZ	8,5X	YES
JR1215		JMP	SLWV	END CODE MY
JR1216		AIXO	1,5X	
JR1217		JMP	SLW-1H	END CODE MN
JR1218		JMP	FCTR9	
JR1219	FCTR2	CM	E2	
JR1220		TMD	LC+6	
JR1221		TDM	LV+6	SET E2
JR1222		TMD	LV+2	
JR1223		TDM	LW+2	SAVE LOC OF OPENM
JR1224		JMP	B	BRING ON OPENM
JR1225		TMD	PTABL+4	\$
JR1226		JAED	FC5	
JR1227		TMD	CNST+2	NO,1B47
JR1228		TDM	T1	PRESENT CHARACTER
JR1229		TMD	LV+6	
JR1230		JMP	S	STORE IN E2
JR1231		TIXZ	6,5X	
JR1232		JMP	NSV	NEXT STORE ON E2
JR1233		JMP	FC6	
JR1234	FC5	TIXZ	2,4X	
JR1235		JMP	NBV	NEXT BRING ON OPENM
JR1236		TMD	Y45	
JR1237		TDXLC	,4X	LV+2,4X OPENM
JR1238		TDXRC	1H,5X	LV+6,5X E2
JR1239		JMP	BSQ	BRING STORE QUANTITY
JR1240	FC6	JMP	SLW-1H	END CODE E2
JR1241		TMD	Y46	
JR1242		TDXLC	,4X	E2,4X
JR1243		TDXRC	1H,5X	EE2,5X
JR1244		JMP	BLOCK	TRANSFER DATA TABLE
JR1245		TMD	LC+6	
JR1246		TDXLC	,3X	E2
JR1247		JMP	RT	BCD TO BIN
JR1248		TMD	RTW+1	
JR1249		TDM	E2	
JR1250		TMA	E1	
JR1251		TMD	E2	
JR1252		JAED	FCTR21	
JR1253		JAGD	FC15	
JR1254		TMD	Y43	
JR1255		TDXLC	,4X	LV+4,4X F2
JR1256		TDXRC	1H,5X	LV+7,5X G
JR1257		JMP	BSQ	BRING STORE QUANTITY
JR1258		TMD	Y47	C/CSM,RTW+1-C/AM,EE2
JR1259		JMP	EXPAD	EXPONENT SUBTRACT

JR1260		TMD	LC+18	
JR1261		TDM	LV+18	SET EE2
JR1262		JMP	B	BRING ON EE2
JR1263		TIXZ	18,4X	
JR1264		JMP	NBV	NEXT BRING ON EE2
JR1265		TMA	T1	
JR1266		TMD	CNST+2	1B47
JR1267		JAED	FC11	
JR1268	FC8	TMD	PTABL+4	NO,5
JR1269		TDM	T1	PRESENT CHARACTER
JR1270		TMD	LV+7	
JR1271		JMP	S	STORE IN G
JR1272		TIXZ	7,5X	
JR1273		JMP	NSV	NEXT STORE ON G
JR1274		TMD	LC+18	
JR1275		TDM	LV+18	SET EE2
JR1276		TMD	Y48	
JR1277		TDXLC	,4X	LV+18,4X EE2
JR1278		TDXRC	1H,5X	LV+7,5X G
JR1279		JMP	BSQ	BRING STORE QUANTITY
JR1280	FC9	TMD	Y49	
JR1281		TDXLC	,4X	LV+2,4X OPENM
JR1282		TDXRC	1H,5X	LV+7,5X G
JR1283		JMP	BSG	BRING STORE GROUP
JR1284	FC10	JMP	SLW-1H	END CODE G
JR1285		TMD	LC+7	
JR1286		TDM	LV+7	SET G
JR1287		JMP	B	BRING ON G
JR1288		TIXZ	7,4X	
JR1289		JMP	NBV	NEXT BRING ON G
JR1290		TMD	LV+8	
JR1291		JMP	S	STORE IN MY
JR1292		TIXZ	8,5X	
JR1293		JMP	NSV	NEXT STORE ON MY
JR1294		JMP	BSG	BRING STORE GROUP
JR1295		CM	F2	
JR1296		CM	F2+1	
JR1297		CM	E2	
JR1298		TMD	LC+3	
JR1299		TDM	LV+3	SET F1
JR1300		TMD	LC+4	
JR1301		TDM	LV+4	SET F2
JR1302		TMD	LC+5	
JR1303		TDM	LV+5	SET E1
JR1304		TMD	LC+6	
JR1305		TDM	LV+6	SET E2
JR1306		JMP	FCTR13	
JR1307	FC11	TMD	LV+18	
JR1308		JMP	B	BRING ON EE2
JR1309		TMD	PTABL	END CODE
JR1310		JAED	FC9	
JR1311		JMP	FC8	NO
JR1312	FCTR21	TIXZ	7,4X	
JR1313		JMP	DECKV	LAST BRING ON G
JR1314		JMP	B	BRING ON G
JR1315		TMD	PTABL+3	ASTERICK
JR1316		JAED	FC9	
JR1317		TIXZ	7,4X	NO
JR1318		JMP	NBV	NEXT BRING ON G
JR1319		TMD	LV+2	

JR1320		JMP	B	BRING ON OPENM
JR1321		TMD	PTABL+3	ASTERICK
JR1322		JAED	FC12	
JR1323		TMD	Y44	NO, CNST, T15
JR1324		TDM	LW+3	SET 1/1.....
JR1325		TMD	Y50	
JR1326		TDXLC	,4X	LW+3,4X 1/1
JR1327		TDXRC	1H,5X	LV+7,5X G
JR1328		JMP	BSQ	BRING STORE QUANTITY
JR1329		JMP	FC10	
JR1330	FC12	TIXZ	2,4X	
JR1331		JMP	NBV	NEXT BRING ON OPENM
JR1332		JMP	FC9	
JR1333	FCTR20	TMD	Y51	
JR1334		TDXLC	,4X	OPENM,4X
JR1335		TDXRC	1H,5X	MY,5X
JR1336		JMP	BLOCK	TRANSFER DATA TABLE
JR1337		TMD	LC+3	
JR1338		TDM	LV+3	SET F1
JR1339		TIXZ	3,5X	
JR1340		JMP	SLWV	END CODE F1
JR1341	FCTR9	TMD	LC+8	
JR1342		TDM	LV+8	SET MY
JR1343		TMD	LV+35	
JR1344		JMP	B	BRING ON PROG
JR1345		TMD	PTABL+7	COMMA
JR1346		JAED	FC13	
JR1347		JMP	FCTR23	NO
JR1348	FC13	TIXZ	35,4X	
JR1349		JMP	NBV	NEXT BRING ON PROG
JR1350		TMD	Y34	
JR1351		TDXLC	,4X	LV+35,4X PROG
JR1352		TDXRC	1H,5X	LV+1,5X FOT
JR1353		JMP	BSQ	BRING STORE QUANTITY
JR1354		JMP	SLW-1H	END CODE FOT
JR1355		TMD	LC+8	
JR1356		TDM	LWW	SET LOC OF MY
JR1357		JMP	STOT	STORE EXPRESSION ON TAPE
JR1358		JMP	FC16	
JR1359	FC14	TMD	LC+8	
JR1360		TDM	LV+8	SET MY
JR1361		TMD	LC+1	
JR1362		TDM	LV+1	SET FOT
JR1363		TMD	Y52	
JR1364		TDXLC	,4X	LV+1,4X FOT
JR1365		TDXRC	1H,5X	LV+8,5X MY
JR1366		JMP	BSQ	BRING STORE QUANTITY
JR1367		JMP	SLW-1H	END CODE MY
JR1368		TMD	LC+8	
JR1369		TDM	LV+8	SET MY
JR1370	FCTR23	TMD	PTABL+1	+
JR1371		TDM	T1	PRESENT CHARACTER
JR1372		TMD	LV+10	
JR1373		JMP	S	STORE IN MP
JR1374		TIXZ	10,5X	
JR1375		JMP	NSV	NEXT STORE ON MP
JR1376		TMD	LC+3	
JR1377		TDM	LV+3	SET F1
JR1378		JMP	B	BRING ON F1
JR1379		TMD	PTABL	END CODE

JR1380		JAED	FC18	
JR1381		TMD	PTABL+5	(
JR1382		TDM	T1	
JR1383		TMD	LV+10	
JR1384		JMP	S	STORE IN MP
JR1385		JMP	NSV-2H	NEXT STORE IN MP
JR1386		TMD	Y53	NO
JR1387		TDXLC	,4X	LV+8,4X MY
JR1388		TDXRC	1H,5X	LV+10,5X MP
JR1389		TMA	MY	
JR1390		SLA	6	
JR1391		TMD	Y113	A/1/1.....05
JR1392		JAED	FFCT2	
JR1393		JMP	BSE	BRING STORE EXPRESSION
JR1394		TMD	PTABL+6)
JR1395		TDM	T1	
JR1396		TMD	LV+10	
JR1397		JMP	S	STORE IN MP
JR1398		JMP	NSV-2H	NEXT STORE IN MP
JR1399		TMD	PTABL+3	ASTERICK
JR1400		TDM	T1	PRESENT CHARACTER
JR1401		TMD	LV+10	
JR1402		JMP	S	STORE IN MP
JR1403		JMP	NSV-2H	NEXT STORE ON MP
JR1404	FFCT1	TMD	Y36	
JR1405		TDXLC	,4X	LV+3,4X F1
JR1406		JMP	BSQ	BRING STORE QUANTITY
JR1407		TMA	EFF1	
JR1408		TMD	CNST+2	1B47
JR1409		JAED	FCTR10	
JR1410		TMD	PTABL+4	\$
JR1411		TDM	T1	PRESENT CHARACTER
JR1412		TMD	LV+10	
JR1413		JMP	S	STORE IN MP
JR1414		JMP	NSV-2H	NEXT STORE ON MP
JR1415		TMD	LC+17	
JR1416		TDM	LV+17	SET EE1
JR1417		TMD	Y23	
JR1418		TDXRC	1H,4X	LV+17,4X EE1
JR1419		JMP	BSQ	BRING STORE QUANTITY
JR1420	FCTR10	TMD	Y54	
JR1421		TDXLC	,4X	MN,4X
JR1422		TDXRC	1H,5X	OPENM,5X
JR1423		JMP	BLOCK	TRANSFER DATA TABLE
JR1424		JMP	FCTR11	
JR1425	FC15	TMA	E2	
JR1426		TMD	CNST+2	1B47
JR1427		JAED	FCTR6	
JR1428		TMD	Y43	
JR1429		TDXLC	,4X	LV+4,4X F2
JR1430		TDXRC	1H,5X	LV+7,5X G
JR1431		JMP	BSQ	BRING STORE QUANTITY
JR1432		TMD	PTABL+4	\$
JR1433		TDM	T1	PRESENT CHARACTER
JR1434		TMD	LV+7	
JR1435		JMP	S	STORE IN G
JR1436		JMP	NSV-2H	NEXT STORE ON G
JR1437		TMD	LC+18	
JR1438		TDM	LV+18	SET EE2
JR1439		TMD	Y48	

JR1440		TDXLC	,4X	LV+18,4X EE2
JR1441		JMP	BSQ	BRING STORE QUANTITY
JR1442		CM	F2	
JR1443		CM	F2+1	
JR1444		JMP	FC1R14	
JR1445	FC16	TMD	Y54	
JR1446		TDXLC	,4X	MN,4X
JR1447		TDXRC	1H,5X	OPENM,5X
JR1448		JMP	BLOCK	TRANSFER DATA TABLE
JR1449		TMD	LC+9	
JR1450		TDM	LV+9	SET MN
JR1451		TMD	LC+8	
JR1452		TDM	LV+8	SET MY
JR1453		TMD	LC+1	
JR1454		TDM	LV+1	SET FOT
JR1455		TMD	LV+8	
JR1456		JMP	B	BRING ON MY
JR1457		TMD	PTABL	END CODE
JR1458		JAED	FC1R11	
JR1459		TMD	Y55	NO
JR1460		TDXLC	,4X	LV+1,4X FOT
JR1461		TDXRC	1H,5X	LV+9,5X MN
JR1462		JMP	BSQ	BRING STORE QUANTITY
JR1463		TMD	PTABL+9	EQUATE SYMBOL
JR1464		TDM	T1	PRESENT CHARACTER
JR1465		TMD	LV+9	
JR1466		JMP	S	STORE IN MN
JR1467		JMP	NSV-2H	NEXT STORE ON MN
JR1468		AIXO	7,4X	LV+8,4X MY
JR1469		JMP	BSE	BRING STORE EXPRESSION
JR1470		JMP	SLW-1H	END CODE MN
JR1471		TMD	LC+9	
JR1472		TDM	LWW	SET LOC OF MN
JR1473		JMP	EDT	PRINT EXPRESSION
JR1474		TMD	Y54	
JR1475		TDXRC	1H,4X	OPENM,4X
JR1476		TDXLC	,5X	MN,5X
JR1477		JMP	BLOCK	TRANSFER DATA TABLE
JR1478		JMP	FC14	
JR1479	FC18	TMD	Y53	
JR1480		TDXLC	,4X	LV+8,4X MY
JR1481		TDXRC	1H,5X	LV+10,5X MP
JR1482		JMP	BSE	BRING STORE EXPRESSION
JR1483		JMP	FCTEE	
JR1484	FFCT2	TMD	LC+8	
JR1485		JMP	B	BRING ON MY
JR1486		TMD	LV+10	
JR1487		JMP	S	STORE IN MP
JR1488		JMP	NSV-2H	NEXT STORE IN MP
JR1489		JMP	FFCT1	
JR1490		PAGE		
JR1491	SUBST	TJM	SBSTX	SUBSTITUTE A INTO B
JR1492		TMD	LC+1	
JR1493		TDM	LV+1	SET FOT
JR1494		TMD	LC+2	
JR1495		TDM	LV+2	SET OPENM
JR1496		TMD	LC+3	
JR1497		TDM	LV+3	SET F1
JR1498		TMD	LC+31	
JR1499		TDM	LV+31	SET SUBSTB

JR1500		TMD	LC+35	
JR1501		TDM	LV+35	SET PROG
JR1502		TIXZ	35,4X	
JR1503		JMP	NBV	NEXT BRING ON PROG
JR1504		JMP	NBV-2H	
JR1505		JMP	NBV-2H	
JR1506		JMP	NBV-2H	
JR1507		TMD	Y34	
JR1508		TDXLC	,4X	LV+35,4X PROG
JR1509		TDXRC	1H,5X	LV+1,5X FOT
JR1510		JMP	BSQ	BRING STORE QUANTITY
JR1511	SBST4	TMD	LC+1	
JR1512		TDM	LV+1	SET FOT
JR1513		TMD	LV+35	
JR1514		JMP	B	BRING ON PROG
JR1515		TMD	PTABL	END CODE
JR1516	SBSTX	JAED	(P)	EXIT SUBST
JR1517		CM	FOT	NO
JR1518		CM	FOT+1	
JR1519		TIXZ	35,4X	
JR1520		JMP	NBV	NEXT BRING ON PROG
JR1521		TMD	Y34	
JR1522		TDXRC	1H,5X	LV+1,5X FOT
JR1523		JMP	BSQ	BRING STORE QUANTITY
JR1524		JMP	SLW-1H	END CODE FOT
JR1525		TMD	LC+30	
JR1526		TDM	LWW	SET SUBSTA
JR1527		JMP	BRFT	BRING FROM TAPE
JR1528	SBST2	TMD	LC+30	
JR1529		TDM	LV+30	SET SUBSTA
JR1530		TMD	LC+3	
JR1531		TDM	LV+3	SET F1
JR1532		CM	F1	
JR1533		CM	F1+1	
JR1534		TMD	LV+2	
JR1535		JMP	B	BRING ON OPENM
JR1536		TMD	PTABL	END CODE
JR1537		JAED	SBST3	
JR1538		TMD	Y35	NO
JR1539		TDXLC	,4X	LV+2,4X OPENM
JR1540		TDXRC	1H,5X	LV+3,5X F1
JR1541		JMP	BSQ	BRING STORE QUANTITY
JR1542		JMP	SLW-1H	END CODE F1
JR1543		TMA	F1	
JR1544		TMD	FOT	
JR1545		JAED	(P)+2H	
JR1546		JMP	YEA	
JR1547		TMA	F1+1	
JR1548		TMD	FOT+1	
JR1549		JAED	YEB	
JR1550	YEA	TMD	LC+3	
JR1551		TDM	LV+3	SET F1
JR1552		TMD	Y36	
JR1553		TDXLC	,4X	LV+3,4X F1
JR1554		TDXRC	1H,5X	LV+31,5X SUBSTB
JR1555		JMP	BSQ	BRING STORE QUANTITY
JR1556		JMP	SBST2	
JR1557	YEB	TMD	PTABL+5	{
JR1558		TDM	T1	PRESENT CHARACTER
JR1559		TMD	LV+31	

JR1560		JMP	S	STORE IN SUBSTB
JR1561		TIXZ	31,5X	
JR1562		JMP	NSV	NEXT STORE ON SUBSTB
JR1563		TMD	LC+30	
JR1564		TDM	LV+30	SET SUBSTA
JR1565		TMD	Y37	
JR1566		TDXLC	,4X	LV+30,4X SUBSTA
JR1567		TDXRC	1H,5X	LV+31,5X SUBSTB
JR1568		JMP	BSE	BRING STORE EXPRESSION
JR1569		TMD	PTABL+6)
JR1570		TDM	T1	PRESENT CHARACTER
JR1571		TMD	LV+31	
JR1572		JMP	S	STORE IN SUBSTB
JR1573		JMP	NSV-2H	NEXT STORE ON SUBSTB
JR1574		JMP	SBST2	
JR1575	SBST3	TIXZ	31,5X	
JR1576		JMP	SLWV	END CODE SUBSTB
JR1577		TMD	Y38	
JR1578		TDXLC	,4X	SUBSTB,4X
JR1579		TDXRC	1H,5X	OPENM,5X
JR1580		JMP	BLOCK	TRANSFER DATA TABLE
JR1581		TMD	LC+2	
JR1582		TDM	LV+2	SET OPENM
JR1583		TMD	LC+30	
JR1584		TDM	LV+30	SET SUBSTA
JR1585		TMD	LC+31	
JR1586		TDM	LV+31	SET SUBSTB
JR1587		JMP	SBST4	
JR1588		PAGE		
JR1589	LALGY	TIJ	SEARCH	ALGEBRAIC PROCESSOR SANFORD
JR1590		TJM	AL3	SET UP TAPE SEARCH
JR1591		JMP	AL1+2H	
JR1592	LAL1	TIJ	LOCATE	SET UP PROGRAM LOCATE
JR1593		TJM	AL3	
JR1594		ICOZ		
JR1595		TMA	Y99	USE NO,T15-USE LOC,T39
JR1596		JMP	PINT	
JR1597		TMD	LC+37	
JR1598		TDM	LV+37	SET PROGB
JR1599		TMA	USE+1	USE 1 FOR SCRATCH TAPE
JR1600		JMP	IN	TAPE INITIALIZATION
JR1601		JMP	RWSCT	REWIND SCRATCH TAPE
JR1602	AL3	JMP	(P)	SEARCH OR LOCATE
JR1603		TMD	PTABL+1	+
JR1604		TDM	DATA-2	STORE 1ST BLK MARKER
JR1605		JMP	WFD	WRITE 1 BLK FORWARD
JR1606		TMD	PTABL+2	-
JR1607		TDM	DATA-2	STORE LAST BLK MARKER
JR1608		JMP	WFD	WRITE 1 BLK FORWARD
JR1609		JMP	BSD	BACKSPACE 1 BLK
JR1610		JMP	PAGE	EJECT PAGE ON PRINTER
JR1611	TEST	TMD	Y59	TEST ON COMMAND ID
JR1612		TDXLC	,4X	LV+37,4X
JR1613		JMP	BI	BRING IGNORE ON PROGB
JR1614		TMD	PTABL+15	E
JR1615		JAED	EQUATE	
JR1616		TMD	PTABL+16	I
JR1617		JAED	INEQT	
JR1618		TMD	PTABL+20	B
JR1619		JAED	BUG	

JR1620	TMD	PTABL+12	S
JR1621	JAED	SBST	
JR1622	TMD	PTABL+23	F
JR1623	JAED	FCTR	
JR1624	TMD	PTABL+11	O
JR1625	JAED	OPN	
JR1626	TMD	PTABL+18	T
JR1627	JAED	TRIG	
JR1628	TMD	PTABL+24	P
JR1629	JAED	PUNCH	
JR1630	TMD	PTABL+10	D
JR1631	JAED	DONE	
JR1632	TMD	PTABL+17	L
JR1633	JAED	FINI	
JR1634	JMP	BF11-4H	
JR1635	EQUATE CM	OPENM-1	
JR1636	TMD	LC+2	
JR1637	TDM	LV+2	SET OPENM
JR1638	TMD	LC+39	
JR1639	TDM	LV+39	SET OPENM-2
JR1640	TIXZ	37,4X	LV+37,4X
JR1641	JMP	NBV	NEXT BRING ON PROGB
JR1642	JMP	NBV-2H	
JR1643	JMP	NBV-2H	
JR1644	JMP	NBV-2H	
JR1645	TMD	Y61	
JR1646	TDXRC	1H,5X	LV+39,5X OPENM-2
JR1647	JMP	BSI	BRING STORE EXPRESSION
JR1648	JMP	SLW-1H	END CODE OPENM-2
JR1649	JMP	NBV-2H	NEXT BRING ON PROGB
JR1650	TMD	Y35	
JR1651	TDXLC	,5X	LV+2,5X OPENM
JR1652	JMP	BSI	BRING STORE EXPRESSION
JR1653	JMP	SLW-1H	END CODE OPENM
JR1654	JMP	NBV-2H	NEXT BRING ON PROGB
JR1655	JMP	OUTPUT	PRINT AND STORE
JR1656	INEQT TIJ	BRFT	
JR1657	TJM	BRNGX-1H	
JR1658	JMP	BRNG	BRING FROM DATA TAPE
JR1659	TIJ	BRFTD	
JR1660	TJM	BRNGX-1H	
JR1661	TMD	LC+35	
JR1662	TDM	LV+35	SET PROG
JR1663	TMD	LC+1	
JR1664	TDM	LV+1	SET FOT
JR1665	TIXZ	35,4X	
JR1666	JMP	NBV	NEXT BRING ON PROG
JR1667	JMP	NBV-2H	
JR1668	JMP	NBV-2H	
JR1669	JMP	NBV-2H	
JR1670	TMD	LC+7	
JR1671	TDM	LV+7	SET G
JR1672	TMD	Y62	
JR1673	TDXLC	,4X	LV+35,4X PROG
JR1674	TDXRC	1H,5X	LV+7,5X G
JR1675	JMP	BSQ	BRING STORE QUANTITY
JR1676	INE TMD	LV+35	
JR1677	JMP	B	BRING ON PROG
JR1678	TIXZ	35,4X	
JR1679	JMP	NBV	NEXT BRING ON PROG

JR1680		TMA	T1	
JR1681		TMD	PTABL	END CODE
JR1682		JAED	TEST	
JR1683		TMD	Y34	
JR1684		TDXRC	1H,5X	LV+1,5X FOT
JR1685		JMP	BSQ	BRING STORE QUANTITY
JR1686		JMP	SLW-1H	END CODE FOT
JR1687		TMD	LC+2	
JR1688		TDM	LWW	SET LOC OF OPENM
JR1689		JMP	STOT	STORE ON TAPE
JR1690		TMD	LC+1	
JR1691		TDM	LV+1	SET FOT
JR1692		JMP	INE	
JR1693		JMP	TEST	
JR1694	BUG	JMP	BRNG	BRING FROM TAPE DESTROY TAG
JR1695	SBST	JMP	BRNG	BRING AND DESTROY TAG
JR1696		JMP	SUBST	SUBSTITUTE
JR1697		JMP	OUTPUT	PRINT AND STORE
JR1698	FCTR	JMP	BRNG	BRING AND DESTROY
JR1699		JMP	FACTOR	FACTOR
JR1700		JMP	OUTPUT	PRINT AND STORE
JR1701	OPN	JMP	BRNG	BRING AND DESTROY
JR1702		JMP	OPEN	OPEN
JR1703		JMP	OUTPUT	PRINT AND STORE
JR1704	TRIG	JMP	BRNG	BRING AND DESTROY
JR1705		TMD	LC+35	
JR1706		TDM	LV+35	SET PROG
JR1707		TIXZ	35,4X	
JR1708		JMP	NBV	NEXT BRING ON PROG
JR1709		JMP	NBV-2H	
JR1710		JMP	NBV-2H	
JR1711		TMD	LV+35	
JR1712		JMP	B	BRING ON PROG
JR1713		TMD	PTABL+19	A
JR1714		JAED	TRGA	
JR1715		TMD	PTABL+20	B
JR1716		JAED	TRGB	
JR1717		TMD	PTABL+21	C
JR1718		JAED	TRGC	
JR1719		HLT		ERROR HALT
JR1720	TRGA	JMP	OPEN	REMOVE PARENTHESSES
JR1721		JMP	(P)	TRIGA
JR1722		JMP	OUTPUT	PRINT AND STORE
JR1723	TRGB	HLT		
JR1724	TRGC	HLT		
JR1725	PUNCH	HLT		
JR1726	DONE	TMD	LV+37	
JR1727		TDM	LWW	SET LOC OF PROGB+
JR1728		JMP	EDT	PRINT
JR1729		JMP	RWSCT	REWIND SCRATCH TAPE
JR1730		TMD	LV+37	
JR1731		JMP	B	BRING ON PROGB
JR1732		TIXZ	37,4X	
JR1733		JMP	NBV	NEXT BRING ON PROGB
JR1734		TMA	T1	
JR1735		TMD	PTABL	END CODE
JR1736		JAED	AL3+1H	
JR1737		JMP	DONE+4H	
JR1738	FINI	JMP	PAGE	PAGE EJECT ON PRINTER
JR1739		TMD	FIN2	

JR1740		TDXLC	,1X	
JR1741	FIN1	TMD	,1X	
JR1742	R	RPTNN	8	
JR1743		TDC		
JR1744		SCD	42	
JR1745		TMD	FIN3	
JR1746		AIXJ	1,1X	
JR1747		JMP	FINISH	
JR1748		JMP	M/620	
JR1749	FIN2	P/FIN4,T15		
JR1750	FIN3	C/HLT,FIN4+3-C/JMP,FIN1\$		
JR1751	FIN4	A/IFINISH OF ALGY RUN	IS	
JR1752	BRNG	TJM	BRNGX	BRING FROM SCRATCH
JR1753		TMD	LC+35	
JR1754		TDM	LV+35	SET PROG
JR1755		TMD	Y59	
JR1756		TDXLC	,4X	LV+37,4X PROGB
JR1757		TDXRC	1H,5X	LV+35,5X PROG
JR1758		JMP	BSI	BRING STORE EXPRESSION
JR1759		JMP	NBV-2H	NEXT BRING ON PROGB
JR1760		JMP	SLW-1H	END CODE PROG
JR1761		TMD	LC+35	
JR1762		TDM	LWW	SET LOC OF PROG
JR1763		JMP	EDT	PRINT
JR1764		CM	FOT+1	
JR1765		TMD	LC+1	
JR1766		TDM	LV+1	SET FOT
JR1767		TMD	LC+35	
JR1768		TDM	LV+35	SET PROG
JR1769		TIXZ	35,4X	LV+35,4X
JR1770		JMP	NBV	NEXT BRING ON PROG
JR1771		JMP	NBV-2H	
JR1772		JMP	NBV-2H	
JR1773		JMP	NBV-2H	
JR1774		TMD	Y52	
JR1775		TDXLC	,5X	LV+1,5X FOT
JR1776		JMP	BSQ	BRING STORE QUANTITY
JR1777		JMP	SLW-1H	END CODE FOT
JR1778		TMD	FOT	
JR1779		TDM	OPENM-2	
JR1780		TMD	FOT+1	
JR1781		TDM	OPENM-1	
JR1782		TMD	LC+2	
JR1783		TDM	LWW	SET LOC OF OPENM
JR1784		JMP	BRFTD	BRING AND DESTROY TAG
JR1785	BRNGX	JMP	(P)	EXIT
JR1786	OUTPUT	TMD	OPENM-2	STORE AND PRINT RESULTS
JR1787		TDM	FOT	
JR1788		TMD	OPENM-1	
JR1789		TDM	FOT+1	
JR1790		TMD	LC+2	
JR1791		TDM	LWW	SET LOC OF OPENM
JR1792		TMD	LC+39	
JR1793		TDM	LV+39	SET OPENM-2
JR1794		TMD	LWW	
JR1795		JMP	B	BRING ON
JR1796		TMD	PTABL	END CODE
JR1797		JAED	(P)+2H	
JR1798		JMP	OT1-1H	
JR1799		TMD	Y60	0/1.....

JR1800		TDM	OPENM	
JR1801		JMP	STOT	STORE ON TAPE
JR1802	OT1	TMD	LV+39	
JR1803		JMP	B-	BRING ON OPENM-2
JR1804		TMD	PTABL	END CODE
JR1805		JAED	(P)+4H	
JR1806		TIXZ	39,4X	
JR1807		JMP	NBV	NEXT BRING ON OPENM-2
JR1808		JMP	OT1	
JR1809		TMD	PTABL+9	
JR1810		TDM	T1	PRESENT CHARACTER
JR1811		TMD	LV+39	EQUATE SYMBOL
JR1812		JMP	S	STORE IN OPENM-2
JR1813	OT2	TIXZ	39,4X	
JR1814		JMP	NBV	NEXT BRING ON OPENM-2
JR1815		TMA	LV+39	DOES (LV+39) EQUAL OPENM
JR1816		TMD	LC+2	
JR1817		JAED	OT3	
JR1818		TMD	PTABL+13	IGNORE
JR1819		TDM	T1	PRESENT CHARACTER
JR1820		TMD	LV+39	
JR1821		JMP	S	STORE IN OPENM-2
JR1822		JMP	OT2	
JR1823	OT3	TMD	LC+39	OPENM-2
JR1824		TDM	LWW	SET LOG OF OPENM-2
JR1825		JMP	EDT	PRINT
JR1826		JMP	TEST	RETURN TO TEST
JR1827		PAGE		
JR1828	*	EDIT	INPUT PROGRAM DESTROYING SEQUENCE NOS	
JR1829	SEARCH	TJM	SEAX	
JR1830		TIJ	LTX	EXIT LOCATE PREMATURE
JR1831		TJM	LT2	
JR1832		JMP	LOCATE	LOCATE INPUT PROGRAM
JR1833		TIJ	LT2+1H	SET NORMAL EXIT IN LOCATE
JR1834		TJM	LT2	
JR1835	LT5	TMA	USE	USE ZERO
JR1836		JMP	IN	INITIALIZE
JR1837		TMD	Y64	PROGB,T15
JR1838		TDXLC	,7X	
JR1839	LT6	TMA	,7X	10N TH WORD
JR1840		TMD	Y65	A/LAST \$
JR1841		JAED	LT7	
JR1842		TMA	Y66	8/110000
JR1843		TMQ	Y67	24/0-24/1
JR1844		EIS	,7X	
JR1845		TMD	Y68	C/HLT,PROGB+120-C/JMP,LT6
JR1846		AIXJ	10,7X	
JR1847		JMP	BSSCT	BACKSPACE INPUT TAPE
JR1848		TMA	Y64	P/PROGB,T15
JR1849		JMP	WTSCT	WRITE INPUT TAPE
JR1850		JMP	REP	READ FORWARD INPUT TAPE
JR1851		JMP	LT5	
JR1852	LT7	JMP	BSSCT	BACKSPACE INPUT TAPE
JR1853		TMA	Y64	P/PROGB,T15
JR1854		JMP	WTSCT	WRITE INPUT TAPE
JR1855		JMP	LOCATE	LOCATE INPUT PROGRAM
JR1856	SEAX	JMP	(P)	EXIT
JR1857	LOCATE	TJM	LTX	
JR1858		TMA	USE	
JR1859		JMP	IN	

JR1860		JMP	RWSCT	REWIND INPUT TAPE
JR1861	LT1	JMP	RFP	READ BLK INPUT TAPE
JR1862		TMA	PROGB	
JR1863		TMD	Y69	A/ B \$
JR1864		JAED	LT2	
JR1865		TMD	Y65	A/LAST \$
JR1866		JAED	LTX+1H	
JR1867		JMP	LT1	
JR1868	LT2	JMP	LT2+1H	
JR1869		TMD	Y66	8/110000
JR1870		TDM	PROGB	
JR1871	LTX	JMP	(P)	EXIT
JR1872		TMD	Y70	P/LT4,T15
JR1873		TDXLC	,1X	
JR1874	LT3	TMD	,1X	
JR1875	R	RPTNN	8	
JR1876		TDC		
JR1877		SCD	42	
JR1878		TMD	Y71	G/HLT,LT4+3-C/JMP,LT3
JR1879		AIXJ	1,1X	
JR1880		HLT		
JR1881		JMP	LT1-1H	
JR1882	LT4	A/IPROGRAM	NOT ON TAPE	IS
JR1883	STOT	TJM	STX	STORE ON TAPE
JR1884		JMP	RFD	READ FORWARD DATA TAPE
JR1885		TMA	DATA-2	IS IT LAST BLOCK MARKER
JR1886		TMD	PTABL+2	-
JR1887		JAED	(P)+2H	YES
JR1888		JMP	STOT+1H	NO,READ ANOTHER BLK
JR1889		TMD	LC+36	DATA-2
JR1890		TDXLC	,2X	
JR1891	L	RPTA	128	
JR1892		CM	,2X	
JR1893		TMD	LC+1	FOT
JR1894		TDM	LV+1	
JR1895		TMD	LC+36	DATA-2
JR1896		TDM	LV+36	
JR1897		TMD	LC+27	DATA
JR1898		TDM	LV+27	
JR1899		JMP	BSD	BACKSPACE DATA TAPE
JR1900		TMD	Y79	
JR1901		TDXLC	,4X	LV+1,4X FOT
JR1902		TDXRC	1H,5X	LV+36,5X DATA-2
JR1903		JMP	BSE	BRING STORE EXPRESSION
JR1904		JMP	SLW-1H	END CODE DATA-2
JR1905		TMD	Y80	
JR1906		TDXLC	,4X	LWW,T15
JR1907		TDXRC	1H,5X	LV+27,T39 DATA
JR1908		JMP	BSE	BRING STORE EXPRESSION
JR1909		JMP	SLW-1H	END CODE DATA
JR1910		JMP	WFD	WRITE DATA TAPE
JR1911		TMD	PTABL+2	LAST BLOCK MARKER
JR1912		TDM	DATA-2	
JR1913		JMP	WFD	WRITE FORWARD DATA TAPE
JR1914		JMP	BSD	BACKSPACE DATA TAPE
JR1915	STX	JMP	(P)	EXIT
JR1916	*	SEARCH	DATA FOR NAME	EQUAL TO CONTENTS OF FOT,+1
JR1917	BRFT	TJM	BRFTX	BRING FROM DATA TAPE
JR1918		CM	BCNT	BLK COUNTER
JR1919		TIJ	BF9	DO NOT DESTROY NAME

JR1920		TJM	BF8	
JR1921		JMP	BF1	
JR1922	BRFTD	TJM	BRFTX	BRING DESTROY TAG
JR1923		CM	BCNT	BLK COUNTER
JR1924		TIJ	BF8+1H	
JR1925		TJM	BF8	
JR1926	BF1	TMD	LC+27	DATA-2
JR1927		TDM	LV+27	
JR1928	BF2	INCAL	BCNT	
JR1929		JMP	RFD	READ 1 BLK FROM DATA TAPE
JR1930		TMA	DATA-2	NAME
JR1931		TMD	PTABL+2	IS LAST BLK MARKER, -
JR1932		JAED	BF4	YES TO BF4
JR1933		TMA	FOT	DESIRED NAME
JR1934		TMD	DATA-2	NAME
JR1935		JAED	BF3	YES TO BF3
JR1936		JMP	BF2	NO TO BF2
JR1937	BF3	TMA	FOT+1	2OND PART OF NAME
JR1938		TMD	DATA-1	
JR1939		JAED	BF8	SAME NAMES TO BF8
JR1940		JMP	BF2	NO RETURN BF2
JR1941	BF4	TMD	BCNT	
JR1942		TDXLC	,1X	NO. OF BLKS PROCESSED
JR1943		JMP	BSD	BASK SPACE 1 BLOCK
JR1944		CD		
JR1945		SIXOL	1,1X	
JR1946		JNO	(P)-3H	
JR1947	BF5	JMP	RRD	READ IN REVERSE DATA TAPE
JR1948		TMA	DATA+125	NAME
JR1949		TMD	PTABL+1	PLUS
JR1950		JAED	BRETX+1H	NOT ON TAPE ERROR EXIT
JR1951		TMD	FOT	DESIRED NAME
JR1952		JAED	BF6	EQUAL TO BF6
JR1953		JMP	BF5	UNEQUAL TO BF5
JR1954	BF6	TMA	DATA+124	2OND PART OF NAME
JR1955		TMD	FOT+1	2OND PART OF DESIRED NAME
JR1956		JAED	BF7	EQUAL TO BF7
JR1957		JMP	BF5	UNEQUAL TO BF5
JR1958	BF7	JMP	RFD	READ FORWARD DATA TAPE
JR1959	BF8	JMP	(P)	SWITCH TO DESTROY OR NOT
JR1960		JMP	BSD	BACKSPACE DATA TAPE
JR1961		CM	DATA-2	CLEAR THE NAME
JR1962		CM	DATA-1	
JR1963		JMP	WFD	WRITE FORWARD DATA TAPE
JR1964	BF9	TMD	Y72	
JR1965		TDXLC	,4X	LV+27,4X DATA
JR1966		TDXRC	1H,5X	LWW,5X
JR1967		JMP	BSE	BRING STORE EXPRESSION
JR1968		JMP	SLW-1H	END CODE
JR1969	BRFTX	JMP	(P)	EXIT
JR1970		TMD	Y73	P/BF11,T15
JR1971		TDXLC	,1X	
JR1972	BF10	TMD	,1X	
JR1973	R	RPTNN	8	
JR1974		TDC		
JR1975		SCD	42	
JR1976		TMD	Y74	C/HLT,BF11+3-C/JMP,BF10
JR1977		AIXJ	1,1X	
JR1978		JMP	PAGE	
JR1979		NOP		TRAP LOCATION

JR1980		JMP	FINISH	
JR1981		JMP	FLEXO	
JR1982	BF11		A/IEXPRESSION NOT ON TAPEIS	
JR1983	BCNT		D/O	
JR1984			PAGE	
JR1985	EDT	TJM	EDTX	EDIT AND PRINT OUTPUT
JR1986		TMD	LC+34	
JR1987		TDM	LV+34	SET BUFF
JR1988		TDXLC	,2X	
JR1989		TMD	Y66	8/110000
JR1990	L	RPTA	15	
JR1991		TDM	1,2X	
JR1992	EDTD	TMD	LWW	
JR1993		JMP	B	BRING ON LWW
JR1994		TMD	Y72	
JR1995		TDXRC	1H,4X	
JR1996		JMP	NBV-2H	NEXT BRING ON LWW
JR1997		TMA	T1	
JR1998		TMD	PTABL	END CODE
JR1999		JAED	EDTC	
JR2000		TMD	Y75	C/HLTL,PTABL
JR2001		TDXLC	,2X	
JR2002		TMA	T1	
JR2003	R	RPTAN	10	IS IT A SPECIAL GHARACTER
JR2004		TMD	1,2X	
JR2005		JAED	EDTB	
JR2006		TMD	LV+34	
JR2007		JMP	S	STORE IN BUFF
JR2008		TIXZ	34,5X	
JR2009		JMP	NSV	NEXT STORE IN BUFF
JR2010		JMP	EDTD	
JR2011	EDTB	CM	LWX	
JR2012		TIJ	TAB-PTABL-1,2X	
JR2013		TJM	LWX	
JR2014		TMD	Y76	
JR2015		TDXLC	,4X	LWX,4X SS
JR2016		TDXRC	1H,5X	LV+34,5X BUFF
JR2017		JMP	BSE	BRING STORE EXPRESSION
JR2018		JMP	EDTD	
JR2019	EDTC	TMD	LV+34	
JR2020		JMP	S	STORE IN BUFF
JR2021		JMP	PRINT	
JR2022	EDTX	JMP	(P)	EXIT EDIT
JR2023	PRINT	TJM	(P)+3H	
JR2024		TMA	Y77	
JR2025		JMP	PANT	
JR2026		JMP	(P)	
JR2027		SPACE	3	
JR2028	RFP	TJM	RFPX	READ FROM PROGRAM TAPE
JR2029		TIJ	RD	READ FORWARD 1 BLK
JR2030		TJM	RD1	
JR2031		TJM	RD2	
JR2032		TMA	USE	USE ZERO FOR PROGRAM TAPE
JR2033		JMP	IN	INITIALIZE CONTROL
JR2034		TMA	Y64	P/PROGB
JR2035		JMP	RDSCCT	READ 1 BLOCK
JR2036		TMA	USE+1	USE 1 FOR DATA TAPE
JR2037		JMP	IN	INITIALIZE
JR2038	RFPX	JMP	(P)	EXIT
JR2039		SPACE	3	

JR2040	RFD	TJM	RFDX	READ FROM DATA TAPE
JR2041		TIJ	RD	READ FORWARD
JR2042		TJM	RD1	
JR2043		TJM	RD2	
JR2044	RFD1	TMA	Y78	DATA-2,T15
JR2045		JMP	RDSCT	READ 1 BLOCK
JR2046	RFDX	JMP	(P)	EXIT
JR2047		SPACE	3	
JR2048	RRD	TJM	RFDX	READ REVERSE DATA TAPE
JR2049		TIJ	RDR	READ BACKWARD
JR2050		TJM	RD1	
JR2051		TJM	RD2	
JR2052		JMP	RFD1	
JR2053		SPACE	3	
JR2054	WFD	TJM	WFDX	WRITE ON DATA TAPE
JR2055		TMA	Y78	DATA-2,T15
JR2056		JMP	WTSCT	WRITE 1 BLOCK
JR2057	WFDX	JMP	(P)	EXIT
JR2058		SPACE	3	
JR2059	BSD	TJM	BSDX	BACKSPACE THE DATA TAPE
JR2060		JMP	BSSCT	BACKSPACE 1 BLOCK
JR2061	BSDX	JMP	(P)	EXIT
JR2062		PAGE		
JR2063	EXPAD	TDM	EXPV	EXPONENT ARITHMETIC
JR2064		TJM	EXPX	
JR2065		TMD	LC+18	EE2
JR2066		TDXLC	,3X	
JR2067		JMP	RT	BCD TO BINARY CONVERSION
JR2068		TMD	RTW+1	RESULTING CONVERSION
JR2069		TDM	EE2	
JR2070		TMD	LC+17	EE1
JR2071		TDXLC	,3X	
JR2072		JMP	RT	BCD TO BIN CONVERSION
JR2073	EXPV	D/O		
JR2074		TAQ		
JR2075		JMP	TR	BINARY TO BCD CONVERSION
JR2076		TMD	LC+32	
JR2077		TDM	LV+32	SET TRU
JR2078		TMD	LC+18	
JR2079		TDM	LV+18	SET EE2
JR2080	EXPZ	TMD	LV+32	
JR2081		JMP	B	BRING ON TRU
JR2082		TIXZ	32,4X	
JR2083		JMP	NBV	NEXT BRING ON TRU
JR2084		TMA	T1	
JR2085		JAZ	EXPZ	
JR2086		TMD	PTABL	END CODE
JR2087		JAED	EXPX+1H	
JR2088	EXPW	TIXZ	32,4X	
JR2089		JMP	DECKV	LB ON TRU
JR2090		TMD	Y63	
JR2091		TDXLC	,4X	LV+32,4X TRU
JR2092		TDXRC	1H,5X	LV+18,5X EE2
JR2093		JMP	BSQ	BRING STORE QUANTITY
JR2094		JMP	SLW-1H	END CODE EE2
JR2095	EXPX	JMP	(P)	
JR2096		CM	T1	
JR2097		TMD	LV+18	
JR2098		JMP	S	STORE IN EE2
JR2099		TIXZ	18,5X	

JR2100		JMP	NSV	NEXT STORE ON EE2
JR2101		JMP	EXPW	
JR2102	NUMAD	TJM	PLUX	ADD FRACTIONS
JR2103		ICOZ		
JR2104		JMP	MUA	CONVERT FROM BCD TO BINARY
JR2105		TMA	S3	SIGN OF N1
JR2106		TMQ	PTABL+1	+
JR2107		SLQ	42	
JR2108		JAEQ	(P)+2H	IS N1 POSITIVE
JR2109		CSMS	NUMER	NO, -NUMERATOR N1
JR2110		TMA	S4	SIGN OF N2
JR2111		JAEQ	(P)+2H	IS N2 POSITIVE
JR2112		CSMS	RTW+2	NO, -NUMERATOR N2
JR2113		TMQ	DENOM	DENOMINATOR N1
JR2114		MM	RTW+1	DENOMINATOR N2
JR2115		JAZ	(P)+2H	
JR2116		JMP	WOLF	ERROR EXIT
JR2117		TQM	PLUX+1	
JR2118		TMQ	NUMER	NUMERATOR N1
JR2119		MM	RTW+1	DENOMINATOR N2
JR2120		JAZ	(P)+4H	
JR2121		AM	CNST+2	1B47
JR2122		JAZ	(P)+2H	
JR2123		JMP	WOLF	ERROR EXIT
JR2124		TQM	NUMER	
JR2125		TMQ	DENOM	DENOMINATOR N1
JR2126		MM	RTW+2	NUMERATOR N2
JR2127		JAZ	(P)+4H	
JR2128		AM	CNST+2	1B47
JR2129		JAZ	(P)+2H	
JR2130		JMP	WOLF	ERROR EXIT
JR2131		TQA		
JR2132		AMS	NUMER	AD + CB
JR2133		JOF	WOLF	ERROR EXIT
JR2134		TMQ	PTABL+1	+
JR2135		JAP	(P)+3H	
JR2136		CAMAS	NUMER	ABSOLUTE SUM
JR2137		TMQ	PTABL+2	-
JR2138		SLQ	42	
JR2139		TQM	S4	SIGN OF SUM
JR2140		TMD	PLUX+1	PRODUCT OF DENOMINATORS
JR2141		TDM	DENOM	
JR2142		JMP	MUB	REDUCE AND CONVERT BIN,BCD
JR2143	PLUX	JMP	(P)	EXIT
JR2144		D/O		
JR2145		SPACE	3	
JR2146	NUMULT	TJM	XX	MULTIPLY FRACTIONS
JR2147		JMP	MUA	CONVERT TO BINARY
JR2148		TMQ	RTW+2	NUMERATOR OF N2
JR2149		MM	NUMER	NUMERATOR OF N1
JR2150		JAZ	(P)+2H	IF EXACT JMP
JR2151		JMP	WOLF	ERROR EXIT
JR2152		TQM	NUMER	PRODUCT NUMERATOR
JR2153		TMQ	RTW+1	DENOMINATOR OF N2
JR2154		MM	DENOM	DENOMINATOR OF N1
JR2155		JAZ	(P)+2H	IF EXACT JMP
JR2156		JMP	WOLF	ERROR EXIT
JR2157		TQM	DENOM	PRODUCT DENOMINATOR
JR2158		JMP	MUB	REDUCE LOW COM, CONVERT BCD
JR2159	XX	JMP	(P)	EXIT

JR2160	MUA	TJM	MUAX	CONVERT FROM BCD TO BINARY
JR2161		TMD	LC+15	N1
JR2162		TDXLC	3X	
JR2163		JMP	RT	BCD TO BIN
JR2164		TMD	RTW+2	NUMERATOR
JR2165		TDM	NUMER	
JR2166		TMD	RTW+1	DENOMINATOR
JR2167		TDM	DENOM	
JR2168		TMD	LC+16	N2
JR2169		TDXLC	3X	
JR2170		JMP	RT	BCD TO BIN
JR2171	MUAX	JMP	(P)	EXIT
JR2172	MUB	TJM	MUBX	REDUCE TO LCD AND BCD
JR2173		JMP	DUCT	TO LCD
JR2174		TMQ	NUMER	NUMERATOR
JR2175		JMP	TR	BIN TO BCD
JR2176		TMD	LC+32	
JR2177		TDM	LV+32	SET TRU
JR2178		TMD	LC+16	
JR2179		TDM	LV+16	SET N2
JR2180	MUBD	TMD	LV+32	
JR2181		JMP	B	BRING ON TRU
JR2182		TIXZ	32,4X	
JR2183		JMP	NBV	NEXT BRING ON TRU
JR2184		TMA	T1	
JR2185		JAZ	MUBD	
JR2186		TMD	PTABL	END CODE
JR2187		JAED	MUBE	
JR2188		TIXZ	32,4X	
JR2189		JMP	DECKV	LAST BRING ON TRU
JR2190		TMD	Y30	
JR2191		TDXRC	1H,5X	LV+16,5X N2
JR2192		JMP	BSQ	BRING STORE QUANTITY
JR2193	MUBF	TMD	PTABL+8	SLASH
JR2194		TDM	T1	
JR2195		TMD	LV+16	
JR2196		JMP	S	STORE IN N2
JR2197		JMP	NSV-2H	NEXT STORE ON N2
JR2198		JMP	MUBC	
JR2199	MUBE	CM	T1	
JR2200		TMD	LV+16	
JR2201		JMP	S	STORE IN N2
JR2202		TIXZ	16,5X	
JR2203		JMP	NSV	NEXT STORE ON N2
JR2204		JMP	MUBF	
JR2205	MUBC	TMQ	DENOM	DENOMINATOR
JR2206		JMP	TR	BIN TO BCD
JR2207		TMD	LC+32	
JR2208		TDM	LV+32	SET TRU
JR2209	MUBG	TMD	LV+32	
JR2210		JMP	B	BRING ON TRU
JR2211		TIXZ	32,4X	
JR2212		JMP	NBV	NEXT BRING ON TRU
JR2213		TMA	T1	
JR2214		JAZ	MUBG	
JR2215		JMP	DECKV-2H	LAST BRING ON TRU
JR2216		TMD	Y30	
JR2217		TDXRC	1H,5X	LV+16,5X N2
JR2218		JMP	BSQ	BRING STORE QUANTITY
JR2219		JMP	SLW-1H	

JR2220		TMD	LC+16	
JR2221		TDM	LV+16	SET N2
JR2222	MUBX	JMP	(P)	EXIT MUB
JR2223	DUCT	TJM	DUX	REDUCE TO LCD
JR2224		TMA	DENOM	DENOMINATOR
JR2225		JAZ	WOLF	ERROR EXIT
JR2226		TAM	REMAN	REMAINDER
JR2227		TMQ	NUMER	NUMERATOR
JR2228	DULL	CA		
JR2229		DAQ	REMAN	DIVIDE BY REMAINDER
JR2230		JAZ	DUCK	IS NEW REMAINDER ZERO
JR2231		TMQ	REMAN	NO, OLD REMAN TO Q
JR2232		TAM	REMAN	NEW REMAINDER TO REMAN
JR2233		JMP	DULL	
JR2234	DUCK	TMQ	NUMER	NUMERATOR
JR2235		DAQ	REMAN	DIVIDE BY GREATEST FACTOR
JR2236		TQM	NUMER	REDUCED NUMERATOR
JR2237		TMQ	DENOM	DENOMINATOR
JR2238		DAQ	REMAN	DIVIDE BY GREATEST FACTOR
JR2239		TQM	DENOM	REDUCED DENOMINATOR
JR2240	DUX	JMP	(P)	EXIT
JR2241		SPACE	3	
JR2242	RT	TJM	RTX	BCD TO BINARY CONVERSION
JR2243		CM	RTW+1	X0
JR2244		TMQ	3X	NO. TO BE CONVERTED
JR2245		TIXZ	0,2X	N=1
JR2246	RTY	CA		
JR2247		SLAQ	6	XN TO A
JR2248		TMD	PTABL+8	IS C A SLASH
JR2249		JAED	RTZ	YES TO RTZ
JR2250		TMD	PTABL	IS C AN END CODE
JR2251	RTX	JAED	(P)	YES, EXIT
JR2252		AM	RTW+1	XN
JR2253	L	RPT	9	
JR2254		AD		
JR2255		TAM	RTW+1	XN
JR2256	RTV	TMD	RTW	8,RTY
JR2257		AIXJ	1,2X	N+1 TO N, IS N 8
JR2258		AIXO	1,3X	NEW WORD
JR2259		JMP	RTY-2H	
JR2260	RTW	C/HLT,8-C/JMP,RTY		
JR2261		SET	(P)+2	
JR2262	RTZ	TMD	RTW+1	XN TO RTW+2
JR2263		TDM	RTW+2	
JR2264		CM	RTW+1	
JR2265		JMP	RTV	
JR2266	TR	TJM	TRX	BIN TO BCD
JR2267		TMD	PTABL	END CODE
JR2268		TDM	TRU+1	
JR2269		CM	TRU	
JR2270		TMD	XWRD+2	TRU+1,6
JR2271		TDXLC	3X	
JR2272	TRY	TDXRC	1H,2X	
JR2273		CA		IS NO. A ZERO
JR2274		JAEQ	TRX	YES TO EXIT
JR2275		DAQ	CNST+4	D/10
JR2276		SLA	2X	SHIFT LEFT AMOUNT OF 2X
JR2277		AMS	3X	ANSWER STORAGE
JR2278		TMD	TRW	48,TRY+1H
JR2279		AIXJ	6,2X	

JR2280		SIXOL	1,3X	
JR2281		CD		
JR2282		JMP	TRY	
JR2283	TRX	JMP	(P)	EXIT
JR2284	TRW	C/HLT,48	-C/JMP,TRY+1H	
JR2285	TRU	SET	(P)+2	
JR2286	WOLF	TJM	WO3	
JR2287		TMD	Y81	
JR2288		TDXLC	,2X	
JR2289	WO1	TMD	,2X	
JR2290	R	RPTNN	8	
JR2291		TDC		
JR2292		SCD	42	
JR2293		TMD	Y82	
JR2294		AIXJ	1,2X	
JR2295		JMP	PAGE	
JR2296		NOP		TRAP LOCATION
JR2297		JMP	FINISH	
JR2298		JMP	FLEXO	
JR2299	WO3	HLT	0	
JR2300	WO2	A/INO.	TOO LARGE IS	
JR2301		PAGE		
JR2302	*	INTERPRETIVE CONTROL ROUTINE		
JR2303	B	TDXLC	,0X	
JR2304		TDXRC	1H,1X	
JR2305		TJM	BX	
JR2306		CA		
JR2307		TMQ	,0X	
JR2308		SLQ	,1X	
JR2309		SLAQ	6	
JR2310		TAM	T1	
JR2311	BX	JMP	(P)	
JR2312	S	TDXLC	,0X	
JR2313		TDXRC	1H,1X	
JR2314		TJM	SX	
JR2315		TMD	,0X	
JR2316		TDXRC	1H,2X	
JR2317		TMD	Y84	
JR2318		AIXJ	0,2X	
JR2319		CD		
JR2320		TXDRC	1H,0X	
JR2321		SRD	8	
JR2322		TDA		
JR2323		CQ		
JR2324	R	RPTNN	8	
JR2325		SRAQ	3	
JR2326		SRQ	3	
JR2327		TQA		
JR2328		TMQ	Y85	
JR2329		SLAQ	6	
JR2330		TAM	TRU+1	
JR2331		TMD	Y86	
JR2332		TDXLC	,3X	
JR2333	OV1	TMD	,3X	
JR2334	R	RPTNN	8	
JR2335		TDC		
JR2336		SCD	42	
JR2337		TMD	Y87	
JR2338		AIXJ	1,3X	
JR2339		TMD	Y88	

JR2340	R	RPTNN	3
JR2341		TDC	
JR2342		SCD	42
JR2343		TMD	TRU+1
JR2344	R	RPTNN	8
JR2345		TDC	
JR2346		SCD	42
JR2347		JMP	PAGE
JR2348		NOP	
JR2349		JMP	FINISH
JR2350		JMP	FLEXO
JR2351	SW	TMQ	,0X
JR2352		SLAQ	,1X
JR2353		SLQ	6
JR2354		SLA	6
JR2355		AM	T1
JR2356		SRAQ	6,1X
JR2357		TQM	,0X
JR2358	SX	JMP	(P)
JR2359	OV2	A/ITABLE	OVERFLOW \$
JR2360	NBW	TMD	COT
JR2361		ADXR	1H,4X
JR2362		TJM	NBX
JR2363		JMP	NB
JR2364	NBV	TJM	NBX
JR2365		TMD	COT
JR2366		ADXL	,4X
JR2367	NB	TMD	,4X
JR2368		TDXLC	,0X
JR2369		TDXRC	1H,1X
JR2370		TMD	Y89
JR2371		AIXJ	6,1X
JR2372		SDXL	,1X
JR2373		TMD	Y90
JR2374		AIXJ	1,0X
JR2375		TMD	LC+37
JR2376		TDXLC	,0X
JR2377		JMP	RFP
JR2378		JMP	NBA
JR2379	NBB	TMD	Y91
JR2380		AIXJ	0,0X
JR2381		TMD	LC+27
JR2382		TDXLC	,0X
JR2383		JMP	RFD
JR2384	NBA	CD	
JR2385		TXDLC	,0X
JR2386		TXDRC	1H,1X
JR2387		TDM	,4X
JR2388	NBX	JMP	(P)
JR2389	NSW	TMD	COT
JR2390		ADXR	1H,5X
JR2391		TJM	NSX
JR2392		JMP	NS
JR2393	NSV	TJM	NSX
JR2394		TMD	COT
JR2395		ADXL	,5X
JR2396	NS	TMD	,5X
JR2397		TDXLC	,0X
JR2398		TDXRC	1H,1X
JR2399		TMD	Y92

JR2400		AIXJ	6,1X
JR2401		SDXL	,1X
JR2402		TMD	Y93
JR2403		AIXJ	1,0X
JR2404		JMP	PRINT
JR2405		TMD	LC+34
JR2406		TDXLC	,0X
JR2407		TDXLC	,3X
JR2408		TMD	Y66
JR2409	L	RPTA	15
JR2410		TDM	1,3X
JR2411		JMP	NSB
JR2412	NSA	TMD	Y94
JR2413		AIXJ	0,0X
JR2414		TMD	LC+27
JR2415		TDXLC	,0X
JR2416		JMP	WFD
JR2417		CM	DATA-2
JR2418		CM	DATA-1
JR2419	NSB	CD	
JR2420		TXDLC	,0X
JR2421		TXDRC	1H,1X
JR2422		TDM	,5X
JR2423	NSX	JMP	(P)
JR2424	DECKW	TMD	COT
JR2425		ADXR	1H,4X
JR2426		TJM	DKX
JR2427		JMP	DECK
JR2428	DECKV	TJM	DKX
JR2429		TMD	COT
JR2430		ADXL	,4X
JR2431	DECK	TMD	,4X
JR2432		TDXLC	,0X
JR2433		TDXRC	1H,1X
JR2434		TMD	Y95
JR2435		SIXJ	0,1X
JR2436		TMD	Y96
JR2437		SDXL	,0X
JR2438		TDXRC	1H,1X
JR2439	DKW	TXDLC	,0X
JR2440		TXDRC	1H,1X
JR2441		TDM	,4X
JR2442	DKX	JMP	(P)
JR2443		SIXO	6,1X
JR2444		CD	
JR2445		JMP	DKW
JR2446	SLWW	TMD	COT
JR2447		ADXR	1H,5X
JR2448		TJM	SLWX
JR2449		JMP	SLW
JR2450	SLWV	TMD	COT
JR2451		ADXL	,5X
JR2452		TJM	SLWX
JR2453	SLW	TMD	PTABL
JR2454		TDM	Ti
JR2455		TMD	,5X
JR2456		JMP	S
JR2457		TMD	Y97
JR2458		AIXJ	6,1X
JR2459	SLWX	JMP	(P)

JR2460		TMD	,5X
JR2461		TXDRC	1H,1X
JR2462		TDM	,5X
JR2463		JMP	SLW+3H
JR2464	COT	P/LV,T15	-P/LW,T39
JR2465	BSQ	TJM	BSQX
JR2466		JMP	BI
JR2467		TMD	Y75
JR2468		TDXLC	,2X
JR2469	R	RPTAN	9
JR2470		TMD	1,2X
JR2471		JAED	BSQP
JR2472		TMQ	CNST+4
JR2473		JAGQ	BSQL
JR2474		TMD	PTABL+1
JR2475		TDM	QFF
JR2476	BSQW	JMP	NBW+2H
JR2477		TMD	,5X
JR2478		JMP	S
JR2479		JMP	NSW+2H
JR2480		JMP	BI
JR2481		TMD	PTABL+8
JR2482		JAED	BSQW
JR2483		TMQ	CNST+4
JR2484		JAGQ	BSQX
JR2485		JMP	BSQW
JR2486	BSQL	TMD	PTABL+3
JR2487		TDM	QFF
JR2488		JMP	NBW+2H
JR2489		TMD	,5X
JR2490		JMP	S
JR2491		JMP	NSW+2H
JR2492		JMP	BI
JR2493		TMD	Y75
JR2494		TDXLC	,2X
JR2495	R	RPTAN	9
JR2496		TMD	1,2X
JR2497		JAED	BSQX
JR2498		JMP	BSQL+2H
JR2499	BSQP	TMD	PTABL+2
JR2500		TDM	QFF
JR2501		JMP	NBW+2H
JR2502		TMD	,5X
JR2503		JMP	S
JR2504		JMP	NSW+2H
JR2505	BSQX	JMP	(P)
JR2506	BSE	TJM	BSEX
JR2507		TMD	,4X
JR2508		JMP	B
JR2509		TMD	PTABL
JR2510	BSEX	JAED	(P)
JR2511		TMD	,5X
JR2512		JMP	S
JR2513		JMP	NSW+2H
JR2514		JMP	NBW+2H
JR2515		JMP	BSE+1H
JR2516	BSG	TJM	BSGX
JR2517		TMD	,4X
JR2518		JMP	B
JR2519		TMD	PTABL

JR2520		JAED	BSGX	
JR2521		TMD	PTABL+1	
JR2522		JAED	BSGX	
JR2523		TMD	PTABL+2	
JR2524	BSGX	JAED	(P)	
JR2525		TMD	,5X	
JR2526		JMP	S	
JR2527		JMP	NSW+2H	
JR2528		JMP	NBW+2H	
JR2529		JMP	BSG+1H	
JR2530	BLOCK	TJM	BLOX	
JR2531		SIXO	3,5X	
JR2532		TMA	,5X	
JR2533		SRA	24	NB39
JR2534		TMQ	Y98	
JR2535		EIS	BLW	SET REPEAT COUNTER
JR2536		AIXO	3,5X	
JR2537	RBLW	RPTAA	0	
JR2538		TMD	1,4X	A
JR2539		TDM	1,5X	B
JR2540	BLOX	JMP	(P)	EXIT
JR2541	BI	TJM	BIX	
JR2542		TMD	,4X	
JR2543		JMP	B	
JR2544		TMD	PTABL+14	
JR2545		JAED	BIX+1H	
JR2546		TMD	PTABL+13	
JR2547		JAED	BIX+1H	
JR2548	BIX	JMP	(P)	
JR2549		JMP	NBW+2H	
JR2550		JMP	BI+1H	
JR2551	BSI	TJM	BSIX	
JR2552		JMP	BI	
JR2553		TMD	PTABL	
JR2554		JAED	BSIX	
JR2555		TMD	PTABL+9	
JR2556	BSIX	JAED	(P)	
JR2557		JMP	NBW+2H	
JR2558		TMD	,5X	
JR2559		JMP	S	
JR2560		JMP	NSW+2H	
JR2561		JMP	BSI+1H	
JR2562	FLEXO	TMD	Y81	
JR2563		TDXRC	1H,7X	
JR2564	FLEX1	TMD	,7X	
JR2565	R	RPTNN	8	
JR2566		TDC		
JR2567		SCD	42	
JR2568		TMD	Y100	
JR2569		AIXJ	1,7X	
JR2570		JMP	M/620	
JR2571	FLEX2	A/IDUMP AND FINISH HAVE BEEN TAKENS		
JR2572		A/ICONTINUE WITH NEXT PROGRAM IS		
JR2573		PAGE		
JR2574		AFEND	39\$	
JR2575		NAME	SCT	
JR2576	*	WRITE,READ,SPACE,BACKSPACE,REWIND,AND READREVERSE		
JR2577	*	J. SANFORD		
JR2578	CWTSCT	TJM	WTX	WRITE ON MAG TAPE
JR2579		CD		

JR2580		TXDLC	,5X	STORE XREGS
JR2581		TXDRC	1H,7X	
JR2582		TDM	XSAVE	
JR2583		TAD		
JR2584		TDXLC	,7X	LOCATION OF DATA
JR2585		TMQ	PL1	13/1-1/0-34/1
JR2586		CA		
JR2587		EIS	K1	
JR2588		JMP	SKP	IS UNIT AVAILABLE
JR2589	WT3	JMP	WT1	ALTERNATE BUFFERS
JR2590	WT1	TMD	PL2	MGB,T15
JR2591		TDXLC	,5X	
JR2592	R	RPTAA	128	MOVE 128 WORDS UPSTAIRS
JR2593		TMD	1,7X	
JR2594		TDM	1,5X	
JR2595		TMA	WT	WRITE 1 BLOCK
JR2596		TIO	MCB	FROM MCB
JR2597	WT4	JMP	(P)-1H	
JR2598		JMP	SKP	PAUSE FOR TAPE ACTION
JR2599		TIJ	WT2	SET UP FOR NEXT BUFFER
JR2600		TJM	WT3	
JR2601	WT5	TMD	XSAVE	RESTORE XREGS
JR2602		TDXLC	,5X	
JR2603		TDXRC	1H,7X	
JR2604	WTX	JMP	(P)	EXIT
JR2605	WT2	TMD	PL3	MCB+128,T15
JR2606		TDXLC	,5X	
JR2607	R	RPTAA	128	MOVE UPSTAIRS
JR2608		TMD	1,7X	
JR2609		TDM	1,5X	
JR2610		TMA	WT	WRITE 1 BLOCK
JR2611		TIO	MCB+128	FROM 2OND BUFFER
JR2612		JMP	(P)-1H	
JR2613		JMP	SKP	PAUSE FOR TAPE ACTION
JR2614		TIJ	WT1	SET UP FOR 1ST BUFFER
JR2615		TJM	WT3	
JR2616		JMP	WT5	EXIT
JR2617	CRDSCT	TJM	RDX	READ FROM MAG TAPE
JR2618		CD		
JR2619		TXDLC	,5X	SAVE XREGS
JR2620		TXDRC	1H,7X	
JR2621		TDM	XSAVE	
JR2622		TAD		
JR2623		TDXLC	,7X	LOCATION TO READ INTO
JR2624		TMQ	PL1	13/-1/0-34/1
JR2625		TMA	PL6	D/1B13
JR2626		EIS	K1	
JR2627		JMP	SKP	UNIT AVAILABLE
JR2628	RD3	JMP	RD1	ALTERNATE BUFFERS
JR2629	CRD1	TMA	(P)	READ FORWARD, BACKWARD
JR2630		TIO	MCB	INTO MCB
JR2631		JMP	(P)-1H	
JR2632		JMP	SKP	PAUSE FOR TAPE ACTION
JR2633		TMD	PL2	MCB,T15
JR2634		TDXLC	,5X	
JR2635	R	RPTAA	128	MOVE 128 WORDS DOWNSTAIRS
JR2636		TMD	1,5X	
JR2637		TDM	1,7X	
JR2638		TIJ	RD2	SET UP FOR ALTERNATE BUFFER
JR2639		TJM	RD3	

JR2640	RD4	TMD	XSAVE	RESTORE XREGS
JR2641		TDXLC	,5X	
JR2642		TDXRC	1H,7X	
JR2643	RDX	JMP	(P)	EXIT
JR2644	CRD2	TMA	(P)	READ FORWARD, BACKWARD
JR2645		TIO	MCB+128	2OND BUFFER
JR2646		JMP	(P)-1H	
JR2647		JMP	SKP	PAUSE FOR TAPE ACTION
JR2648		TMD	PL3	MCB+128,T15
JR2649		TDXLC	,5X	
JR2650	R	RPTAA	128	MOVE 128 WORD DOWNSTAIRS
JR2651		TMD	1,5X	
JR2652		TDM	1,7X	
JR2653		TIJ	RD1	SET UP FOR 1ST BUFFER
JR2654		TJM	RD3	
JR2655		JMP	RD4	EXIT
JR2656		SPACE	3	
JR2657	CRWSCT	TJM	RWX	
JR2658		TMA	RW	
JR2659		TIO		
JR2660		JMP	(P)-1H	
JR2661	RWX	JMP	(P)	
JR2662		SPACE	3	
JR2663	CSPSCT	TJM	SPX	
JR2664		TMQ	PL1	13/1-1/0-34/1
JR2665		TMA	PL6	D/1B13
JR2666		EIS	K1	
JR2667	SP1	TMA	SP	SPACE 1 BLK FRWD
JR2668		TIO		
JR2669		JMP	(P)-1H	
JR2670		JMP	SKP	
JR2671	SPX	JMP	(P)	
JR2672		SPACE	3	
JR2673	CBSSCT	TJM	BSX	
JR2674		TMQ	PL1	13/1-1/0-34/1
JR2675		TMA	PL6	D/1B13
JR2676		EIS	K1	
JR2677	BS1	TMA	BSP	BACKSPACE 1 BLK
JR2678		TIO		
JR2679		JMP	(P)-1H	
JR2680		JMP	SKP	
JR2681	BSX	JMP	(P)	
JR2682	XSAVE	D/O		
JR2683	*	LOAD	A REG WITH PL NO. AND JMP TO IN	
JR2684	BIN	TJM	INX	
JR2685		CM	L	
JR2686		TMQ	PL8	20/1-4/0-24/1
JR2687		EIS	L	
JR2688		TMQ	PL9	D/10B23
JR2689		JAGQ	INX+1H	TAPE NOT ASSIGNED
JR2690		TMQ	PL8	20/1-4/0-24/1
JR2691		EIS	RD	READ 1 BLK FORWARD
JR2692		EIS	RDR	READ 1 BLK IN REVERSE
JR2693		EIS	WT	WRITE 1 BLK FORWARD
JR2694		EIS	SP	SPACE 1 BLK FORWARD
JR2695		EIS	BSP	BACKSPACE 1 BLK
JR2696		EIS	RW	REWIND
JR2697		EIS	EC	ERASE 1 BLOCK
JR2698		TMA	L	
JR2699		SLA	19	

JR2700		TMQ	PL10	1/1-4/0-43/1
JR2701		EIS	K1	
JR2702		EIS	K2	
JR2703		EIS	K3	
JR2704		EIS	K4	
JR2705	INX	JMP	(P)	EXIT
JR2706		TMD	PL11	P/C1,T15
JR2707		TDXLC	,1X	
JR2708	INX	TMD	,1X	
JR2709	R	RPTNN	8	
JR2710		TDC		
JR2711		SCD	42	
JR2712		TMD	PL12	C1+3,INX
JR2713		AIXJ	1,1X	
JR2714		HLT	0	
JR2715		JMP	(P)-1H	
JR2716	C1	A/IUSE	NO. NOT ASSIGNED	IS
JR2717	RSKP	TJM	KX	
JR2718	K1	SKC		
JR2719		JMP	K3	
JR2720	K2	SKF	1,0	
JR2721		JMP	FAULT	
JR2722	K3	SKC	0,0	
JR2723		JMP	K1	
JR2724	K4	SKF	1,0	
JR2725		JMP	K1	
JR2726	KX	JMP	(P)	
JR2727	FAULT	TMA	K2	
JR2728		TMQ	24/1T47	
JR2729		EIS	K6	
JR2730	K5	INCA	K6	
JR2731	LK6	SKF	1,0	
JR2732		JMP	K5	
JR2733		TDA		
JR2734		TMD	P/K10,T15	
JR2735		TDM	K11	
JR2736		CM	ES	
JR2737		TMQ	6/1-10/0-32/1	
JR2738		EIS	ES	
JR2739		SLA	5	
JR2740	K7	JAZ	K9	
JR2741		SLA	1	
JR2742		JAN	K8	
JR2743		INCAL	K11	
JR2744		JMP	K7	
JR2745	K8	TMD	K11	
JR2746		TDXLC	,7X	
JR2747		TMD	,7X	
JR2748		JMP	FLEX	
JR2749	K9	TMD	P/B10,T15-P/3,T39\$	
JR2750		JMP	FLEX	
JR2751	LK10	P/B1,T15-P/3,T39		
JR2752		P/B2,T15-P/4,T39		
JR2753		P/B3,T15-P/4,T39		
JR2754		P/B4,T15-P/2,T39		
JR2755		P/B5,T15-P/3,T39		
JR2756		P/B6,T15-P/1,T39		
JR2757		P/B7,T15-P/1,T39		
JR2758		P/B8,T15-P/3,T39		
JR2759		P/B9,T15-P/2,T39		

JR2760	K11	D/O	
JR2761	ES	D/O	
JR2762	B1	A/ITRANSPORT DISABLED	I\$
JR2763	B2	A/IMISSING BEGINNING BLOCK MARK	I\$
JR2764	B3	A/IMISSING ENDING BLOCK MARK	I\$
JR2765	B4	A/ISPROCKET	I\$
JR2766	B5	A/IIMPROPER BLOCK MARK	I\$
JR2767	B6	A/IPARITYI\$	
JR2768	B7	A/ICRAZY I\$	
JR2769	B8	A/IBEGINNING OF TAPE	I\$
JR2770	B9	A/IENTD OF TAPE	I\$
JR2771	B10	A/IPREMATURE ERROR EXIT	I\$
JR2772	FLEX	TDXLC	,7X
JR2773		TDXRC	1H,6X
JR2774	FLX	TMD	,7X
JR2775	R	RPTNN	8
JR2776		TDC	
JR2777		SCD	42
JR2778		CD	
JR2779		SIXOL	1,6X
JR2780		JNO	FLX
JR2781		NOP	
JR2782		JMP	M/620
JR2783	BRD	O/661T47	READ 1 BLK FRWD MODE 3
JR2784	BRDR	O/761T47	READ 1 BLK REVERSE
JR2785	WT	O/433T47	WRITE 1 BLK FRWD
JR2786	RW	O/212T47	REWIND
JR2787	SP	O/40000000261T47	SPACE 1 BLK FRWD
JR2788	BSP	O/40000000361T47	BACKSPACE 1 BLK
JR2789	EC	O/316T47	ERASE 1 BLK
JR2790	PL1	13/1-1/0-34/1	
JR2791	PL2	P/MCB,T15	
JR2792	PL3	P/MCB+128,T15	
JR2793	PL4	A/IWE TS	
JR2794	PL5	16/1	
JR2795	PL6	D/1B13	
JR2796	PL7	A/IRE TS	
JR2797	PL8	20/1-4/0-24/1	
JR2798	PL9	D/10B23	
JR2799	PL10	1/1-4/0-43/1	
JR2800	PL11	P/C1,T15	
JR2801	PL12	C/HLT,C1+3-C/JMP,INY	
JR2802	PL13	15/1	
JR2803	PL14	A/ISE TS	
JR2804	L	SET	(P)+1
JR2805	MCB	SET	(P)+256
JR2806		PAGE	
JR2807		NAME	PANTS
JR2808	BPANT	TJM	RESX\$
JR2809		TAD	\$
JR2810		TDXC	1H,3X\$
JR2811		TDXC	,1X\$
JR2812		TCXS	,3X\$
JR2813	PAND	TMA	,3X\$
JR2814		JMP	STUF\$
JR2815		CD	\$
JR2816		SIXO	1,1X\$
JR2817		JNO	PAND\$
JR2818		JMP	EOLS
JR2819	RESX	JMP	(P)\$
			STARTING ADDRESS
			NUMBER OF WORDS
			GET DATA WORD
			TEST FOR DONE
			NOT DONE
			WRITE END OF LINE
			EXIT

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JR2820 *SUBROUTINE TO WRITE END OF LINE
JR2821 LEOL TJM EOX$
JR2822 EOA TMA EO1$ END OF LINE CONSTANT
JR2823 EOB JMP STUF$ SWITCH TO WRITE BUFFER
JR2824 EOX JMP (P)$
JR2825 EO1 0/3232323232770200$
JR2826 *SUBROUTINE TO WRITE ONE WORD
JR2827 LSTUF TJM STUX$
JR2828 STUA TAM BUFF+1$ STORE WORD IN BUFFER
JR2829 TMA STU1$
JR2830 INCA STUA$
JR2831 JAGD STUX$
JR2832 TIJ OUT$ SET SWITCH TO WRITE BUFF
JR2833 TJM EOB$ WHEN LINE IS DONE
JR2834 STUX JMP (P)$
JR2835 LSTU1 TJM STUX$
JR2836 TAM BUFF+M/156$
JR2837 *SUBROUTINE TO WRITE BUFFER AND RESET SWITCHES AND
JR2838 LOUT TJM OUX$
JR2839 OUA TMD WRIT1$
JR2840 TIO BUFF$ WRITE BUFFER
JR2841 JMP NOGOS$ TT OR AU NOT AVAILABLE
JR2842 LSK SKC 0$
JR2843 JMP SKF$
JR2844 JMP OUB$ SUCCESS
JR2845 RSKF SKF 1,0$
JR2846 LSKEC SKC M/3777,0$
JR2847 JMP SK$
JR2848 LSKFA SKF M/177,0$ FAULT
JR2849 JMP HELPS$ RECOVERY IMPOSSIBLE- SI
JR2850 TMA FAUL1$
JR2851 JMP FLEX $ TYPE )FAULT T)
JR2852 TMQ UNIT1$
JR2853 JMP DP$ TYPE UNIT NUMBER
JR2854 TMA ERAS2$
JR2855 JMP FLEX$ TYPE )ERASE)
JR2856 TMD ERAS1$
JR2857 TIO $ ERASE BAD BLOCK
JR2858 JMP (P)-1H$
JR2859 TMD REL1$
JR2860 TIO $ RELEASE UNIT
JR2861 JMP (P)-1H$
JR2862 JMP OUA$ TRY AGAIN
JR2863 NOGO TMA REL3$
JR2864 JMP FLEX$ TYPE )RELE)
JR2865 TIXZ 16,2X$ SET UP LOOP
JR2866 TMA REL2$
JR2867 TMQ 1B23$
JR2868 NOGA AQS T1$
JR2869 TIO $ RELEASE ALL UNITS
JR2870 NOP $
JR2871 SIXO 1,2X$
JR2872 JNO NOGAS$ END LOOP
JR2873 JMP OUA$ TRY AGAIN
JR2874 FLEX TJM FLX$ SUBROUTINE TO TYPE ONE W
JR2875 TAD $
JR2876 R RPTNN 8$
JR2877 LOUC TDC BUFF+1$
JR2878 SCD 42$
JR2879 FLX JMP (P)$

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JR2880	DP	TJM	DPX\$	CONVERT AND TYPE DECIMAL
JR2881		CA	\$	
JR2882		DAQ	TEN1\$	
JR2883		TQD	\$	
JR2884		SRAQ	6\$	
JR2885		TDA	\$	
JR2886		JAZ	DPAS	IGNORE LEADING ZERO
JR2887		TDC	\$	
JR2888	DPA	TQD	\$	
JR2889		TDC	\$	
JR2890	DPX	JMP	(P)\$	
JR2891	HELP	TMA	HELP1\$	
JR2892		JMP	FLEX\$	TYPE)HELP)
JR2893		HLT	M/7777\$	HALT FOR MANUAL ACTION
JR2894		JMP	OUAS	TRY AGAIN
JR2895	WRIT1	C/HLT,0-C/TQA,1\$		WRITE ORDER- SET
JR2896	ERAS1	C/HLT,0-C/FCAQAS		ERASE ORDER- SET
JR2897	REL1	C/HLT,0-C/FAQAS		RELEASE ORDER- SET
JR2898	UNIT1	\$		UNIT NUMBER- SET
JR2899	REL2	C/HLT,0-C/FAQAS		RELEASE ORDER
JR2900	T1	\$		TEMPORARY STORAGE
JR2901	TEN1	D/10\$		
JR2902	1B23	D/1B23\$		
JR2903	FAUL1	O/3226216443636063\$		
JR2904	ERAS2	O/6025512162256032\$		
JR2905	REL3	O/3235512543253532\$		
JR2906	HELP1	O/3235302543473532\$		
JR2907	LOUB	TIJ	STUF\$	RESET SWITCHES, SET UP B
JR2908		TJM	EOB\$	RESET
JR2909		TIJ	BUFF+1\$	
JR2910		TJM	STUAS	RESET
JR2911		TMD	DS1\$	
JR2912	R	TDM	BUFF\$	DATA SELECT
JR2913		TMA	OU2\$	END OF LINE
JR2914		TMD	OUC\$	
JR2915		TDXC	,2X\$	
JR2916		TMD	OU3\$	
JR2917	L	RPTNN	M/176\$	
JR2918		TDM	,2X\$	STORE IGNORE
JR2919		TAM	BUFF+M/177\$	STORE END OF LINE
JR2920	OUX	JMP	(P)\$	
JR2921	OU2	O/3232323232323277\$		
JR2922	OU3	O/3232323232323232\$		
JR2923	PA1	O/3232323232770700\$		
JR2924	CPINT	TJM	RESX\$	
JR2925		TAD	\$	
JR2926		TDXC	1H,2X\$	USE TAPE NUMBER
JR2927		ADX	,2X\$	
JR2928		TMA	,2X\$	PL UNIT
JR2929		SLA	19\$	
JR2930		TMQ	M1\$	
JR2931		EIS	SK\$	SET UP SKIPS
JR2932		EIS	SKEC\$	
JR2933		EIS	SKFAS	
JR2934		SRA	19\$	
JR2935		SRQN	19\$	
JR2936		EIS	WRIT1\$	SET UP IO ORDERS
JR2937		EIS	ERAS1\$	
JR2938		EIS	REL1\$	
JR2939		SRA	5\$	

JR2940		SRQN	5\$	
JR2941		EIS	SKF\$	SET UP SKF
JR2942		SRA	19\$	
JR2943		SRQN	19\$	
JR2944		EIS	UNIT1\$	SET UP UNIT
JR2945		TIJ	RESX\$	
JR2946		TJM	OUB\$	
JR2947		JMP	OUB\$	RESET AND EXIT
JR2948		*SUBROUTINE TO CHANGE DATA SELECT CHARACTER		
JR2949	LCDS	TDM	MD\$	
JR2950		TJM	RESX\$	
JR2951		TMQ	M2\$	
JR2952		ETA	MD\$	EXTRACT NEW DATA SELECT
JR2953		ETD	DS1\$	EXTRACT OLD DATA SELECT
JR2954		JAED	RESX\$	EXIT IF NO CHANGE
JR2955		ES	DS1\$	
JR2956		AMS	DS1\$	NEW DATA SELECT
JR2957		TDQ	\$	
JR2958		TMA	BUFF+1\$	
JR2959		TMD	OU3\$	
JR2960		JAED	CDA\$	BUFFER EMPTY
JR2961		JMP	OUT\$	BUFFER NOT EMPTY, FINISH
JR2962	CDA	TQM	BUFF\$	NEW DATA SELECT TO BUFFE
JR2963		JMP	RESX\$	
JR2964	DS1	O/0200323232323232\$		
JR2965	DS2	O/0252323232323232\$		
JR2966	M1	O/4177777777777777\$		
JR2967	M2	O/17T11\$		
JR2968	BUFF	SET	(P)+M/200\$	128 WORD OUTPUT BUFFER
JR2969	MD	\$		
JR2970	CSPCE	TJM	RESX\$	
JR2971		JMP	EOL\$	
JR2972		JMP	RESX\$	
JR2973	CPAGE	TJM	RESX\$	
JR2974		TMA	PA1\$	
JR2975		JMP	STUF\$	
JR2976		JMP	SPCE+1H\$	
JR2977	CFINISH	TJM	RESX\$	
JR2978		TMD	DS2\$	
JR2979		TDM	BUFF\$	
JR2980		JMP	OUT\$	
JR2981		JMP	RESX\$	
JR2982		PAGE		
JR2983		NAME	JRS	
JR2984	Y1	P/LW+10,T15-P/LV+22,T39\$		
JR2985	Y2	P/LV+2,T15-P/LV+23,T39		
JR2986	Y3	P/MULTC,T15-P/OPENM,T39\$		
JR2987	Y4	P/MULTC,T15-P/MULTB,T39\$		
JR2988	Y5	P/MULTC,T15-P/MULTA,T39\$		
JR2989	Y6	P/LV+24,T15-P/LW+8,T39		
JR2990	Y7	P/MN,T15-P/OPENM,T39		
JR2991	Y8	P/OPENM-1,T15-P/42,T39		
JR2992	Y9	P/LV+24,T15-P/LV+9,T39		
JR2993	Y10	P/LW+11,T15-P/LV+9,T39		
JR2994	Y11	P/LV+22,T15-P/LV+12,T39\$		
JR2995	Y12	P/SORTO,T15-P/SORTC,T39\$		
JR2996	Y13	P/LV+23,T15-P/LV+12,T39\$		
JR2997	Y14	P/LC+13,T15-P/LV+13,T39\$		
JR2998	Y15	P/LV+12,T15-P/LV+19,T39\$		
JR2999	Y16	P/LV+19,T15-P/LV+15,T39\$		

JR3000	Y17	P/LV+14,T15-P/LV+20,T39\$
JR3001	Y18	P/LV+20,T15-P/LV+13,T39\$
JR3002	Y19	P/LV+14,T15-P/LV+13,T39\$
JR3003	Y20	P/LV+19,T15-P/LV+13,T39\$
JR3004	Y21	P/LV+12,T15-P/LV+13,T39\$
JR3005	Y22	P/SORTA,T15-P/SORTB,T39\$
JR3006	Y23	P/LV+12,T15-P/LV+17,T39\$
JR3007	Y24	P/LV+14,T15-P/LV+18,T39\$
JR3008	Y25	C/TMA,RTW+1-C/AM,EE2
JR3009	Y26	P/LV+18,T15-P/LV+13,T39\$
JR3010	Y27	P/LV+16,T15-P/LV+13,T39\$
JR3011	Y28	P/SORTA,T15-P/SORTO,T39\$
JR3012	Y29	P/LV+12,T15-P/LV+15,T39\$
JR3013	Y30	P/LV+24,T15-P/LV+16,T39\$
JR3014	Y31	P/LV+24,T15-P/LV+14,T39\$
JR3015	Y32	P/N1,T15-P/N2,T39
JR3016	Y33	P/LV+28,T15-P/LW+1,T39
JR3017	Y34	P/LV+35,T15-P/LV+1,T39
JR3018	Y35	P/LV+2,T15-P/LV+3,T39
JR3019	Y36	P/LV+3,T15-P/LV+31,T39
JR3020	Y37	P/LV+30,T15-P/LV+31,T39\$
JR3021	Y38	P/SUBSTB,T15-P/OPENM,T39\$
JR3022	Y39	P/LV+35,T15-P/LV+3,T39
JR3023	Y40	P/E1,T15-P/EE1,T39
JR3024	Y41	P/MP,T15-P/OPENM,T39
JR3025	Y42	P/LV+2,T15-P/LV+4,T39
JR3026	Y43	P/LV+4,T15-P/LV+7,T39
JR3027	Y44	P/CNST,T15
JR3028	Y45	P/LV+2,T15-P/LV+6,T39
JR3029	Y46	P/E2,T15-P/EE2,T39
JR3030	Y47	C/CSM,RTW+1-C/AM,EE2
JR3031	Y48	P/LV+18,T15-P/LV+7,T39
JR3032	Y49	P/LV+2,T15-P/LV+7,T39
JR3033	Y50	P/LW+3,T15-P/LV+7,T39
JR3034	Y51	P/OPENM,T15-P/MY,T39
JR3035	Y52	P/LV+1,T15-P/LV+8,T39
JR3036	Y53	P/LV+8,T15-P/LV+10,T39
JR3037	Y54	P/MN,T15-P/OPENM,T39
JR3038	Y55	P/LV+1,T15-P/LV+9,T39
JR3039	Y56	P/T1,T15
JR3040	Y57	D/O
JR3041	Y58	D/O
JR3042	Y59	P/LV+37,T15-P/LV+35,T39\$
JR3043	Y60	O/0061013333333333
JR3044	Y61	P/LV+37,T15-P/LV+39,T39\$
JR3045	Y62	P/LV+35,T15-P/LV+7,T39
JR3046	Y63	P/LV+32,T15-P/LV+18,T39\$
JR3047	Y64	P/PROGB,T15
JR3048	Y65	A/LAST \$
JR3049	Y66	8/110000
JR3050	Y67	24/0-24/1
JR3051	Y68	C/HLT,PROGB+120-C/JMP,LT6\$
JR3052	Y69	A/ B \$
JR3053	Y70	P/LT4,T15
JR3054	Y71	C/HLT,LT4+3-C/JMP,LT3
JR3055	Y72	P/LV+27,T15-P/LWW,T39
JR3056	Y73	P/BF11,T15
JR3057	Y74	C/HLT,BF11+3-C/JMP,BF10\$
JR3058	Y75	C/HLT,PTABL-C/TJML,BUFF+16\$
JR3059	Y76	P/LWX,T15-P/LV+34,T39

JR3060	Y77	P/15,T15-P/BUFF,T39	
JR3061	Y78	P/DA TA-2,T15	
JR3062	Y79	P/LV+1,T15-P/LV+36,T39	
JR3063	Y80	P/LWW,T15-P/LV+27,T39	
JR3064	Y81	P/WO2,T15-P/FLEX2,T39	
JR3065	Y82	C/HLT,WO2+2-C/JMP,WO1	
JR3066	Y83	C/HLT,PTABL-C/TJML,BUFF+16\$	
JR3067	Y84	C/HLT,4095-C/JMP,SW	
JR3068	Y85	O/32	
JR3069	Y86	P/OV2,T15	
JR3070	Y87	C/HLT,OV2+2-C/JMP,OV1	
JR3071	Y88	A/AT \$	
JR3072	Y89	C/HLT,48-C/JMP,NBA	
JR3073	Y90	C/HLT,PROGB+128-C/JMP,NBB\$	
JR3074	Y91	C/HLT,DA TA+126-C/JMP,NBA\$	
JR3075	Y92	C/HLT,48-C/JMP,NSB	
JR3076	Y93	C/HLT,BUFF+15-C/JMP,NSA\$	
JR3077	Y94	C/HLT,DA TA+126-C/JMP,NSB\$	
JR3078	Y95	C/HLT,0-C/JMP,DKX+1H	
JR3079	Y96	P/1,T15-P/42,T39	
JR3080	Y97	C/HLT,48-C/JMP,SLWX+1H	
JR3081	Y98	28/1-12/0-8/1	
JR3082	Y99	P/3,T15-P/USE,T39	
JR3083	Y100	C/HLT,FLEX2+8-C/JMP,FLEX1\$	
JR3084	Y112	P/LV+2,T15-P/LV+10,T39	
JR3085	Y113	A/1/1.....0\$	
JR3086	PTABL	O/33T47	END CODE
JR3087		O/20T47	PLUS
JR3088		O/40T47	MINUS
JR3089		O/54T47	TIMES
JR3090		O/53T47	EXPON
JR3091		O/74T47	OPEN
JR3092		O/34T47	CLOSE
JR3093		O/73T47	COMMA
JR3094		O/61T47	SLASH
JR3095		O/13T47	EQUAL
JR3096		O/24T47	D
JR3097		O/46T47	O
JR3098		O/62T47	S
JR3099		O/32T47	IGNORE
JR3100		O/60T47	SPACE
JR3101		O/25T47	E
JR3102		O/31T47	I
JR3103		O/43T47	L
JR3104		O/63T47	T
JR3105		O/21T47	A
JR3106		O/22T47	B
JR3107		O/23T47	C
JR3108		O/55T47	QUOTE
JR3109		O/26T47	F
JR3110		O/47T47	P
JR3111	TAB	O/33T5	END CODE
JR3112		O/60206033T23	PLUS
JR3113		O/60406033T23	MINUS
JR3114		O/5433T11	TIMES
JR3115		O/5333T11	EXP
JR3116		O/7433T11	OPEN
JR3117		O/3433T11	CLOSE
JR3118		O/7333T11	COMMA
JR3119		O/6133T11	SLASH

JR3120		O/1333T11	EQUAL
JR3121	GNST	O/0161013333333333	
JR3122		48/0	
JR3123		O/1T47	
JR3124		O/11T47	
JR3125		O/12T47	
JR3126		8/110000	
JR3127	QFF	SET (P)+1	
JR3128	EFF1	SET (P)+1	
JR3129	EFF2	SET (P)+1	
JR3130	MFF1	SET (P)+1	
JR3131	CTL	SET (P)+1	
JR3132	CTLP	SET (P)+1	
JR3133	CTE	SET (P)+1	
JR3134	XWRD	C/HLTL,SORTA-1-C/HLTR,SORTB+1HS	
JR3135		C/HLT,SORTA+19-C/JMP,GATH7S	
JR3136		P/TRU+1,T15-P/6,T39	
JR3137	LC	D/0	
JR3138		P/FOT,T15	
JR3139		P/OPENM,T15	
JR3140		P/F1,T15	
JR3141		P/F2,T15	
JR3142		P/E1,T15	
JR3143		P/E2,T15	
JR3144		P/G,T15	
JR3145		P/MY,T15	
JR3146		P/MN,T15	
JR3147		P/MP,T15	
JR3148		D/0	
JR3149		P/SORTO,T15	
JR3150		P/SORTA,T15	
JR3151		P/SORTB,T15	
JR3152		P/N1,T15	
JR3153		P/N2,T15	
JR3154		P/EE1,T15	
JR3155		P/EE2,T15	
JR3156		P/T2,T15	
JR3157		P/T3,T15	
JR3158		P/SORIC,T15	
JR3159		P/MULTA,T15	
JR3160		P/MULTB,T15	
JR3161		P/MULTC,T15	
JR3162		P/S3,T15	
JR3163		D/0	
JR3164		P/DATA,T15	
JR3165		P/S4,T15	
JR3166		D/0	
JR3167		P/SUBSTA,T15	
JR3168		P/SUBSTB,T15	
JR3169		P/TRU,T15	
JR3170		D/0	
JR3171		P/BUFF,T15	
JR3172		P/PROG,T15	
JR3173		P/DATA-2,T15	
JR3174		P/PROGB,T15	
JR3175		P/PROGB,T15-P/24,T39	
JR3176		P/OPENM-2,T15	
JR3177	LV	SET (P)+45	
JR3178	LW	SET (P)+15	
JR3179	LWW	D/0	

JR3180	LWX	D/0
JR3181	T1	SET (P)+1
JR3182	NUMER	SET (P)+2
JR3183	DENOM	SET (P)+2
JR3184	REMAN	SET (P)+2
JR3185		P/1,T15-P/4095,T39
JR3186		SET (P)+2
JR3187	EE1	SET (P)+1
JR3188		P/1,T15-P/4095,T39
JR3189		SET (P)+2
JR3190	EE2	SET (P)+1
JR3191		P/1,T15-P/4095,T39
JR3192		SET (P)+2
JR3193	E1	SET (P)+1
JR3194		P/1,T15-P/4095,T39
JR3195		SET (P)+2
JR3196	E2	SET (P)+1
JR3197		P/1,T15-P/4095,T39
JR3198		SET (P)+2
JR3199	S1	SET (P)+1
JR3200		P/1,T15-P/4095,T39
JR3201		SET (P)+2
JR3202	S2	SET (P)+1
JR3203		P/1,T15-P/4095,T39
JR3204		SET (P)+2
JR3205	S3	SET (P)+1
JR3206		P/2,T15-P/4095,T39
JR3207		SET (P)+2
JR3208	FOT	SET (P)+2
JR3209		P/4,T15-P/4095,T39
JR3210		SET (P)+2
JR3211	F1	SET (P)+4
JR3212		P/4,T15-P/4095,T39
JR3213		SET (P)+2
JR3214	F2	SET (P)+4
JR3215		P/4,T15-P/4095,T39
JR3216		SET (P)+2
JR3217	N1	SET (P)+4
JR3218		P/4,T15-P/4095,T39
JR3219		SET (P)+2
JR3220	N2	SET (P)+4
JR3221		P/20,T15-P/4095,T39
JR3222		SET (P)+2
JR3223	G	SET (P)+20
JR3224		P/20,T15-P/4095,T39
JR3225		SET (P)+2
JR3226	SORTO	SET (P)+20
JR3227		P/20,T15-P/4095,T39
JR3228		SET (P)+2
JR3229	SORTA	SET (P)+20
JR3230		P/20,T15-P/4095,T39
JR3231		SET (P)+2
JR3232	SORTB	SET (P)+20
JR3233		P/1900,T15-P/4095,T39
JR3234		SET (P)+2
JR3235	OPENM	SET (P)+1900
JR3236		P/1900,T15-P/4095,T39
JR3237		SET (P)+2
JR3238	MY	SET (P)+1900
JR3239		P/1900,T15-P/4095,T39

JR3240		SET	(P)+2
JR3241	MN	SET	(P)+1900
JR3242		P/1900,T15-P/4095,T39	
JR3243		SET	(P)+2
JR3244	MULTA	SET	(P)+1900
JR3245		P/1900,T15-P/4095,T39	
JR3246		SET	(P)+2
JR3247	MULTB	SET	(P)+1900
JR3248		P/1900,T15-P/4095,T39	
JR3249		SET	(P)+2
JR3250	MULTC	SET	(P)+1900
JR3251		P/128,T15-P/4095,T39	
JR3252	PROGB	SET	(P)+128
JR3253		P/30,T15-P/4095,T39	
JR3254		SET	(P)+2
JR3255	PROG	SET	(P)+30
JR3256		P/126,T15-P/4095,T39	
JR3257		D/O	
JR3258		D/O	
JR3259	DATA	SET	(P)+126
JR3260		P/15,T15-P/4095,T39	
JR3261		SET	(P)+2
JR3262	BUFF	SET	(P)+15
JR3263		P/4095,T39	
JR3264		END	ALGY