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**IBM® 1620**

Program Library

GOTRAN for cards

1620-PR-011

VPTB DATE

IBM 1620 GOTRAN

LANGUAGE SPECIFICATIONS

The language specifications for the IBM 1620 GOTRAN system have been published in the IBM Systems bulletin, IBM 1620 GOTRAN: Preliminary Specifications, form number, J29-4205. In addition to these specifications a new GOTRAN statement is now available to plot curves. This statement is as follows:

GENERAL FORM	EXAMPLE
PLOT (v, c) where v is a floating point variable and c is the character to be used for the plot	PLOT (X, *) PLOT ( DELT, + )

The PLOT statement will space the carriage a number of spaces equal to the integral part of the variable v and print the character specified as c. The character to be used for the plot may be any 1620 character except the record mark. The carriage is returned only by a PRINT statement, thus making it possible to plot multi-functions. If the standard margin and tab settings\* are used, the variable v should be scaled between 0 and 66.

NOTE: The PLOT statement is not compatible with IBM 1620 FORTRAN.

OPERATING PROCEDURES

The operating procedures for the IBM 1620 GOTRAN system can be divided into the following three phases:

- (1) Loading the GOTRAN system tape
- (2) Loading and compilation of the source program
- (3) Executing the program.

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\* See Section Program Execution of this write-up for these settings.

### Loading the GOTRAN System Tape

To initiate the loading of the GOTRAN system tape (i. e., the compiler/interpreter program) a read instruction must be manually entered through the console as follows:

- (1) Depress the Reset Key
- (2) Depress the Insert Key
- (3) Type the instruction  
36 00000 00300
- (4) Depress the Release Key
- (5) Depress the Start Key

After the GOTRAN compiler/interpreter has been loaded into storage, the machine will halt and await the entry of the source statements.

### Loading and Compilation of the Source Program

Under control of Program Switch 1 the source program statements may be entered using one of two methods.

- (1) If the input is on paper tape, mount the tape and depress the Start key.
- (2) If the source statements are to be typed in, depressing the Start key after the compiler/interpreter has been loaded will cause the compiler/interpreter to transfer control to the console and await the first source statement. After this statement has been typed in and processed, the compiler/interpreter will transfer control to the console and await the entry of the next statement. This continues until all statements have been entered and a program in the interpretive language has been compiled. NOTE: The last character of each statement typed must be a record mark.

When the last statement of the source program (i. e., the END statement) has been entered and processed, the machine halts.

### Switch Settings

During the loading and compilation of the source program, the console program switches perform the following functions:

	<u>ON</u>	<u>OFF</u>
Switch 1	Source program is being entered on paper tape.	Source program is being entered via console typewriter.
Switch 2	Source statements are punched on paper tape as they are entered.	Source statements are not punched.
Switch 3 *	Source statements are printed at console.	Source statements are not printed.
Switch 4	This switch provides the operator with the ability to restart the typing of a statement if an error has been made while entering source statements in through the console typewriter. Switch #4 is normally OFF. When a typing error is made that is to be corrected, it is turned ON, the Release and Start keys depressed, and then SW 4 turned OFF. The operator then re-types the statement.	

All console check switches are set to Program.

#### Error Messages

The following error messages may appear during the compilation phase of GOTRAN.

<u>MESSAGE</u>	<u>MEANING</u>
ERROR C1	Symbol table has been exceeded.
ERROR C2	Unacceptable function name.
ERROR C3	Improper operator in arithmetic statements.

After such an error message appears the program will halt. At this point, the instruction which caused this message has not be compiled and it is possible to enter a new version of the instruction. This is done as follows:

- (1) If the source program is being entered via paper tape, set switch 1 ON.
- (2) Depress the Start key. The program will select the console and await the entry of typed data.

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\* See Section Restart Procedure for additional use of Switch #3.

- (3) Type in the corrected statement.
- (4) Depress the Release and Start keys. NOTE: If SW 1 was OFF originally to accept input from paper tape it must be restored to this position after the instruction has been typed in.

### Program Execution

Depressing the Start key when the machine has halted following the completion of compilation, causes the program to be executed. If the input data to the program is on paper tape, the data tape should be mounted before depressing the Start key. The halt following compilation also allows the operator time to set the console switches.

### Switch Settings

During the execution of the compiled program, the console program switches perform the following functions:

	<u>ON</u>	<u>OFF</u>
Switch 1	Input data to be entered on paper tape.	Input data to be entered via console typewriter.
Switch 2	Result of each <u>arithmetic statement</u> is printed. This is known as the trace mode.	N/A
Switch 3	Not used except in restart procedures.	
Switch 4	This switch provides the operator with the ability to restart the typing of input data if an error has been made while typing in data at the console. Switch #4 is normally OFF. When a typing error is made that is to be corrected, it is turned ON, the Release and Start keys depressed, and then SW 4 turned OFF. The operator then re-types the input data.	

All console check switches are set to Program.

### Margin and Tab Settings

During execution time, the left margin should be set at 10 and the right margin at 95. Tab settings should be at 28, 46, 63, 80, and 94.

## Error Messages

The following error messages may appear during the execution of the compiled program.

MESSAGE	MEANING	RESULT IN REGISTER
ERROR E1	FAD, FSB overflow	(all nines)
ERROR E2	FAD, FSB underflow	(all zeroes)
ERROR E3	FMP overflow	(all nines)
ERROR E4	FMP underflow	(all zeroes)
ERROR E5	FDV overflow	(all nines)
ERROR E6	FDV underflow	(all zeroes)
ERROR E7	FDV: attempted division by zero	(all nines)
ERROR F1	Loss of all significance in F SIN, F COS	(all nines)
ERROR F2	FLN: $A = 0$	(all zeroes)
ERROR F3	FLN: $A < 0$	FLN   A
ERROR F4	FEXP overflow	(all nines)
ERROR F5	FEXP underflow	(all zeroes)
ERROR F6	FAXB: $A < 0$	A   B
ERROR A1	ANY indicator or MAR check indicator turned on. *	

### Restart Procedure

Whenever the machine halts on an error or gets into an uncontrolled loop, the operator has the ability of reinitializing the GOTRAN program to accept a new program or to begin anew the existing program in storage. For both compilation and execution, Program Switch 3 is used for this feature in the following way: Depressing the RESET, INSERT, RELEASE, and START keys cause console switch 3 to be interrogated. (If Restart is used when an exit from a loop is not attained the machine must, of course, be halted before these keys are depressed.) If SW 3 is:

- ON - the compiler/interpreter will reinitialize itself and come to the halt which precedes the entering of a GOTRAN source program. A new source program may be entered at this time.
- OFF - the compiler/interpreter will reinitialize and begin anew the execution of the compiled program currently in 1620 core storage.

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\* This message may also appear during compilation.



TAPE DATA

<u>Label</u>	<u>Type</u>	<u>Hash Total</u>
2/10 GOTRAN	Numeric with internal record marks	15705 56742 07989 0702 <u>1</u>



## OPERATING INSTRUCTIONS

### IBM 1620 GOTRAN - CARD SYSTEM

This write-up assumes that the reader is familiar with bulletin number J29-4205-0 entitled "IBM 1620 GOTRAN", and the write-up on operating instructions dated February 15, 1961.

Console Switch #1 has an additional use and must be set before loading the system deck. If Switch #1 is off, all subroutines are loaded; if on, SIN, COS, and ATN are omitted, thus allowing for a larger program.

To load the system, depress the RESET key, place the System deck into the read hopper, and depress the load key. Upon completion of loading, the computer will come to a halt. At this time, the switches are set for compilation.

The functions of the switches have not been changed. All references to tape are now applicable to cards, except that the end-of-line character need not be present on the card.

1 CLEAR

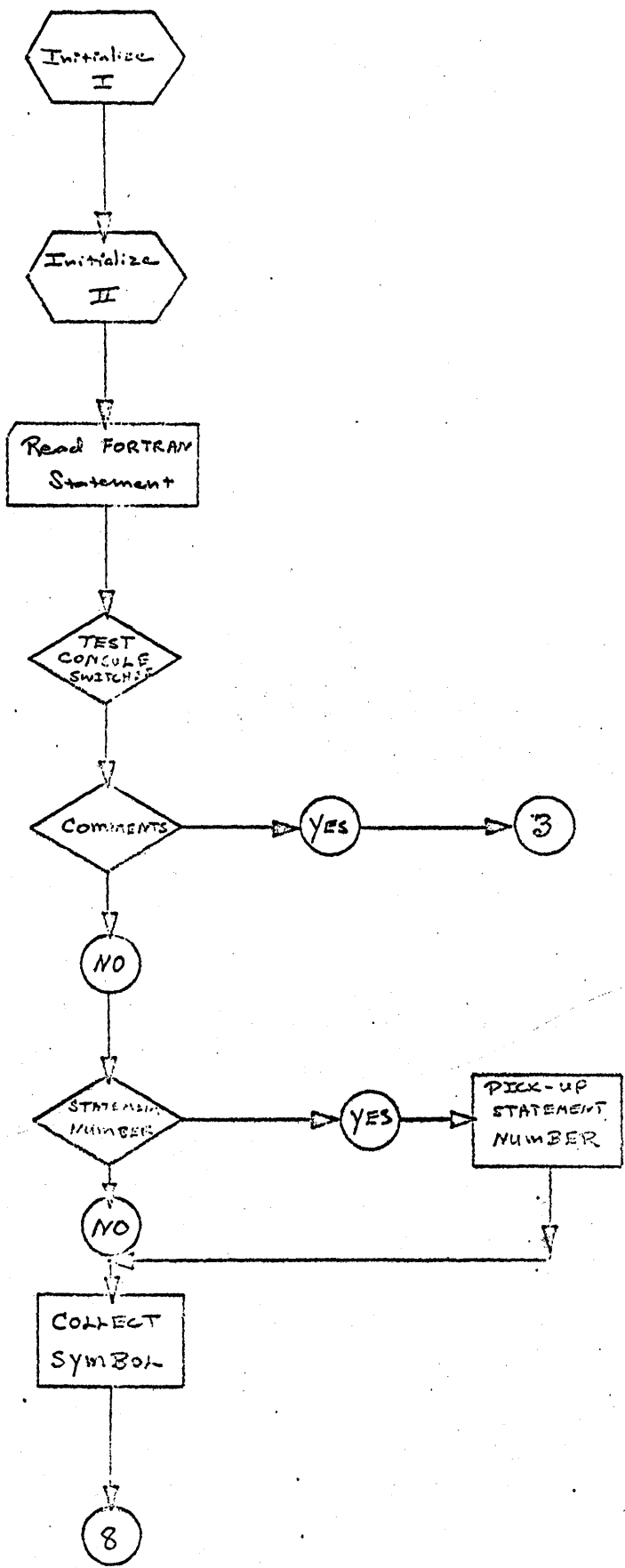
2 CLEAR

3 BEGIN

4 NER

5 NERR

7 BEGINA



PUSTM

8 TLU.

Perform  
Table  
look-up

IN  
TABLE

NO

PUT IN  
TABLE

TRUE 9

10 TLU+23

GET  
ADDRESS

16

NON-ARITHMETIC

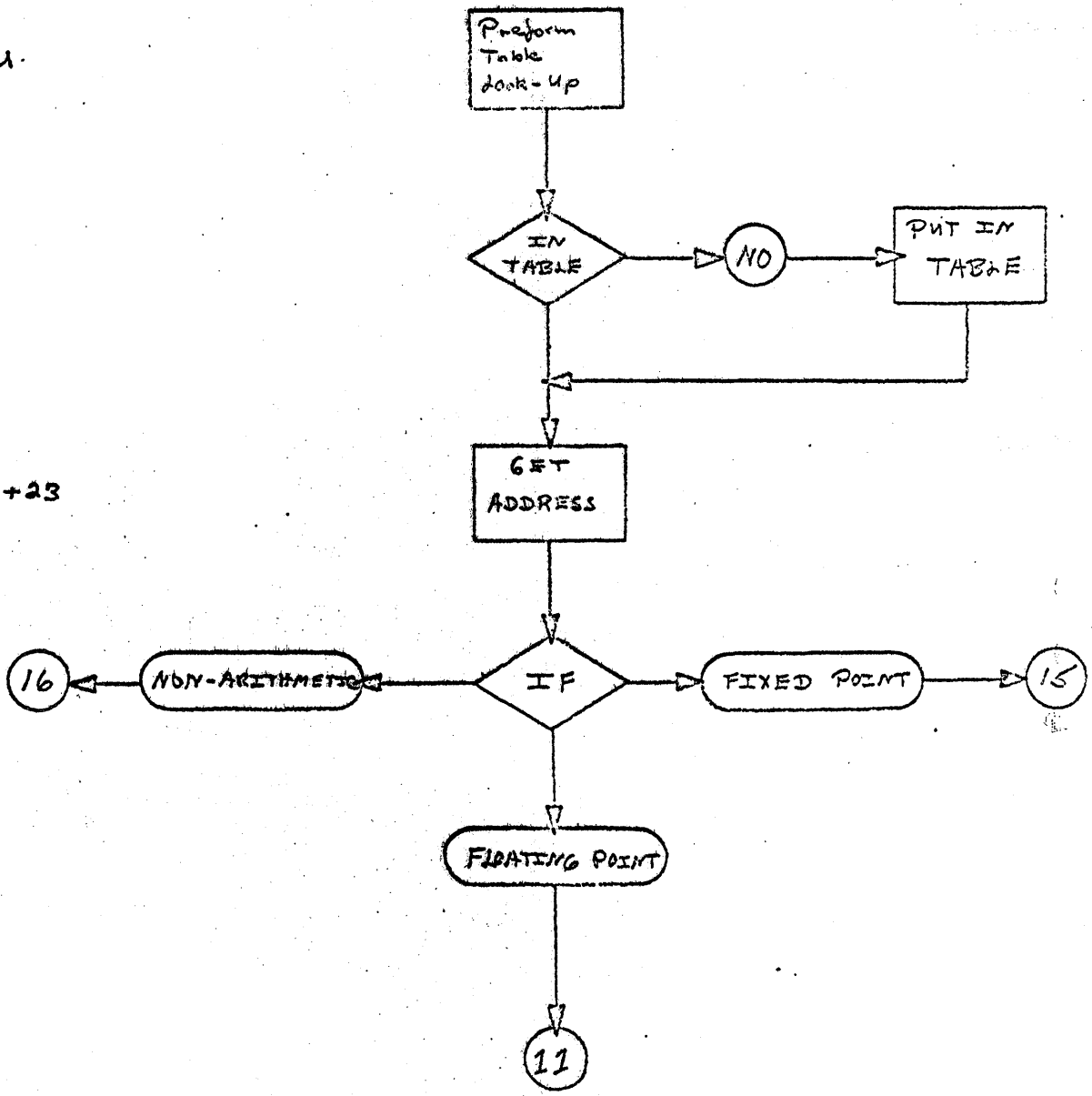
IF

FIXED POINT

15

FLOATING POINT

11

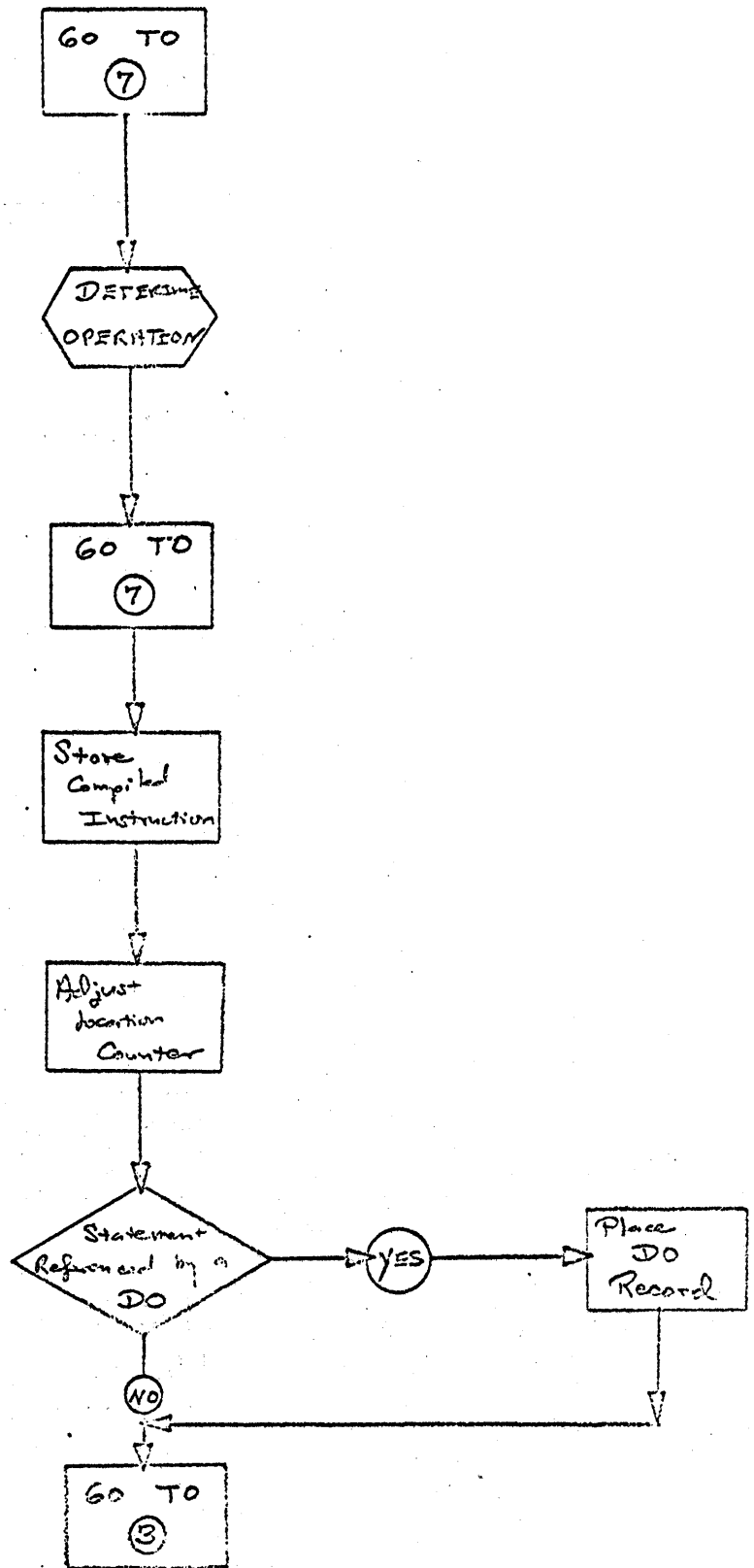


11 BEGIN + 132

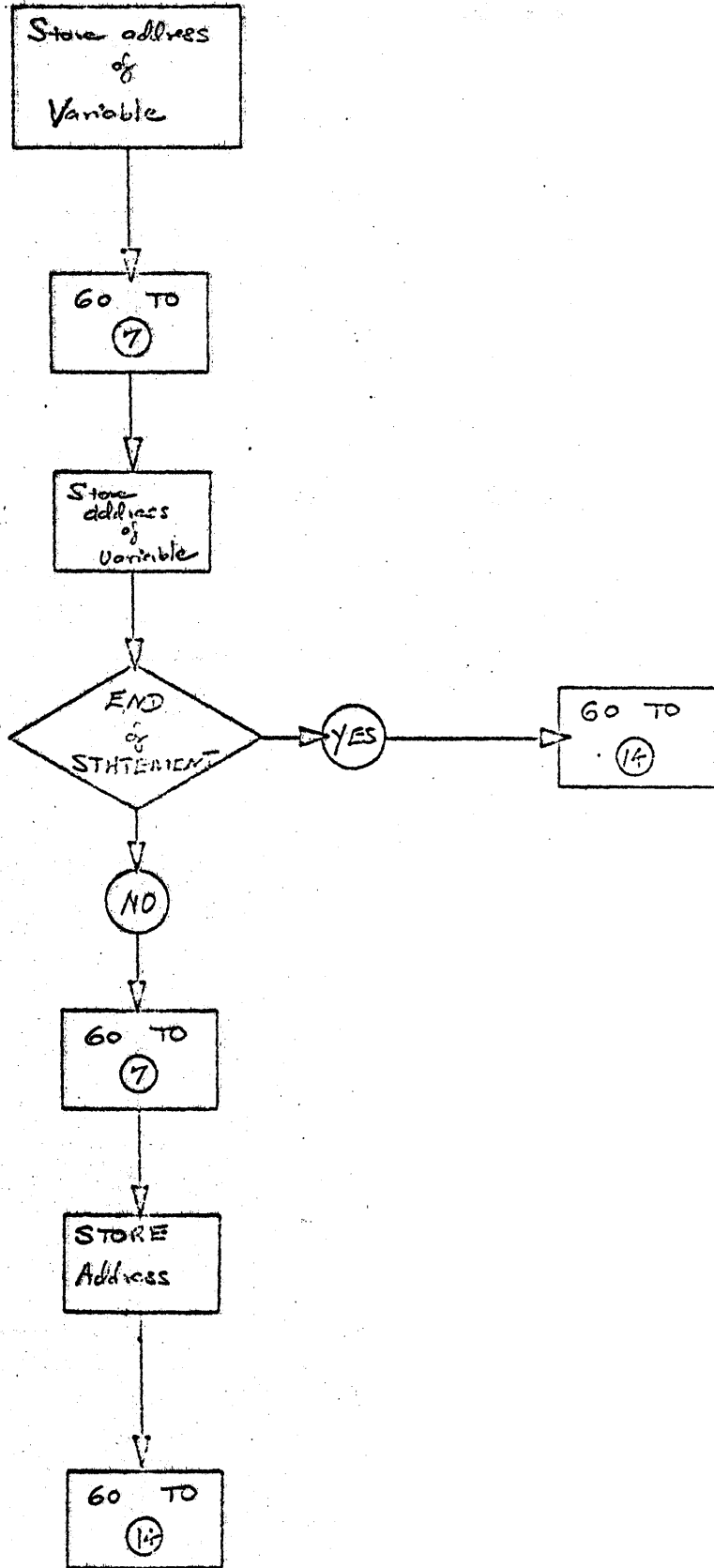
12 BEGA

13 BEGC + 12

14 BEGC + 96



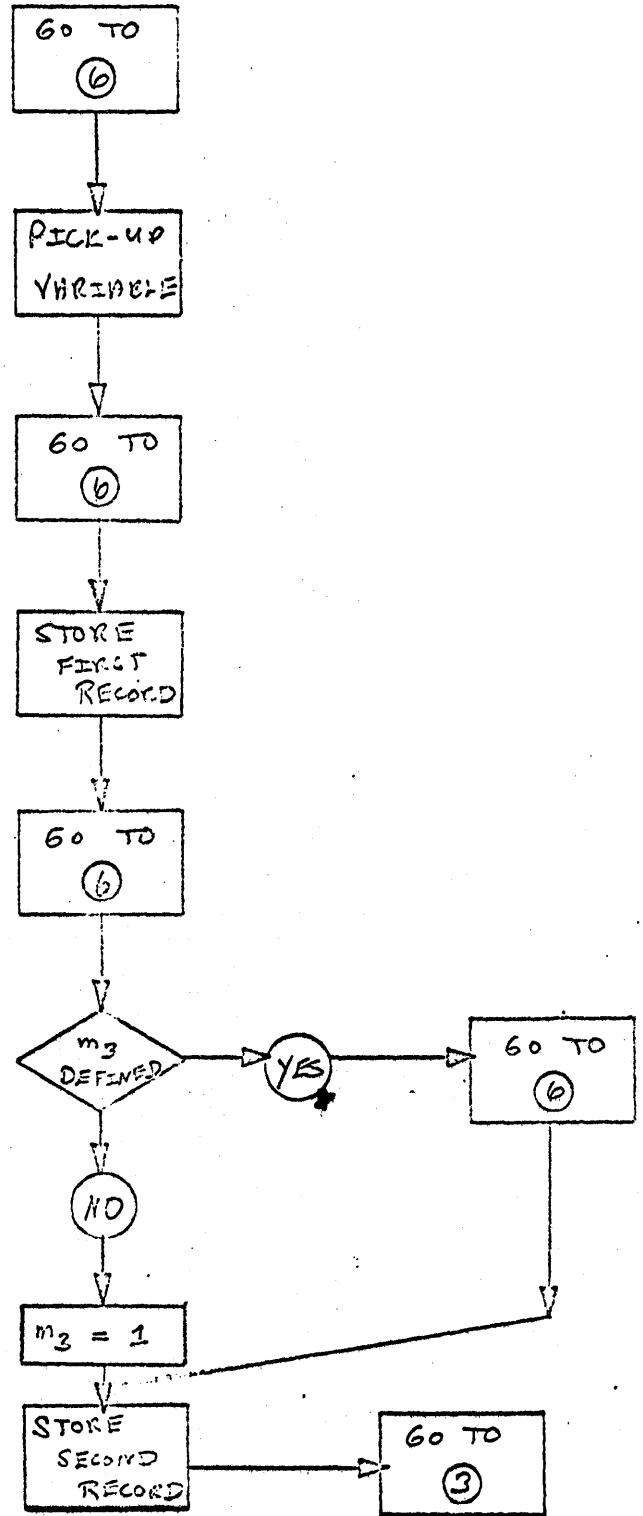
15 Fixed



16 NOTA

COMPUTE  
Address of BRANCH  
at  
R

17 CODO



18 COGO

GO TO  
6

STORE  
RECORD

Adjust  
location  
COUNTER

GO TO  
3

19 COREAD

GO TO  
7

STORE  
RECORD

END

YES

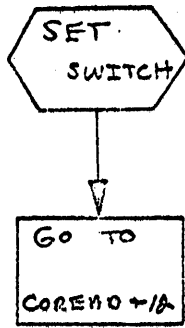
GO TO  
12

NO

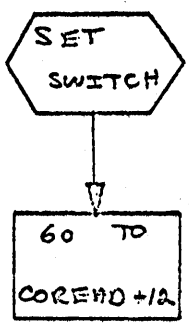
GO TO  
20

20 ER

21 COPRIN



22 COPCH



23 COSTOP





24 CPHUZ

SET  
SWITCH

STORE  
RECORD

GO TO  
14

25 COCONT

GO TO  
14

26 CODIM

COLLECT  
SYMBOL

COLLECT  
NUMBER

STORE IN  
SYMBOL  
TABLE

27 CD

END

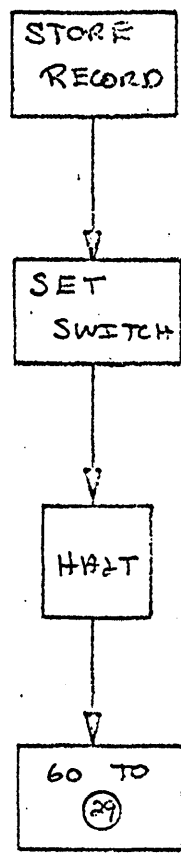
YES

GO TO  
3

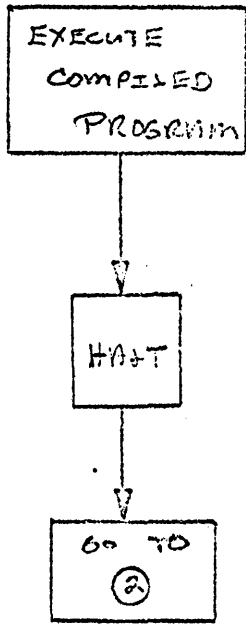
NO

GO TO  
26

28 COEND



29



				*	GO TRAN	COMPILER-INTERPRETERZ
00060				1	FAC	DS ,60Z
00400				2		DORG 400Z
00400	49	00880	00000	3		B GOTOZ
00408				4		DORG 408Z
00408	49	00912	00000	5		B IFZ
00416				6		DORG 416Z
00416	49	01280	00000	7		B D01Z
00424				8		DORG 424Z
00424	49	01324	00000	9		B D02Z
00432				10		DORG 432Z
00432	49	01448	00000	11		B FX2Z
00440				12		DORG 440Z
00440	49	01898	00000	13		B RDZ
00448				14		DORG 448Z
00448	49	01064	00000	15		B WTZ
00456				16		DORG 456Z
00456	49	01576	00000	17		B PAUSEZ
00464				18		DORG 464Z
00464	49	01794	00000	19		B ENDZ
00472				20		DORG 472Z
00472	49	01740	00000	21		B STOPZ
00480				22		DORG 480Z
00480	49	01236	00000	23		B PTZ
00488				24		DORG 488Z
00488	31	00849	J4816	25	INT	TR WK,LOC,7Z
00500	44	00844	00849	26		BNF WK-5,WKZ
00512	44	04730	00850	27		BNF FUNCT,WK&1Z
00524	25	00546	00849	28		TD *&22,WKZ
00536	26	00650	19994	29		TF IB&6,19994Z
00548	11	00499	000J4	30		AM INT&11,14,10Z
00560	26	00642	00852	31		TF IA&10,WK&3Z
00572	43	00748	00853	32		BD IRA,WK&4Z
00584	26	00654	00856	33	INTA	TF IB&10,WK&7Z
00596	43	00780	00857	34		BD IRB,WK&8Z
00608	26	00661	00860	35	INTB	TF IC&5,WK&11Z
00620	43	00812	00861	36		BD IRC,WK&12Z
00632	26	00060	19999	37	IA	TF FAC,19999Z
00644	27	09554	19999	38	IB	BT FAD,19999Z
00656	26	19999	00060	39	IC	TF 19999,FACZ
00668	47	00488	00200	40		BNC2 INTZ
00680	15	07199	00001	41		TDM W6-3,1Z
00692	15	06847	00001	42		TDM W23&9,1Z
00704	16	07203	000L4	43		TFM W6&1,34,10Z
00716	34	00000	00102	44		RCTY Z
00728	27	06674	00662	45		BT WRITE,IC&6Z
00740	49	00488	00000	46		B INTZ
00748				47		DORG *-3Z
00748	25	00770	00853	48	IRA	TD *&22,WK&4Z
00760	22	00642	19997	49		S IA&10,19997Z
00772	49	00584	00000	50		B INTAZ
00780				51		DORG *-3Z
00780	25	00802	00857	52	IRB	TD *&22,WK&8Z
00792	22	00654	19997	53		S IB&10,19997Z
00804	49	00608	00000	54		B INTBZ
00812				55		DORG *-3Z
00812	25	00834	00861	56	IRC	TD *&22,WK&12Z

00824	22	00661	19997	57		S	IC&5,19997Z
00836	49	00632	00000	58		B	IAZ
00844				59		DORG	*-3Z
00844	49	00400	00000	60	ABCDE	B	400Z
00849				61	WK	DS	,ABCDE&5Z
00879		24		62		DS	24Z
00880	26	00902	00853	63	GOTO	TF	*&22,WK&4Z
00892	26	00499	19996	64		TF	INT&11,19996Z
00904	49	00488	00000	65		B	INTZ
00912				66		DORG	*-3Z
00912	26	00946	00853	67	IF	TF	IFA&10,WK&4Z
00924	43	01032	00854	68		BD	IFB,WK&5Z
00936	26	00060	19999	69	IFA	TF	FAC,19999Z
00948	43	00980	00053	70		BD	IFC,FAC-7Z
00960	26	00902	00860	71		TF	GOTO&22,WK&11Z
00972	49	00892	00000	72		B	GOTO&12Z
00980				73		DORG	*-3Z
00980	44	01012	00060	74	IFC	BNF	IFD,FACZ
00992	26	00902	00857	75		TF	GOTO&22,WK&8Z
01004	49	00892	00000	76		B	GOTO&12Z
01012				77		DORG	*-3Z
01012	26	00902	00863	78	IFD	TF	GOTO&22,WK&14Z
01024	49	00892	00000	79		B	GOTO&12Z
01032				80		DORG	*-3Z
01032	25	01054	00854	81	IFB	TD	*&22,WK&5Z
01044	22	00946	19997	82		S	IFA&10,19997Z
01056	49	00936	00000	83		B	IFAZ
01064				84		DORG	*-3Z
01064	15	07199	00001	85	WT	TDM	W6-3,1Z
01076	15	06847	00001	86		TDM	W23&9,1Z
01088	16	07203	000L4	87		TFM	W6&1,34,10Z
01100	34	00000	00102	88		RCTY	Z
01112	11	00499	000-3	89	WTT	AM	INT&11,3,10Z
01124	26	01170	00853	90		TF	WRINST&10,WK&4Z
01136	11	00499	000-4	91		AM	INT&11,4,10Z
01148	43	01204	00854	92		BD	WRSUB,WK&5Z
01160	17	06674	J9999	93	WRINST	BTM	WRITE,19999Z
01172	31	00851	00855	94		TR	WK&2,WK&6Z
01184	45	01124	00851	95		BNR	WTT&12,WK&2Z
01196	49	00488	00000	96		B	INTZ
01204				97		DORG	*-3Z
01204	25	01226	00854	98	WRSUB	TD	*&22,WK&5Z
01216	22	01170	19997	99		S	WRINST&10,19997Z
01228	49	01160	00000	100		B	WRINSTZ
01236				101		DORG	*-3Z
01236	15	07199	00004		PT	TDM	W6-3,4Z
01248	15	06847	00004			TDM	W23&9,4Z
01260	16	07203	000M1	104		TFM	W6&1,41,10Z
01272	49	01112	00000	105		B	WTTZ
01280				106		DORG	*-3Z
01280	25	01297	00851	107	D01	TD	*&17,WK&2Z
01292	26	19997	00854	108		TF	19997,WK&5Z
01304	11	00499	000-7	109		AM	INT&11,7,10Z
01316	49	00488	00000	110		B	INTZ
01324				111		DORG	*-3Z
01324	25	01353	00851	112	D02	TD	*&29,WK&2Z
01336	25	01370	00851	113		TD	*&34,WK&2Z
01348	21	19997	00856	114		A	19997,WK&7Z

01360	24	00854	19997	115
01372	47	01404	01300	116
01384	26	00499	00861	117
01396	49	00488	00000	118
01404				119
01404	11	00499	00-14	120
01416	25	01433	00851	121
01428	22	19997	00856	122
01440	49	00488	00000	123
01280				124
01448				125
01448	25	01513	00851	126
01460	25	01501	00851	127
01472	25	01506	00852	128
01484	25	01509	00853	129
01496	26	19997	19997	130
01508	21	J9997	00856	131
01520	46	01532	01400	132
01532	11	00499	000-9	133
01544	47	00488	00200	134
01556	26	00661	01513	135
01568	49	00680	00000	136
01576				137
01576	48	00000	00000	138
01588	11	00499	000-3	139
01600	49	00488	00000	140
01608				142
01608	16	01643	J2913	1
01620	16	01652	J2913	1
01632	45	01646	00000	1
01644	42	00000	00000	1
01646				1
01646	14	00000	000-0	1
01658	47	01702	01200	1
01670	12	01643	000-2	1
01682	12	01652	000-2	1
01694	49	01632	00000	1
01702				1
01702	26	01732	01652	1
01714	11	01732	000-2	1
01726	15	00000	00000	1
01737		1		1
01738	42	00000	00000	1
01740				1
01583				141
01740	34	00000	00102	143
01752	39	01785	00100	144
01764	34	00000	00108	145
01776	49	01806	00000	146
01784				147
01793		10		148
01794	34	00000	00102	149
01806	39	09265	00100	150
01818	34	00000	00102	151
01830	34	00000	00102	152
01842	48	00999	00000	153
01854	15	06107	00001	154
01866	16	00499	J4816	155

	C	WK&5,19997Z
	BL	DOERZ
	TF	INT&11,WK&12Z
	B	INTZ
	DORG	*-3Z
DOER	AM	INT&11,14,9Z
	TD	*&17,WK&2Z
	S	19997,WK&7Z
	B	INTZ
FX1	DS	,D01Z
	DORG	*-3Z
FX2	TD	*&65,WK&2Z
	TD	*&41,WK&2Z
	TD	*&34,WK&3Z
	TD	*&25,WK&4Z
	TF	19997,19997Z
	A	19997,WK&7,2Z
	BV	*&12Z
	AM	INT&11,9,10Z
	BNC2	INTZ
	TF	IC&5,*-43Z
	B	IC&24Z
	DORG	*-3Z
PAUSE	H	Z
	AM	INT&11,3,10Z
	B	INTZ
	DORG	*-3Z
INSTRM	TFM	TST2-3,CHI&158Z
	TFM	TST2&6,CHI&158Z
TST1	BNR	*&14,0Z
	BB	Z
	DORG	*-9Z
TST2	CM	,0,10Z
	BNE	TST3Z
	SM	TST2-3,2,10Z
	SM	TST2&6,2,10Z
	B	TST1Z
	DORG	*-3Z
TST3	TF	*&30,TST2&6Z
	AM	*&18,2,10Z
	TDM	,Z
	DC	1,@,*Z
	BB	Z
	DORG	*-9Z
CVR	DS	,PAUSE&7Z
STOP	RCTY	Z
	WATY	STPMES-8Z
	TBTY	Z
	B	END&12Z
	DORG	*-3Z
STPMES	DC	10,626356570@Z
END	RCTY	Z
	WATY	MESS-22Z
	RCTY	Z
	RCTY	Z
	H	999Z
	TDM	COMPSW,1Z
	TFM	INT&11,LOCZ

01878	16	05838	J4816	156		TFM	L,LOCZ
01890	49	07362	00000	157		B	CLEARZ
01898				158		DORG	*-3Z
01898	11	00499	000-3	159	RD	AM	INT&11,3,10Z
01910	46	01934	00100	160		BC1	RRZ
01922	34	00000	00102	161		RCTY	Z
01934	46	01966	00100	162	RR	BC1	*&32Z
01946	37	12755	00100	163		RATY	CHIZ
01958	49	01978	00000	164		B	*&20Z
01966				165		DORG	*-3Z
01966	37	12755	00500	166		RACD	CHIZ
01978	27	01608	01607	99999		BT	INSTRM,INSTRM-1Z
01990	46	01922	00400	167		BC4	RR-12Z
02002	46	02026	01900	168		BI	PIRTCK,1900Z
02014	47	02050	00800	169		BNI	*&36,800Z
02026	17	06078	J7100	170	PIRTCK	BTM	ERROR,17100Z
02037		1		171		DC	1,@,*Z
02038	49	02002	00000	172		B	*-36Z
02050	26	02159	00853	173		TF	RWINST&17,WK&4Z
02062	11	00499	000-4	174		AM	INT&11,4,10Z
02074	14	02159	00R79	175		CM	RWINST&17,979,9Z
02086	46	02118	01100	176		BH	*&32Z
02098	15	02160	00009	177		TDM	*&62,9Z
02110	49	02130	00000	178		B	*&20Z
02118				179		DORG	*-3Z
02118	15	02160	00007	180		TDM	*&42,7Z
02130	43	02230	00854	181		BD	RWSUB,WK&5Z
02142	27	02608	02607	182	RWINST	BT	READ,READ-1Z
02154	26	19999	00060	183		TF	19999,FACZ
02166	31	00851	00855	184		TR	WK&2,WK&6Z
02178	45	02198	00851	185		BNR	EVR,WK&2Z
02190	49	00488	00000	186		B	INTZ
02198				187		DORG	*-3Z
02198	46	01934	00100	188	EVR	BC1	RRZ
02210	34	00000	00108	189		TBTY	Z
02222	49	01934	00000	190		B	RRZ
02230				191		DORG	*-3Z
02230	25	02252	00854	192	RWSUB	TD	*&22,WK&5Z
02242	22	02159	19997	193		S	RWINST&17,19997Z
02254	49	02142	00000	194		B	RWINSTZ
02262				195		DORG	*-3Z
02262	16	02285	1R999	196	TLU	TFM	*&23,19999,8Z
02274	26	09191	19876	197		TF	TESTER,19876Z
02286	45	02378	09190	198		BNR	TLUB-12,TESTER-1Z
02298	17	06078	L7100	199		BTM	ERROR,37100Z
02309		1		200		DC	1,@,*Z
02310	24	09213	09191	201	TLUC	C	COLL,TESTERZ
02322	46	02440	01400	202		BV	TLUAZ
02334	24	09191	09213	203		C	TESTER,COLLZ
02346	46	02440	01400	204		BV	TLUAZ
02358	46	02414	01200	205		BE	TLUB&24Z
02370	49	02440	00000	206		B	TLUAZ
02378				207		DORG	*-3Z
02378	45	02310	09191	208		BNR	TLUC,TESTERZ
02390	26	02408	02285	209	TLUB	TF	*&18,TLU&23Z
02402	26	19999	09213	210		TF	19999,COLLZ
02414	25	02285	-1928	211		TD	TLU&23,SBSCT,7Z
02426	42	00000	00000	212		BB	Z

02428				213		DORG	*-9Z
02428	15	02285	00009	214	TCOA	TDM	TLU&23,9Z
02440	12	02285	0-010	215	TLUA	SM	TLU&23,10,8Z
02452	49	-2274	00000	216		B	TLU&12,,2Z
02460				217		DORG	*-3Z
02460	16	09214	00-00	218	PUSTN	TFM	COLL&1,,9Z
02471		1		219		DC	1,@,*Z
02472	31	09211	09212	220		TR	COLL-2,COLL-1Z
02484	25	09213	12755	221		TD	COLL,CHIZ
02496	31	12754	12756	222		TR	CHI-1,CHI&1Z
02508	45	02528	12755	223		BNR	*&20,CHIZ
02520	49	02552	00000	224		B	*&32Z
02528				225		DORG	*-3Z
02528	14	12755	000P0	226		CM	CHI,70,10Z
02540	46	02472	01300	227		BNN	PUSTN&12Z
02552	32	09211	00000	228		SF	COLL-2Z
02564	43	02588	09170	229		BD	*&24,JCLJRZ
02576	32	09213	00000	230		SF	COLLZ
02588	49	02262	00000	231		B	TLUZ
02596				232		DORG	*-3Z
02596	31	12754	J2756	233		TR	CHI-1,CHI&1,7Z
02608	14	12755	000-0	234	READ	CM	CHI,,10Z
02620	46	02596	01200	235		BE	READ-12Z
02632	14	12755	000K0	236		CM	CHI,20,10Z
02644	46	03588	01200	237		BE	NEGZ
02656	14	12755	000-3	238		CM	CHI,3,10Z
02668	47	02692	01200	239		BNE	*&24Z
02680	49	03692	00000	240		B	N-12Z
02692	14	12755	000J0	241		CM	CHI,10,10Z
02704	46	03656	01200	242		BE	N-48Z
02716	14	12755	000P0	243		CM	CHI,70,10Z
02728	46	03704	01300	244		BNN	NZ
02740	26	09213	12755	245		TF	COLL,CHIZ
02752	31	12754	12756	246	READC	TR	CHI-1,CHI&1Z
02764	45	02784	12755	247		BNR	*&20,CHIZ
02776	49	02912	00000	248		B	READA&48Z
02784				249		DORG	*-3Z
02784	14	12755	000M0	250		CM	CHI,40,10Z
02796	47	02864	01300	251		BL	READAZ
02808	31	09195	09197	252		TR	COLL-18,COLL-16Z
02820	26	09213	12755	253		TF	COLL,CHIZ
02832	33	09212	00000	254		CF	COLL-1Z
02844	49	02752	00000	255		B	READCZ
02852				256		DORG	*-3Z
02852	31	12754	12756	257		TR	CHI-1,CHI&1Z
02864	14	12755	000-0	258	READA	CM	CHI,,10Z
02876	46	02852	01200	259		BE	READA-12Z
02888	14	12755	000K4	260		CM	CHI,24,10Z
02900	46	02932	01200	261		BE	READBZ
02912	15	01928	00000	262		TDM	SBSCTZ
02924	49	02262	00000	263		B	TLUZ
02932				264		DORG	*-3Z
02932	31	12754	12756	265	READB	TR	CHI-1,CHI&1Z
02944	14	12755	000-0	266		CM	CHI,,10Z
02956	46	02932	01200	267		BE	READBZ
02968	49	03044	00000	268		B	READFZ
02976				269		DORG	*-3Z
02976	25	01928	12755	270	READH	TD	SBSCT,CHIZ

02988	31	12754	12756	271	TR	CHI-1,CHI&1Z
03000	14	12755	000-4	272	CM	CHI,4,10Z
03012	47	02988	01200	273	BNE	*-24Z
03024	31	12754	12756	274	TR	CHI-1,CHI&1Z
03036	49	02262	00000	275	B	TLUZ
03044				276	DORG	*-3Z
03044	14	12755	000M9	277	READF	CM CHI,49,10Z
03056	47	03092	01300	278	BL	READGZ
03068	14	12755	000N6	279	CM	CHI,56,10Z
03080	47	02976	01100	280	BNH	READHZ
03092	24	09213	09233	281	READG	C COLL,EXPZ
03104	46	03296	01200	282	BE	REXPZ
03116	24	09213	09239	283	C	COLL,LNZ
03128	46	03316	01200	284	BE	RLNZ
03140	24	09213	09245	285	C	COLL,SQRZ
03152	46	03336	01200	286	BE	RSQRZ
03164	14	09213	0M946	287	CM	COLL,4946,8Z
03176	46	06386	01200	288	BE	COIFZ
03188	24	09213	09251	291	C	COLL,SINFZ
03200	46	03392	01200	292	BE	RSINZ
03212	24	09213	09257	293	C	COLL,COSFZ
03224	46	03412	01200	294	BE	RCOSZ
03236	24	09213	09263	295	C	COLL,ATNFZ
03248	46	03432	01200	296	BE	RATNZ
03260	24	09213	09223	297	C	COLL,PLOTZ
03272	46	03452	01200	298	BE	RPLOTZ
03284	17	06078	L7200	299	BTM	ERROR,37200Z
03295		1		300	DC	1,@,*Z
01822				301	TIX	DS ,END&28Z
01834				302	ACL	DS ,END&40Z
03296	16	00853	J2026	303	REXP	TFM WK&4,FEXPZ
03308	49	05752	00000	304	B	BEGC&12Z
03316				305	DORG	*-3Z
03316	16	00853	J1058	306	RLN	TFM WK&4,FLNZ
03328	49	05752	00000	307	B	BEGC&12Z
03336				308	DORG	*-3Z
03336	15	00849	0000N	309	RSQR	TDM WK,5,11Z
03348	27	02608	02607	310	BT	READ,READ-1Z
03360	26	00853	02285	311	TF	WK&4,TLU&23Z
03372	16	00857	0R980	312	TFM	WK&8,9980,8Z
03384	49	05820	00000	313	B	BEGC&80Z
03392				314	DORG	*-3Z
03392	16	00853	J2980	315	RSIN	TFM WK&4,FSINZ
03404	49	05752	00000	316	B	BEGC&12Z
03412				317	DORG	*-3Z
03412	16	00853	J2926	318	RCOS	TFM WK&4,FCOSZ
03424	49	05752	00000	319	B	BEGC&12Z
03432				320	DORG	*-3Z
03432	16	00853	J3724	321	RATN	TFM WK&4,FATNZ
03444	49	05752	00000	322	B	BEGC&12Z
03452				323	DORG	*-3Z
03452	16	00853	-4602	324	RPLOT	TFM WK&4,FPLOTZ
03464	27	02608	02607	325	BT	READ,READ-1Z
03476	26	00857	02285	326	TF	WK&8,TLU&23Z
03488	49	03508	00000	327	B	*&20Z
03496				328	DORG	*-3Z
03496	31	12754	12756	329	TR	CHI-1,CHI&1Z
03508	14	12755	000K3	330	CM	CHI,23,10Z



03520	47	03496	01200	331	BNE	*-24Z
03532	31	12754	12756	332	TR	CHI-1,CHI&1Z
03544	14	12755	000-0	333	CM	CHI,,10Z
03556	46	03532	01200	334	BE	*-24Z
03568	26	00861	12755	335	TF	WK&12,CHIZ
03580	49	05820	00000	3361	B	BEGC&80Z
03588				337	DORG	*-3Z
03588	31	12754	12756	338	NEG TR	CHI-1,CHI&1Z
03600	15	09484	00000	339	TDM	SIGNZ
03612	14	12755	000-3	340	CM	CHI,3,10Z
03624	47	03716	01200	341	BNE	N&12Z
03636	15	09171	00000	342	TDM	DECZ
03648	49	03716	00000	343	B	N&12Z
03656				344	DORG	*-3Z
03656	31	12754	12756	345	TR	CHI-1,CHI&1Z
03668	14	12755	000-3	346	CM	CHI,3,10Z
03680	47	03704	01200	347	BNE	NZ
03692	15	09171	00000	348	TDM	DECZ
03704	15	09484	00001	349	N TDM	SIGN,1Z
03716	26	00060	11820	350	TF	FAC,CZERO-1Z
03728	16	03825	000J2	351	TFM	SEXP&1,12,10Z
03740	15	03972	00001	352	TDM	ADEXP,1Z
03752	16	03898	-0053	353	TFM	N1&6,FAC-7Z
03764	16	00052	000N1	354	TFM	FAC-8,51,10Z
03776	14	12755	000-3	355	N3 CM	CHI,3,10Z
03788	46	04060	01200	356	BE	N2&24Z
03800	14	12755	000P0	357	CM	CHI,70,10Z
03812	47	03892	01200	358	BNE	N1Z
03824	M1	00052	000-1	359	SEXP NOP	FAC-8,1,010Z
03836	31	12754	12756	360	TR	CHI-1,CHI&1Z
03848	45	03776	12755	361	BNR	N3,CHIZ
03860	49	04116	00000	362	B	N10Z
03868				363	DORG	*-3Z
03868	43	03892	00053	364	N6 BD	*&24,FAC-7Z
03880	16	03898	-0053	365	TFM	N1&6,FAC-7Z
03892	25	-0053	12755	366	N1 TD	FAC-7,CHI,2Z
03904	31	12754	12756	367	TR	CHI-1,CHI&1Z
03916	45	03936	12755	368	BNR	*&20,CHIZ
03928	49	04116	00000	369	B	N10Z
03936				370	DORG	*-3Z
03936	14	12755	000P0	371	CM	CHI,70,10Z
03948	47	04036	01300	372	BL	N2Z
03960	46	04004	01200	373	BE	N5Z
03972	11	00052	000-1	374	ADEXP AM	FAC-8,1,10Z
03984	11	03898	000-1	375	AM	N1&6,1,10Z
03996	49	03868	00000	376	B	N6Z
04004				377	DORG	*-3Z
04004	43	03972	00053	378	N5 BD	ADEXP,FAC-7Z
04016	12	00052	000-1	379	SM	FAC-8,1,10Z
04028	49	03904	00000	380	B	N1&12Z
04036				381	DORG	*-3Z
04036	14	12755	000-3	382	N2 CM	CHI,3,10Z
04048	47	04092	01200	383	BNE	*&44Z
04060	16	03825	000M1	384	TFM	SEXP&1,41,10Z
04072	15	03972	00004	385	TDM	ADEXP,4Z
04084	49	03904	00000	386	B	N1&12Z
04092				387	DORG	*-3Z
04092	14	12755	000M5	388	CM	CHI,45,10Z

04104	46	04306	01200	389		BE	N4Z
04116	14	03825	000M1	390	N10	CM	SEXP&1,41,10Z
04128	46	04212	01200	391		BE	*&84Z
04140	16	00099	00-00	392		TFM	99,,9Z
04152	26	00052	04150	393		TF	FAC-8,*-2Z
04164	26	04187	03898	394		TF	*&23,N1&6Z
04176	21	00099	19876	395		A	99,19876Z
04188	46	04200	01400	396		BV	*&12Z
04200	26	00060	00099	397		TF	FAC,99Z
04212	43	04248	09171	398		BD	*&36,DECZ
04224	12	00052	000-1	399		SM	FAC-8,1,10Z
04236	15	09171	00001	400		TDM	DEC,1Z
04248	43	04272	09484	401		BD	*&24,SIGNZ
04260	32	00060	00000	402		SF	FACZ
04272	26	09213	00060	403		TF	COLL,FACZ
04284	43	04298	06107	404		BD	*&14,COMP SWZ
04296	42	00000	00000	405		BB	Z
04298				406		DORG	*-9Z
04298	49	02912	00000	407		B	READA&48Z
04306				408		DORG	*-3Z
04306	31	12754	12756	409	N4	TR	CHI-1,CHI&1Z
04318	43	04338	12754	410		BD	N99,CHI-1Z
04330	49	04306	00000	411		B	N4Z
04338				412		DORG	*-3Z
04338	14	12755	000K0	413	N99	CM	CHI,20,10Z
04350	46	04498	01200	414		BE	N12Z
04362	14	12755	000J0	415		CM	CHI,10,10Z
04374	46	04518	01200	416		BE	N11Z
04386	15	09485	00001	417		TDM	EXSIGN,1Z
04398	16	02594	-4430	418	N20	TFM	READ-14,*&32Z
04410	15	09170	00002	419		TDM	JCLJR,2Z
04422	49	02460	00000	420		B	PUSTNZ
04430				421		DORG	*-3Z
04430	15	09170	00000	422		TDM	JCLJR,0Z
04442	16	02594	-2262	423		TFM	READ-14,TLUZ
04454	32	09212	00000	424		SF	COLL-1Z
04466	25	04479	09485	425		TD	*&13,EXSIGNZ
04478	21	00052	09213	426		A	FAC-8,COLLZ
04490	49	04116	00000	427		B	N10Z
04498				428		DORG	*-3Z
04498	15	09485	00002	429	N12	TDM	EXSIGN,2Z
04510	49	04530	00000	430		B	*&20Z
04518				431		DORG	*-3Z
04518	15	09485	00001	432	N11	TDM	EXSIGN,1Z
04530	31	12754	12756	433		TR	CHI-1,CHI&1Z
04542	49	04398	00000	434		B	N20Z
04550				435		DORG	*-3Z
04550	26	04568	02285	436	PDQ	TF	*&18,TLU&23Z
04562	26	19876	05838	437		TF	19876,LZ
04574	49	05322	00000	438		B	BEGINAZ
04582				439		DORG	*-3Z
04591		10		440	FPLTA	DC	10,5810000000Z
04601		10		441		DS	10Z
04602	26	00060	04591	442	FPLOT	TF	FAC,FPLTAZ
04614	27	09554	04601	443		BT	FAD,FPLOT-1Z
04626	32	00059	00000	444		SF	FAC-1Z
04638	14	00060	000-0	445		CM	FAC,,10Z
04650	46	04698	01200	446		BE	*&48Z

04662	12	00060	000-1	447	SM	FAC,1,10Z
04674	34	00000	00101	448	SPTY	Z
04686	49	04638	00000	449	B	*-48Z
04698	26	09225	00861	450	TF	POINT-2,WK&12Z
04710	39	09225	00100	451	WATY	POINT-2Z
04722	49	00488	00000	452	B	INTZ
04730				453	DORG	*-3Z
04730	11	00499	000J4	454	FUNCT AM	INT&11,14,10Z
04742	26	04808	00853	455	TF	*&66,WK&4Z
04754	26	04812	00856	456	TF	*&58,WK&7Z
04766	43	04858	00857	457	BD	INDEXA,WK&8Z
04778	26	04819	00860	458	TF	*&41,WK&11Z
04790	43	04890	00861	459	BD	INDEXB,WK&12Z
04802	27	19999	19999	460	BT	19999,19999Z
04814	26	19999	00060	461	TF	19999,FACZ
04826	26	00662	04820	462	TF	IC&6,*-6Z
04838	46	00680	00200	463	BC2	IC&24Z
04850	49	00488	00000	464	B	INTZ
04858				465	DORG	*-3Z
04858	25	04880	00857	466	INDEXA TD	*&22,WK&8Z
04870	22	04812	19997	467	S	*-58,19997Z
04882	49	04778	00000	468	B	*-104Z
04890				469	DORG	*-3Z
04890	25	04912	00861	470	INDEXB TD	*&22,WK&12Z
04902	22	04819	19997	471	S	*-83,19997Z
04914	49	04802	00000	472	B	*-112Z
04922				473	DORG	*-3Z
04922	48	00111	00000	474	H	111Z
04934	47	04966	00100	475	BEGIN BNC1	*&32Z
04946	37	12755	00500		RACD	CHIZ
04958	49	04990	00000	477	B	*&32Z
04966				478	DORG	*-3Z
04966	37	12755	00100	479	RATY	CHIZ
04978	34	00000	00102	480	RCTY	Z
04990	27	01608	01607	4801	BT	INSTRM,INSTRM-1Z
05002	47	05038	00300	481	BNC3	*&36Z
05014	39	12755	00100	482	WATY	CHIZ
05026	34	00000	00102	483	RCTY	Z
05038	46	04934	00400	484	BC4	BEGINZ
05050	47	05074	00200	485	BNC2	*&24Z
05062	39	12755	00400		WACD	CHIZ
05074	46	05098	01900	487	BI	PAIRCK,1900Z
05086	47	05110	00800	488	BNI	NER,800Z
05098	17	06078	J7100	489	PAIRCK BTM	ERROR,17100Z
05109		1		490	DC	1,@,*Z
05110	14	12755	000M3	491	NER CM	CHI,43,10Z
05122	47	05170	01200	492	BNE	NERRZ
05134	43	05170	12756	493	BD	NERR,CHI&1Z
05146	43	05170	12758	494	BD	NERR,CHI&3Z
05158	49	04934	00000	495	B	BEGINZ
05170	43	05202	12754	496	NERR BD	*&32,CHI-1Z
05182	31	12754	12756	497	TR	CHI-1,CHI&1Z
05194	49	05170	00000	498	B	*-24Z
05202				499	DORG	*-3Z
05202	14	12755	000P0	500	CM	CHI,70,10Z
05214	47	05322	01300	501	BL	BEGINAZ
05226	27	02460	02459	502	BT	PUSTN,PUSTN-1Z
05238	15	02285	00006	503	TDM	TLU&23,6Z

05250	26	05273	02285	504	TF	*&23,TLU&23Z
05262	45	04550	19876	505	BNR	PDQ,19876Z
05274	15	01834	00000	506	TDM	DOSWZ
05286	26	05321	02285	507	TF	*&35,TLU&23Z
05298	12	05321	000J3	508	SM	*&23,13,10Z
05310	16	05903	J9876	509	TFM	DOREC&11,19876Z
05322	27	02608	-2607	510	BEGINA	BT READ,READ-1,7Z
05334	14	02285	1R900	511	CM	TLU&23,19900,8Z
05346	46	08874	01300	512	BNN	FIXEDZ
05358	14	02285	1R770	513	CM	TLU&23,19770,8Z
05370	46	06140	01300	514	BNN	NOTAZ
05382	26	00861	02285	515	TF	WK&12,TLU&23Z
05394	31	12754	12756	516	TR	CHI-1,CHI&1Z
05406	14	12755	000-0	517	CM	CHI,,10Z
05418	46	05394	01200	518	BE	*-24Z
05430	14	12755	000L3	519	CM	CHI,33,10Z
05442	46	05394	01200	520	BE	*-48Z
05454	27	02608	-2607	521	BT	READ,READ-1,7Z
05466	14	02285	0R770	522	CM	TLU&23,9770,8Z
05478	47	05514	01300		BN	*&36Z
05490	27	02428	02427		BT	TCOA,TCOA-1Z
05502	49	05466	00000		B	*-36Z
05514	26	00853	02285	524	TF	WK&4,TLU&23Z
05526	45	05588	12755	525	BNR	BEGZ,CHIZ
05538	15	00849	0000-	526	TDM	WK,,11Z
05550	16	00857	0R990	527	TFM	WK&8,9990,8Z
05562	49	05820	00000	5281	B	BEGC&80Z
05579		6		529	DS	6Z
05580	49	00656	00000	530	NULL	B ICZ
05588				531	DORG	*-3Z
05588	14	12755	000-0	532	BEGZ	CM CHI,,10Z
05600	47	05632	01200	533	BNE	BEGAZ
05612	31	12754	12756	534	TR	CHI-1,CHI&1Z
05624	49	05588	00000	535	B	*-36Z
05632				536	DORG	*-3Z
05632	14	12755	000J0	537	BEGA	CM CHI,10,10Z
05644	46	05924	01200	538	BE	BEGBZ
05656	14	12755	000K0	539	CM	CHI,20,10Z
05668	46	05944	01200	540	BE	BEGDZ
05680	14	12755	000J4	541	CM	CHI,14,10Z
05692	46	05964	01200	542	BE	BEGEZ
05704	14	12755	000K1	543	CM	CHI,21,10Z
05716	46	06040	01200	544	BE	BEGGZ
05728	17	06078	L7300	545	BTM	ERROR,37300Z
05739		1		546	DC	1,@,*Z
05740	31	12754	12756	547	BEGC	TR CHI-1,CHI&1Z
05752	27	02608	-2607	548	BT	READ,READ-1,7Z
05764	14	02285	0R770	549	CM	TLU&23,9770,8Z
05776	47	05808	01300	5491	BN	*&32Z
05788	27	02428	02427		BT	TCOA,TCOA-1Z
05800	49	05764	00000		B	*-36Z
05808				5492	DORG	*-3Z
05808	26	00857	02285	551	TF	WK&8,TLU&23Z
05820	15	00862	00000	552	TDM	WK&13Z
05831		1		553	DC	1,@,*Z
05832	31	J4816	00849	554	TR	LOC,WK,2Z
05838				5551	L	DS ,BEGC&98Z
05844	11	05838	000J4	556	AM	*-6,14,10Z

05856	43	04934	01834	557	BD	BEGIN,DOSWZ
05868	15	01834	00001	558	TDM	DOSW,1Z
05880	26	05898	05838	559	TF	*&18,LZ
05892	31	19876	19876	560	DOREC	TR 19876,19876Z
05904	11	05838	000J4	561	AM	L,14,10Z
05916	49	04934	00000	562	B	BEGINZ
05924				563	DORG	*-3Z
05924	15	00849	0000J	564	BEGB	TDM WK,1,11Z
05936	49	05740	00000	565	B	BEGCZ
05944				566	DORG	*-3Z
05944	15	00849	0000K	567	BEGD	TDM WK,2,11Z
05956	49	05740	00000	568	B	BEGCZ
05964				569	DORG	*-3Z
05964	14	12757	000J4	570	BEGE	CM CHI&2,14,10Z
05976	47	06020	01200	571	BNE	BEGFZ
05988	15	00849	0000N	572	TDM	WK,5,11Z
06000	31	12754	12756	573	TR	CHI-1,CHI&1Z
06012	49	05740	00000	574	B	BEGCZ
06020				575	DORG	*-3Z
06020	15	00849	0000L	576	BEGF	TDM WK,3,11Z
06032	49	05740	00000	577	B	BEGCZ
06040				578	DORG	*-3Z
06040	15	00849	0000M	579	BEGG	TDM WK,4,11Z
06052	49	05740	00000	580	B	BEGCZ
06060				581	DORG	*-3Z
06077		18		582	E EK	DC 18,45595956590040000@Z
06060				583	OUCH	DS ,EEK-17Z
06078	34	00000	00102	584	ERROR	RCTY Z
06090	39	06061	00100	585		WATY OUCH&1Z
06102	34	00000	00108	586		TBTY Z
06114	15	09935	00002	587		TDM ENDD&1,2Z
06126	43	04922	06107	588	BD	BEGIN-12,COMP SWZ
06138	42	00000	00000	589	BB	Z
06140				590	DORG	*-9Z
06140	25	06163	02284	591	NOTA	TD *&23,TLU&22Z
06152	13	01822	000-0	592	MM	FIVE,,10Z
06164	11	00099	00211	593	AM	99,*&47,8Z
06176	26	06199	00099	594	TF	*&23,99Z
06188	26	06206	09876	595	TF	*&18,9876Z
06200	49	19876	0-000	596	R	B 19876,,8Z
06257		46		597	DS	46Z
06258	31	12754	12756	598	COGO	TR CHI-1,CHI&1Z
06270	14	12755	000P0	599	CM	CHI,70,10Z
06282	47	06258	01300	600	BL	COGOZ
06294	27	02460	02459	601	BT	PUSTN,PUSTN-1Z
06306	16	00850	00M00	602	TFM	WK&1,400,9Z
06318	26	00853	02284	603	TF	WK&4,TLU&22Z
06330	15	00854	00000	604	TDM	WK&5Z
06341		1		605	DC	1,@,*Z
06342	26	06360	05838	606	TF	*&18,LZ
06354	31	00000	00849	607	TR	,WKZ
06366	11	05838	000-6	608	AM	L,6,10Z
06378	49	04934	00000	609	B	BEGINZ
06386				610	DORG	*-3Z
06386	27	02608	02607	611	COIF	BT READ,READ-1Z
06398	26	00854	02285	612	TF	WK&5,TLU&23Z
06410	25	00854	01928	613	TD	WK&5,SB SCTZ
06422	31	12754	12756	614	TR	CHI-1,CHI&1Z

06434	14	12755	000P0	615	CM	CHI,70,10Z
06446	47	06422	01300	616	BL	*-24Z
06458	27	02460	02459	617	BT	PUSTN,PUSTN-1Z
06470	26	00857	02284	618	TF	WK&8,TLU&22Z
06482	14	12755	000K3	619	CM	CHI,23,10Z
06494	31	12754	12756	620	TR	CHI-1,CHI&1Z
06506	47	06482	01200	621	BNE	*-24Z
06518	27	02460	02459	622	BT	PUSTN,PUSTN-1Z
06530	26	00860	02284	623	TF	WK&11,TLU&22Z
06542	14	12755	000K3	624	CM	CHI,23,10Z
06554	31	12754	12756	625	TR	CHI-1,CHI&1Z
06566	47	06542	01200	626	BNE	*-24Z
06578	27	02460	02459	627	BT	PUSTN,PUSTN-1Z
06590	26	00863	02284	628	TF	WK&14,TLU&22Z
06602	15	00864	00000	629	TDM	WK&15Z
06613		1		630	DC	1,@,*Z
06614	16	00850	00M08	631	TFM	WK&1,408,9Z
06626	26	06644	05838	632	TF	*&18,LZ
06638	31	05838	00849	633	TR	L,WKZ
06650	11	05838	000J6	634	AM	L,16,10Z
06662	49	04934	00000	635	B	BEGINZ
06674	26	06697	06673	636	TF	*&23,*-1Z
06686	26	00060	19876	637	TF	FAC,19876Z
06698	31	09294	09454	638	TR	OUT,WC1Z
06710	44	06858	00059	639	BNF	W21,FAC-1Z
06722	26	06744	06696	640	TF	*&22,WRITE&22Z
06734	26	00060	19997	641	TF	FAC,19997Z
06746	16	09315	000-0	642	TFM	OUT&21,,10Z
06757		1		643	DC	1,@,*Z
06758	25	09313	00060	644	TD	OUT&19,FACZ
06770	25	09311	00059	645	TD	OUT&17,FAC-1Z
06782	25	09309	00058	646	TD	OUT&15,FAC-2Z
06794	44	06826	00060	647	BNF	W22,FACZ
06806	15	09306	00002	648	TDM	OUT&12,2Z
06818	49	06838	00000	649	B	W23Z
06826				650	DORG	*-3Z
06826	15	09306	00000	651	TDM	OUT&12Z
06838	39	09307	00100	652	WATY	OUT&13Z
06850	49	07202	00000	653	B	W6Z
06858				654	DORG	*-3Z
06858	44	06882	00060	655	BNF	WS1,FACZ
06870	15	09294	00002	656	TDM	OUT,2Z
06882	12	00052	000N0	657	SM	FAC-8,50,10Z
06894	47	07274	01300	658	BL	W9Z
06906	14	00052	000-8	659	CM	FAC-8,8,10Z
06918	46	07294	01100	660	BH	W9&20Z
06930	16	09315	000-0	661	TFM	OUT&21,,10Z
06941		1		662	DC	1,@,*Z
06942	16	07056	-9297	663	TFM	W2&6,OUT&3Z
06954	21	07056	00052	664	A	W2&6,FAC-8Z
06966	21	07056	00052	665	A	W2&6,FAC-8Z
06978	26	07025	09495	666	TF	W1&11,WC2&11Z
06990	24	07020	07056	667	C	W1&6,W2&6Z
07002	46	07050	01200	668	BE	W2Z
07014	25	09297	00053	669	TD	OUT&3,FAC-7Z
07026	21	07025	01583	670	A	W1&11,WC3Z
07038	49	06990	00000	671	B	W1-24Z
07050	16	00000	000-3	672	TFM	,3,10Z

WRITE

W22

W23

W21

WS1

W11

W1

W2

07062	26	07141	07025	673		TF	W3&11,W1&11Z
07074	11	07136	000-2	674		AM	W3&6,2,10Z
07086	49	07106	00000	675		B	*&20Z
07094				676		DORG	*-3Z
07094	21	07141	01583	677	W4	A	W3&11,WC3Z
07106	14	07136	-9315	678		CM	W3&6,OUT&21Z
07118	46	07154	01200	679		BE	W5Z
07130	25	09294	00060	680	W3	TD	OUT,FACZ
07142	49	07094	00000	681		B	W4Z
07154	43	07226	09316	682	W5	BD	W8,OUT&22Z
07166	43	07190	00053	683		BD	*&24,FAC-7Z
07178	16	09303	000-0	684		TFM	OUT&9,,10Z
07189		1		685		DC	1,@,*Z
07190	39	09295	00100	686		WATY	OUT&1Z
07202	34	00000	00108	687	W6	TBTY	Z
07214	42	00000	00000	688		BB	Z
07226	25	09321	00052	689	W8	TD	OUT&27,FAC-8Z
07238	43	07342	00051	690		BD	W10,FAC-9Z
07250	15	09318	00000	691		TDM	OUT&24Z
07262	49	07166	00000	692		B	W5&12Z
07274	15	09316	00002	693	W9	TDM	OUT&22,2Z
07286	49	07306	00000	694		B	*&20Z
07294				695		DORG	*-3Z
07294	15	09316	00001	696		TDM	OUT&22,1Z
07306	12	00052	000-1	697		SM	FAC-8,1,10Z
07318	16	07056	-9299	698		TFM	W2&6,OUT&5Z
07330	49	06978	00000	699		B	W11Z
07342	25	09319	00051	700	W10	TD	OUT&25,FAC-9Z
07354	49	07166	00000	701		B	W5&12Z
07362				702		DORG	*-3Z
06107				703	XEC	DS	,ERROR&29Z
07362	16	07380	J9769	704	CLEAR	TFM	*&18,19769Z
07374	16	19876	000-0	705		TFM	19876,,10Z
07385		1		706		DC	1,@,*Z
07386	12	07380	-0010	707		SM	*-6,10Z
				7081		CM	*-18,14860Z
07398	14	07380	J4860				
07410	46	07374	01100	709		BH	CLEAR&12Z
07422	26	07439	07379	710		TF	*&17,CLEAR&17Z
07434	16	0-008	000-0	711		TFM	8,,310Z
07445		1		712		DC	1,@,*Z
07446	16	07464	J2755	713		TFM	*&18,CHIZ
07458	16	J2755	000-0	714	SFCF	TFM	CHI,,210Z
07470	11	07464	-0002	715		AM	*-6,2Z
07482	14	07464	J2915	7161		CM	SFCF&6,CHI&160Z
07494	47	07458	01200	717		BNE	SFCFZ
07506	49	04934	00000	718		B	BEGINZ
07514				719		DORG	*-3Z
07514	16	00850	00M16	720	CODO	TFM	WK&1,416,9Z
07526	27	02460	02459	721		BT	PUSTN,PUSTN-1Z
07538	26	07567	02284	722		TF	*&29,TLU&22Z
07550	12	07568	00-10	723		SM	*&18,10,9Z
07562	15	19999	0000P	724		TDM	19999,7,11Z
07574	26	08011	07567	725		TF	COREAD-15,*-7Z
07586	31	12754	12756	726		TR	CHI-1,CHI&1Z
07598	14	12755	000M0	727		CM	CHI,40,10Z
07610	47	07586	01300	728		BL	*-24Z
07622	25	00851	12755	729		TD	WK&2,CHIZ

07634	31	12754	12756	730	TR	CHI-1,CHI&1Z
07646	14	12755	000P0	731	CM	CHI,70,10Z
07658	47	07634	01300	732	BL	*-24Z
07670	15	02589	00002	733	TDM	READ-19,2Z
07682	15	09170	00004	734	TDM	JCLJR,4Z
07694	27	02460	02459	735	BT	PUSTN,PUSTN-1Z
07706	26	00854	09213	736	TF	WK&5,COLLZ
07718	15	00855	00000	737	TDM	WK&6Z
07729		1		738	DC	1,@,*Z
07730	26	07748	05838	739	TF	*&18,LZ
07742	31	05838	00849	740	TR	L,WKZ
07754	11	05838	000-7	741	AM	L,7,10Z
07766	26	00861	05838	742	TF	WK&12,LZ
07778	16	00850	00M24	743	TFM	WK&1,424,9Z
07790	15	00862	00000	744	TDM	WK&13Z
07801		1		745	DC	1,@,*Z
07802	31	12754	12756	746	TR	CHI-1,CHI&1Z
07814	14	12755	000P0	747	CM	CHI,70,10Z
07826	47	07802	01300	748	BL	*-24Z
07838	27	02460	02459	749	BT	PUSTN,PUSTN-1Z
07850	26	00854	09213	751	TF	WK&5,COLLZ
07862	45	07910	12755	7521	BNR	*&48,CHIZ
07874	15	09170	00000	750	TDM	JCLJRZ
07886	16	00856	000-1	753	TFM	WK&7,1,10Z
07898	49	07994	00000	754	B	*&96Z
07910	31	12754	12756	755	TR	CHI-1,CHI&1Z
07922	14	12755	000P0	756	CM	CHI,70,10Z
07934	47	07910	01300	757	BL	*-24Z
07946	27	02460	02459	758	BT	PUSTN,PUSTN-1Z
07958	15	09170	00000	759	TDM	JCLJRZ
07970	32	09212	00000	760	SF	COLL-1Z
07982	26	00856	09213	761	TF	WK&7,COLLZ
07994	15	02589	00009	762	TDM	READ-19,9Z
08006	31	J9993	00849	763	TR	19993,WK,2Z
08018	49	04934	00000	764	B	BEGINZ
08026				765	DORG	*-3Z
08026	16	00851	0M400	766	COREAD TFM	WK&2,4400,8Z
08037		1		767	DC	1,@,*Z
08038	26	08056	05838	768	TF	*&18,LZ
08050	31	05838	00849	769	TR	L,WKZ
08062	11	05838	000-2	770	AM	L,2,10Z
08074	15	08289	00005	771	TDM	ED&11,5Z
08086	31	12754	12756	772	TR	CHI-1,CHI&1Z
08098	14	12755	000M0	773	CM	CHI,40,10Z
08110	47	08086	01300	774	BL	*-24Z
08122	14	12755	000P0	775	CM	CHI,70,10Z
08134	46	08086	01300	776	BNN	*-48Z
08146	27	02608	02607	777	BT	READ,READ-1Z
08158	26	00853	02284	778	TF	WK&4,TLU&22Z
08170	25	00854	01928	779	TD	WK&5,SBSC TZ
08182	15	00855	00000	780	TDM	WK&6Z
08193		1		781	DC	1,@,*Z
08194	26	08212	05838	782	TF	*&18,LZ
08206	31	05838	00851	783	TR	L,WK&2Z
08218	11	05838	000-4	784	AM	L,4,10Z
08230	12	08289	000-1	785	SM	ED&11,1,10Z
08242	46	08266	01200	786	BZ	ED-12Z
08254	45	08098	12755	787	BNR	ER,CHIZ



08266	11	05838	000-1	788		AM	L,1,10Z
08278	49	05856	000-0	7891	ED	B	BEGC&116,,10Z
08290	16	00851	0M480	790	COPRIN	TFM	WK&2,4480,8Z
08301		1		791		DC	1,@,*Z
08302	49	08038	00000	792		B	COREAD&12Z
08310				793		DORG	*-3Z
08310	44	08346	09208		COPCH	BNF	*&36,COLL-5Z
08322	27	02428	02427			BT	TCOA,TCOA-1Z
08334	49	05358	00000			B	BEGINA&36Z
08346	16	00851	0M800	796		TFM	WK&2,4800,8Z
08357		1		797		DC	1,@,*Z
08358	49	08038	00000	798		B	COREAD&12Z
08366				799		DORG	*-3Z
08366	44	05856	09206	800	COCONT	BNF	L&18,COLL-7Z
08378	27	02428	02427			BT	TCOA,TCOA-1Z
08390	49	05358	00000			B	BEGINA&36Z
08398				802		DORG	*-3Z
08398	16	00850	00M72	803	COSTOP	TFM	WK&1,472,9Z
08410	15	00851	00000	804		TDM	WK&2Z
08421		1		805		DC	1,@,*Z
08422	26	08440	05838	806		TF	*&18,LZ
08434	31	05838	00849	807		TR	L,WKZ
08446	11	05838	000-3	808		AM	L,3,10Z
08458	49	04934	00000	809		B	BEGINZ
08466				810		DORG	*-3Z
08466	26	08484	05838	8111	COEND	TF	*&18,BEGC&98Z
08478	31	19876	07205	812		TR	19876,ZZZ-2Z
08490	15	06107	00000	813		TDM	COMPSWZ
08502	34	00000	00102	814		RCTY	Z
08514	48	00222	00000	815		H	222Z
08526	49	00488	00000	816		B	INTZ
08534				817		DORG	*-3Z
08534	16	02906	-2262	818	CODIM	TFM	READA&42,TLUZ
08546	27	02608	02607	819		BT	READ,READ-1Z
08558	16	02906	-2932	820		TFM	READA&42,READBZ
08570	31	12754	12756	821		TR	CHI-1,CHI&1Z
08582	14	12755	000P0	822		CM	CHI,70,10Z
08594	47	08570	01300	823		BL	*-24Z
08606	15	02589	00002	824		TDM	READ-19,2Z
08618	15	09170	00007	825		TDM	JCLJR,7Z
08630	27	02460	02459	826		BT	PUSTN,PUSTN-1Z
08642	15	02589	00009	827		TDM	READ-19,9Z
08654	15	09170	00000	828		TDM	JCLJRZ
08666	26	08725	02408	829		TF	CD&11,TLUB&18Z
08678	26	08720	02408	830		TF	CD&6,TLUB&18Z
08690	26	08785	09213	831		TF	EMB&11,COLLZ
08702	12	08720	000J0	832		SM	*&18,10,10Z
08714	26	19876	19876	833	CD	TF	19876,19876Z
08726	12	08785	000-1	834		SM	EMB&11,1,10Z
08738	47	08702	01200	835		BNZ	*-36Z
08750	31	12754	12756	836		TR	CHI-1,CHI&1Z
08762	45	08786	12755	837		BNR	*&24,CHIZ
08774	49	04934	00000	838	EMB	B	BEGINZ
08786	14	12755	000M0	839		CM	CHI,40,10Z
08798	47	08750	01300	840		BL	*-48Z
08810	49	08534	00000	841		B	CODIMZ
08818				842		DORG	*-3Z
08818	16	00862	0-560	843	COPAUZ	TFM	WK&13,560,8Z

08829		1		844	DC	1,@,*Z
08830	26	08848	05838	845	TF	*818,LZ
08842	31	19876	00860	846	TR	19876,WK&11Z
08854	11	05838	000-3	847	AM	L,3,10Z
08866	49	05856	00000	848	B	DOREC-36Z
08874				849	DORG	*-3Z
08874	16	00850	00M16	850	FIXED TFM	WK&1,416,9Z
08886	25	00851	02284	851	TD	WK&2,TLU&22Z
08898	31	12754	12756	852	TR	CHI-1,CHI&1Z
08910	15	04285	00002	853	TDM	N4-21,2Z
08922	27	02608	02607	854	BT	READ,READ-1Z
08934	45	09030	12755	855	BNR	*896,CHIZ
08946	26	00854	00060	856	TF	WK&5,FACZ
08958	15	00855	00000	857	TDM	WK&6Z
08969		1		858	DC	1,@,*Z
08970	26	08988	05838	859	TF	*818,LZ
08982	31	05838	00849	860	TR	L,WKZ
08994	11	05838	000-7	861	AM	L,7,10Z
09006	15	04285	00003	862	TDM	N4-21,3Z
09018	49	05856	00000	8631	B	BEGC&116Z
09030	16	00850	00M32	864	TFM	WK&1,432,9Z
09042	25	00852	02284	865	TD	WK&3,TLU&22Z
09054	25	00853	12754	866	TD	WK&4,CHI-1Z
09066	31	12754	12756	867	TR	CHI-1,CHI&1Z
09078	27	02608	02607	868	BT	READ,READ-1Z
09090	15	04285	00003	869	TDM	N4-21,3Z
09102	26	00856	00060	870	TF	WK&7,FACZ
09114	15	00857	00000	871	TDM	WK&8Z
09125		1		872	DC	1,@,*Z
09126	26	09144	05838	873	TF	*818,LZ
09138	31	05838	00849	874	TR	L,WKZ
09150	11	05838	000-9	875	AM	L,9,10Z
09162	49	05856	00000	876	B	DOREC-36Z
09170				877	DORG	*-3Z
07207		4		878	ZZZ DS	4,W6&5Z
01928		1		879	SBSCT DS	1,RR-6Z
09171		2		880	DEC DC	2,2Z
09170				881	JCLJR DS	,DEC-1Z
09191		20		882	TESTER DS	20Z
09193		2		883	DC	2,@Z
09213		20		884	COLL DC	20,0Z
09215		2		885	DC	2,@Z
09223		8		886	PLOT DC	8,57535663Z
09227		4		887	POINT DC	4,30@Z
09233		6		888	EXP DC	6,456757Z
09239		6		889	LN DC	6,535647Z
09245		6		890	SQR DC	6,625859Z
09251		6		891	SINF DC	6,624955Z
09257		6		892	COSF DC	6,435662Z
09263		6		893	ATNF DC	6,416355Z
01822		2		894	FIVE DC	2,5,TIXZ
01834		2		895	DOSW DC	2,1,ACLZ
06107		2		896	COMP SW DC	2,1,XECZ
09287		24		897	MESS DC	24,455544005646005759564759Z
09293		6		898	DC	6,41540@Z
09294		1		899	OUT DS	1Z
09323		29		900	DS	29Z
09373		50			DC	50,0Z

09423		50			DC	50,0Z
09453		30		9003	DC	30,0Z
09454		1		901 WC1	DC	1,0Z
09477		23		902	DC	23,07070707070707070704500Z
09483		6		903	DC	6,70700@Z
09484	41	-9297	00053	904 WC2	NOP	OUT&3,FAC-7,2Z
01583		6		905 WC3	DC	6,200001,CVRZ
09484		1		906 SIGN	DS	1,WC2Z
09485		1		907 EXSIGN	DS	1,WC2&1Z
09496		1		908 FTIME	DS	1Z
18000				909	DORG	18000Z
18000	31	00000	18180	910 CLEARJ	TR	,XYZZ
18012	32	07385	00000	911	SF	CLEAR&23Z
18024	16	07207	0-640	912	TFM	ZZZ,640,8Z
18035		1		913	DC	1,@,*Z
18036	15	00400	00004	914	TDM	400,4Z
18048	47	18156	00100	9141	BNC1	*&108Z
18060	16	00499	J2916	9142	TFM	INT&11,FCOS-10Z
18072	16	00023	J2916	9143	TFM	23,FCOS-10Z
18084	16	05838	J2916	9144	TFM	L,FCOS-10Z
18096	16	03189	000M1	9145	TFM	READG&97,41,10Z
18108	16	03213	000M1	9146	TFM	READG&121,41,10Z
18120	16	03237	000M1	9147	TFM	READG&145,41,10Z
18132	16	01877	J2916	9148	TFM	END&83,FCOS-10Z
18144	16	01889	J2916	9149	TFM	END&95,FCOS-10Z
18156	48	00333	00000	915	H	333Z
18168	49	07362	00000	916	B	CLEARZ
18180	46	01818	00300	917 XYZ	BC3	END&24Z
18192	16	00499	J4816	918	TFM	INT&11,LOC,7Z
18204	49	00488	00000	919	B	INTZ
18212				920	DORG	*-3Z
18212		1		921	DC	1,@Z
06207				922	DORG	R&7Z
06211		5	-7514	923	DSA	CODO,COGO,COREAD,COPRINZ
06216		5	-6258			
06221		5	-8026			
06226		5	-8290			
06231		5	-8466	924	DSA	COEND,COSTOP,COPAUZ,COPCHZ
06236		5	-8398			
06241		5	-8818			
06246		5	-8310			
06251		5	-8366	925	DSA	COCONT,CODIMZ
06256		5	-8534			
09496				926	DORG	FTIMEZ
09496		1		927 ERCD	DS	1Z
09505		9		928	DS	9Z
09506	26	09553	11820	929 FSB	TF	FAD-1,CZERO-1Z
09518	22	09553	09505	930	S	FAD-1,FSB-1Z
09530	49	09554	00000	931	B	FADZ
09537				932	DORG	*-4Z
09539		3		933	DC	3,571Z
09542		3		934	DC	3,572Z
09543		1		935	DC	1,@Z
09553		10		936	DS	10Z
09554	15	09779	00001	937 FAD	TDM	ADD&1,1Z
09566	16	09789	-9553	938	TFM	ADD&11,FAD-1Z
09578	24	00052	09545	939	C	FAC-8,FAD-9Z

09590	46	09650	01100	940	BH	*&60Z
09602	46	09754	01200	941	BE	ADD-24Z
09614	26	09505	09553	942	TF	FSB-1,FAD-1Z
09626	26	09553	00060	943	TF	FAD-1,FACZ
09638	26	00060	09505	944	TF	FAC,FSB-1Z
09650	22	09545	00052	945	S	FAD-9,FAC-8Z
09662	21	09789	09545	946	A	ADD&11,FAD-9Z
09674	44	09698	09553	947	BNF	*&24,FAD-1Z
09686	15	09779	00002	948	TDM	ADD&1,2Z
09698	14	09545	000-P	949	CM	FAD-9,7,1011Z
09710	46	09754	01100	950	BH	ADD-24Z
09722	47	09934	01200	951	BNE	ENDDZ
09734	15	09545	0000-	952	TDM	FAD-9,,11Z
09746	49	09766	00000	953	B	ADD-12Z
09754				954	DORG	*-3Z
09754	32	09546	00000	955	SF	FAD-8Z
09766	32	00053	00000	956	SF	FAC-7Z
09778	21	00060	00000	957	ADD	A
09790	25	00099	00060	958	TD	99,FACZ
09802	31	09496	09537	959	TR	ERCD,FSB&31Z
09814	47	09942	01400	960	BNV	ENDD&8Z
09826	26	00060	00059	961	TF	FAC,FAC-1Z
09838	33	00054	00000	962	CF	FAC-6Z
09850	15	00053	00001	963	TDM	FAC-7,1Z
09862	11	00052	000-1	964	AM	FAC-8,1,10Z
09874	26	06075	09498	965	TF	ERROR-3,ERCD&2Z
09886	46	10710	01400	966	BV	ZERDIV&12Z
09898	44	09922	00099	967	BNF	*&24,99Z
09910	32	00060	00000	968	SF	FACZ
09922	33	00053	00000	969	CF	FAC-7Z
09934	42	00000	00000	970	ENDD	BB
09942				971	DORG	*-3Z
09942	43	09922	00053	972	BD	ENDD-12,FAC-7Z
09954	46	10098	01200	973	BZ	*&144Z
09966	33	00060	00000	974	CF	FACZ
09978	15	00061	00000	975	TDM	FAC&1Z
09989		1		976	DC	1,@,*Z
09990	31	00053	00054	977	TR	FAC-7,FAC-6Z
10002	15	00060	00000	978	TDM	FACZ
10014	12	00052	000-1	979	SM	FAC-8,1,10Z
10026	43	10066	00053	980	BD	ETEST,FAC-7Z
10038	49	09990	00000	981	B	*-48Z
10046				982	DORG	*-3Z
10046	26	12025	00060	983	LINK	TF
10058	49	12038	00000	984	B	FEXP&12Z
10066				985	DORG	*-3Z
10066	46	09874	01300	986	ETEST	BNN
10078	26	06075	09501	987	TF	ERROR-3,ERCD&5Z
10090	49	12638	00000	988	B	EROUT&36Z
10098				989	DORG	*-3Z
10098	26	00060	11820	990	TF	FAC,CZERO-1Z
10110	49	09934	00000	991	B	ENDDZ
10117				992	DORG	*-4Z
10119		3		993	DC	3,573Z
10122		3		994	DC	3,574Z
10123		1		995	DC	1,@Z
10133		10		996	DS	10Z
10134	32	00053	00000	997	FMP	SF

10146	32	10126	00000	998	SF	FMP-8Z
10158	12	10125	000N0	999	SM	FMP-9,50,10Z
10170	23	00060	10133	1000	M	FAC,FMP-1Z
10182	46	10098	01200	1001	BZ	FMP-36Z
10194	11	00093	000-5	1002	AM	93,5,10Z
10206	43	10286	00084	1003	BD	*80,84Z
10218	12	10125	000-1	1004	SM	FMP-9,1,10Z
10230	32	00085	00000	1005	SF	85Z
10242	26	00060	00092	1006	TF	FAC,92Z
10254	31	09496	10117	1007	TR	ERCD,FMP-17Z
10266	21	00052	10125	1008	A	FAC-8,FMP-9Z
10278	49	10066	00000	1009	B	ETESTZ
10286				1010	DORG	*-3Z
10286	11	00093	000M5	1011	AM	93,45,10Z
10298	26	00060	00091	1012	TF	FAC,91Z
10310	49	10254	00000	1013	B	FMP&120Z
10317				1014	DORG	*-4Z
10319		3		1015	DC	3,575Z
10322		3		1016	DC	3,576Z
10323		1		1017	DC	1,@Z
10333		10		1018	DS	10Z
10334	32	00053	00000	1019	FDV SF	FAC-7Z
10346	32	10326	00000	1020	SF	FDV-8Z
10358	12	10325	000N0	1021	SM	FDV-9,50,10Z
10370	31	10888	10856	1022	TR	RAREA-31,ENTRY&34Z
10382	26	10696	10892	1023	TF	ZERDIV-2,RAREA-27Z
10394	26	10561	10897	1024	TF	FACTOR&35,RAREA-22Z
10406	26	10585	10904	1025	TF	FACTOR&59,RAREA-15Z
10418	26	10633	10911	1026	TF	FACTOR&107,RAREA-8Z
10430	26	10653	10918	1027	TF	ZERDIV-45,RAREA-1Z
10442	26	10689	10913	1028	TF	ZERDIV-9,RAREA-6Z
10454	26	10477	10909	1029	TF	DIVIDE&11,RAREA-10Z
10466	26	00087	00000	1030	DIVIDE TF	87Z
10478	15	10537	00000	1031	TDM	FACTOR&11Z
10490	44	10526	10333	1032	BNF	*836,FDV-1Z
10502	33	10333	00000	1033	CF	FDV-1Z
10514	32	10537	00000	1034	SF	FACTOR&11Z
10526	13	00060	-0100	1035	FACTOR MM	FAC,100Z
10538	15	00098	00000	1036	TDM	98Z
10549		1		1037	DC	1,@,*Z
10550	26	10955	00000	1038	TF	ADJUSTZ
10562	22	10954	10333	1039	S	ADJUST-1,FDV-1Z
10574	43	10698	00000	1040	BD	ZERDIVZ
10586	26	10967	10954	1041	TF	COMP,ADJUST-1Z
10598	22	10955	10967	1042	S	ADJUST,COMPZ
10610	21	00097	10967	1043	A	97,COMPZ
10622	43	10642	00000	1044	BD	*820Z
10634	49	10610	00000	1045	B	*-24Z
10642				1046	DORG	*-3Z
10642	31	00000	00000	1047	TR	Z
10654	15	00097	00000	1048	TDM	97Z
10666	22	00097	10955	1049	S	97,ADJUSTZ
10678	44	10622	00000	1050	BNF	*-56Z
10690	49	00000	00000	1051	B	Z
10698				1052	DORG	*-3Z
10698	16	06075	00N77	1053	ZERDIV TFM	ERROR-3,577,9Z
10710	26	00060	10942	1054	TF	FAC,NINEZ
10722	49	06078	00000	1055	B	ERRORZ

10730				1056		DORG	*-3Z
10730	43	10822	00078	1057		BD	ENTRY,78Z
10742	14	00080	00-00	1058		CM	80,,9Z
10754	46	10098	01200	1059		BE	FMP-36Z
10766	32	00079	00000	1060		SF	79Z
10778	26	00060	00086	1061		TF	FAC,86Z
10790	31	09496	10317	1062		TR	ERCD,FDV-17Z
10802	22	00052	10325	1063		S	FAC-8,FDV-9Z
10814	49	10066	00000	1064		B	ETESTZ
10822				1065		DORG	*-3Z
10822	12	10325	000-1	1066	ENTRY	SM	FDV-9,1,10Z
10834	26	00060	00085	1067		TF	FAC,85Z
10846	49	10790	00000	1068		B	ENTRY-32Z
10854				1069		DORG	ENTRY&32Z
10854	41	J0730	J0931	1070		NOP	ZERDIV&32,ONEZ-1,27Z
10866	41	J0944	J0929	1071		NOP	ADJUST-11,ONEZ-3,27Z
10879		2		1072		DC	2,88Z
10887		8		1073		DC	8,7800079@Z
10919		32		1074	RAREA	DS	32Z
10932		13		1075	ONEZ	DC	13,10000000000000Z
10942		10		1076	NINE	DC	10,9999999999Z
10955		13		1077	ADJUST	DS	13Z
10967		12		1078	COMP	DS	12Z
10968	26	11804	11810	1079	FAXB	TF	FINISH&6,CZERO-11Z
10980	16	11204	J2595	1080		TFM	BBNOP&74,BRNP&81Z
10992	26	10133	10967	1081		TF	FMP-1,FAXB-1Z
11004	26	11057	00060	1082		TF	FLN-1,FACZ
11016	26	09940	12664	1083		TF	ENDD&6,LOGE-9Z
11028	15	11131	00009	1084		TDM	BBNOP&1,9Z
11040	49	11094	00000	1085		B	FLN&36Z
11048				1086		DORG	*-3Z
11057		10		1087		DS	10Z
11058	16	11804	-6078	1088	FLN	TFM	FINISH&6,ERRORZ
11070	16	11204	J1799	1089		TFM	BBNOP&74,FINISH&1Z
11082	15	11131	00001	1090		TDM	BBNOP&1,1Z
11094	15	11209	00002	1091		TDM	BBNOP&79,2Z
11106	43	11162	11050	1092		BD	BBNOP&32,FLN-8Z
11118	26	00060	11820	1093		TF	FAC,CZERO-1Z
11130	49	06114	00000	1094	BBNOP	B	ERROR&36Z
11142	16	06075	00072	1095		TFM	ERROR-3,672,9Z
11154	49	06078	00000	1096		B	ERRORZ
11162				1097		DORG	*-3Z
11162	44	11198	11057	1098		BNF	*&36,FLN-1Z
11174	33	11057	00000	1099		CF	FLN-1Z
11186	15	11209	00009	1100		TDM	*&23,9Z
11198	15	00000	00000	1101		TDM	Z
11210	16	11573	J1821	1102		TFM	LOOP&107,CZEROZ
11222	26	11609	11049	1103		TF	MULM&11,FLN-9Z
11234	15	11049	0000J	1104		TDM	FLN-9,1,11Z
11246	14	11050	000J5	1105		CM	FLN-8,15,10Z
11258	46	11302	01300	1106		BNL	*&44Z
11270	21	11057	11057	1107		A	FLN-1,FLN-1Z
11282	11	11573	-0011	1108		AM	LOOP&107,11Z
11294	49	11234	00000	1109		B	*-60Z
11302				1110		DORG	*-3Z
11302	26	00060	11057	1111		TF	FAC,FLN-1Z
11314	22	00060	11968	1112		S	FAC,LCN5-1Z
11326	26	10333	11057	1113		TF	FDV-1,FLN-1Z

11338	31	10888	11888	1114	TR	RAREA-31,LNTEN&23Z
11350	49	10382	00000	1115	B	DIVIDE-84Z
11358				1116	DORG	*-3Z
11358	26	11057	00085	1117	TF	FLN-1,85Z
11370	32	11057	00000	1118	SF	FLN-1Z
11382	32	11048	00000	1119	SF	FLN-10Z
11394	23	11057	11057	1120	M	FLN-1,FLN-1Z
11406	26	10967	00089	1121	TF	FAXB-1,89Z
11418	21	11057	11057	1122	A	FLN-1,FLN-1Z
11430	26	00060	11820	1123	TF	FAC,CZERO-1Z
11442	16	11477	J1929	1124	TFM	*&35,LCN1Z
11454	16	11463	000-6	1125	TFM	*&9,6,10Z
11466	21	00060	00000	1126	LOOP	A
11478	23	00060	10967	1127	M	FAC,FAXB-1Z
11490	26	00060	00089	1128	TF	FAC,89Z
11502	11	11477	-0010	1129	AM	LOOP&11,10Z
11514	12	11463	000-1	1130	SM	LOOP-3,1,10Z
11526	47	11466	01200	1131	BNZ	LOOPZ
11538	23	00060	11057	1132	M	FAC,FLN-1Z
11550	22	00089	11057	1133	S	89,FLN-1Z
11562	26	11057	00000	1134	TF	FLN-1Z
11574	22	11057	00089	1135	S	FLN-1,89Z
11586	12	11609	000N0	1136	SM	MULM&11,50,10Z
11598	13	11865	-0000	1137	MULM	MM
11610	21	00099	11057	1138	A	99,FLN-1Z
11622	24	00097	11821	1139	C	97,CZEROZ
11634	46	11866	01200	1140	BE	LNTEN&1Z
11646	16	00086	000N3	1141	TFM	86,53,10Z
11658	25	11595	00099	1142	TD	MULM-3,99Z
11670	15	00099	00000	1143	TDM	99Z
11681		1		1144	DC	1,@,*Z
11682	43	11738	00087	1145	BD	*&56,87Z
11694	31	00087	00088	1146	TR	87,88Z
11706	12	00086	000-1	1147	SM	86,1,10Z
11718	15	00098	00000	1148	TDM	98Z
11730	49	11682	00000	1149	B	*-48Z
11738				1150	DORG	*-3Z
11738	33	00087	00000	1151	CF	87Z
11750	44	11774	11595	1152	BNF	*&24,MULM-3Z
11762	32	00094	00000	1153	SF	94Z
11774	26	00060	00094	1154	TF	FAC,94Z
11786	16	06075	00073	1155	TFM	ERROR-3,673,9Z
11798	49	00000	00000	1156	FINISH	B
11804				1157	DORG	*-5Z
11804	4R	10134	00000	1158	B	FMP,,1Z
11811				1159	DORG	*-4Z
11821		11		1160	CZERO	DC
11832		11		1161	DC	11,-6931471805Z
11843		11		1162	DC	11,-13862943611Z
11854		11		1163	DC	11,-20794415416Z
11865		11		1164	LNTEN	DC
11866	16	00087	00-00	1165	TFM	87,,9Z
11878	49	11774	00000	1166	B	FINISH-24Z
11886				1167	DORG	*-3Z
11886	41	J1358	J0932	1168	NOP	LOOP-108,ONEZ,27Z
11898	41	J0943	J0932	1169	NOP	ADJUST-12,ONEZ,27Z
11911		2		1170	DC	2,87Z
11919		8		1171	DC	8,7500076@Z

11929	10		1172	LCN1	DC	10,769230769Z
11939	10		1173	LCN2	DC	10,909090909Z
11949	10		1174	LCN3	DC	10,1111111111Z
11959	10		1175	LCN4	DC	10,1428571428Z
11969	10		1176	LCN5	DC	10,2000000000Z
11979	10		1177	LCN6	DC	10,3333333333Z
11989	10		1178		DS	10Z
11990	26	12025	11820	1179	FEXN	TF FEXP-1,CZERO-1Z
12002	22	12025	11989	1180		S FEXP-1,FEXN-1Z
12014	41	00000	00000	1181		NOP Z
12026	15	12595	00002	1182	FEXP	TDM BRNP&81,2Z
12038	43	12070	12018	1183		BD *&32,FEXP-8Z
12050	26	00060	12753	1184		TF FAC,ONEZ
12062	49	12570	00000	1185		B BRNP&56Z
12070				1186		DORG *-3Z
12070	32	12018	00000	1187		SF FEXP-8Z
12082	23	12673	12025	1188		M LOGE,FEXP-1Z
12094	14	12017	000M2	1189		CM FEXP-9,42,10Z
12106	47	12050	01100	1190		BNH *-56Z
12118	14	12017	000N3	1191		CM FEXP-9,53,10Z
12130	47	12166	01300	1192		BL *&36Z
12142	47	12602	01200	1193		BNE EROUTZ
12154	43	12602	00083	1194		BD EROUT,83Z
12166	33	00083	00000	1195		CF 83Z
12178	26	00079	11817	1196		TF 79,CZERO-4Z
12190	11	12017	000L1	1197		AM FEXP-9,31,10Z
12202	26	12220	12017	1198		TF *&18,FEXP-9Z
12214	32	00000	00000	1199		SF Z
12226	11	12017	000-1	1200		AM FEXP-9,1,10Z
12238	26	12256	12017	1201		TF *&18,FEXP-9Z
12250	11	00000	000N1	1202		AM ,51,10Z
12262	46	12602	01400	1203		BV EROUTZ
12274	15	12515	00009	1204		TDM BRNP&1,9Z
12286	44	12310	12025	1205		BNF *&24,FEXP-1Z
12298	15	12515	00001	1206		TDM BRNP&1,1Z
12310	11	12017	000-8	1207		AM FEXP-9,8,10Z
12322	26	12345	12017	1208		TF *&23,FEXP-9Z
12334	26	12025	00000	1209		TF FEXP-1Z
12346	32	12018	00000	1210		SF FEXP-8Z
12358	16	12405	J2683	1211		TFM *&47,EXCN1Z
12370	26	00060	11820	1212		TF FAC,CZERO-1Z
12382	16	12391	000-7	1213		TFM *&9,7,10Z
12394	21	00060	00000	1214		A FACZ
12406	23	00060	12025	1215		M FAC,FEXP-1Z
12418	26	00060	00091	1216		TF FAC,91Z
12430	11	12405	-0010	1217		AM *-25,10Z
12442	12	12391	000-1	1218		SM *-51,1,10Z
12454	47	12394	01200	1219		BNZ *-60Z
12466	11	00052	000J0	1220		AM FAC-8,10,10Z
12478	23	00060	00060	1221		M FAC,FACZ
12490	26	00080	12017	1222		TF 80,FEXP-9Z
12502	26	00060	00088	1223		TF FAC,88Z
12514	49	12570	00000	1224	BRNP	B *&56Z
12526	26	10333	00060	1225		TF FDV-1,FACZ
12538	26	00060	12753	1226		TF FAC,ONEZ
12550	16	09940	J2570	1227		TFM ENDD&6,*&20Z
12562	49	10334	00000	1228		B FDVZ



12570				1229	DORG	*-3Z
12570	15	09935	00002	1230	TDM	ENDD&1,2Z
12582	16	06075	00076	1231	TFM	ERROR-3,676,9Z
12594	49	06078	00000	1232	B	ERRORZ
12602				1233	DORG	*-3Z
12602	16	06075	00074	1234	EROUT	TFM ERROR-3,674,9Z
12614	44	10710	12025	1235	BNF	ZERDIV&12,FEXP-1Z
12626	16	06075	00075	1236	TFM	ERROR-3,675,9Z
12638	26	00060	11820	1237	TF	FAC,CZERO-1Z
12650	49	06078	00000	1238	B	ERRORZ
12658				1239	DORG	*-3Z
12658	4R	10046	00000	1240	B	LINK,,1Z
12665				1241	DORG	*-4Z
12673		9		1242	LOGE	DC 9,434294482Z
12683		10		1243	EXCN1	DC 10,932643Z
12693		10		1244	EXCN2	DC 10,2554918Z
12703		10		1245	EXCN3	DC 10,17421120Z
12713		10		1246	EXCN4	DC 10,72951737Z
12723		10		1247	EXCN5	DC 10,254393575Z
12733		10		1248	EXCN6	DC 10,662730884Z
12743		10		1249	EXCN7	DC 10,1151292776Z
12753		10		1250	ONE	DC 10,5110000000Z
12755		1		1438	CHI	DAS 1Z
12757		79			DAS	79Z
12915		1		1440	DAC	1,@Z
12925		10		1251	DS	10Z
12926	15	13211	00009	1252	FCOS	TDM BNP&1,9Z
12938	16	13053	000K6	1253	TFM	SIN&73,26,10Z
12950	26	12979	12925	1254	TF	SIN-1,COS-1Z
12962	49	13004	00000	1255	B	SIN&24Z
12970				1256	DORG	*-3Z
12979		10		1257	DS	10Z
12980	15	13211	00001	1258	FSIN	TDM BNP&1,1Z
12992	16	13053	000M1	1259	TFM	SIN&73,41,10Z
13004	43	13028	12972	1260	BD	*&24,SIN-8Z
13016	16	12971	000-0	1261	TFM	SIN-9,,10Z
13028	14	12971	000M6	1262	CM	SIN-9,46,10Z
13040	46	13078	01100	1263	BH	*&38Z
13052	26	12979	12753	1264	TF	SIN-1,ONEZ
13064	26	00060	12979	1265	TF	FAC,SIN-1Z
13076	42	00000	00000	1266	BB	Z
13078				1267	DORG	*-9Z
13078	16	06075	00071	1268	TFM	ERROR-3,671,9Z
13090	11	12971	000M1	1269	AM	SIN-9,41,10Z
13102	46	10710	01400	1270	BV	ZERDIV&12Z
13114	32	12972	00000	1271	SF	SIN-8Z
13126	23	13643	12979	1272	M	RTWOPI,SIN-1Z
13138	33	00083	00000	1273	CF	83Z
13150	26	13209	12971	1274	TF	BNP-1,SIN-9Z
13162	12	12971	000-8	1275	SM	SIN-9,8,10Z
13174	26	13192	12971	1276	TF	*&18,SIN-9Z
13186	32	00000	00000	1277	SF	Z
13198	26	00061	00000	1278	TF	FAC&1Z
13210	49	13246	00000	1279	B	*&36Z
13222	44	13616	00099	1280	BNF	RTWOPI-27,99Z
13234	21	00061	13652	1281	A	FAC&1,CONAZ
13246	32	00061	00000	1282	SF	FAC&1Z
13258	21	00061	13661	1283	A	FAC&1,CONBZ

13270	33	00061	00000	1284	CF	FAC&1Z
13282	22	00061	13652	1285	S	FAC&1,CONAZ
13294	46	13306	01400	1286	BV	*&12Z
13306	24	00060	11818	1287	C	FAC,CZERO-3Z
13318	47	13344	01200	1288	BNE	*&26Z
13330	26	00060	11820	1289	TF	FAC,CZERO-1Z
13342	42	00000	00000	1290	BB	Z
13344				1291	DORG	*-9Z
13344	16	13353	000-4	1292	TFM	*&9,4,10Z
13356	23	00061	00061	1293	M	FAC&1,FAC&1Z
13368	26	09553	00090	1294	TF	FAD-1,90Z
13380	26	09505	13671	1295	TF	FSB-1,CONCZ
13392	16	13451	J3681	1296	TFM	*&59,CONC&10Z
13404	23	09553	09505	1297	M	FAD-1,FSB-1Z
13416	44	13440	00099	1298	BNF	*&24,99Z
13428	32	00090	00000	1299	SF	90Z
13440	21	00090	00000	1300	A	90Z
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13476	12	13353	000-1	1303	SM	*-123,1,10Z
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13512	23	00061	09505	1306	M	FAC&1,FSB-1Z
13524	15	00092	00000	1307	TDM	92Z
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13536	31	00053	00082	1309	TR	FAC-7,82Z
13548	16	00052	000N1	1310	TFM	FAC-8,51,10Z
13560	43	09898	00053	1311	BD	ENDD-36,FAC-7Z
13572	31	00053	00054	1312	TR	FAC-7,FAC-6Z
13584	12	00052	000-1	1313	SM	FAC-8,1,10Z
13596	15	00062	00000	1314	TDM	FAC&2Z
13608	49	13560	00000	1315	B	*-48Z
13616				1316	DORG	*-3Z
13616	32	00061	00000	1317	SF	FAC&1Z
13628	49	13234	00000	1318	B	BNP&24Z
13635				1319	DORG	*-4Z
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13652		9		1321	CONA DC	9,250000000Z
13661		9		1322	CONB DC	9,500000000Z
13671		10		1323	CONC DC	10,3971067150Z
13681		10		1324	DC	10,-7657497509Z
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13701		10		1326	DC	10,-4134167750Z
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13723		11		1329	DS	11Z
13724	43	13750	13716	1330	FATN BD	*&26,FATN-8Z
13736	26	00060	11820	1331	TF	FAC,CZERO-1Z
13748	42	00000	00000	1332	BB	Z
13750				1333	DORG	*-9Z
13750	14	13715	000M7	1334	CM	FATN-9,47,10Z
13762	47	13748	01300	1335	BL	*-14Z
13774	16	13809	-0000	1336	TFM	TEST&11Z
13786	44	13822	13723	1337	BNF	*&36,FATN-1Z
13798	32	13807	00000	1338	TEST SF	*&9Z
13810	33	13723	00000	1339	CF	FATN-1Z
13822	14	13715	000N0	1340	CM	FATN-9,50,10Z
13834	46	14464	01100	1341	BH	TEST1&26Z

13846	46	13918	01200	1342	BE	*&72Z
13858	16	13917	J3723	1343	TFM	*&59,FATN-1Z
13870	21	13917	13715	1344	A	*&47,FATN-9Z
13882	12	13917	000N0	1345	SM	*&35,50,10Z
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13906	26	13723	00000	1347	TF	FATN-1Z
13918	32	13716	00000	1348	SF	FATN-8Z
13930	14	13717	000K9	1349	CM	FATN-7,29,10Z
13942	47	14082	01300	1350	BL	ARET&48Z
13954	13	13723	000-6	1351	MM	FATN-1,6,10Z
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13990	26	00060	13723	1354	TF	FAC,FATN-1Z
14002	26	10333	00098	1355	TF	FDV-1,98Z
14014	31	10888	14784	1356	TR	RAREA-31,ACON4&3Z
14026	49	10382	00000	1357	B	DIVIDE-84Z
14034				1358	DORG	*-3Z
14034	46	14046	01400	1359	ARET BV	*&12Z
14046	25	14285	00099	1360	TD	TEST2-13,99Z
14058	26	13723	00085	1361	TF	FATN-1,85Z
14070	32	13809	00000	1362	SF	TEST&11Z
14082	23	13723	13723	1363	M	FATN-1,FATN-1Z
14094	26	10333	00091	1364	TF	FDV-1,91Z
14106	16	14153	J1948	1365	TFM	*&47,LCN3-1Z
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14130	23	11938	10333	1367	M	LCN2-1,FDV-1Z
14142	26	00060	00000	1368	TF	FACZ
14154	22	00060	00091	1369	S	FAC,91Z
14166	23	00060	10333	1370	M	FAC,FDV-1Z
14178	11	14153	000J0	1371	AM	*-25,10,10Z
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14202	47	14142	01200	1373	BNZ	*-60Z
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14226	22	00060	00091	1375	S	FAC,91Z
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14250	44	14298	13809	1377	BNF	TEST2,TEST&11Z
14262	44	14286	14285	1378	BNF	*&24,TEST2-13Z
14274	32	00091	00000	1379	SF	91Z
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14298	44	14334	13808	1381	TEST2 BNF	*&36,TEST&10Z
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14322	21	00091	14761	1383	A	91,ACON2Z
14334	16	00052	000N1	1384	TFM	FAC-8,51,10Z
14346	15	00092	00000	1385	TDM	92Z
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14358	43	14414	00082	1387	BD	*&56,82Z
14370	12	00052	000-1	1388	SM	FAC-8,1,10Z
14382	31	00082	00083	1389	TR	82,83Z
14394	15	00091	00000	1390	TDM	91Z
14406	49	14358	00000	1391	B	*-48Z
14414				1392	DORG	*-3Z
14414	31	00053	00082	1393	TR	FAC-7,82Z
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14572	26	10333	13723	1408	TF	FDV-1,FATN-1Z
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14608	49	10394	00000	1411	B	DIVIDE-72Z
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19845		3		1448	DAC	3,END,19845Z
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 M55544Z 101J9844J9850000395  
 O2635657N741646245N764554348Z 101J9852J9880000396  
 M44954455562495655Z 101J9882J9900000397  
 000Z 101J9905J9908000398  
 000N1Z 101J9915J9920000399  
 000N2Z 101J9925J9930000400  
 000N3Z 101J9935J9940000401  
 000N4Z 101J9945J9950000402  
 000N500000000000000000 N050000000Z 101J9955J9990000403  
 000M9Z 101J9995000000000404  
 05580Z 101J9900J9905000405

09554Z  
09506Z  
J0134Z  
J0334Z  
J0968Z  
L600000005004900000Z  
3600100005003600172005003600244005003600316005003600000005000000000000000000412  
000000000000102030400020406080003060902100408021610050015102006021814200Z0000413  
70411282008061422300908172630000000005060708090012141618151811242720242Z0000414  
822363520353045403632484455324946536048465462754453627180123456789123456Z0000415  
7890234567890J34567890JK4567890JKL567890JKLM67890JKLMN7890JKLMNO890JKLMNZ0000416  
M1000000000049J8000OP90JKLMNOPQZ0000L10038800019M90000000000M9000360000000000417

```

C      TEST PROBLEM
C      SWITCH TWO MUST BE ON DURING EXECUTION
12     I = 1
13     J = 2
14     J = J + 1
15     J = J - 1
16     I = I + 1
17     I = I - 1
18     K = J + 2
19     L = I - 5
20     PRINT , I,J,K,L
21     END

```

```

003
002
002
001
004
-004
001
004
002
-004
END OF PROGRAM

```

```

C      TEST PROBLEM
C      SW = 2 MUST BE ON DURING EXECUTION
DIMENSION ROT(4), RRT(4), RC(4), B(4), A(4), RY(4)
1      CONTINUE
K = 1
ROT(K) = 6.0
RRT(K) = 5.0
K = 2
ROT(K) = 7.0
RRT(K) = 5.0
K = 3
ROT(K) = 5.0
RRT(K) = 3.0
K = 4
ROT(K) = 4.0
RRT(K) = 2.0
PSEC = 0.0
2      DO 3 J = 1,4
3      RC = 0.0
END

```

```

6.0000000
5.0000000
7.0000000
5.0000000
5.0000000
3.0000000
4.0000000
2.0000000
0.0
0.0
0.0
0.0
0.0
END OF PROGRAM

```

C THIS PROGRAM CALCULATES THE SQUARE ROOT OF NUMBERS  
 C FROM 1 TO 15

```

B = 0.0
DO 5 I = 1, 15, 1
R = 1.0
B = B + 1.0
RT = B / R
RT = RT + R
RT = RT / 2.0
2 R = RT
RT = B / R
RT = RT + R
RT = RT / 2.0
TEST = R - RT
TEST = TEST - .00000001
IF (TEST) 4,4,2
4 CONTINUE
5 PRINT 5, I, R
END

```

001	1.0000000
002	1.4142135
003	1.7320508
004	2.0000000
005	2.2360679
006	2.4494897
007	2.6457513
008	2.8284271
009	3.0000000
010	3.1622776
011	3.3166247
012	3.4641016
013	3.6055512
014	3.7416573
015	3.8729833

END OF PROGRAM

C TEST PROBLEM

```

C
DIMENSION A(25), B(25), C(25), D(25)
I = 1
A(I) = 0.0
PRINT , I, A(I)
DO 15 I = 2, 25
J = I - 1
A(I) = A(J) + 1.0
15 PRINT , I, A(I)
DO 2 J = 1, 25
B(J) = LOG(A(J))
2 PRINT , J, A(J), B(J)
5 CONTINUE
DO 3 K = 1, 25
D(K) = A(K) ** 2.0
C(K) = SQR(A(K))
3 PRINT , K, A(K), D(K), C(K)
END

```

001	0.0
002	1.0000000
003	2.0000000
004	3.0000000
005	4.0000000
006	5.0000000
007	6.0000000
008	7.0000000
009	8.0000000
010	9.0000000
011	10.0000000
012	11.0000000
013	12.0000000
014	13.0000000
015	14.0000000
016	15.0000000
017	16.0000000
018	17.0000000
019	18.0000000
020	19.0000000
021	20.0000000
022	21.0000000
023	22.0000000
024	23.0000000
025	24.0000000

ERROR F2

001	0.0	0.0
002	1.0000000	0.0
003	2.0000000	.69314718
004	3.0000000	1.0986122
005	4.0000000	1.3862943
006	5.0000000	1.6094379
007	6.0000000	1.7917594
008	7.0000000	1.9459101
009	8.0000000	2.0794415
010	9.0000000	2.1972245
011	10.0000000	2.3025850
012	11.0000000	2.3978952
013	12.0000000	2.4849066
014	13.0000000	2.5649493
015	14.0000000	2.6390573
016	15.0000000	2.7080502
017	16.0000000	2.7725887
018	17.0000000	2.8332133
019	18.0000000	2.8903717
020	19.0000000	2.9444389
021	20.0000000	2.9957322
022	21.0000000	3.0445224
023	22.0000000	3.0910424
024	23.0000000	3.1354942
025	24.0000000	3.1780538



001	0.0	0.0	0.0
002	1.0000000	1.0000000	1.0000000
003	2.0000000	4.0000000	1.4142135
004	3.0000000	8.9999983	1.7320507
005	4.0000000	15.999997	1.9999999
006	5.0000000	24.999998	2.2360679
007	6.0000000	35.999994	2.4494896
008	7.0000000	48.999994	2.6457511
009	8.0000000	63.999993	2.8284271
010	9.0000000	80.999987	2.9999999
011	10.000000	99.999978	3.1622774
012	11.000000	120.99997	3.3166246
013	12.000000	143.99998	3.4641015
014	13.000000	168.99997	3.6055513
015	14.000000	195.99998	3.7416574
016	15.000000	224.99999	3.8729832
017	16.000000	255.99998	4.0000000
018	17.000000	288.99996	4.1231057
019	18.000000	323.99996	4.2426407
020	19.000000	360.99993	4.3588989
021	20.000000	399.99993	4.4721357
022	21.000000	440.99996	4.5825755
023	22.000000	483.99994	4.6904155
024	23.000000	528.99997	4.7958314
025	24.000000	575.99995	4.8989793

END OF PROGRAM

C TEST PROBLEM  
A = .5  
B = .5  
DO 4 I = 1, 5  
DO 5 J = 1, 5  
AXB = A \*\* B  
PRINT , I, J, A, B, AXB  
5 A = A + .5  
A = .5  
4 B = B + .5  
END

001	001	.50000000	.50000000	.70710681
001	002	1.00000000	.50000000	1.00000000
001	003	1.50000000	.50000000	1.2247448
001	004	2.00000000	.50000000	1.4142135
001	005	2.50000000	.50000000	1.5811388
002	001	.50000000	1.00000000	.50000002
002	002	1.00000000	1.00000000	1.00000000
002	003	1.50000000	1.00000000	1.49999999
002	004	2.00000000	1.00000000	1.99999999
002	005	2.50000000	1.00000000	2.49999999
003	001	.50000000	1.50000000	.35355339
003	002	1.00000000	1.50000000	1.00000000
003	003	1.50000000	1.50000000	1.8371172
003	004	2.00000000	1.50000000	2.8284271
003	005	2.50000000	1.50000000	3.9528470
004	001	.50000000	2.00000000	.25000001
004	002	1.00000000	2.00000000	1.00000000
004	003	1.50000000	2.00000000	2.24999999
004	004	2.00000000	2.00000000	4.00000000
004	005	2.50000000	2.00000000	6.2500001

```

005          001
005          002
005          003
005          004
005          005

```

```

.50000000
1.00000000
1.50000000
2.00000000
2.50000000

```

```

2.50000000
2.50000000
2.50000000
2.50000000
2.50000000

```

```

.17677670
1.00000000
2.7556760
5.6568545
9.8821182

```

END OF PROGRAM

```

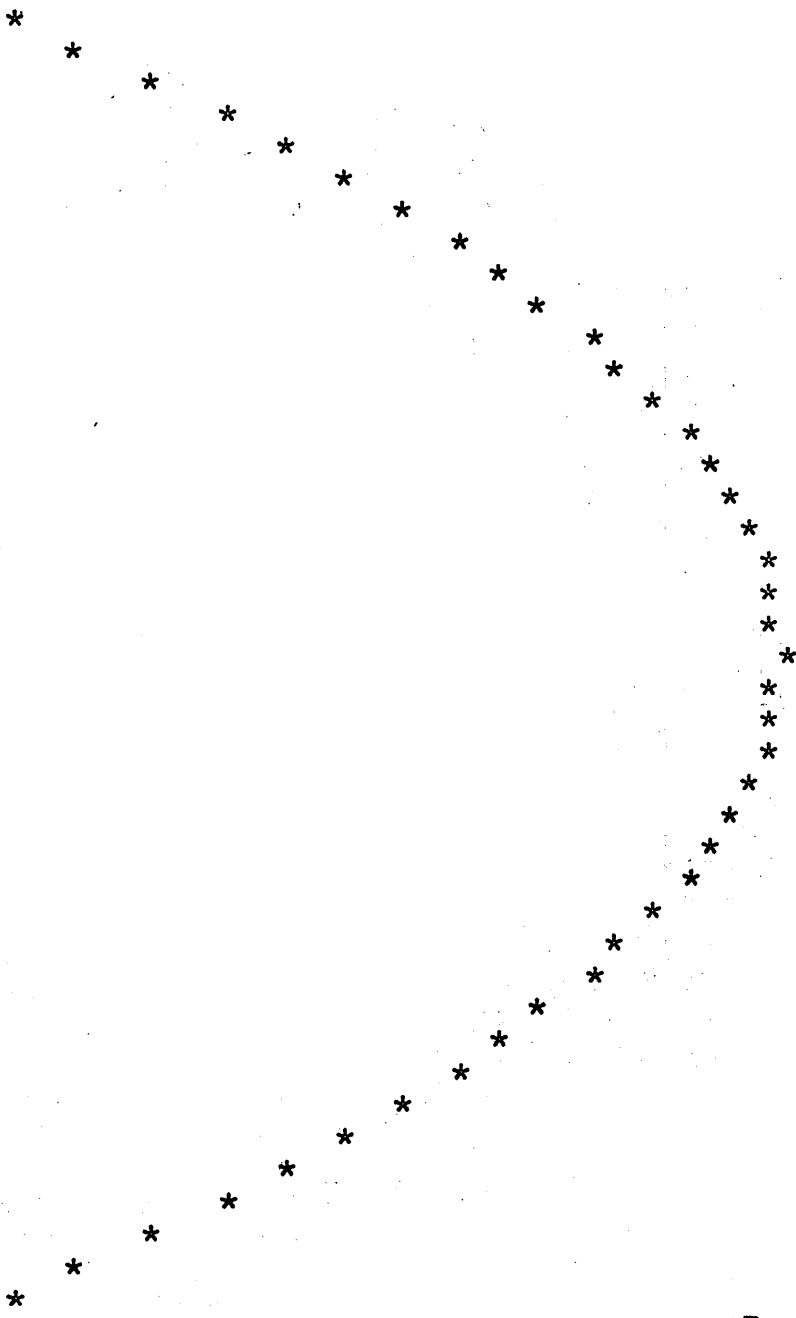
C TEST PROBLEM
  X = -20.0
  DO 5 I = 1, 41
  XP = X * X
  XP = 400.0 - XP
  Y = XP / 10.0
  PRINT , X
  PLOT (Y, *)
5  X. = X + 1.0
  END

```

```

-20.000000
-19.000000
-18.000000
-17.000000
-16.000000
-15.000000
-14.000000
-13.000000
-12.000000
-11.000000
-10.000000
-9.0000000
-8.0000000
-7.0000000
-6.0000000
-5.0000000
-4.0000000
-3.0000000
-2.0000000
-1.0000000
0.0
1.0000000
2.0000000
3.0000000
4.0000000
5.0000000
6.0000000
7.0000000
8.0000000
9.0000000
10.000000
11.000000
12.000000
13.000000
14.000000
15.000000
16.000000
17.000000
18.000000
19.000000
20.000000

```



END OF PROGRAM

C TEST OF NEW SUBROUTINES -- SIN, COS, ATN

```

TEST = 0.0
DO 3 J = 0, 12
A = SIN(TEST)
B = COS (TEST)
C = ATN (TEST)
PRINT, J, TEST, A, B, C
3 TEST = TEST + .10
END

```

000	0.0	0.0	1.0000000	0.0
001	.10000000	9.9833414E- 2	.99500416	9.9668652E- 2
002	.20000000	.19866932	.98006658	.19739555
003	.30000000	.29552020	.95533649	.29145680
004	.40000000	.38941834	.92106100	.38050637
005	.50000000	.47942554	.87758256	.46364761
006	.60000000	.56464247	.82533561	.54041950
007	.70000000	.64421769	.76484218	.61072595
008	.80000000	.71735608	.69670671	.67474093
009	.90000000	.78332690	.62160997	.73281509
010	1.0000000	.84147098	.54030231	.78539816
011	1.1000000	.89120736	.45359612	.83298127
012	1.2000000	.93203909	.36235776	.87605805

END OF PROGRAM

```

C TEST PROBLEM
DO 3 J = 1, 10
1 READ, I, A
2 PRINT, I, A
3 PUNCH, I, A
PAUSE
DO 25 K = 1, 10
25 READ, I, A
PRINT, I, A
END

```

001	1.0000000
002	2.0000000
003	3.0000000
004	4.0000000
005	5.0000000
006	6.0000000
007	7.0000000
008	8.0000000
009	9.0000000
010	10.000000
001	1.0000000
002	2.0000000
003	3.0000000
004	4.0000000
005	5.0000000
006	6.0000000
007	7.0000000
008	8.0000000
009	9.0000000
010	10.000000

END OF PROGRAM

IBM

General Products Division  
Monterey & Cottle Roads  
San Jose 14, California

*International Business Machines Corporation*

Telephone: CYPRESS 7-2950

September 18, 1962

MEMORANDUM TO: Users of 1620-PR-011 GOTRAN  
Version 1

SUBJECT: Modification No. 1

Enclosed is the subject modification to the 1620 GOTRAN.

Please replace cards number 101, 102, 109 and 112 with the enclosed correspondingly numbered cards; also include the enclosed modification as part of the supporting documentation to the 1620 GOTRAN system.

GP PROGRAMMING SYSTEMS

cc: Branch Offices

ERROR: Input data which has leading zeroes are normalized incorrectly.

CORRECTION: Make the following changes to the deck.

<u>Card No.</u>	<u>Column</u>	<u>Present</u>	<u>Change To</u>
101	23 - 24	$\bar{1}2$	$\bar{4}\bar{1}$
101	60	1	0
102	41 - 42	89	97
109	25 - 26	16	33
112	2	3	9

The following are the changes to the program listing:

<u>Inst. at</u>					
03728	16	03825	000 $\bar{4}\bar{1}$	TFM	SEXP + 1, -41, 10
03764	16	00052	000 $\bar{5}0$	TFM	FAC - 8, 50, 10
03812	47	03972	01200	BNE	ADEXP
04060	33	03825		CF	SEXP + 1
04212	49	04248		B	* + 36

# IBM

General Products Division  
Monterey & Cottle Roads  
San Jose 14, California

Telephone: 227-7100 (Area Code: 408)

*International Business Machines Corporation*

January 22, 1963

MEMORANDUM TO: Users of 1620-PR-011  
1620 GOTRAN

SUBJECT: Modification Number 2

Enclosed is the subject modification to the 1620 GOTRAN System.

Please replace cards numbered 0083, 0097, and 0125 with the enclosed correspondingly numbered cards. The enclosed modification should be included as part of the supporting documentation to the 1620 GOTRAN System.

GP PROGRAMMING SYSTEMS

cc: Branch Offices

1620 GOTRAN  
1620-Pr-011, Version 1

Modification No. 2  
January 22, 1963

ERROR:

The compilation of a function statement was incorrect if the variable name of the argument started with the letter O.

The spacing caused by the PLOT statement was incorrect if the numeric portion of the character to be plotted was a 6, 7, or 8.

CORRECTION:

Make the following changes to the deck:

<u>Card No.</u>	<u>Column</u>	<u>Present</u>	<u>Change To</u>
0083	46	1	3
0097	18, 19	61	59
0125	47, 48	61	59

Make the following changes to the program listing:

<u>Number</u>	<u>Location</u>	<u>Symbolic</u>	<u>Actual</u>
280	03080	BL READH	47 02976 01300
335	03568	TF WK+10, CHI	26 00859 12755
450	04698	TF POINT - 2, WK+10	26 09225 00859



*General Products Division  
Monterey & Cottle Roads  
San Jose 14, California*

*Telephone: 227-7100 (Area Code: 408)*

*International Business Machines Corporation*

March 27, 1963

MEMORANDUM TO: Users of #1620-PR-011  
GOTRAN Card System

SUBJECT: Modification Number 3

Enclosed is the subject modification to the GOTRAN Card System.

Please replace card numbered 0193 with the enclosed card. The enclosed modification should be included as part of the supporting documentation to the 1620 GOTRAN System.

GP PROGRAMMING SYSTEMS

cc: Branch Offices



1620 GOTRAN  
1620-PR-011, Version 1

Modification No. 3

The output of data by the GOTRAN System inserted a blank if the range of the floating point number was between X. X.....E-b9 and X, X.....E+b9. The enclosed correction card will cause the data to be punched and printed as E+09. The GOTRAN output data will be acceptable as input to FORTRAN with Format.

Change instruction #691:

Was	TDM	Out + 24	07250	15	09318	00000
Should be	NOP	Out + 24	07250	41	09318	00000

# IBM

*General Products Division  
Monterey & Cottle Roads  
San Jose 14, California*

*Telephone: 227-7100 (Area Code: 408)*

*International Business Machines Corporation*

April 9, 1963

MEMORANDUM TO: Users of #1620-PR-011  
GOTRAN Card System

SUBJECT: Modification Number 4

Please replace card numbered 0112 with the enclosed card. The enclosed modification should be included as part of the supporting documentation to the 1620 GOTRAN System.

Any discrepancy between the material you receive and the items listed should be reported to the Manager of DP Program Information Department, 112 East Post Road, White Plains, New York.

Continued use of the Applied Programming Analysis Report Form for reporting difficulties will be appreciated.

GP PROGRAMMING SYSTEMS

cc: Branch Offices

ERROR:

The internal representation of floating point zero was incorrect. The addition of a number to 0000.0000 resulted in a loss of accuracy of from one to three digits.

CORRECTION:

Instructions #398, 399, and 400 should be:

#398	BD	*+36, FAC-7	04212	43	04248	00053
#399	TFM	FAC-8, 0, 10	04224	16	00052	00000
#400	NOP		04236	41	00000	00000



*General Products Division  
Monterey & Cottle Roads  
San Jose 14, California*

*Telephone: 227-7100 (Area Code: 408)*

*International Business Machines Corporation*

June 19, 1963

MEMORANDUM TO: Users of 1620 GOTRAN Card System

SUBJECT: 1620 GOTRAN, Program #1620-PR-011  
Version 1, Modification Level 5

This letter transmits Version 1, Modification Level 5 of the 1620 GOTRAN Card System. This modification is in the form of nine (9) replacement cards. These enclosed cards are to replace the correspondingly numbered cards ( cc 77-80 ) of the system program deck.

Any discrepancy between the material you receive and the items listed should be reported to the Manager of DP Program Information Department, 112 East Post Road, White Plains, New York.

Continued use of the Authorized Programming Analysis Report Form for reporting difficulties will be appreciated.

GP Programming Systems

cc: Branch Office

1620 GOTRAN

Modification No. 5

1620-PR-011

ERROR:

When statements were entered via the console typewriter and the card output option for source statements was exercised, information was repeated in all following cards having a shorter statement.

CORRECTION:

The input area is now cleared prior to accepting each statement.

The following instructions have been modified as listed:

#484	BC4	SFCF-12	Card #134
#495	B	SFCF-12	#137
#557	BD	SFCF-12, DOSW	#155
#562	B	SFCF-12	#156
#609	B	SFCF-12	#170
#635	B	SFCF-12	#176
#764	B	SFCF-12	#213
#809	B	SFCF-12	#230
#838 EMB	B	SFCF-12	#237