

FLOATING POINT LOGRAMS

TRW COMPUTER DIVISION  
8433 FALLBROOK AVENUE  
CANOGA PARK, CALIFORNIA

November 1963

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FLOATING POINT LOGRAMS

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TRW 130 COMPUTER

TITLE  
 FXN - Fix Number (Unfloat)

LIBRARY NUMBER  
 1L AE 199 0

PROGRAM TYPE  
 Logram

DATA TYPE  
 B2

DESCRIPTION

The contents of \$AE, \$AL and \$AR are treated as a floating point number. The contents of \$AL and \$AR are converted to fixed point in \$AL and \$AR and shifted so that the binary point is "B" positions to the right of the sign bit in \$AL. Overflow is indicated by a positive number in \$AE, and underflow by a negative number in \$AE. The original contents of \$AL and \$AR are not altered if overflow is indicated. Bits shifted right out of \$AR are lost.

CALLING SEQUENCE

Location	Contents (operand, parameter, etc.)
Y	FXN (See Restrictions)

LOCATIONS/INDICATORS AFFECTED

\$AE	\$AR	\$MON
\$AL	\$IC	

EXIT POINTS

CONFIGURATION

OTHER PROGRAMS REQUIRED

PERFORMANCE

Number of Locations	40
Execution Time	*
Accuracy	N.A.

RESTRICTIONS

-16384 ≤ B ≤ 16383  
 \*84 us min.  
 262 us max.  
 188 us avg.

RELEVANT LIBRARY PIECES

Prepared by  
 PSD Staff

Date  
 11/63

Organization  
 PSD/Washington

Listing p. 1

TRW 130 COMPUTER

TITLE

FLN - Float Number

LIBRARY NUMBER

1L AE 198 0

PROGRAM TYPE

Logram

DATA TYPE

F2

DESCRIPTION

Normalizes number in \$AL, \$AR with exponent stored in \$AE. The binary point of the original number is specified by user as "B" places to the right of sign bit. "B" may be any number that is consistent with the word size of the exponent.

CALLING SEQUENCE

Location	Contents (operand, parameter, etc.)
Y	FLN
Y+1	B (See Restrictions)

LOCATIONS/INDICATORS AFFECTED

\$IC	\$AL
\$AE	\$AR

EXIT POINTS

CONFIGURATION

OTHER PROGRAMS REQUIRED

PERFORMANCE

Number of Locations	29
Execution Time	*
Accuracy	N.A.

RESTRICTIONS

-16384 B 16383; if (\$AL, \$AR) = 0, (\$AE) will be set to 0.

\* 138 + 3N when (0 N 14) 138 min.  
 198 + 3(N-15) when (15 N 29) 250 max.

RELEVANT LIBRARY PIECES

Prepared by

A. I. Knott

Date

11/63

Organization

PSD/Washington

Listing p. 2

TRW 130 COMPUTER

TITLE  
 SZF - Store Zero Floating

LIBRARY NUMBER  
 1L AD 197 0

PROGRAM TYPE  
 Logram

DATA TYPE  
 F2

DESCRIPTION  
 Store zero in locations G, G+1, and G+2

CALLING SEQUENCE	
Location	Contents (operand, parameter, etc.)
Y	SZF
Y+1	G

LOCATIONS/INDICATORS AFFECTED  
 \$IC

EXIT POINTS

CONFIGURATION

OTHER PROGRAMS REQUIRED

PERFORMANCE	
Number of Locations	5
Execution Time	66 us
Accuracy	N.A.

RESTRICTIONS

RELEVANT LIBRARY PIECES

Prepared by  
 A. E. Burgess

Date  
 11/63

Organization  
 PSD/Washington

Listing p. 2

TRW 130 COMPUTER

TITLE  
 STF - Store Accumulator Floating

LIBRARY NUMBER  
 1L AB 196 0

PROGRAM TYPE  
 Logram

DATA TYPE  
 F2

**DESCRIPTION**  
 Store contents of floating point accumulator into G, G+1, and G+2

**CALLING SEQUENCE**

Location	Contents (operand, parameter, etc.)
Y	STF
Y+1	G

**LOCATIONS/INDICATORS AFFECTED**  
 \$AE      \$AL  
 \$IC      \$AR

**EXIT POINTS**

**CONFIGURATION**

**OTHER PROGRAMS REQUIRED**

**PERFORMANCE**

Number of Locations	8
Execution Time	102 us
Accuracy	N.A.

**RESTRICTIONS**

**RELEVANT LIBRARY PIECES**

Prepared by  
 A. E. Burgess

Date  
 11/63

Organization  
 PSD/Washington

Listing p. 3

TRW 130 COMPUTER

TITLE  
 LAF - Load Absolute Floating

LIBRARY NUMBER  
 1L AA 195 0

PROGRAM TYPE  
 Logram

DATA TYPE  
 F2

DESCRIPTION

The contents of G, /G+1, G+2/ are stored in \$AE, \$AL, and \$AR

CALLING SEQUENCE

Location	Contents (operand, parameter, etc.)
Y	LAF
Y+1	G

LOCATIONS/INDICATORS AFFECTED

\$AE	\$AR
\$AL	\$IC

EXIT POINTS

CONFIGURATION

OTHER PROGRAMS REQUIRED

PERFORMANCE

Number of Locations	30
Execution Time	*
Accuracy	N.A.

RESTRICTIONS

\*120 min.  
 207 max.  
 164 ave.

RELEVANT LIBRARY PIECES

Prepared by  
 A. E. Burgess

Date  
 11/63

Organization  
 PSD/Washington

Listing p. 3

**TRW 130 COMPUTER**

**TITLE**

LDF - Load Accumulator Floating

**LIBRARY NUMBER**

1L AA 194 0

**PROGRAM TYPE**

Logram

**DATA TYPE**

F2

**DESCRIPTION**

Load floating point accumulator with (G, G+1, and G+2)

**CALLING SEQUENCE**

Location	Contents (operand, parameter, etc.)
Y	LDF
Y+1	G

**CONFIGURATION**

**LOCATIONS/INDICATORS AFFECTED**

\$AE	\$AL
\$IC	\$AR

**OTHER PROGRAMS REQUIRED**

**EXIT POINTS**

**PERFORMANCE**

Number of Locations	8
Execution Time	102 us
Accuracy	N.A.

**RESTRICTIONS**

**RELEVANT LIBRARY PIECES**

Prepared by

A. E. Burgess

Date

11/63

Organization

PSD/Washington

Listing p. 4



TRW 130 COMPUTER

TITLE  
 ADF - Add

LIBRARY NUMBER  
 1L BA 200 0

PROGRAM TYPE  
 Logram

DATA TYPE  
 F2

DESCRIPTION

The floating point number in G, G+1, G+2 is added to the number in the accumulator and the result left in the accumulator, \$AE, \$AL, \$AR. The number in G, G+1, G+2 is not changed.

CALLING SEQUENCE

Location	Contents (operand, parameter, etc.)
Y	ADF
Y+1	G

LOCATIONS/INDICATORS AFFECTED

\$AE	\$IC	\$MON
\$AL	\$T1	\$ONE
\$AR	\$T2	

EXIT POINTS

CONFIGURATION

OTHER PROGRAMS REQUIRED

PERFORMANCE

Number of Locations	178
Execution Time	400 us avg.
Accuracy	29 bits

RESTRICTIONS

RELEVANT LIBRARY PIECES

Prepared by  
 A. E. Burgess and A. I. Knott

Date  
 11/63

Organization  
 PSD/Washington

Listing p. 8

TRW 130 COMPUTER

TITLE  
 SBF - Subtract

LIBRARY NUMBER  
 1L BB 201 0

PROGRAM TYPE  
 Logram

DATA TYPE  
 F2

DESCRIPTION

The floating point number in G, G+1, G+2 is subtracted from the number in the floating accumulator, and the result left in the accumulator, \$AE, \$AL, \$AR. The number in G, G+1, G+2 is not changed.

CALLING SEQUENCE

Location	Contents (operand, parameter, etc.)
Y	SBF
Y+1	G

LOCATIONS/INDICATORS AFFECTED

\$AE	\$IC	\$MON
\$AL	\$T1	
\$AR	\$T2	

EXIT POINTS

CONFIGURATION

OTHER PROGRAMS REQUIRED

PERFORMANCE

Number of Locations	103
Execution Time	425 us avg.
Accuracy	28 bits

RESTRICTIONS

RELEVANT LIBRARY PIECES

Prepared by  
 A. I. Knott

Date  
 11/63

Organization  
 PSD/Washington

Listing p. 8

TRW 130 COMPUTER

TITLE	LIBRARY NUMBER
MPF - Floating Multiply	1L BC 202 0
PROGRAM TYPE	DATA TYPE
Logram	F2

DESCRIPTION

The floating point number at G, G+1, G+2 is multiplied by the floating point number in \$AE, \$AL, \$AR. The normalized floating point product is stored in \$AE, \$AL, \$AR.

CALLING SEQUENCE

Location	Contents (operand, parameter, etc.)
Y	MPF
Y+1	G

LOCATIONS/INDICATORS AFFECTED

\$IC	\$AL	\$T1
\$AE	\$AR	

EXIT POINTS

CONFIGURATION

OTHER PROGRAMS REQUIRED

PERFORMANCE

Number of Locations	59
Execution Time	610 us avg.
Accuracy	28 bits

RESTRICTIONS

RELEVANT LIBRARY PIECES

Prepared by

R. D. Murdock

Date

11/63

Organization

PSD/Washington

Listing p. 11

TRW 130 COMPUTER

TITLE

DVF - Floating Divide

LIBRARY NUMBER

1L BD 203 0

PROGRAM TYPE

Logram

DATA TYPE

F2

DESCRIPTION

The floating point number at \$AE, \$AL, \$AR is divided by the floating point number at G, G+1, G+2. The normalized floating point quotient is stored at \$AE, \$AL, \$AR.

CALLING SEQUENCE

Location	Contents (operand, parameter, etc.)
Y	DVF
Y+1	G

LOCATIONS/INDICATORS AFFECTED

\$IC	\$AL	\$T1
\$AE	\$AR	\$T2
\$DK	\$ONE	

EXIT POINTS

CONFIGURATION

OTHER PROGRAMS REQUIRED

PERFORMANCE

Number of Locations	88
Execution Time	806 us avg.
Accuracy	27 bits

RESTRICTIONS

Attempted division by zero will cause the divide check indicator (\$DK) to be set to 1; the original dividend will remain in \$AE, \$AL, \$AR.

RELEVANT LIBRARY PIECES

Prepared by

R. D. Murdock

Date

11/63

Organization

PSD/Washington

Listing p. 12

**TRW 130 COMPUTER**

**TITLE**  
 CEF - Compare Equal Floating

**LIBRARY NUMBER**  
 1L EM 204 0

**PROGRAM TYPE**  
 Logram

**DATA TYPE**  
 F2

**DESCRIPTION**  
 Compares (G, G+1, G+2) to (\$AE, \$AL, \$AR). If comparison proves equal, branches to H; if unequal, continues with next logram in sequence.

CALLING SEQUENCE	
Location	Contents (operand, parameter, etc.)
Y	CEF
Y+1	G
Y+2	H
LOCATIONS/INDICATORS AFFECTED	
\$IC	\$AL
\$T1	\$AR
\$AE	
EXIT POINTS	

**CONFIGURATION**

**OTHER PROGRAMS REQUIRED**

PERFORMANCE	
Number of Locations	20
Execution Time	*
Accuracy	N.A.

**RESTRICTIONS**  
 \* 90 us min.  
 180 max.

**RELEVANT LIBRARY PIECES**

Prepared by  
 A. I. Knott

Date  
 11/63

Organization  
 PSD/Washington

Listing p. 15

**TRW 130 COMPUTER**

**TITLE**  
 CLF - Compare Less Floating

**LIBRARY NUMBER**  
 1L EM 205 0

**PROGRAM TYPE**  
 Logram

**DATA TYPE**  
 F2

**DESCRIPTION**

Branches to H if  $(AC) f < (G, G+1, G+2)$ , where  $(G, G+1, G+2)$  is a floating point number. If  $(AC) f \geq (G, G+1, G+2)$  returns to Y+3.

**CALLING SEQUENCE**

Location	Contents (operand, parameter, etc.)
Y	CLF
Y+1	G
Y+2	H

**LOCATIONS/INDICATORS AFFECTED**

\$IC     \$AL  
 \$T1    \$AR  
 \$AE

**EXIT POINTS**

**CONFIGURATION**

**OTHER PROGRAMS REQUIRED**

**PERFORMANCE**

Number of Locations	41
Execution Time	162 us
Accuracy	N.A.

**RESTRICTIONS**

**RELEVANT LIBRARY PIECES**

Prepared by  
 A. I. Knott

Date  
 11/63

Organization  
 PSD/Washington

Listing p. 15

TRW 130 COMPUTER

TITLE  
 SRF - Square Root, Floating

LIBRARY NUMBER  
 1L CA 209 0

PROGRAM TYPE  
 Logram

DATA TYPE  
 F2

DESCRIPTION

The floating point number at \$AE, \$AL, \$AR is replaced by its square root, a normalized floating point number.

CALLING SEQUENCE

Location	Contents (operand, parameter, etc.)
Y	SRF

CONFIGURATION

LOCATIONS/INDICATORS AFFECTED

\$IC	\$AR
\$AE	\$T3
\$AL	

OTHER PROGRAMS REQUIRED

EXIT POINTS

PERFORMANCE

Number of Locations	60
Execution Time	*
Accuracy	28 bits

RESTRICTIONS

\* 663 min.  
 723 max.  
 693 avg.

RELEVANT LIBRARY PIECES

Prepared by  
 R. D. Murdock

Date  
 11/63

Organization  
 PSD/Washington

Listing p. 16

TRW 130 COMPUTER

TITLE  
 LNF - Natural Logarith, Floating Point

LIBRARY NUMBER  
 1L CG 261 0

PROGRAM TYPE  
 Logram

DATA TYPE  
 F2

DESCRIPTION

The input argument Y is assumed to be in \$AE, \$AL, \$AR in normalized floating point form. If  $Y \leq 0$  the value 1 is stored in \$OV. Otherwise  $\ln Y$ , in normalized floating point form, replaces the contents of \$AE, \$AL, \$AR. It should be noted that LNF is written as a second level logram.

CALLING SEQUENCE

Location	Contents (operand, parameter, etc.)
Y	LNF

CONFIGURATION

LOCATIONS/INDICATORS AFFECTED

\$IC2    \$AR  
 \$AE    \$T5 - \$T13 inclusive  
 \$AL

OTHER PROGRAMS REQUIRED

EXIT POINTS

PERFORMANCE

Number of Locations	83
Execution Time	6630 us
Accuracy	27 bits

RESTRICTIONS

RELEVANT LIBRARY PIECES

Prepared by  
 J. G. Steadman

Date  
 11/63

Organization  
 TRW

Listing p. 18



TRW 130 COMPUTER

TITLE	LIBRARY NUMBER
SNF - Sine, Floating Point	1L CB 262 0
PROGRAM TYPE	DATA TYPE
Logram	F2

DESCRIPTION

The input argument x is assumed to be in \$AE, \$AL, \$AR in normalized floating point form. The logram calculates sin x and stores the result in \$AE, \$AL, \$AR in normalized floating point form. Control passes to the next logram in sequence. It should be noted that SNF is written as a second level logram.

CALLING SEQUENCE

Location	Contents (operand, parameter, etc.)
Y	SNF

LOCATIONS/INDICATORS AFFECTED

\$IC2     \$AR  
 \$AE     \$T5-\$T14 inclusive  
 \$AL

EXIT POINTS

CONFIGURATION

OTHER PROGRAMS REQUIRED

PERFORMANCE

Number of Locations	164
Execution Time	*
Accuracy	26 bits

RESTRICTIONS

This logram uses the following floating point lograms: LDF, STF, CLF, FLN, ADF, MPF, DVF.  
 Input argument, x, must be less than  $2^{15}$  in magnitude.

\* 7200 us max.  
 6144 us avg.

RELEVANT LIBRARY PIECES

Prepared by  
 J. G. Steadman

Date  
 11/63

Organization  
 TRW

Listing p. 20

TRW 130 COMPUTER

TITLE  
 ATF - Artangent, Floating Point

LIBRARY NUMBER  
 1L CE 263 0

PROGRAM TYPE  
 Logram

DATA TYPE  
 F2

**DESCRIPTION**

The input argument Y is assumed to be in \$AE, \$AL, \$AR in normalized floating point form. Arctan Y is calculated and the result is stored in \$AE, \$AL, \$AR in normalized floating point form. Control passes to the next logram in sequence. It should be noted that ATF is written as a second level logram.

**CALLING SEQUENCE**

Location	Contents (operand, parameter, etc.)
Y	ATF

**LOCATIONS/INDICATORS AFFECTED**

\$IC2	\$AR
\$AE	\$T4 - \$T14 inclusive
\$AL	

**EXIT POINTS**

**CONFIGURATION**

**OTHER PROGRAMS REQUIRED**

**PERFORMANCE**

Number of Locations	203
Execution Time	6420 us
Accuracy	27 bits

**RESTRICTIONS**

This logram uses the following floating point lograms: STF, LDF, ADF, MPF, DVF.

**RELEVANT LIBRARY PIECES**

Prepared by  
 J. G. Steadman

Date  
 11/63

Organization  
 TRW

Listing p. 24

TRW 130 COMPUTER

TITLE  
 CSF - Cosine, Floating Point

LIBRARY NUMBER  
 1L CC 264 0

PROGRAM TYPE  
 Logram

DATA TYPE  
 F2

DESCRIPTION

The input argument x is assumed to be in \$AE, \$AL, \$AR in normalized floating point form. The logram calculates cos x and stores the result in \$AE, \$AL, \$AR in normalized floating point form. Control passes to the next logram in sequence. It should be noted that CSF is written as a second level logram.

CALLING SEQUENCE

Location	Contents (operand, parameter, etc.)
Y	CSF

CONFIGURATION

LOCATIONS/INDICATORS AFFECTED

\$IC2    \$AR  
 \$AE    \$T5-\$T14 inclusive  
 \$AL

OTHER PROGRAMS REQUIRED

EXIT POINTS

PERFORMANCE

Number of Locations	6
Execution Time	*
Accuracy	26 bits

RESTRICTIONS

This logram uses the following floating point lograms: ADF (plus SNF) input argument, x, must be less than  $2^{15}$  in magnitude.

\* 7618 max.  
 6562 avg.

RELEVANT LIBRARY PIECES

Prepared by  
 J. G. Steadman

Date  
 11/63

Organization  
 TRW

Listing p. 29

TRW 130 COMPUTER

TITLE  
 EPF - Exponential, Floating Point

LIBRARY NUMBER  
 1L CF 271 0

PROGRAM TYPE  
 Logram

DATA TYPE  
 F1

DESCRIPTION

The input argument, X, is assumed to be in \$AE, \$AL, \$AR in normalized floating point form. The logram calculates  $e^x$  and stores the result in \$AE, \$AL, \$AR in normalized floating point form. Control passes to the next logram in sequence. It should be noted that EPF is written as a second level logram.

CALLING SEQUENCE

Location	Contents (operand, parameter, etc.)
Y	EPF

CONFIGURATION

LOCATIONS/INDICATORS AFFECTED

\$IC2	\$AR	and
\$AE	\$OV	\$T21 - \$T23 inclusive
\$AL	\$T11 - \$T13	

OTHER PROGRAMS REQUIRED

EXIT POINTS

PERFORMANCE

Number of Locations	153
Execution Time	8500 us
Accuracy	26 bits

RESTRICTIONS

This logram uses the following floating point lograms: MPF, STF, LDF, FLN, SBF, ADF. Input argument, X, must be less than  $2^{15}$  (unless X is negative)

RELEVANT LIBRARY PIECES

Prepared by  
 K. Branch

Date  
 11/63

Organization  
 TRW

Listing p. 29



10602	62177	FXN4	LP	DL	\$MON	LOAD SIGN BITS	19900390
10603	42162		SP	DL	\$AL	STORE SIGN BITS	19900400
10604	62571		LP	IL	\$IC	EXIT	19900410
			*	1LAE1980	01F2FLN	,FLOAT NUMBER	29 138US 19800000
			*		FLOAT		19800010
10605	42171	FLN	SP	DL	\$IC	SAVE INSTRUCTION COUNTER	19800020
10606	75162		LA	DL	\$AL		19800030
10607	47163		RP	DL	\$AR	LOAD \$AL \$AR, Y+1 TO \$AR	19800040
10610	01077		FL	DM	D L15	NORMALIZE	19800050
10611	51162		HA	DL	\$AL	F (\$AL) TO \$AL, FLOAT COMMAND TO A	19800060
10612	76005		XA	DM	CS		19800070
10613	00017		OCT		17	EXTRACT NUMBER OF SHIFTS	19800080
10614	20436		BR	IM	NH		19800090
10615	00016		OCT		16		19800100
10616	10623		PZE		FLN1	BRANCH IF NUMBER OF SHIFTS 14	19800110
10617	47163		RP	DL	\$AR	F (\$AR) TO \$AR, Y+1 TO P	19800120
10620	60201		NO	DP	AI	B-NUMBER OF SHIFTS	19800130
10621	50161		SA	DL	\$AE		19800140
10622	62200		LP	DP	NO	EXIT	19800150
10623	75162	FLN1	LA	DL	\$AL	RELOAD (\$AL)	19800160
10624	20024		BR	DM	AZ		19800170
10625	10636		PZE		FLN2		19800180
10626	01077		FL	DM	D L15	NORMALIZE	19800190
10627	51162		HA	DL	\$AL	F (\$AL) INTO \$AL, FLOAT COMMAND INTO A	19800200
10630	73000		AS	DM	NO	GET 2S COMPLEMENT OF NUMBER OF SHIFTS	19800210
10631	76662		OCT		76662		19800220
10632	47163		RP	DL	\$AR	F (\$AR) INTO \$AR Y+1 INTO P	19800230
10633	60213		NO	DP	AS	SUBTRACT NUMBER OF SHIFTS FROM B	19800240
10634	50161		SA	DL	\$AE	STORE EXPONENT	19800250
10635	62200		LP	DP	NO	EXIT	19800260
10636	44161	FLN2	ZE	DL	\$AE	ZERO EXPONENT	19800270
10637	47163		RP	DL	\$AR	Y+1 TO P ZERO \$AR	19800280
10640	60200		NO	DP	NO		19800290
10641	62200		LP	DP	NO	EXIT	19800300
			*	1LAD1970	01F2SZF	,STORE ZERO FLOATING	5 66US 19700000
			*		STORE ZERO		19700010
10642	44610	SZF	ZE	IP	C LT	ZERO (G), LOAD T WITH ZERO	19700020
10643	42171		SP	DL	\$IC	STORE INSTRUCTION COUNTER	19700030
10644	40300		ST	DA	C NO	ZERO (G+1)	19700040
10645	40200		ST	DP	C NO	ZERO (G+2)	19700050

10646	62300		LP	DA	C	NO	EXIT		19700060	
			*	1LAB1960	01F2STF		,STORE ACCUMULATOR FLOATING	8	102US	19600000
			*				STORE			19600010
10647	75161	STF	LA	DL		\$AE	LOAD A WITH EXPONENT			19600020
10650	52600		SE	IP	C	NO	STORE (\$AE) (G)			19600030
10651	42171		SP	DL		\$IC	STORE INSTRUCTION COUNTER			19600040
10652	60162		NO	DL		\$AL	LOAD (\$AL)			19600050
10653	52300		SE	DA	C	NO	STORE (\$AL) (G+1)			19600060
10654	60163		NO	DL		\$AR	LOAD (\$AR)			19600070
10655	52200		SE	DP	C	NO	STORE (\$AR) (G+2)			19600080
10656	62300		LP	DA		NO				19600090
			*	1LAA1950	01F2LAF		,LOAD ABSOLUTE FLOATING	30	164US	19500000
			*				LOAD ABSOLUTE			19500010
10657	60610	LAF	NO	IP		LT	(G) TO T			19500020
10660	42171		SP	DL		\$IC	SAVE INSTRUCTION COUNTER			19500030
10661	75300		LA	DA		NO	LOAD(G+1)			19500040
10662	20035		BR	DM		AP				19500050
10663	10701		PZE			LAF1	BRANCH IF NUMBER IS POSITIVE			19500060
10664	20031		BR	DM		OV				19500070
10665	10666		PZE			++1	TURN OFF OVERFLOW			19500080
10666	67200		CC	DP		NO	(G+1) TO A, (G+2) TO L			19500090
10667	66075		AP	DM	B	LA	(G+2) TO A, (G+1) TO P			19500100
10670	65001		CS	DM		AI	-(G+2) TO A			19500110
10671	00000		OCT			0				19500120
10672	66071		AP	DM	B	AM	-(G+1) TO A, -(G+2) TO P			19500130
10673	20031		BR	DM		OV				19500140
10674	10706		PZE			LAF2				19500150
10675	40161		ST	DL		\$AE	STORE (G)			19500160
10676	50162		SA	DL		\$AL	STORE-(G+1)			19500170
10677	42163		SP	DL		\$AR	STORE-(G+2)			19500180
10700	62571		LP	IL		\$IC	EXIT			19500190
10701	40161	LAF1	ST	DL		\$AE	STORE(G)			19500200
10702	50162		SA	DL		\$AL	STORE (G+1)			19500210
10703	75200		LA	DP		NO				19500220
10704	50163		SA	DL		\$AR				19500230
10705	62571		LP	IL		\$IC				19500240
10706	11041	LAF2	SO	DM	D	R1				19500250
10707	50162		SA	DL		\$AL	STORE-(G+1)			19500260
10710	42163		SP	DL		\$AR	STORE-(G+2)			19500270
10711	64013		AT	DM		AS	ADJUST EXPONENT			19500280

10712	00001		OCT			1				19500290	
10713	50161		SA	DL		\$AE		STORE(G)+1		19500300	
10714	62571		LP	IL		\$IC		EXIT		19500310	
			*	1LAA1940	01F2LDF			,LOAD ACCUMULATOR FLOATING	8	102US	19400000
			*					LOAD			19400010
10715	60600	LDF	NO	IP	C	NO		CONTENTS(G)			19400020
10716	52161		SE	DL		\$AE		(G) \$AE			19400030
10717	42171		SP	DL		\$IC		STORE INSTRUCTION COUNTER			19400040
10720	60300		NO	DA	C	NO		LOAD A WITH (G+1)			19400050
10721	52162		SE	DL		\$AL		STORE (G+1) (\$AL)			19400060
10722	60200		NO	DP	C	NO		LOAD P WITH (G+2)			19400070
10723	52163		SE	DL		\$AR		STORE (G+2) (\$AR)			19400080
10724	62300		LP	DA		NO					19400090
			*	1LBA2000	00F2ADF			,ADD	178	400US	20000000
			*					ADD			20000010
10725	75162	ADF	LA	DL		\$AL					20000020
10726	20024		BR	DM		AZ					20000030
10727	10774		PZE			ADF4					20000040
10730	60610		NO	IP		LT					20000050
10731	42171		SP	DL		\$IC					20000060
10732	40113		ST	DL		\$T1					20000070
10733	75365		LA	DA	B	CS					20000080
10734	61161		AI	DL		\$AE					20000090
10735	20031		BR	DM		OV					20000100
10736	10737		PZE			*+1					20000110
10737	20034		BR	DM		AN					20000120
10740	11061		PZE			ADF10					20000130
10741	65210		CS	DP		LT					20000140
10742	20436		BR	IM		NH					20000150
10743	00017		OCT			17					20000160
10744	11004		PZE			ADF5					20000170
10745	67001		CC	DM		AI					20000180
10746	13040		OCT			13040					20000190
10747	64200		AT	DP		NO					20000200
10750	62060		LP	DM	B	NO					20000210
10751	40020		ST	DM	H	NO					20000220
10752	00000		PZE			**					20000230
10753	66060		AP	DM	B	NO					20000240
10754	63163	ADF2	AL	DL		\$AR					20000250
10755	66060		AP	DM	B	NO					20000260



10756	71162		AM	DL		\$AL	20000270
10757	20031		BR	DM		OV	20000280
10760	11021		PZE			ADF6	20000290
10761	01077		FL	DM	D	L15	20000300
10762	51162		HA	DL		\$AL	20000310
10763	76005		XA	DM		CS	20000320
10764	00017		OCT			17	20000330
10765	20436		BR	IM		NH	20000340
10766	00016		OCT			16	20000350
10767	11032		PZE			ADF7	20000360
10770	42163		SP	DL		\$AR	20000370
10771	61161		AI	DL		\$AE	20000380
10772	50161		SA	DL		\$AE	20000390
10773	62571	ADF3	LP	IL		\$IC	20000400
10774	60610	ADF4	NO	IP		LT	20000410
10775	42171		SP	DL		\$IC	20000420
10776	40161		ST	DL		\$AE	20000430
10777	75300		LA	DA	C	NO	20000440
11000	50162		SA	DL		\$AL	20000450
11001	75200		LA	DP	C	NO	20000460
11002	50163		SA	DL		\$AR	20000470
11003	62571		LP	IL		\$IC	20000480
11004	20436	ADF5	BR	IM		NH	20000490
11005	00035		OCT			35	20000500
11006	10773		PZE			ADF3	20000510
11007	65001		CS	DM		AI	20000520
11010	12760		OCT			12760	20000530
11011	50024		SA	DM	H	AT	20000540
11012	00000		PZE			**	20000550
11013	44062		ZE	DM	B	LP	20000560
11014	20035		BR	DM		AP	20000570
11015	10754		PZE			ADF2	20000580
11016	62177		LP	DL		\$MON	20000590
11017	20020		BR	DM		UN	20000600
11020	10754		PZE			ADF2	20000610
11021	20032	ADF6	BR	DM		CY	20000620
11022	11050		PZE			ADF9	20000630
11023	11041		SO	DM	D	R1	20000640
11024	50162		SA	DL		\$AL	20000650
11025	42163		SP	DL		\$AR	20000660

11026	75161		LA	DL	\$AE	20000670
11027	73176		AS	DL	\$ONE	20000680
11030	50161		SA	DL	\$AE	20000690
11031	62571		LP	IL	\$IC	20000700
11032	75162	ADF7	LA	DL	\$AL	20000710
11033	20024		BR	DM	AZ	20000720
11034	11045		PZE		ADF8	20000730
11035	01077		FL	DM	D L15	20000740
11036	51162		HA	DL	\$AL	20000750
11037	73000		AS	DM	NO	20000760
11040	76662		OCT		76662	20000770
11041	44163		ZE	DL	\$AR	20000780
11042	73161		AS	DL	\$AE	20000790
11043	50161		SA	DL	\$AE	20000800
11044	62571		LP	IL	\$IC	20000810
11045	44161	ADF8	ZE	DL	\$AE	20000820
11046	44163		ZE	DL	\$AR	20000830
11047	62571		LP	IL	\$IC	20000840
11050	11041	ADF9	SO	DM	D R1	20000850
11051	73000		AS	DM	NO	20000860
11052	40000		OCT		40000	20000870
11053	50162		SA	DL	\$AL	20000880
11054	42163		SP	DL	\$AR	20000890
11055	75161		LA	DL	\$AE	20000900
11056	73176		AS	DL	\$ONE	20000910
11057	50161		SA	DL	\$AE	20000920
11060	62571		LP	IL	\$IC	20000930
11061	70205	ADF10	LT	DP	CS	20000940
11062	20437		BR	IM	NL	20000950
11063	77760		OCT		77760	20000960
11064	11120		PZE		ADF12	20000970
11065	61000		AI	DM	NO	20000980
11066	13040		OCT		13040	20000990
11067	64200		AT	DP	C NO	20001000
11070	52114		SE	DL	\$T2	20001010
11071	20024		BR	DM	AZ	20001020
11072	10773		PZE		ADF3	20001030
11073	55162		RA	DL	\$AL	20001040
11074	62163		LP	DL	\$AR	20001050
11075	40020		ST	DM	H NO	20001060

FLOATING POINT LOGRAM PACKAGE

11076	00000		PZE			**	20001070
11077	66060		AP	DM	B	NO	20001080
11100	63114	ADF11	AL	DL		\$T2	20001090
11101	66060		AP	DM	B	NO	20001100
11102	71162		AM	DL		\$AL	20001110
11103	20031		BR	DM		OV	20001120
11104	11142		PZE			ADF13	20001130
11105	01077		FL	DM	D	L15	20001140
11106	51162		HA	DL		\$AL	20001150
11107	76005		XA	DM	C	CS	20001160
11110	00017		OCT			17	20001170
11111	20436		BR	IM		NH	20001180
11112	00016		OCT			16	20001190
11113	11153		PZE			ADF14	20001200
11114	42163		SP	DL		\$AR	20001210
11115	61113		AI	DL		\$T1	20001220
11116	50161		SA	DL		\$AE	20001230
11117	62571		LP	IL		\$IC	20001240
11120	20437	ADF12	BR	IM		NL	20001250
11121	77742		OCT			77742	20001260
11122	11166		PZE			ADF15	20001270
11123	61000		AI	DM	C	NO	20001280
11124	12761		OCT			12761	20001290
11125	64200		AT	DP	C	NO	20001300
11126	52114		SE	DL		\$T2	20001310
11127	20024		BR	DM		AZ	20001320
11130	10773		PZE			ADF3	20001330
11131	55162		RA	DL		\$AL	20001340
11132	40020		ST	DM	H	NO	20001350
11133	00000		PZE			**	20001360
11134	44062		ZE	DM	B	LP	20001370
11135	20035		BR	DM		AP	20001380
11136	11100		PZE			ADF11	20001390
11137	62177		LP	DL		\$MON	20001400
11140	20020		BR	DM		UN	20001410
11141	11100		PZE			ADF11	20001420
11142	20032	ADF13	BR	DM		CY	20001430
11143	11176		PZE			ADF16	20001440
11144	11041		SO	DM	D	R1	20001450
11145	50162		SA	DL		\$AL	20001460

11146	42163		SP	DL	\$AR			20001470	
11147	75113		LA	DL	\$T1			20001480	
11150	73176		AS	DL	\$ONE			20001490	
11151	50161		SA	DL	\$AE			20001500	
11152	62571		LP	IL	\$IC			20001510	
11153	75162	ADF14	LA	DL	\$AL			20001520	
11154	20024		BR	DM	AZ			20001530	
11155	11045		PZE		ADF8			20001540	
11156	01077		FL	DM	D	L15		20001550	
11157	51162		HA	DL	\$AL			20001560	
11160	73000		AS	DM	C	NO		20001570	
11161	76662		OCT			76662		20001580	
11162	44163		ZE	DL	\$AR			20001590	
11163	73113		AS	DL	\$T1			20001600	
11164	50161		SA	DL	\$AE			20001610	
11165	62571		LP	IL	\$IC			20001620	
11166	64210	ADF15	AT	DP	C	LT		20001630	
11167	20024		BR	DM		AZ		20001640	
11170	10773		PZE			ADF3		20001650	
11171	40163		ST	DL	\$AR			20001660	
11172	50162		SA	DL	\$AL			20001670	
11173	75113		LA	DL	\$T1			20001680	
11174	50161		SA	DL	\$AE			20001690	
11175	62571		LP	IL	\$IC			20001700	
11176	11041	ADF16	SO	DM	D	R1		20001710	
11177	73000		AS	DM		NO		20001720	
11200	40000		OCT			40000		20001730	
11201	50162		SA	DL	\$AL			20001740	
11202	42163		SP	DL	\$AR			20001750	
11203	75113		LA	DL	\$T1			20001760	
11204	73176		AS	DL	\$ONE			20001770	
11205	50161		SA	DL	\$AE			20001780	
11206	62571		LP	IL	\$IC			20001790	
			*	1LBB2010	00F2SBF	,SUBTRACT	103	425US	20100000
			*			SUBTRACT			20100010
11207	75162	SBF	LA	DL	\$AL			20100020	
11210	20024		BR	DM		AZ		20100030	
11211	11236		PZE			SBF2		20100040	
11212	60610		NO	IP	C	LT		20100050	
11213	42171		SP	DL	\$IC			20100060	

11214	40113		ST	DL		\$T1		20100070
11215	75365		LA	DA	B	CS		20100080
11216	61161		AI	DL		\$AE		20100090
11217	20031		BR	DM		OV		20100100
11220	11221		PZE			*+1		20100110
11221	20034		BR	DM		AN		20100120
11222	11261		PZE			SBF3		20100130
11223	65210		CS	DP		LT		20100140
11224	20436		BR	IM		NH		20100150
11225	00017		OCT			17		20100160
11226	11302		PZE			SBF4		20100170
11227	67001		CC	DM		AI		20100180
11230	13040		OCT			13040		20100190
11231	64207		AT	DP		CC		20100200
11232	66075		AP	DM	B	LA		20100210
11233	67066		CC	DM	B	AP		20100220
11234	20020		BR	DM		UN		20100230
11235	10751		PZE			ADF2-3		20100240
11236	20031	SBF2	BR	DM		OV	TURN OFF OVERFLOW	20100250
11237	11240		PZE			*+1		20100260
11240	60610		NO	IP		LT	GEX TO T	20100270
11241	40161		ST	DL		\$AE	STORE GEX	20100280
11242	42171		SP	DL		\$IC		20100290
11243	75307		LA	DA		CC	LOAD GMS, COMPLEMENT	20100300
11244	60200		NO	DP		NO	GLS TO E	20100310
11245	66075		AP	DM	B	LA	GMS TO P, GLS TO A	20100320
11246	65001	SBF7	CS	DM		AI		20100330
11247	00000		OCT			0		20100340
11250	66071		AP	DM	B	AM		20100350
11251	20031		BR	DM		OV		20100360
11252	11023		PZE			ADF6+2	BRANCH IF 40000	20100370
11253	20426		BR	IM		EQ		20100380
11254	17777		OCT			17777		20100390
11255	11347		PZE			SBF8		20100400
11256	50162		SA	DL		\$AL		20100410
11257	42163		SP	DL		\$AR		20100420
11260	62571		LP	IL		\$IC	EXIT FOR (\$AL)=0	20100430
11261	70205	SBF3	LT	DP	C	CS		20100440
11262	20437		BR	IM		NL		20100450
11263	77760		OCT			77760		20100460

11264	11320		PZE			SBF5	20100470
11265	61000		AI	DM	C	NO	20100480
11266	13040		OCT			13040	20100490
11267	64060		AT	DM	B	NO	20100500
11270	20024		BR	DM		AZ	20100510
11271	10773		PZE			ADF3	20100520
11272	67200		CC	DP		NO	20100530
11273	66075		AP	DM	B	LA	20100540
11274	67066		CC	DM	B	AP	20100550
11275	42114		SP	DL		\$T2	20100560
11276	55162		RA	DL		\$AL	20100570
11277	62163		LP	DL		\$AR	20100580
11300	20020		BR	DM		UN	20100590
11301	11075		PZE			ADF11=3	20100600
11302	20436	SBF4	BR	IM		NH	20100610
11303	00035		OCT			35	20100620
11304	10773		PZE			ADF3	20100630
11305	65001		CS	DM		AI	20100640
11306	12760		OCT			12760	20100650
11307	66004		AP	DM		AT	20100660
11310	00000		OCT			0	20100670
11311	43027		HP	DM	H	CC	20100680
11312	00000		PZE			**	20100690
11313	20035		BR	DM		AP	20100700
11314	10754		PZE			ADF2	20100710
11315	62177		LP	DL		\$MON	20100720
11316	20020		BR	DM		UN	20100730
11317	10754		PZE			ADF2	20100740
11320	20437	SBF5	BR	IM		NL	20100750
11321	77742		OCT			77742	20100760
11322	11336		PZE			SBF6	20100770
11323	61000		AI	DM		NO	20100780
11324	12761		OCT			12761	20100790
11325	64060		AT	DM	B	NO	20100800
11326	20024		BR	DM		AZ	20100810
11327	10773		PZE			ADF3	20100820
11330	67200		CC	DP		NO	20100830
11331	66075		AP	DM	B	LA	20100840
11332	67066		CC	DM	B	AP	20100850
11333	42114		SP	DL		\$T2	20100860

SHIFT COMMAND TO P, GMS TO A, 0 TO P

SHIFT COMMAND TO L, ZERO TO P

FLOATING POINT LOGRAM PACKAGE

11334	20020		BR	DM		UN			20100870	
11335	11131		PZE			ADF12+9			20100880	
11336	64060	SBF6	AT	DM	B	NO			20100890	
11337	20024		BR	DM		AZ			20100900	
11340	10773		PZE			ADF3			20100910	
11341	67200		CC	DP		NO			20100920	
11342	66075		AP	DM	B	LA			20100930	
11343	70113		LT	DL		\$T1			20100940	
11344	40161		ST	DL		\$AE			20100950	
11345	20020		BR	DM		UN			20100960	
11346	11246		PZE			SBF7			20100970	
11347	11061	SBF8	SO	DM	D	L1			20100980	
11350	50162		SA	DL		\$AL			20100990	
11351	42163		SP	DL		\$AR			20101000	
11352	64013		AT	DM		AS			20101010	
11353	77777		OCT			77777			20101020	
11354	50161		SA	DL		\$AE			20101030	
11355	62571		LP	IL		\$IC			20101040	
			* 1LBC2020 01F2MPF , FLOATING MULTIPLY						59 610US	20200000
			* MULTIPLY							20200010
11356	60610	MPF	NO	IP	C	LT	LOAD ( G )		20200020	
11357	42171		SP	DL		\$IC	STORE (Y+2)		20200030	
11360	75304		LA	DA	C	AT	LOAD (G+1) AND STORE SIGN IN T		20200040	
11361	73161		AS	DL		\$AE	ADD EXPONENTS		20200050	
11362	50161		SA	DL		\$AE			20200060	
11363	67215		CC	DP	C	LA	LOAD (G+2)		20200070	
11364	40375		ST	DA	B	LA	MULTIPLIER IN A, P		20200080	
11365	20035		BR	DM		AP	TEST MULTIPLIER SIGN		20200090	
11366	11371		PZE			FMP1			20200100	
11367	77066		CH	DM	B	AP	ONES COMPLEMENT		20200110	
11370	77066		CH	DM	B	AP	A AND P		20200120	
11371	11061	FMP1	SO	DM	D	L1			20200130	
11372	55162		RA	DL		\$AL	LOAD (\$AL)		20200140	
11373	47163		RP	DL		\$AR	LOAD (\$AR)		20200150	
11374	20035		BR	DM		AP	TEST MULTIPLICAND SIGN		20200160	
11375	11401		PZE			FMP2			20200170	
11376	77364		CH	DA	B	AT			20200180	
11377	77064		CH	DM	B	AT	A AND P		20200190	
11400	66077		AP	DM	B	CH	ALSO COMPLEMENT SIGN		20200200	
11401	11061	FMP2	SO	DM	D	L1			20200210	

11402	40113		ST	DL		\$T1	STORE PRODUCT SIGN	20200220
11403	64162		AT	DL		\$AL	LOAD (G+1)	20200230
11404	15057		MP	DM	D	15	(G+1) TIMES (\$AR)	20200240
11405	55163		RA	DL		\$AR	STORE PARTIAL PRODUCT PP1	20200250
11406	40066		ST	DM	B	AP		20200260
11407	15057		MP	DM	D	15	(G+2) TIMES (\$AL) IS PP2	20200270
11410	62162		LP	DL		\$AL		20200280
11411	45113		RT	DL		\$T1		20200290
11412	15057		MP	DM	D	15	(G+1) TIMES (\$AL) PLUS PP2	20200300
11413	66163		AP	DL		\$AR	LOAD PP1	20200310
11414	60063		NO	DM	B	AL	FORM LEAST SIGNIFICANT HALF	20200320
11415	66001		AP	DM	C	AI	FORM MOST SIGNIFICANT HALF	20200330
11416	00000		OCT			00000	OF PRODUCT	20200340
11417	20024		BR	DM		AZ	IF ZERO STORE ZERO	20200350
11420	11437		PZE			FMP5		20200360
11421	20035		BR	DM		AP	NORMALIZATION TEST	20200370
11422	11443		PZE			FMP6		20200380
11423	11041		SO	DM	D	R1	NORMALIZE MANTISSA	20200390
11424	64060	FMP3	AT	DM	B	NO		20200400
11425	20035		BR	DM		AP	DETERMINE PRODUCT SIGN	20200410
11426	11434		PZE			FMP4		20200420
11427	64077		AT	DM	B	CH	ONES COMPLEMENT	20200430
11430	66077		AP	DM	B	CH	PRODUCT	20200440
11431	50163		SA	DL		\$AR	STORE LEAST SIGNIFICANT PART	20200450
11432	42162		SP	DL		\$AL	STORE MOST SIGNIFICANT PART	20200460
11433	62571		LP	IL		\$IC	EXIT	20200470
11434	40162	FMP4	ST	DL		\$AL	STORE MOST SIGNIFICANT PART	20200480
11435	42163		SP	DL		\$AR	STORE LEAST SIGNIFICANT PART	20200490
11436	62571		LP	IL		\$IC	EXIT	20200500
11437	44161	FMP5	ZE	DL		\$AE	ZERO EXPONENT	20200510
11440	44162		ZE	DL		\$AL	ZERO MANTISSA	20200520
11441	44163		ZE	DL		\$AR		20200530
11442	62571		LP	IL		\$IC		20200540
11443	55161	FMP6	RA	DL		\$AE	PRODUCT ALREADY NORMALIZED	20200550
11444	63000		AL	DM	C	NO	SUBTRACT ONE	20200560
11445	77777		OCT			77777	FROM EXPONENT	20200570
11446	55161		RA	DL		\$AE		20200580
11447	20020		BR	DM		UN		20200590
11450	11424		PZE			FMP3		20200600

\* 1LBD2030 01F2DVF FLOATING DIVIDE

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11520	60113		NO	DL		\$T1		20300410
11521	15057		MP	DM	D	15	MULTIPLY Q3 BY Q1	20300420
11522	67002		CC	DM	C	LP	COMPLEMENT PRODUCTS IN A	20300430
11523	77777		OCT			-1	FILL P WITH ONES	20300440
11524	03062		SC	DM	D	L2	TWO HIGH ORDER BITS IN P	20300450
11525	63114		AL	DL		\$T2	SUBTRACT LO BITS FROM Q2	20300460
11526	66113		AP	DL		\$T1		20300470
11527	60061		NO	DM	B	AI	SUBTRACT HI BITS FROM Q1	20300480
11530	20035	FDV3	BR	DM		AP		20300490
11531	11537		PZE			FDV4		20300500
11532	11041		SO	DM	D	R1	SHIFT QUOTIENT IF NOT LESS THAN ONE	20300510
11533	55161		RA	DL		\$AE		20300520
11534	63000		AL	DM	C	NO	ADJUST EXPONENT FOR SHIFT	20300530
11535	00001		OCT			1		20300540
11536	55161		RA	DL		\$AE		20300550
11537	64060	FDV4	AT	DM	B	NO		20300560
11540	20035		BR	DM		AP	TEST SIGN	20300570
11541	11551		PZE			FDV5		20300580
11542	64077		AT	DM	B	CH	COMPLEMENT QUOTIENT	20300590
11543	66077		AP	DM	B	CH		20300600
11544	50163		SA	DL		\$AR	LOW BITS \$AR1	20300610
11545	42162		SP	DL		\$AL	HIGH BITS TO \$AL	20300620
11546	20031		BR	DM		OV	CLEAR OVERFLOW INDICATOR	20300630
11547	11550		PZE			**1		20300640
11550	62571		LP	IL		\$IC	EXIT FOR NEGATIVE QUOTIENT	20300650
11551	40162	FDV5	ST	DL		\$AL		20300660
11552	42163		SP	DL		\$AR		20300670
11553	20031		BR	DM		OV	CLEAR OVERFLOW INDICATOR	20300680
11554	11555		PZE			**1		20300690
11555	62571		LP	IL		\$IC	EXIT FOR POSITIVE QUOTIENT	20300700
11556	75113	FDV6	LA	DL		\$T1	LOAD Q1	20300710
11557	20020		BR	DM		UN		20300720
11560	11530		PZE			FDV3		20300730
11561	66067	FDV7	AP	DM	B	CC	COMPLEMENT (G+2)	20300740
11562	66001		AP	DM	C	AI	ADD ONE TO NEGATIVE (G+1)	20300750
11563	00001		OCT			1		20300760
11564	20020		BR	DM		UN		20300770
11565	11467		PZE			FDV1		20300780
11566	60176	FDV8	NO	DL		\$ONE	CANNOT DIVIDE BY ZERO	20300790
11567	52175		SE	DL		\$DK	SET DIVIDE CHECK TO ONE	20300800

11570	20031		BR	DM	OV				20300810	
11571	11572		PZE		**1				20300820	
11572	62571		LP	IL	\$IC				20300830	
11573	44161	FDV9	ZE	DL	\$AE		THE QUOTIENT IS ZERO		20300840	
11574	44162		ZE	DL	\$AL				20300850	
11575	44163		ZE	DL	\$AR				20300860	
11576	20031		BR	DM	OV				20300870	
11577	11600		PZE		**1				20300880	
11600	62571		LP	IL	\$IC		ZERO QUOTIENT EXIT		20300890	
			*	1LEM2040	02F2CEF		,COMPARE EQUAL FLOATING	20	90US	20400000
			*		COMPARE		EQUAL			20400010
11601	60610	CEF	NO	IP	LT		GEX TO T			20400020
11602	64205		AT	DP	CS		-GEX TO A, G+1 TO T, H TO E			20400030
11603	52113		SE	DL	\$T1		STORE H			20400040
11604	42171		SP	DL	\$IC		SAVE INSTRUCTION COUNTER			20400050
11605	61161		AI	DL	\$AE		(\$AE)-GEX			20400060
11606	20024		BR	DM	AZ					20400070
11607	11611		PZE		CEF1		BRANCH IF (\$AE)=GEX			20400080
11610	62200		LP	DP	NO		EXIT TO Y+3 IF (\$AE)=GEX			20400090
11611	64066	CEF1	AT	DM	B AP		G+1 TO P			20400100
11612	75205		LA	DP	CS		GMS TO A			20400110
11613	61162		AI	DL	\$AL		(\$AL)-GMS			20400120
11614	20024		BR	DM	AZ					20400130
11615	11617		PZE		CEF2		BRANCH IF (\$AL)=GMS			20400140
11616	62571		LP	IL	\$IC		EXIT TO Y+3 IF (\$AL)=GMS			20400150
11617	75205	CEF2	LA	DP	CS		GLS TO A			20400160
11620	61163		AI	DL	\$AR		(\$AR)-GLS			20400170
11621	20024		BR	DM	AZ					20400180
11622	11624		PZE		CEF3		BRANCH IF (\$AR)=GLS			20400190
11623	62571		LP	IL	\$IC		EXIT TO Y+3 IF (\$AR)=GLS			20400200
11624	62513	CEF3	LP	IL	\$T1		EXIT TO H IF F(AC)=(G, G-1, G+2)			20400210
			*	1LEM2050	02F2CLF		,COMPARE LESS FLOATING	41	162US	20500000
			*		COMPARE		LESS			20500010
11625	60610	CLF	NO	IP	LT		GEX INTO T			20500020
11626	64205		AT	DP	CS		H INTO E, -GEX INTO A, G+1 INTO T			20500030
11627	52113		SE	DL	\$T1		STORE H			20500040
11630	42171		SP	DL	\$IC		SAVE INSTRUCTION COUNTER			20500050
11631	61161		AI	DL	\$AE		SUBTRACT EXPONENTS			20500060
11632	20034		BR	DM	AN					20500070
11633	11663		PZE		CLF4		BRANCH IF GEX=\$AE			20500080

11634	20024		BR	DM		AZ		20500090	
11635	11651		PZE			CLF2	BRANCH IF GEX = \$AE	20500100	
11636	75162		LA	DL		\$AL		20500110	
11637	20034		BR	DM		AN		20500120	
11640	11662		PZE			CLF3	BRANCH IF (\$AL) 0, EXIT TO H	20500130	
11641	20024		BR	DM		AZ		20500140	
11642	11644		PZE			CLF1	BRANCH IF (\$AL) = 0	20500150	
11643	62571		LP	IL		\$IC	EXIT (AC) = (G,G+1,G+2) TO Y+3	20500160	
11644	67064	CLF1	CC	DM	B	AT	G+1 TO A	20500170	
11645	75300		LA	DA		NO	GMS TO A	20500180	
11646	20035		BR	DM		AP		20500190	
11647	11662		PZE			CLF3	BRANCH TO EXIT TO H	20500200	
11650	62571		LP	IL		\$IC	EXIT TO Y+3	20500210	
11651	40062	CLF2	ST	DM	B	LP	G+1 TO P	20500220	
11652	60200		NO	DP		NO	GET G+2	20500230	
11653	75163		LA	DL		\$AR		20500240	
11654	67201		CC	DP		AI	GLS = (\$AR)	20500250	
11655	75417		LA	IM		CH		20500260	
11656	00062		PZE			\$AL	LOAD (\$AL) COMP.	20500270	
11657	40062		ST	DM	B	LP	G+1 TO A	20500280	
11660	24637		SK	IP		NL		20500290	
11661	62571		LP	IL		\$IC	EXIT TO Y+3 IF GMS LESS (\$AL)	20500300	
11662	62513	CLF3	LP	IL		\$T1	EXIT TO H IF GMS GRTR (\$AL)	20500310	
11663	67064	CLF4	CC	DM	B	AT	G+1 TO A	20500320	
11664	75300		LA	DA		NO	GMS TO TO A, G+2 TO P	20500330	
11665	20034		BR	DM		AN		20500340	
11666	11675		PZE			CLF6	EXIT TO Y+3 IF GMS 0	20500350	
11667	20024		BR	DM		AZ		20500360	
11670	11672		PZE			CLF5		20500370	
11671	62513		LP	IL		\$T1	BRANCH TO H IF GMS 0	20500380	
11672	75162	CLF5	LA	DL		\$AL	LOAD (\$AL)	20500390	
11673	20034		BR	DM		AN		20500400	
11674	11662		PZE			CLF3	EXIT TO H IF (\$AL) 0	20500410	
11675	62571	CLF6	LP	IL		\$IC	EXIT TO Y+3 IF (\$AL) 0	20500420	
			* 1LCA2090 00F2SRF , SQUARE ROOT, FLOATING					60 693US	20900000
			* SQUARE ROOT FLOATING						20900010
11676	42171	SRF	SP	DL		\$IC	STORE Y+2	20900020	
11677	75162		LA	DL		\$AL		20900030	
11700	20024		BR	DM		AZ	IS X ZERO	20900040	
11701	11766		PZE			SRF3		20900050	

FLOATING POINT LOGRAM PACKAGE

11702	55161		RA	DL		\$AE		20900060
11703	20021		BR	DM		AD	IS EXPONENT ODD	20900070
11704	11752		PZE			SRF2		20900080
11705	13001		NR	DM	S	R1	DIVIDE EXPONENT BY 2	20900090
11706	55161		RA	DL		\$AE		20900100
11707	11001		SO	DM	S	R1		20900110
11710	60013		NO	DM	C	AS	Y1 EQUALS 0.5X PLUS 0.5	20900120
11711	20000		OCT			20000	HIGH AND APPROXIMATION	20900130
11712	50070	SRF1	SA	DM	B	LT	STORE Y1 IN T	20900140
11713	67162		CC	DL		\$AL	COMPLEMENT Y1	20900150
11714	51060		HA	DM	B	NO		20900160
11715	05076		DV	DM	D	14	DIVIDE X BY Y1	20900170
11716	40373		ST	DA	B	AS	ADD Y1	20900180
11717	11001		SO	DM	S	R1	DIVIDE BY 2 FOR Y2	20900190
11720	50070		SA	DM	B	LT	STORE Y2 IN T	20900200
11721	65001		CS	DM		AI	GET TWOS COMPLEMENT OD Y*2	20900210
11722	00000		OCT			0		20900220
11723	62162		LP	DL		\$AL	LOAD L WITH X	20900230
11724	51060		HA	DM	B	NO	EXCHANGE A AND L	20900240
11725	05076		DV	DM	D	14	DIVIDE X BY 2	20900250
11726	40373		ST	DA	B	AS	ADD Y2	20900260
11727	11001		SO	DM	S	R1	DIVIDE BY 2 FOR Y3	20900270
11730	50062		SA	DM	B	LP	HOLD Y3 IN P	20900280
11731	67340		CC	DA	N	NO	Y3+1 IN P, Y3 PRIME IN A	20900290
11732	47163		RP	DL		\$AR	LOAD LOW ORDER X	20900300
11733	55162		RA	DL		\$AL	LOAD HIGH ORDER X	20900310
11734	05076		DV	DM	D	14	DIVIDE X BY Y3-1	20900320
11735	42115		SP	DL		\$T3	STORE HIGH ORDER BITS	20900330
11736	44062		ZE	DM	B	LP	CLEAR P	20900340
11737	11041		SO	DM	D	R1	MAKE REMAINDER POSITIVE	20900350
11740	60162		NO	DL		\$AL		20900360
11741	05077		DV	DM	D	15	DIVIDE REMAINDER BY Y3+1	20900370
11742	75115		LA	DL		\$T3	LOAD HIGH ORDER BITS	20900380
11743	73163		AS	DL		\$AR	ADD Y3+1	20900390
11744	11041		SO	DM	D	R1	DIVIDE BY 2	20900400
11745	50162		SA	DL		\$AL	HIGH ORDER ROOT	20900410
11746	42163		SP	DL		\$AR	LOW ORDER ROOT	20900420
11747	20031		BR	DM		OV	CLEAR OVERFLOW	20900430
11750	11751		PZE			**+1		20900440
11751	62571		LP	IL		\$IC	NORMAL EXIT	20900450

11752	60013	SRF2	NO	DM	C	AS	ADD 1 TO EXPONENT	20900460
11753	00001		OCT			1		20900470
11754	13001		NR	DM	S	R1	DIVIDE EXPONENT BY 2	20900480
11755	55161		RA	DL		\$AE		20900490
11756	62163		LP	DL		\$AR		20900500
11757	11041		SO	DM	D	R1	SHIFT DOUBLE X	20900510
11760	50162		SA	DL		\$AL		20900520
11761	42163		SP	DL		\$AR	STORE SHIFTED X	20900530
11762	73000		AS	DM	C	NO	Y1 EQUALS X PLUS 0.25	20900540
11763	10000		OCT			10000	LOW END APPROXIMATION	20900550
11764	20020		BR	DM		UN		20900560
11765	11712		PZE			SRF1		20900570
11766	44161	SRF3	ZE	DL		\$AE		20900580
11767	44162		ZE	DL		\$AL		20900590
11770	44163		ZE	DL		\$AR		20900600
11771	62571		LP	IL		\$IC	ZERO EXIT	20900610
			*	1LCG2610	00F2LNF		NATURAL LOGARITHM FLOATING	83 6630US= 26100000
11772	42172	LNF	SP	DL		\$IC2	SAVE LINK	26100010
11773	75162		LA	DL		\$AL		26100020
11774	20034		BR	DM		AN		26100030
11775	12063		PZE			LNF2		26100040
11776	20024		BR	DM		AZ		26100050
11777	12063		PZE			LNF2		26100060
12000	75161		LA	DL		\$AE		26100070
12001	50120		SA	DL		\$T6		26100080
12002	20024		BR	DM		AZ	FLOAT N	26100090
12003	12012		PZE			LNF1		26100100
12004	01037		FL	DM	S	L15		26100110
12005	51120		HA	DL		\$T6		26100120
12006	76005		XA	DM		CS		26100130
12007	00017		OCT			17		26100140
12010	61000		AI	DM		NO		26100150
12011	00016		PZE			14		26100160
12012	50117	LNF1	SA	DL		\$T5		26100170
12013	44121		ZE	DL		\$T7		26100180
12014	44161		ZE	DL		\$AE	STORE X	26100190
12015	62400		LP	IM		NO		26100200
12016	12017		PZE			*+1		26100210
12017	10647		PZE			\$T6	CALC T	26100220
12020	00022		PZE			\$T8		26100230

12021	10725	PZE	ADF			26100240
12022	12070	PZE	X0	X+X0		26100250
12023	10647	PZE	STF			26100260
12024	00025	PZE	\$T11			26100270
12025	10715	PZE	LDF	X		26100280
12026	00022	PZE	\$T8			26100290
12027	10725	PZE	ADF	X=X0		26100300
12030	12073	PZE	MX0			26100310
12031	11451	PZE	DVF	$(X=X0) / (X+X0) = T$		26100320
12032	00025	PZE	\$T11			26100330
12033	10647	PZE	STF			26100340
12034	00022	PZE	\$T8			26100350
12035	11356	PZE	MPF	T*T		26100360
12036	00061	PZE	\$AE			26100370
12037	10725	PZE	ADF	T*T + C		26100380
12040	12076	PZE	LNFC			26100390
12041	10647	PZE	STF			26100400
12042	00025	PZE	\$T11			26100410
12043	10715	PZE	LDF			26100420
12044	12101	PZE	LNFB			26100430
12045	11451	PZE	DVF	$B/\%C+T*T$		26100440
12046	00025	PZE	\$T11			26100450
12047	10725	PZE	ADF	$A+B/\%C+T*T$		26100460
12050	12104	PZE	LNFA			26100470
12051	11356	PZE	MPF	$T (A+B/(C+T*T)) = R (T)$		26100480
12052	00022	PZE	\$T8			26100490
12053	10725	PZE	ADF			26100500
12054	00017	PZE	\$T5	ADD N		26100510
12055	10725	PZE	ADF			26100520
12056	12107	PZE	M0.5	ADD -0.5		26100530
12057	11356	PZE	MPF			26100540
12060	12112	PZE	LNFE2			26100550
12061	12062	PZE	**1			26100560
12062	62572	LNF3	LP	IL	EXIT	26100570
12063	75000	LNF2	LA	DM		26100580
12064	00001		PZE			26100590
12065	50174		SA	DL		26100600
12066	20020		BR	DM		26100610
12067	12062		PZE			26100620
12070	00000	X0	OCT			26100630





12140	75161		LA	DL		\$AE		26200200
12141	63000		AL	DM		NO	FORM SHIFT COMMAND	26200210
12142	11061		SO	DM	D	L1		26200220
12143	62163		LP	DL		\$AR		26200230
12144	55162		RA	DL		\$AL		26200240
12145	52020		SE	DM	H	NO	HOLD FRACT X2 IN FLOATING FORM	26200250
12146	00000		PZE			**		26200260
12147	11041		SO	DM	D	R1		26200270
12150	50162		SA	DL		\$AL		26200280
12151	42163		SP	DL		\$AR		26200290
12152	62400		LP	IM		NO		26200300
12153	12154		PZE			++1		26200310
12154	10605		PZE			FLN		26200320
12155	00000		PZE			0		26200330
12156	11356		PZE			MPF		26200340
12157	12334		PZE			2PI		26200350
12160	11625	SNF4A	PZE			CLF		26200360
12161	12342		PZE			PI	JUMP IF X2 LESS THAN PI	26200370
12162	12166		PZE			SNF5		26200380
12163	10725		PZE			ADF	OTHERWISE SUBT PI	26200390
12164	12345		PZE			MPI		26200400
12165	12270		PZE			REVE	REVERSE STATE OF E	26200410
12166	11625	SNF5	PZE			CLF		26200420
12167	12350		PZE			HAFPI		26200430
12170	12174		PZE			SNF6		26200440
12171	10725		PZE			ADF		26200450
12172	12345		PZE			MPI	REDUCE TO Y	26200460
12173	12274		PZE			NEG		26200470
12174	11625	SNF6	PZE			CLF	TEST WHICH FORM TO USE	26200480
12175	12356		PZE			NIN1		26200490
12176	12227		PZE			SNF7		26200500
12177	10725		PZE			ADF	USE COS FORM	26200510
12200	12353		PZE			MHAFPI	GET Z	26200520
12201	12274		PZE			NEG		26200530
12202	11356		PZE			MPF	SAVE ZZ	26200540
12203	00061		PZE			\$AE		26200550
12204	10647		PZE			STF		26200560
12205	00026		PZE			\$T12		26200570
12206	10725		PZE			ADF		26200580
12207	12331		PZE			B13		26200590

12210	10647	PZE		STF	SAVE B13 + ZZ	26200600
12211	00017	PZE		\$T5		26200610
12212	10715	PZE		LDF		26200620
12213	12326	PZE		B12	B12/(B13+ZZ) + B11	26200630
12214	11451	PZE		DVF		26200640
12215	00017	PZE		\$T5		26200650
12216	10725	PZE		ADF		26200660
12217	12323	PZE		B11		26200670
12220	11356	PZE		MPF	TIMES ZZ	26200680
12221	00026	PZE		\$T12		26200690
12222	10725	PZE		ADF		26200700
12223	12320	PZE		B01		26200710
12224	12225	PZE		*+1		26200720
12225	20020	BR	DM	UN		26200730
12226	12256	PZE		SNF8		26200740
12227	10647	PZE	SNF7	STF	SIN FORM	26200750
12230	00026	PZE		\$T12		26200760
12231	11356	PZE		MPF		26200770
12232	00061	PZE		\$AE	SAVE YY	26200780
12233	10647	PZE		STF		26200790
12234	00017	PZE		\$T5		26200800
12235	10725	PZE		ADF		26200810
12236	12315	PZE		A13		26200820
12237	10647	PZE		STF	SAVE YY + A13	26200830
12240	00022	PZE		\$T8		26200840
12241	10715	PZE		LDF		26200850
12242	12312	PZE		A12	A12/(A13+YY) + A11	26200860
12243	11451	PZE		DVF		26200870
12244	00022	PZE		\$T8		26200880
12245	10725	PZE		ADF		26200890
12246	12307	PZE		A11		26200900
12247	11356	PZE		MPF	TIMES YY	26200910
12250	00017	PZE		\$T5		26200920
12251	10725	PZE		ADF	PLUS A01	26200930
12252	12304	PZE		A01		26200940
12253	11356	PZE		MPF	TIMES Y	26200950
12254	00026	PZE		\$T12		26200960
12255	12256	PZE		*+1		26200970
12256	75125	PZE	SNF8	LA	DL	26200980
12257	20035	BR	DM	AP		26200990

FLOATING POINT LOGRAM PACKAGE

12260	12265		PZE		SNF9			26201000
12261	62400		LP	IM	NO			26201010
12262	12263		PZE		**1			26201020
12263	12274		PZE		NEG			26201030
12264	12265		PZE		**1			26201040
12265	62572	SNF9	LP	IL	\$IC2		EXIT	26201050
12266	62400	SNF4	LP	IM	NO			26201060
12267	12160		PZE		SNF4A			26201070
12270	75125	REVE	LA	DL	\$T11			26201080
12271	67060		CC	DM	NO	B		26201090
12272	50125		SA	DL	\$T11			26201100
12273	62200		LP	DP	NO			26201110
12274	75162	NEG	LA	DL	\$AL			26201120
12275	20024		BR	DM	AZ			26201130
12276	12303		PZE		NEG1			26201140
12277	67163		CC	DL	\$AR			26201150
12300	51162		HA	DL	\$AL			26201160
12301	67060		CC	DM	NO	B		26201170
12302	50163		SA	DL	\$AR			26201180
12303	62200	NEG1	LP	DP	NO			26201190
12304	00001	A01	OCT		1			26201200
12305	20000		DECD		100000004E1B1		A01	26201210
12306	00013							
12307	77776	A11	OCT		77776			26201220
12310	26464		DECD		706300012		A11	26201230
12311	01174							
12312	00004	A12	OCT		4			26201240
12313	43567		DECD		-141334124E2B4		A12	26201250
12314	30536							
12315	00006	A13	OCT		6			26201260
12316	24455		DECD		411761967E2B6		A13	26201270
12317	06635							
12320	00001	B01	OCT		1			26201280
12321	20000		OCT		20000			26201290
12322	00001		OCT		1			26201300
12323	00000	B11	OCT		0			26201310
12324	27404		DECD		734669553		B11	26201320
12325	64671							
12326	00006	B12	OCT		6			26201330
12327	55553		DECD		-365820306E2B6		B12	26201340



FLOATING POINT LOGRAM PACKAGE

12377	12415	PZE			ATF3		26300150
12400	50116	SA	DL		ST4	SET TO SUBT FROM PI/2	26300160
12401	62400	LP	IM		NO		26300170
12402	12403	PZE			**1		26300180
12403	10647	PZE		ATF2	STF		26300190
12404	00017	PZE			ST5		26300200
12405	10715	PZE			LDF	TAKE RECIPROCAL OF Z	26300210
12406	12556	PZE			ONEF		26300220
12407	11451	PZE			DVF		26300230
12410	00017	PZE			ST5		26300240
12411	12412	PZE			**1		26300250
12412	75125	LA	DL		ST11		26300260
12413	67060	CC	DM	B	NO		26300270
12414	50125	SA	DL		ST11		26300280
12415	65060	CS	DM	B	NO		26300290
12416	75161	LA	DL		SAE	TEST FOR SAE LESS THAN -4	26300300
12417	20436	BR	IM		NH		26300310
12420	00003	OCT			3		26300320
12421	12541	PZE			ATF04		26300330
12422	50117	SA	DL		ST5	SAVE EXP OF ZK	26300340
12423	73000	AS	DM		NO		26300350
12424	11066	SO	DM	D	L6		26300360
12425	62162	LP	DL		SAL		26300370
12426	44121	ZE	DL		ST7		26300380
12427	51020	HA	DM	H	NO		26300390
12430	00000	PZE			**		26300400
12431	50070	SA	DM	B	LT		26300410
12432	01037	FL	DM	S	L15		26300420
12433	50120	SA	DL		ST6		26300430
12434	64013	AT	DM		AS		26300440
12435	12572	PZE			ATFT1		26300450
12436	75320	LA	DA	H	NO	MSW XK TO A	26300460
12437	66013	AP	DM	C	AS		26300470
12440	00041	PZE			33		26300480
12441	70320	LT	DA	H	NO	LSW XK TO T, MSW XK TO A	26300490
12442	41062	HT	DM	B	LP	LSW XK TO P	26300500
12443	01077	FL	DM	D	L15	FLOAT XK	26300510
12444	51123	HA	DL		ST9		26300520
12445	76005	XA	DM		CS	ACCUMULATE EXP AND STORE XK	26300530
12446	00017	OCT			17		26300540

12447	42124	SP	DL	\$T10		26300550
12450	61000	AI	DM	NO		26300560
12451	00000	PZE		0		26300570
12452	50122	SA	DL	\$T8		26300580
12453	62400	LP	IM	NO		26300590
12454	12455	PZE		**+1		26300600
12455	10647	PZE		STF	SAVE Z	26300610
12456	00026	PZE		\$T12		26300620
12457	11356	PZE		MPF	ZK*Z	26300630
12460	00017	PZE		\$T5		26300640
12461	10725	PZE		ADF		26300650
12462	12556	PZE		ONEF	ZK*Z+1	26300660
12463	12464	PZE		**+1		26300670
12464	75117	LA	DL	\$T5		26300680
12465	55161	RA	DL	\$AE	LOAD -ZK	26300690
12466	50117	SA	DL	\$T5		26300700
12467	75120	LA	DL	\$T6	SAVE Z*ZK+1	26300710
12470	55162	RA	DL	\$AL		26300720
12471	50120	SA	DL	\$T6		26300730
12472	75121	LA	DL	\$T7		26300740
12473	55163	RA	DL	\$AR		26300750
12474	50121	SA	DL	\$T7		26300760
12475	62400	LP	IM	NO		26300770
12476	12477	PZE		**+1		26300780
12477	12546	PZE		ATF7		26300790
12500	10725	PZE		ADF		26300800
12501	00026	PZE		\$T12	Z-ZK	26300810
12502	11451	PZE		DVF		26300820
12503	00017	PZE		\$T5	(Z-ZK) / (1+ZK*Z)	26300830
12504	10647	PZE	ATF4	STF		26300840
12505	00017	PZE		\$T5	SAVE T	26300850
12506	11356	PZE		MPF		26300860
12507	00061	PZE		\$AE	T*T	26300870
12510	11356	PZE		MPF		26300880
12511	12564	PZE		B3	T*T*B3	26300890
12512	10725	PZE		ADF		26300900
12513	12561	PZE		B1	T*T*B3+B1	26300910
12514	11356	PZE		MPF		26300920
12515	00017	PZE		\$T5	(T*T*B3+B1)*T	26300930
12516	10725	PZE		ADF		26300940

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FLOATING POINT LOGRAM PACKAGE

12517	00022		PZE		\$T8	ADD XK	26300950
12520	12521		PZE		**1		26300960
12521	75116		LA	DL	\$T4	PI/2 CONTROL	26300970
12522	20024		BR	DM	AZ		26300980
12523	12531		PZE		ATF5		26300990
12524	62400		LP	IM	NO		26301000
12525	12526		PZE		**1		26301010
12526	10725		PZE		ADF	PI/2 - ARCTANZ	26301020
12527	12567		PZE		M.5PI		26301030
12530	12531		PZE		**1		26301040
12531	75125	ATF5	LA	DL	\$T11	SIGN CONTROL	26301050
12532	20035		BR	DM	AP		26301060
12533	12540		PZE		ATF6		26301070
12534	62400		LP	IM	NO		26301080
12535	12536		PZE		**1		26301090
12536	12546		PZE		ATF7		26301100
12537	12540		PZE		**1		26301110
12540	62572	ATF6	LP	IL	\$IC2	EXIT	26301120
12541	44122	ATF04	ZE	DL	\$T8		26301130
12542	44123		ZE	DL	\$T9		26301140
12543	44124		ZE	DL	\$T10		26301150
12544	62400		LP	IM	NO		26301160
12545	12504		PZE		ATF4		26301170
12546	75162	ATF7	LA	DL	\$AL		26301180
12547	20024		BR	DM	AZ		26301190
12550	12555		PZE		ATF71		26301200
12551	67163		CC	DL	\$AR		26301210
12552	51162		HA	DL	\$AL		26301220
12553	67060		CC	DM	NO		26301230
12554	50163		SA	DL	\$AR		26301240
12555	62200	ATF71	LP	DP	NO		26301250
12556	00001	ONEF	OCT		1		26301260
12557	20000		OCT		20000		26301270
12560	00000		OCT		0		26301280
12561	00000	B1	OCT		0		26301290
12562	37777		DECD		999999941		26301300
12563	77740						
12564	77777	B3	OCT		77777		26301310
12565	52535		DECD		-666178683		26301320
12566	25013						

12567	00001	M.5PI	OCT	1		26301330
12570	46674		OCT	46674		26301340
12571	02254		OCT	02254		26301350
12572	00000	ATFT1	DEC	00000	ATAN ZK	26301360
12573	01000		DEC	03123		26301370
12574	01777		DEC	06241		26301380
12575	02773		DEC	09347		26301390
12576	03765		DEC	12435		26301400
12577	04753		DEC	15499		26301410
12600	05735		DEC	18534		26301420
12601	06710		DEC	21535		26301430
12602	07656		DEC	24497		26301440
12603	10614		DEC	27416		26301450
12604	11542		DEC	30288		26301460
12605	12461		DEC	33109		26301470
12606	13366		DEC	35877		26301480
12607	14262		DEC	38588		26301490
12610	15145		DEC	41241		26301500
12611	16016		DEC	43833		26301510
12612	16654		DEC	46364		26301520
12613	17501		DEC	48833		26301530
12614	20313		DEC	51238		26301540
12615	21113		DEC	53581		26301550
12616	21700		OCT	21700		26301560
12617	22453		DEC	58075		26301570
12620	23214		DEC	60228		26301580
12621	23742		DEC	62319		26301590
12622	24457		DEC	64350		26301600
12623	25162		DEC	66320		26301610
12624	25653		OCT	25653		26301620
12625	26333		DEC	70085		26301630
12626	27001		DEC	71882		26301640
12627	27437		DEC	73625		26301650
12630	30064		DEC	75315		26301660
12631	30500		DEC	76952		26301670
12632	31104		DEC	78539		26301680
12633	00000		OCT	00000		26301690
12634	65255		OCT	65255		26301700
12635	52673		OCT	52673		26301710
12636	41404		OCT	41404		26301720



12637	33523		OCT	33523		26301730
12640	35671		OCT	35671		26301740
12641	57322		OCT	57322		26301750
12642	32724		OCT	32724		26301760
12643	56575		OCT	56575		26301770
12644	75321		OCT	75321		26301780
12645	35632		OCT	35632		26301790
12646	53314		OCT	53314		26301800
12647	06240		OCT	06240		26301810
12650	23233		OCT	23233		26301820
12651	73541		OCT	73541		26301830
12652	55144		OCT	55144		26301840
12653	31602		OCT	31602		26301850
12654	67205		OCT	67205		26301860
12655	77224		OCT	77224		26301870
12656	56633		OCT	56633		26301880
12657	05653		OCT	05653		26301890
12660	07131		OCT	07131		26301900
12661	70034		OCT	70034		26301910
12662	37670		OCT	37670		26301920
12663	07643		OCT	07643		26301930
12664	72573		OCT	72573		26301940
12665	04606		OCT	04606		26301950
12666	63070		OCT	63070		26301960
12667	23705		OCT	23705		26301970
12670	65675		OCT	65675		26301980
12671	50266		OCT	50266		26301990
12672	72776		OCT	72776		26302000
12673	75524		OCT	75524		26302010
			* 1LCC2640 00F2CSF	,COSINE FLOATING	6: 6562US-	26400000
12674	42172	CSF	SP DL	\$IC2	SET LINK	26400010
12675	62400		LP IM	NO	ENTER	26400020
12676	12677		PZE	**1	INTER MODE	26400030
12677	10725		PZE	ADF		26400040
12700	12350		PZE	HAFPI	PI/2 IN SIN X REGION	26400050
12701	12116		PZE	SNF*1	EXIT INTER MODE AND GO TO SIN X	26400060
			* 1LCF2710 00F2EPF	,EXPONENTIAL, FLOATING POINT		27100000
			* FLOATING POINT EXPONENTIAL - K. BRANCH			27100010
12702	42172	EPF	SP DL	\$IC2		27100020
12703	44137		ZE DL	\$T21		27100030

12704	75162		LA	DL	\$AL		27100040
12705	20034		BR	DM	AN		27100050
12706	13057		PZE		EPF35	X IS NEG	27100060
12707	75161		LA	DL	\$AE		27100070
12710	20034		BR	DM	AN		27100080
12711	12721		PZE		EPF20		27100090
12712	65013		CS	DM	AS		27100100
12713	00015		OCT		15		27100110
12714	20035		BR	DM	AP		27100120
12715	12721		PZE		EPF20		27100130
12716	75176		LA	DL	\$ONE		27100140
12717	50174		SA	DL	\$OV		27100150
12720	62572		LP	IL	\$IC2	OVERFLOW EXIT *****	27100160
12721	62400	EPF20	LP	IM	NO		27100170
12722	12723		PZE		++1		27100180
12723	11356		PZE		MPF		27100190
12724	13103		PZE		EPF9		27100200
12725	10647		PZE		STF		27100210
12726	00025		PZE		\$T11		27100220
12727	12730		PZE		++1		27100230
12730	75125		LA	DL	\$T11		27100240
12731	20034		BR	DM	AN		27100250
12732	12773		PZE		EPF25	NEG EXP	27100260
12733	73000	EPF21	AS	DM	NO		27100270
12734	11061		SO	DM	D	L1	27100280
12735	50400		SA	IM		NO	27100290
12736	12743		PZE		EPF22		27100300
12737	50400		SA	IM		NO	27100310
12740	12750		PZE		EPF23		27100320
12741	62126		LP	DL		\$T12	27100330
12742	44075		ZE	DM	B	LA	27100340
12743	11060	EPF22	SO	DM	D	L0	27100350
12744	50140		SA	DL		\$T22	27100360
12745	42141		SP	DL		\$T23	27100370
12746	62127		LP	DL		\$T13	27100380
12747	44075		ZE	DM	B	LA	27100390
12750	11060	EPF23	SO	DM	D	L0	27100400
12751	73141		AS	DL		\$T23	27100410
12752	11041		SO	DM	D	R1	27100420
12753	42127		SP	DL		\$T13	27100430

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FLOATING POINT LOGRAM PACKAGE

12754	50126		SA	DL		\$T12	F1	27100440
12755	44060		ZE	DM	B	NO		27100450
12756	52125		SE	DL		\$T11	F0	27100460
12757	62400		LP	IM		NO		27100470
12760	12761		PZE			**+1		27100480
12761	10715		PZE			LDF		27100490
12762	00025		PZE			\$T11		27100500
12763	10605		PZE			FLN		27100510
12764	00000		PZE			0		27100520
12765	10647		PZE			STF		27100530
12766	00025		PZE			\$T11		27100540
12767	12770		PZE			**+1		27100550
12770	75137		LA	DL		\$T21		27100560
12771	20024		BR	DM		AZ		27100570
12772	13013		PZE			EPF2		27100580
12773	44062	EPF25	ZE	DM	B	LP		27100590
12774	75176		LA	DL		\$ONE		27100600
12775	50161		SA	DL		\$AE		27100610
12776	11042		SO	DM	D	R2		27100620
12777	42162		SP	DL		\$AL		27100630
13000	44163		ZE	DL		\$AR		27100640
13001	62400		LP	IM		NO		27100650
13002	13003		PZE			**+1		27100660
13003	11207		PZE			SBF		27100670
13004	00025		PZE			\$T11		27100680
13005	10647		PZE			STF		27100690
13006	00025		PZE			\$T11		27100700
13007	13010		PZE			**+1		27100710
13010	75140		LA	DL		\$T22		27100720
13011	67060		CC	DM	B	NO		27100730
13012	50140		SA	DL		\$T22		27100740
13013	62400	EPF2	LP	IM		NO		27100750
13014	13015		PZE			**+1		27100760
13015	10715		PZE			LDF		27100770
13016	13130		PZE			A6		27100780
13017	11356		PZE			MPF		27100790
13020	00025		PZE			\$T11		27100800
13021	10725		PZE			ADF		27100810
13022	13125		PZE			A5		27100820
13023	11356		PZE			MPF		27100830

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FLOATING POINT LOGRAM PACKAGE

13024	00025	PZE		\$T11		27100840
13025	10725	PZE		ADF		27100850
13026	13122	PZE		A4		27100860
13027	11356	PZE		MPF		27100870
13030	00025	PZE		\$T11		27100880
13031	10725	PZE		ADF		27100890
13032	13117	PZE		A3		27100900
13033	11356	PZE		MPF		27100910
13034	00025	PZE		\$T11		27100920
13035	10725	PZE		ADF		27100930
13036	13114	PZE		A2		27100940
13037	11356	PZE		MPF		27100950
13040	00025	PZE		\$T11		27100960
13041	10725	PZE		ADF		27100970
13042	13111	PZE		A1		27100980
13043	11356	PZE		MPF		27100990
13044	00025	PZE		\$T11		27101000
13045	10725	PZE		ADF		27101010
13046	13106	PZE		A0		27101020
13047	13050	PZE		**+1		27101030
13050	75161	LA	DL	SAE		27101040
13051	73140	AS	DL	\$T22		27101050
13052	50161	SA	DL	SAE		27101060
13053	62572	LP	IL	\$IC2		27101070
13054	44140	EPF30	ZE	DL	NORMAL EXIT *****	27101080
13055	20020		BR	DM		27101090
13056	12770		PZE			27101100
13057	50137	EPF35	SA	DL	SET FLAG	27101110
13060	75163		LA	DL		27101120
13061	67060		CC	DM	B	27101130
13062	50163		SA	DL		27101140
13063	75162		LA	DL		27101150
13064	77011		CH	DM		27101160
13065	00000		PZE			27101170
13066	50162		SA	DL		27101180
13067	75161		LA	DL		27101190
13070	20034		BR	DM	EXPO NEG	27101200
13071	12721		PZE			27101210
13072	65013		CS	DM		27101220
13073	00015		OCT			27101230

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13074	20035		BR	DM	AP		27101240
13075	12721		PZE		EPF20	EXPO TOO LARGE	27101250
13076	44161		ZE	DL	\$AE		27101260
13077	44162		ZE	DL	\$AL	SET TO	27101270
13100	44163		ZE	DL	\$AR	ZERO	27101280
13101	62572		LP	IL	\$IC2	ZERO EXIT *****	27101290
13102	00003	EPF6	PZE		3		27101300
13103	00001	EPF9	OCT		00001		27101310
13104	27052		OCT		27052		27101320
13105	43545		OCT		43545		27101330
13106	00001	A0	OCT		1		27101340
13107	20000		OCT		20000		27101350
13110	00001		OCT		00001		27101360
13111	00000	A1	OCT		00000		27101370
13112	26134		OCT		26134		27101380
13113	41166		OCT		41166		27101390
13114	77776	A2	OCT		-0002		27101400
13115	36577		OCT		36577		27101410
13116	57752		OCT		57752		27101420
13117	77774	A3	OCT		-00004		27101430
13120	34317		OCT		34317		27101440
13121	63516		OCT		63516		27101450
13122	77772	A4	OCT		-0006		27101460
13123	23653		OCT		23653		27101470
13124	33605		OCT		33605		27101480
13125	77767	A5	OCT		-00011		27101490
13126	24224		OCT		24224		27101500
13127	55166		OCT		55166		27101510
13130	77764	A6	OCT		-00014		27101520
13131	34541		OCT		34541		27101530
13132	47165		OCT		47165		27101540
13133	10535		END		4445		