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1965-37

Haystack Pointing System:
Belt

A. A. Mathiasen
J. D. Drinan
Editors

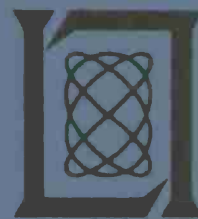
9 September 1965

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Lexington, Massachusetts



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MASSACHUSETTS INSTITUTE OF TECHNOLOGY
LINCOLN LABORATORY

HAYSTACK POINTING SYSTEM: BELT

A. A. MATHIASSEN

J. D. DRINAN

Editors

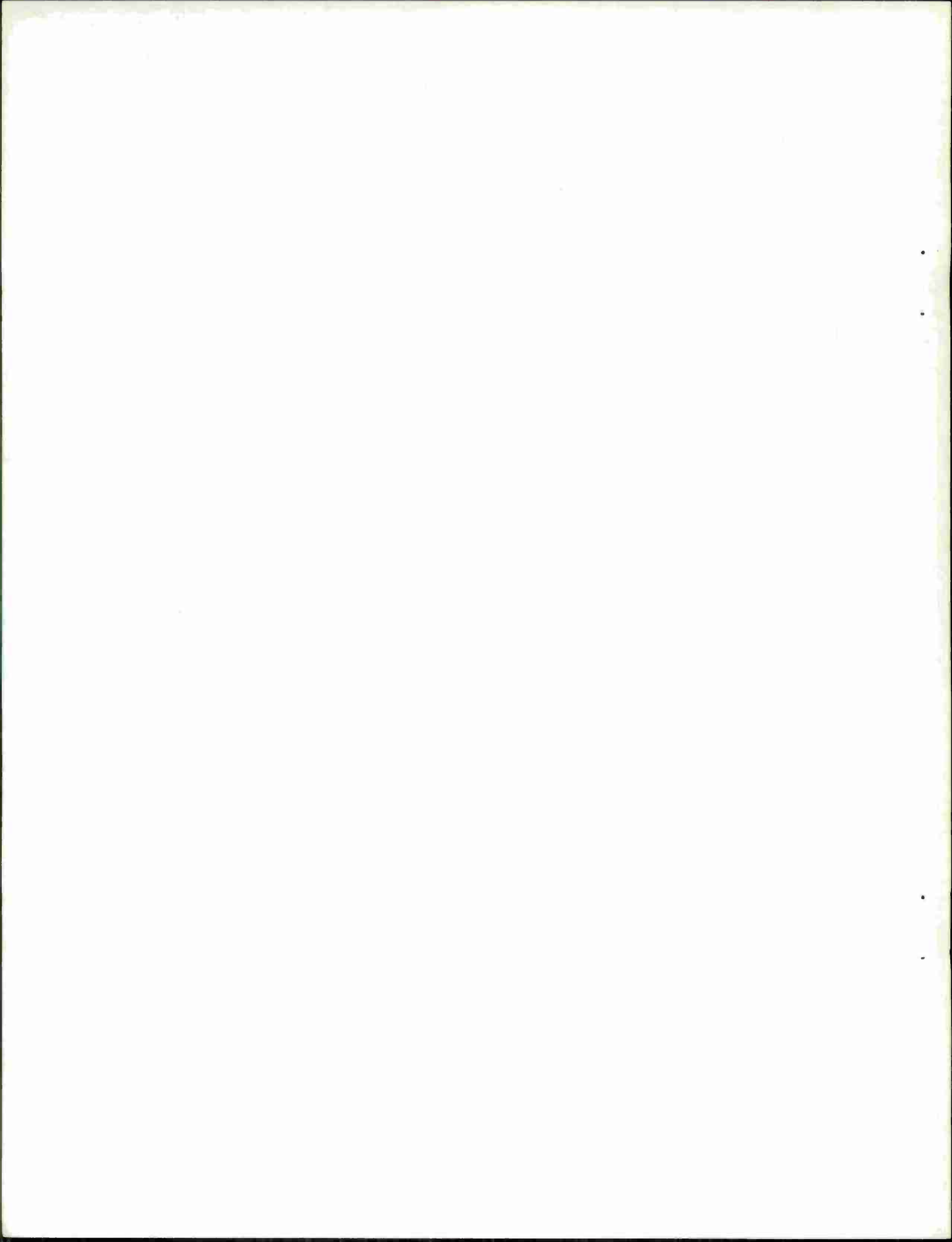
Group 62

TECHNICAL NOTE 1965-37

9 SEPTEMBER 1965

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ABSTRACT

The Haystack pointing system can direct an antenna at selected points of an orbit. The point selected may be the intersection of the orbit with a fixed right ascension half plane, a fixed longitude half plane, or a fixed declination cone; in addition a horizon-to-horizon scan along the orbit may be generated. The primary use for this facility is in connection with radar or communication experiments with a West Ford dipole belt. The Belt program in the pointing system, given a set of orbital parameters and the selected schedule, generates the celestial coordinates and their rates of change for use by other programs in the system in producing antenna angles, range, and doppler.

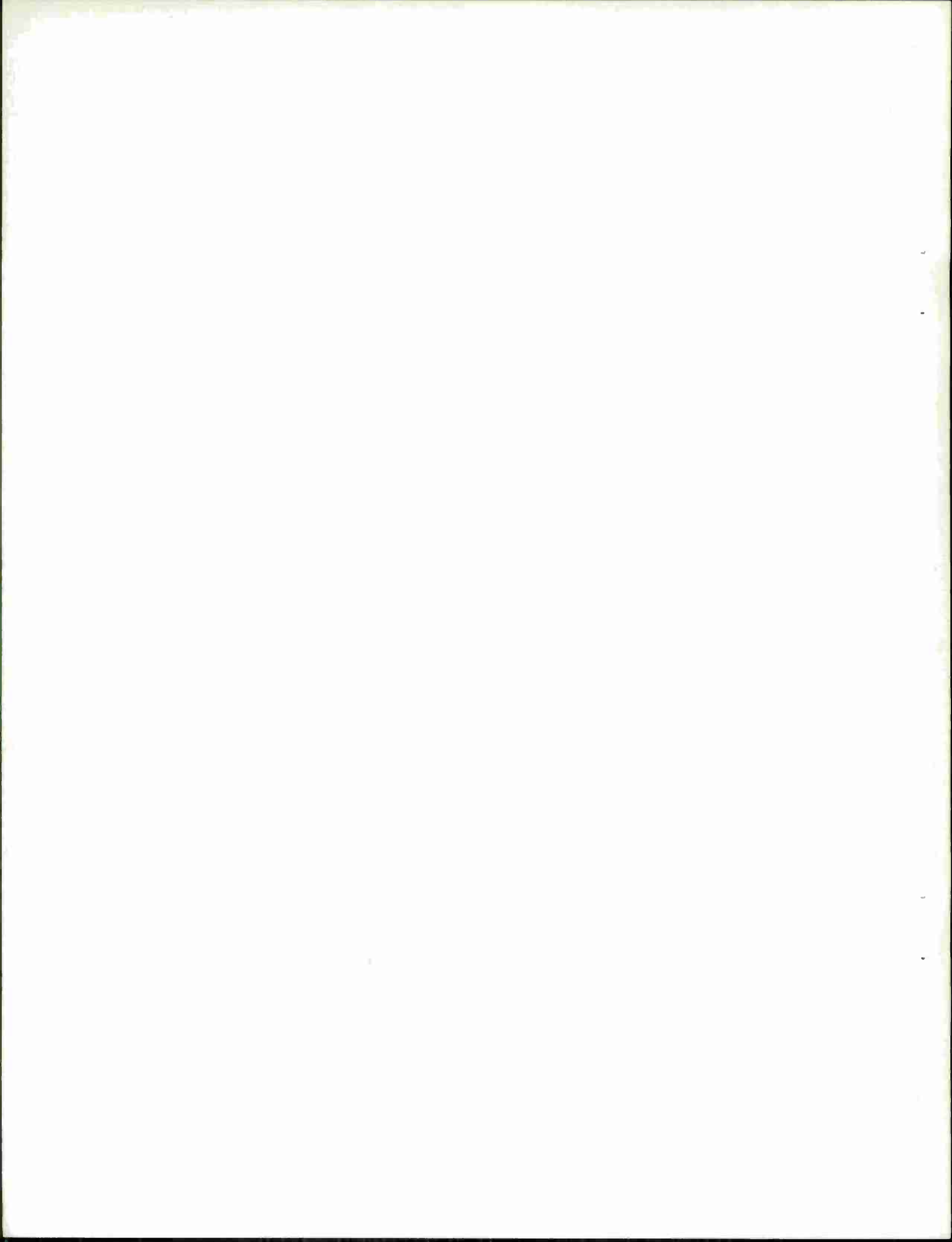
Accepted for the Air Force
Stanley J. Wisniewski
Lt Colonel, USAF
Chief, Lincoln Laboratory Office

PREFACE

This document was written by C. W. Adams Associates, 575 Technology Square, Cambridge, Massachusetts, under subcontract to Group 62 of Lincoln Laboratory, as part of a programming effort on the Haystack Pointing System.

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I. INTRODUCTION

The Belt Celestial Computation Program (BELTP) was written for the Univac 490 as part of the pointing system for the Haystack radar antenna operated by Lincoln Laboratory. Written in SPURT assembly language, the program calculates pointing information in celestial coordinates for a selected point of a belt in orbit around the earth, such as the West Ford dipole belt. Basically, the program performs the calculations necessary to convert mean orbital elements which are valid as of a certain day to instantaneous elements valid as of the time of computation; from these it then determines celestial coordinates and their first time derivatives of a point on the orbiting belt according to the "schedule" (mode of operation) of the program. The schedule selects the point on the belt by keeping one coordinate fixed.

BELTP is divided into three main sections: the controller, the four schedules, and the utility routines. The controller is further divided into an initialization section and a working section. When the initialization section is entered with L(SYSTAT1) set to -0, the operator types in the parameters on the on-line typewriter. When the initialization section is entered with L(SYSTAT1) set to +0, the operator may examine the previous input values and, optionally, either use them again or change them.

Each of the four schedules is divided into two distinct subprograms. The initialization section, which is entered only once during initialization or reinitialization, calculates the values that are to be constant during the tracking, given the initial input values. When the working section of a schedule is entered, a calculation is made for the right ascension, declination, and range for the time contained in W(CELTIME). All routines save and restore all registers with the exception of B7.

Errors will fall into two general classifications: the belt is untrackable because of the physical limitations of the radar scan, or inconsistent parameters have been specified. If an error occurs, control will be transferred to the location following the return jump to BELTP and the A-register will contain a code indicating the nature and probable location of the error. A normal exit will transfer control to two locations after the return jump.

II. PROGRAM SPECIFICATIONS

Calling Sequence

RJP H(BELTP) Error return Normal return	H = L if initialization or reinitialization H = U if normal operational entry for the computation of a point set
---	--

Input (via on-line typewriter)

<u>Label</u>	<u>Description</u>	<u>Unit</u>	<u>Range</u>
A(E.R.)	Semi-major axis, a	(earth radii)	1 to 25
E	Eccentricity, e		0 to 1 ⁻
I	Inclination, i	(degrees)	0 to 180
OMEGA	Argument of perigee at epoch, ω_0	(degrees)	-360 to +360
OMEGADOT	Time derivative of argument of perigee, $\dot{\omega}$	(degrees/day)	-90 to +90
DRAGON	Right ascension of ascending node at epoch, Ω_0	(degrees)	-360 to +360
DRAGONDOT	Time derivative of right ascension of ascending node, $\dot{\Omega}$	(degrees/day)	-90 to +90
EPOCH	Epoch (time of validity)		
YEAR xxxx	xxxx = year (e.g. 1965)		
MONTH yy	yy = month (e.g. 11)		
DAY (0.000-31.999)	day and decimal portion of day		
FIXDEC (1)	SCAN (2)	FIXRA (3)	FIXLONG (4)

Depending on the schedule, one of the following sets is input:

if 1 DEC	Declination (δ)	(degrees)	-90 to +90
if 2 PERIOD	Period ($1/d\mu/dt$)	(minutes/degree)	
ARG OF LAT	First argument of latitude point (u)	(degrees)	-360 to +360
if 3 RA	Right ascension, α	(degrees)	-360 to +360
if 4 EAST LONG	Longitude (east is positive)	(degrees)	-360 to +360

Output (common storage)

<u>Label</u>	<u>Description</u>	<u>Units and Scaling</u>
RA	Right ascension of point of belt, α	(Revolutions B27)
DEC	Declination of point of belt, δ	(Revolutions B27)
SINORIENT	Sine of orientation angle, $-\sin\beta$	(B29)
COSORIENT	Cosine of orientation angle, $\cos\beta$	(B29)
RADIUS	Radius from center of earth to point of belt, ρ	(earth radii B22)
DECDOT	Time derivative of declination, $d\delta/dt$	(radians/sec B37)
RADOT	$(d\alpha/dt)\cos\delta$	(radians/sec B37)
RADIUSDOT	Time derivative of radius, $d\rho/dt$	(nautical miles/sec B24)

Storage Areas Read

L(SYSTATI)	+0 if reinitialization -0 if initialization	
W(CELTIME)	Time of computation	(days B28)
W(LONGITUDE)	Longitude of site	(degrees B20)
W(GEOCENLAT)	Geocentric latitude of site	(degrees B20)
W(SIDERTIME)	Right ascension of site	(degrees B26)
W(ELEV)	Elevation of antenna	
W(FRAMESIZE)		(B0)

Error Conditions

Control will be transferred to the error return. A code will be left in the A-register indicating the nature of the error and the routine in which it occurred.

<u>Error Code</u>	<u>Program</u>	<u>Condition</u>
0	FIXLATI	The declination is equal to 90° or 270° or the inclination is equal to 0° or 180°.
1	FIXLATI	The inclination of the belt is too low for this declination. The plane of the belt will not intersect the requested fixed declination ($i < \delta$).
		$\frac{\sin \delta}{\sin i} = \sin u > 1$ where δ = declination i = inclination u = argument of latitude
2	SINALF	The sin or cos of α (right ascension) is
3	ALPHA	greater than one. Check calculations and/or
4	COSALF	input data.

5 BRANGE The denominator $1 + e \cos(u-w)$ used in calculating ρ is ϕ .

7 PTSEL Due to an inconsistency in the data the $\cos\Gamma > 1$ where

$$\cos\Gamma = \frac{\cos\alpha \cos\delta \cos\alpha_r \cos\delta_r + \sin\alpha \cos\delta \sin\alpha_r \cos\delta_r + \sin\delta \sin\delta_r}{\sin\delta \sin\delta_r}$$

Γ = angle between radius to satellite and radius to radar site

α = right ascension

δ = declination

α_r = value of right ascension of radar

δ_r = value of declination of radar

8 BELDV Range = 0

III. SUBROUTINE DESCRIPTIONS

FIXLATI

Function

To initialize for fixed latitude schedule by permanently calculating values for u , $\cos u$, and $\sin u$ where u is the fixed argument of the latitude.

Calling Sequence

RJP FIXLATI
Error return
Normal return

Input

Inclination, i , and declination, δ .

Output

Fixed argument of latitude, u .

Subroutines Used

MOD2PI, FLTPT (Univac package), COSALF, SINALF, PTSEL

Storage Areas Read

DELTB, IISIN, IICOS, RAM, AA, EE, ZOMEGA

Storage Areas Written

DELTSIN, LLSIN, LLCOS, LL1COS, LL2COS, DELTCOS, RAMSIN,
RAMCOS, ALPH1SIN, ALPH1COS, ALPH2SIN, ALPHA2COS, DELT1COS,
DELT2COS, DELT1SIN, DELT2SIN, NUMPT

Error Conditions

1. If $\delta = 90^\circ$, or 270° or $\dot{z} = 0^\circ$ or 180° control is transferred to the error return with the A-register equal to 0.
2. If $LLSIN(=DELTSIN/IISIN)$ is greater than 1, an error return results and a 1 is left in the A-register.
3. Those supplied by subroutines.

FIXLAT

Function

To calculate values of right ascension and range for new values of argument of perigee and longitude of ascending node.

Calling Sequence

RJP FIXLAT
Error return
Normal return

Input

Argument of perigee, ω , and longitude of ascending node, Ω .

Output

Right ascension, α , declination, δ , radius, ρ .

Subroutines Used

ALPHA, COSALF, RANGE, FLTPT

Storage Areas Read

LL, LLSIN, LLCOS, DELTB, IICOS, DELTCOS, AA, EE

Storage Areas Written

RAMCOS, RAMSIN, ALPHB, ALPHCOS, LAMDB

Error Conditions

Those supplied by subroutines.

FIXRATI

Function

To initialize for fixed rate schedule by calculating initial arguments of latitude and times of calculations for first two time points.

Calling Sequence

RJP FIXRATI
Error return
Normal return

Input

Period $1 \div \frac{du}{dt}$

Output

Argument of latitude, u , and time factor of first two points.

Storage Areas Read

TIME10, TIME1, KK, DOMEGA, RAM, SOMEGA, IISIN, IICOS, LL1

Storage Areas Written

DLLB, LL, LL1LAST, LL2LAST, TIME1LAST, TIME2LAST, LLSIN,
LLCOS, DELTSIN, DELTCOS, RAMCOS, RAMSIN, DELT1SIN,
DELT2SIN, DELT1COS, DELT2COS, ALPHA1COS, ALPH1SIN,
ALPH2COS, ALPH2SIN, NUMPT, BSELSW

Error Conditions

Those supplied by subroutines.

FIXRATE

Function

To calculate values of right ascension, α , radius, ρ , and declination, δ , from new values of argument of perigee, ω , and right ascension of ascending node, Ω .

Calling Sequence

RJP FIXRATE
Error return
Normal return

Input

Time value, right ascension of ascending node, Ω , and argument of perigee, ω .

Output

Right ascension, α , declination, δ , radius, ρ .

Subroutines Used

MOD2PI, ALPHB, COSALF, RANGE, FLTPT

Storage Areas Read

DLLB, IISIN, IICOS, LLI, STIME, BSELSW, AA, EE, LLLAST, LL2LAST, TIME1LAST, TIME2LAST, ELEV

Storage Areas Written

LL, DLLB, LL2LAST, LLLAST, TIME2LAST, TIME1LAST, LLSIN, LLCOS, DELTSIN, DELTCOS, DELTB, RAMSIN, RAMCOS, ALPHB, ALPHCOS, LAMDB

Error Conditions

Those supplied by subroutines.

FIXRAI

Function

To initialize for fixed right ascension schedule by determining the proper quadrant to be used for latitude and declination calculations.

Calling Sequence

RJP FIXRAI
Error return
Normal return

Input

Right ascension of ascending node, Ω , argument of perigee, ω , right ascension, α .

Output

Proper quadrant for latitude calculator (BSELSW).

Subroutines Used

MOD2PI, LAT1, LAT2, FLTPT

Storage Areas Read

ALPHB, IISIN, IICOS

Storage Areas Written

RAMSIN, RAMCOS, ALPHASW, ALPHSIN, ALPHCOS, ALPHTAN, LL, LLSIN, DELTSIN, DELTCOS, DELT1COS, DELT1SIN, DELT2SIN, DELT2COS, DELT3COS, DELT3SIN, DELT4SIN, DELT4COS, ALPH1SIN, ALPH2SIN, ALPH3SIN, ALPH4SIN, ALPH1COS, ALPH2COS, ALPH3COS, ALPH4COS, BSELSW

Error Conditions

Those supplied by subroutines.

FIXRA

Function

To calculate new values of declination and radius from current values of argument of perigee, right ascension of ascending node, and time.

Calling Sequence

RJP FIXRA
Error return
Normal return

Input

Right ascension of ascending node, Ω , argument of perigee, ω .

Output

Right ascension, α , declination, δ , radius, ρ .

Subroutines Used

LAT1, LAT2, RANGE, FLTPT

Storage Areas Read

ALPHB, IISIN, ALPHTAN, IICOS, AA, EE, BSELSW, ALPHASW

Storage Areas Written

RAMSIN, RAMCOS, LL, LLSIN, DELTSIN, DELTB, LAMDB

Error Conditions

Those supplied by subroutines.

FIXLONGI

Function

To initialize fixed longitude schedule by determining the proper quadrant to be used in calculating latitude and declination.

Calling Sequence

RJP FIXLONGI
Error return
Normal return

Input

Longitude to be tracked.

Output

Right ascension, α .

Subroutines Used

ALPHAG, MOD2PI, FIXRAI, FLTPT

Storage Areas Read

BELC1, BELC2, BELC3, BELC4, TIME, LAMDB

Storage Areas Written

ALPHG, ALPHB, those in FIXRAI

Error Conditions

Those supplied by subroutines.

FIXLONG

Function

To calculate new values for right ascension, radius, and declination for current values of argument of perigee, right ascension of ascending node, and time.

Calling Sequence

RJP FIXLONG
Error return
Normal return

Input

Argument of perigee, ω , right ascension of ascending node, Ω .

Output

Right ascension, α , declination, δ , radius, ρ .

Subroutines Used

MOD2PI, FIXRA, FLTPT

Storage Areas Read

BELC1, BELC2, BELC3, BELC4, LAMDB

Storage Areas Written

ALPHG, ALPHB, ALPHSIN, ALPHCOS, ALPHTAN, those written by FIXRA

Error Conditions

Those supplied by subroutines.

DATAIN

Function

To make possible the input of several parameters via the on-line typewriter.

Calling Sequence

RJP DATAIN

Input

See input description of program specifications.

Output

Converted internal representations of the input parameters.

Subroutines Used

INTERCOM

Storage Areas Read

DAY, YEARMONTH

Storage Areas Written

A, E, I, SRAM, DRAM, SOMEGA, DOMEGA, VYEAR, VMONTH, VDAY,
DEC, LONG, KK, SCHSW

Method

By use of INTERCOM.

Error Conditions

None.

PTSEL

Function

To determine Γ , the angle between satellite direction and radar direction (both from earth center), evaluate:

$$\cos\Gamma = \cos\alpha\cos\delta\cos\alpha_r\cos\delta_r + \sin\alpha\cos\delta\sin\alpha_r\cos\delta_r + \sin\delta\sin\delta_r$$

Calling Sequence

RJP PTSEL
Error return
Normal return (A has code 1 to 4)

Input

None.

Output

$\cos\Gamma$, a floating-point number stored in

GAM1COS with 1 in A register, or
GAM2COS with 2 in A register, or
GAM3COS with 3 in A register, or
GAM4COS with 4 in A register

Subroutines Used

ALPHAG, FLTPT

Storage Areas Read

ALPH1SIN	ALPH1COS	DELT1SIN	DELT1COS
ALPH2SIN	ALPH2COS	DELT2SIN	DELT2COS
ALPH3SIN	ALPH3COS	DELT3SIN	DELT3COS
ALPH4SIN	ALPH4COS	DELT4SIN	DELT4COS

LL, LAMDR, NUMPT

Error Conditions

1. $\cos\Gamma > 1$ control transferred to error return with a 7 in the A-register.
2. Those supplied by subroutines.

BRANGE

Function

To evaluate: $\rho = \frac{a(1-e^2)}{1+e\cos(u-w)}$, $|u-w| \leq 2\pi$

Calling Sequence

RJP BRANGE
Error return
Normal return, (ρ has exponent in A, fraction in Q)

Input

None.

Output

Floating-point number, ρ , stored in RANGEB.

Subroutines Used

MOD2PI, FLTPT

Storage Areas Read

AA
EE
LL
OMEGA

Storage Areas Written

RANGEB

Error Conditions

$1 + e \cos(u-w) = 0$ action taken through the error exit.
A 5 is left in the A-register.

LATI

Function

To evaluate: $u = \tan^{-1} \frac{\cos\Omega \tan\alpha - \sin\Omega}{\tan\alpha \cos i \sin\Omega + \cos i \cos\Omega}$, $u \leq 2\pi$

Calling Sequence

RJP LATI
Error return
Normal return (u has exponent in A, fraction in Q)

Input

$\cos\Omega$, $\sin\Omega$, $\tan\alpha$, $\cos i$

Output

Floating-point number u stored in LL ($u \leq 2\pi$).

Subroutines Used

FLTPT

Storage Areas Read

RAMCOS, RAMSIN, ALPHTAN, IICOS

Storage Areas Written

LL

Error Conditions

None.

LAT2

Function

To evaluate: $u = \tan^{-1} \left(\frac{\cos \Omega}{\cos i \sin \Omega} \right), u \leq 2\pi$

Calling Sequence

RJP LAT2
Error return
Normal return (u has exponent in A, fraction in Q)

Input

None.

Output

Floating-point number u stored in LL ($u \leq 2\pi$)

Subroutines Used

FLTPT, MOD2PI

Storage Areas Read

RAMCOS, IICOS, RAMSIN

Storage Areas Written

LL (with floating-point number)

Method

$$u = \sin^{-1} \frac{K^2}{\sqrt{1 + K^2}}$$

where $K = \tan^{-1} u$

Error Conditions

None.

DECLIN or SINDECLIN
(depending upon the call)

Function

To evaluate: $\delta = \sin^{-1}(\sin i \sin u)$
or $\sin \delta = (\sin i \sin u)$

Calling Sequence

RJP DECLIN (SINDECLIN)
Error return
Normal return (δ or $\sin \delta$ has exponent in A, fraction in Q)

Input

$\sin i$, $\sin u$, (both floating-point numbers).

Output

δ or $\sin \delta$; floating-point numbers stored in DELTA or DELTSIN, respectively.

Subroutines Used

FLTPT

Storage Areas Read

IISIN, LLSIN

Storage Areas Written

DELTA or DELTSIN

Error Conditions

None.

COSALF

Function

To evaluate $\cos\alpha = \frac{\cos\Omega\cos\mu - \cos i \sin\Omega\sin\mu}{\cos\delta}$, $|\cos\alpha| \leq 1$

Calling Sequence

RJP COSALF
Error return
Normal return ($\cos\alpha$ has exponent in A, fraction in Q)

Input

$\cos\Omega$, $\cos\mu$, $\cos i$, $\sin\Omega$, $\sin\mu$, $\cos\delta$

Output

Floating-point number $\cos\alpha$ stored in ALPHCOS.

Subroutines Used

FLTPT

Storage Areas Read

RAMCOS, LLCOS, IICOS, RAMSIN, LLSIN, DELTCOS

Storage Areas Written

ALPHCOS

Error Conditions

$|\cos\alpha| > 1$ action taken through error exit with 4 in the A-register.

ALPHA or SINALF
(depending upon the call)

Function

To evaluate:

$$\alpha = \sin^{-1} \left(\frac{\sin\Omega \cos u + \cos i \cos\Omega \sin u}{\cos\delta} \right)$$

Calling Sequence

RJP ALPHA (SINALF)

Error return

Normal return (α or $\sin\alpha$ has exponent in A, fraction in Q)

Input

$\sin\Omega$, $\cos\Omega$, $\sin u$, $\cos u$, $\cos i$, $\cos\delta$

Output

Floating-point number α or $\sin\alpha$ in ALPH or ALPHSIN,
respectively.

Subroutines Used

FLTPT, MOD2PI

Storage Areas Read

RAMSIN, RAMCOS, LLSIN, LLCOS, IICOS, DELTCOS

Storage Areas Written

ALPHB or ALPHSIN

Error Conditions

$|\sin\alpha| > 1$ action taken through the error exit with 2 in
the A-register if SINALF or 3 if ALPHA.

ALPHAGNEW

Function

To determine a value for the right ascension at Greenwich, α_G .

Calling Sequence

RJP ALPHAG
Error return
Normal return

Input

None.

Output

Floating-point number α_G , with the exponent in the A-register, also the fraction in the Q register, and the number in ALPHG.

Subroutines Used

FLTPT

Storage Areas Read

SIDERTIME, FRAMESIZE, LAMDR, RAGREENCON

Storage Areas Written

ALPHG

Method

$$\alpha_G = (\text{SIDERTIME}) - \lambda_r + (\text{FRAMESIZE}) C1$$

where C1 is a constant stored in RAGREENCON

λ_r = longitude of site.

Error conditions

None.

MOD2PI

Function

To adjust the absolute value of an angle so that it falls between 0 and 2π , i.e., $|\text{value of number}| \leq 2\pi$.

Calling Sequence

RJP MOD2PI

Input

Floating-point number with the exponent in the A-register and the fraction in the Q register.

Output

Floating-point number modulo 2π with the exponent in the A-register and the fraction in the Q-register.

Storage Areas Read

None

Storage Areas Written

None

Error Conditions

None

BCONVERT

Function

To convert floating-point input values to correct units compatible with the main program.

Calling Sequence

RJP BCONVERT
Normal return

Input

Values input via subroutine DATAIN in units of degrees and portions of a day.

Output

Values in units of seconds and radians.

Subroutines Used

FLTPT

Storage Areas Read

SOMEGA, DOMEGA, SRAM, DRAM, DECT, ALPHB

Storage Areas Written

Same as above.

Method

$$x \text{ degrees } \left(\frac{\text{radians}}{\text{degree}} \right) = x' \text{ radians}$$

$$x \text{ days } \left(\frac{\text{seconds}}{\text{day}} \right) = x' \text{ seconds}$$

Error Conditions

None .

BRESTORE

Function

To restore input values to original units so that they may be typed out for inspection during reinitialization.

Calling Sequence

RJP BRESTORE
Normal return

Input

Values in units of seconds and radians.

Output

Values in units of days and degrees.

Subroutines Used

FLTPT

Storage Areas Read

SOMEGA, DOMEGA, DRAM, SRAM, STIME, DECT, ALPHB

Storage Areas Written

Same as above.

Method

$$x \text{ radians} / \frac{\text{radians}}{\text{degree}} = x' \text{ degrees}$$

$$x \text{ seconds} / \frac{\text{seconds}}{\text{day}} = x' \text{ days}$$

Error Conditions

None.

BELDV

Function

To calculate the time derivative of v , $\frac{dv}{dt}$.

Calling Sequence

RJP BELDV
Error return
Normal return

Input

None.

Output

$\frac{dv}{dt}$, $\frac{du}{dt}$

Storage Areas Read

LL ZOMEGA
NN FACTOR6
AA DOMECA

Storage Areas Written

VV VVSIN
DV BELPROD
DU

Method

1. $v = u - w$
2. $\frac{dv}{dt} = \frac{a^2 N \sqrt{1-e^2}}{\rho^2}$

$$3. \frac{du}{dt} = \frac{dv}{dt} + \frac{dw}{dt}$$

Error Conditions

Control will be transferred to the error return if $\rho^2=0$. The A-register will contain 8.

DRANGE

Function

To calculate the time derivative of the **radius**, $\frac{dp}{dt}$, and store it in the common storage area.

Calling Sequence

RJP DRANGE
Error return
Normal return

Input

None.

Output

$\frac{dp}{dt}$ stored in RADIUSDOT

Storage Areas Read

AA, EE, FACTOR6, VVSIN, NMCON

Storage Areas Written

BELPROD, BELQUOT, BELDR, NMBELDR, RADIUSDOT

Method

1. $\frac{dp}{dt} = \left(\frac{aen}{\sqrt{1-e^2}} \right) \sin v$
2. Convert $\frac{dp}{dt}$ to fixed point nautical miles and store it in RADIUSDOT.

Error Conditions

None.

DELDELTA

Function

To calculate the fixed point value of the time derivative of the declination, $\frac{d\delta}{dt}$, and store it in the common storage area.

Calling Sequence

RJP DELDELTA
Error return
Normal return

Input

None.

Output

$\frac{d\delta}{dt}$ stored in DECDOT

Storage Areas Read

IISIN, LLCOS, DELTCOS, DU

Storage Areas Written

BELPROD, BELQUOT, DDELT, DECDOT

Method

1. $\frac{d\delta}{dt} = \frac{d\mu}{dt} ((\sin i) (\cos \mu) / \cos \delta)$
2. Convert $\frac{d\delta}{dt}$ to fixed point and store in DECDOT

Error Conditions

None.

DALPHA

Function

To calculate the fixed point value $\frac{d\alpha}{dt}(\cos\delta)$ and store it in the common storage area.

Calling Sequence

RJP DALPHA
Error return
Normal return

Input

None.

Output

$\frac{d\alpha}{dt}(\cos\delta)$ stored in RADOT

Storage Areas Read

DELTCOS, IICOS, DU, DRAM

Storage Areas Written

BELPROD, BELQUOT, DELALPH, RADOT

Method

1. $\frac{d\alpha}{dt} = \frac{d\Omega}{dt} + \frac{\cos i}{\cos^2 \delta} \cdot \frac{d\mu}{dt}$
2. Convert $\frac{d\alpha}{dt}(\cos\delta)$ to fixed point and store it in RADOT

Error Conditions

None.

IV. PROGRAM VARIABLE LABELS

Input Parameters

<u>Notation</u>	<u>Computer Representation</u>	<u>Description</u>	<u>Unit</u>
a	AA	semi-major axis	degrees
e	EE	eccentricity	degrees
i	II	inclination ($\pm 0^\circ, 180^\circ$)	degrees
ω_0 (omega)	SOMEGA	argument of perigee at epoch	degrees
$\dot{\omega}$ (omegadot)	DOMEGA	time derivative of argument of perigee	degree/day
Ω_0 (dragon)	SRAM	right ascension of ascending node at epoch	degrees
$\dot{\Omega}$ (dragondot)	DRAM	time derivative of Ω	degree/day
epoch: year	VYEAR	year of validity	year
month	VMONTH	month of validity	numeric months (1 to 12)
day	VDAY	day and portion of day of validity	day and decimal portion (0 to 31.999)
schedule	SCHDSW	switch to indicate schedule (0=A, 1=B, 2=C, 3=D)	
α_b	ALPHB	right ascension	degrees
δ	DELTB	declination	degrees
period	KK	($1/du/dt$)	minutes/degree
u	LL1	1st argument of latitude	degrees
λ	LONG	argument of longitude	degrees

Intermediate Values

Time values (floating-point unless indicated by *)

TIME	present time equal to (CELTIME)	seconds
TIME1	initial time equal to (CELTIME)	seconds
BLASTFLT	initial time equal to (CELTIME)	days
TIMETEMP	present time equal to (CELTIME)	days
VMONTH*	month of validity	numeric months (0 to 12)
VYEAR*	year of validity	
VDAY	day and decimal portion of validity	day and decimal portion (0 to 31.999)
BDAY*	day number of 0 day of VMONTH	days
BDAY1*		
BDAYNOW*	day of year relative to validity (present year - VYEAR) 365 + L(DAY)	days
FLTBDAY	(BDAY)	days
FLTNDAY	(BDAYNOW)	days
NTIME1	(CELTIME) + (BDAYNOW)	days
NSTIME	(BDAY) + (VDAY)	days
FLTDIFF	(NTIME1) - (NSTIME)	days

FLTSECDIFF	(FLTDIFF)	seconds
CURJULDAY	current julian day	
CURJULDAYF*	current julian day	
TIME1LAST	last time point	
TIME2LAST	2nd last time point	
TIMEDIFF	(T) - (TLAST)	

Trigonometric Functions

$\sin i$	IISIN	
$\cos i$	IICOS	
$\sin \Omega$	RAMSIN	
$\cos \Omega$	RAMCOS	
$\sin \delta$	DELT SIN	
$\sin^2 \delta$	DELT SIN2	
$\cos \delta$	DELT COS	
$\sin \delta_1$	DELT SIN)	1st point
$\cos \delta_1$	DELT COS)	
$\sin \delta_2$	DELT2 SIN)	2nd point
$\cos \delta_2$	DELT2 COS)	
$\sin \delta_3$	DELT3 SIN)	3rd point
$\cos \delta_3$	DELT3 COS)	
$\sin \delta_4$	DELT4 SIN)	4th point
$\cos \delta_4$	DELT4 COS)	

$\sin\alpha$	ALPHSIN	
$\cos\alpha$	ALPHCOS	
$\sin\alpha_1$	ALPH1SIN)	1st point
$\cos\alpha_1$	ALPH1COS)	
$\sin\alpha_2$	ALPH2SIN)	2nd point
$\cos\alpha_2$	ALPH2COS)	
$\sin\alpha_3$	ALPH3SIN)	3rd point
$\cos\alpha_3$	ALPH3COS)	
$\sin\alpha_4$	ALPH4SIN)	4th point
$\cos\alpha_4$	ALPH4COS)	
$\tan\alpha$	ALPHTAN	
$\sin u$	IISIN	
$\sin^2 u$	IISIN2	
$\cos u$	IICOS	
$\sin_1 u$	II1SIN)	1st point
$\cos_1 u$	II1COS)	
$\sin_2 u$	II2SIN)	2nd point
$\cos_2 u$	II2COS)	
$\sin\alpha_r$	ALPHRSIN	
$\cos\alpha_r$	ALPHRCOS	
$\sin\delta_r$	DELTRSIN	
$\cos\delta_r$	DELTRCOS	
	SINCHI	$\sin\chi = \sin i (\cos\alpha_b - \Omega)$
	COSCHI	$\cos\chi = \sqrt{1 - \sin^2\chi}$

sinv	VVSIN	$\sin (u - w)$
cosv	VVCOS	$\cos (u - w)$
sinE	EESIN	$\frac{1 - e \cos E}{\sqrt{1 - e^2}} \sin w$
cosE	EECOS	$\frac{\cos v + e}{1 + e \cos v}$
sin Γ	IISINPOS	
cos Γ	GAMCOS	cos γ between satellite direction and radar direction
cos Γ_1	GAM1COS	1st point
cos Γ_2	GAM2COS	2nd point
cos Γ_3	GAM3COS	3rd point
cos Γ_4	GAM4COS	4th point

Switches and Indicators

<u>Notation</u>	<u>Computer Representation</u>	<u>Description</u>	<u>Values</u>
	IISWITCH*	is belt forward or retrograde 0 → forward 1 → retrograde	0 or 1
	UNDEARTHSW*	was last point acceptable to radar? 0 → yes, 1 → no	0 or 1
	NUMPT*	indicates to point selector routine how many points are being compared	2 to 4
	BSELSW*	point selector switch contains 1, 2, 3, or 4	1 to 4

ALPHASW*		indicates whether long or short formula to calculate u	
NCODE*		indicates whether in initialization (or reinitialization) or working section 0 → init 1 → working	0 or 1
LATEM*		1 if $u = 90$; 0 if $u \neq 90$	0 or 1

Computed Values

u	LL	argument of latitude	0 to 2π
u_2	LL2	2nd argument of latitude point	0 to 2π
du_b/dt	DLLB	time derivative of argument of latitude	0 to 2π
	LL1LAST	last argument of latitude point calculated	0 to 2π
	LL2LAST	2nd argument of latitude point calculated	0 to 2π
α_G	ALPHG	right ascension of Greenwich	0 to 2π
δ_R	DELTR	current declination value	0 to 2π
α_R	ALPHR	current right ascension value	0 to 2π
ω	ZOMEGA	current argument of perigee	
Ω	SRAM	current value of right ascension of ascending node	

BELM	$E - e \sin E = M$
MLLAST	last value of M
NN	$\left(\frac{GM^{\frac{1}{2}}}{K^3} \right)$
DV	$\frac{na^2 \sqrt{1-e^2}}{\rho^2}$
DU	(DV) + (DOMEGA)
DDELTA	$\frac{\sin i \cos u}{\cos \delta} \cdot du = d\delta$
K	$a^2 \left[1 - \frac{1A_e}{3p^2} (1 - \frac{3}{2} \sin^2 i) (1-e^2)^{\frac{1}{2}} \right]$
BELDR	$\frac{aen}{\sqrt{1-e^2}} \sin v = dp$
DELALPH	$d\Omega + \frac{\cos i}{\cos^2 \delta} du = d\alpha$
BELSQRT	$\sqrt{1-e^2}$
NUMRAN	$a(1-e^2)$
RAMLAST	last value of Ω
MEGALAST	last value of ω
PTTEM	$2\pi(1.00273791)T$

COSCHI2	$\cos^2 (\alpha_b - \Omega)$
CHI	$\alpha_b - \Omega$
ALPHB	right ascension (revolutions)
DELTBL	declination (revolutions)
GAMLTEMP	$2 + \cos\Gamma_1$
GAM2TEMP	$2 + \cos\Gamma_2$
GTEMP1	modified floating-point number
GTEMP2	
IIDELTDIFF	declination - inclination
FACTOR1	$A_2/3p^2 (1-3/2 \sin^2 i)$
FACTOR2	$A_2/3p^2$
FACTOR3	A_2/p^2
FACTOR4	$1-3/2 \sin^2 i$
FACTOR5	$3/2 \sin^2 i$
FACTOR6	$\sqrt{1-e^2}$
FACTOR10	$1 - (\text{FACTOR12})$
FACTOR11	$\sqrt{GM/K}$
EE2	e^2
EE2ML	$1-e^2$
KKNCALC	$a (\text{FACTOR10})$
FACTOR12	$(\text{FACTOR1}) (\sqrt{1-e^2})$
FRAMECON	$(\text{FRAME SIZE}) (7.292115847 \times 10^{-5})$

RAGREENCON	$7.292115847 \times 10^{-5}$
FRAMEFLTPT	(FRAMESIZE) in floating point
SIDERFLTPT	(SIDERTIME) in floating point
SIDERLAMDR	(SIDERTIME) - (LAMDR)
KRECIP	$1 / (\text{KKNCALC})$
GMK	GM/K
NMBELDR	range in n.m.
PP	$[a(1-e^2)]^2$

Cartesian coordinates

TXX	$\rho (\cos\delta) (\cos\alpha)$
TXX1	$\rho (\cos\delta)$
YY	$\rho (\cos\delta) (\sin\alpha)$

Constants

PTCON	1.0027379	
JULYDAY064*	julian day Jan 0 1964 (2,438,394.5)	
ANGCONV	.0174533	radians/degree
TCONV	86,400	seconds/day
FLTONE	1	

	BEL2PI	2π
	BEL2PII	$2\pi + 1 \text{ bit}$
	FLTTWO	2
	FLTFOUR	4
	CON60	60
	HFPI	$\pi/2$
	BONE*	1
	GM	2.51744×10^{-8}
	A_2	1.6235×10^{-3}
	PI	π
	THFPI	$3\pi/2$
	BELTEM	5000
λ_r	LAMDR	longitude of site (LONGITUDE)
	GLR	latitude of site (GEOCENLAT)
	DYPRMO	table of days per month
	DYPRYR	table of days per year

Equivalent Values

RR	RANGEB
ALPH	ALPHB
FLTTWO	FLTWO
WONE	FLTONE

BANGLEX	THFPI
BANGLE	HFPI
BEL2PI	TTWPI
DELTB	DECT
LLL	LZERO
LAMDB	LONG
TLAST	TIMELLAST
DELT	DECT
BELPIXX	PI

Temporary Location

TIMTP
BELDIFF
BELCOS
BELPROD
BELSUM
BELQUOT
BELSTOR1
BELSTOR2
MODNUM
LL4
ALPHDIFF

V. FLOW CHARTS

Flow charts for the subroutines described in Section III appear on the following pages.



Given:
 Cetime
 (time to start)
 L(systat 1) =
 O(reinit) 1 (init)
 Sidertime
 (of radar site)
 Longitude
 (of site)
 Geocenlat
 (lat of site)
 Frame size
 (time intervals)
 present day,
 month, year



Initialize
 elev = 0
 unearth sw = 0
 neode = 0 (1st time)
 convert start time

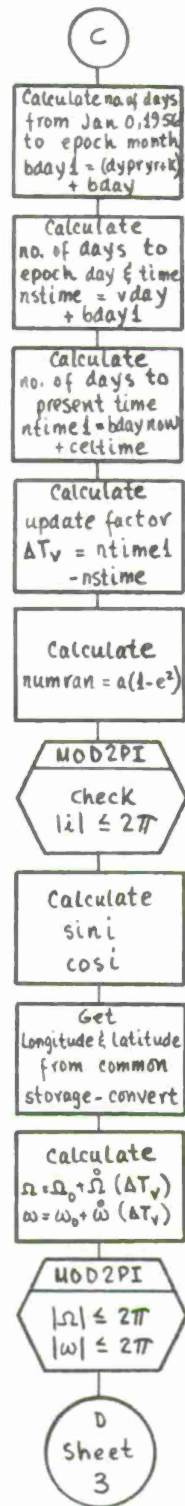
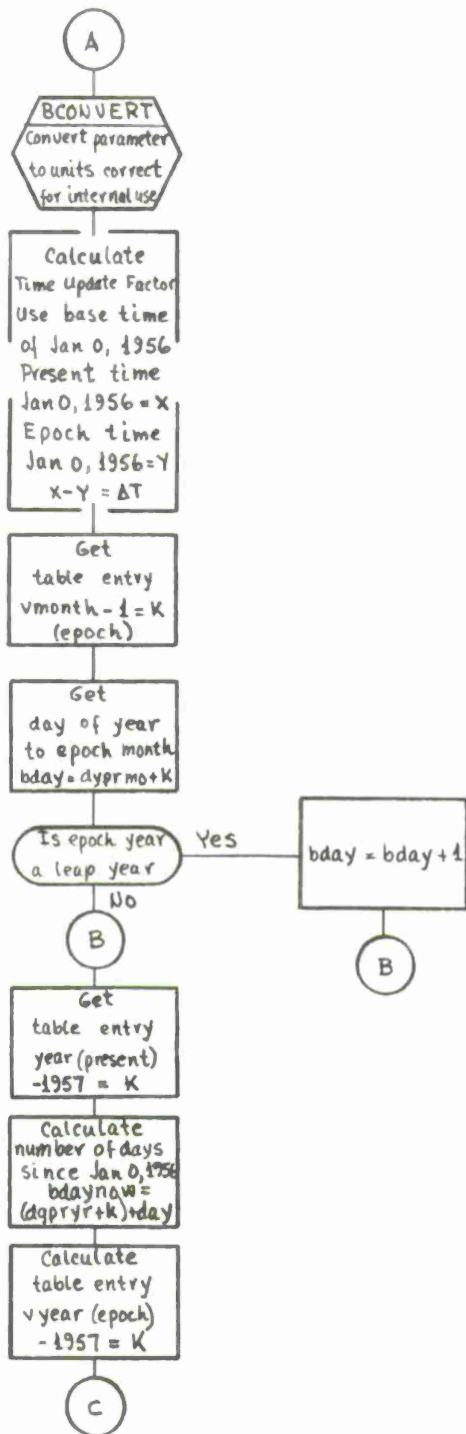
BRESTORE
 Restore
 previous input
 to orig units

DATAIN
 Receives
 req'd
 parameters

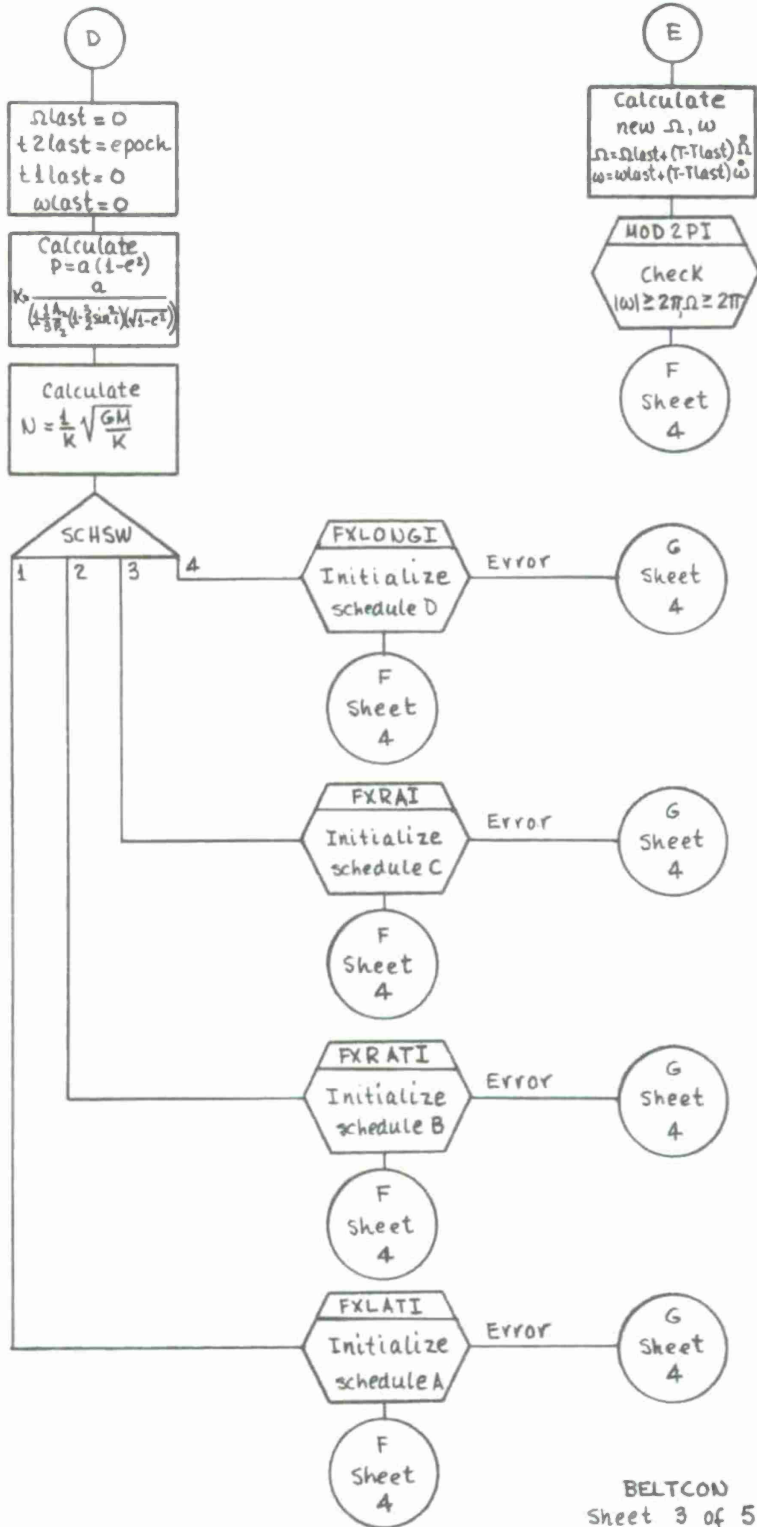
Receives
 following parameters
 $a, e, i, \omega, \dot{\omega}, \Omega, \dot{\Omega}$
 epoch schedule
 If:
 PIDECL δ (declination)
 SCAUX k (period)
 ϵ (latitude)
 PRRA α (rt. ascension)
 FYLDDG λ (longitude)

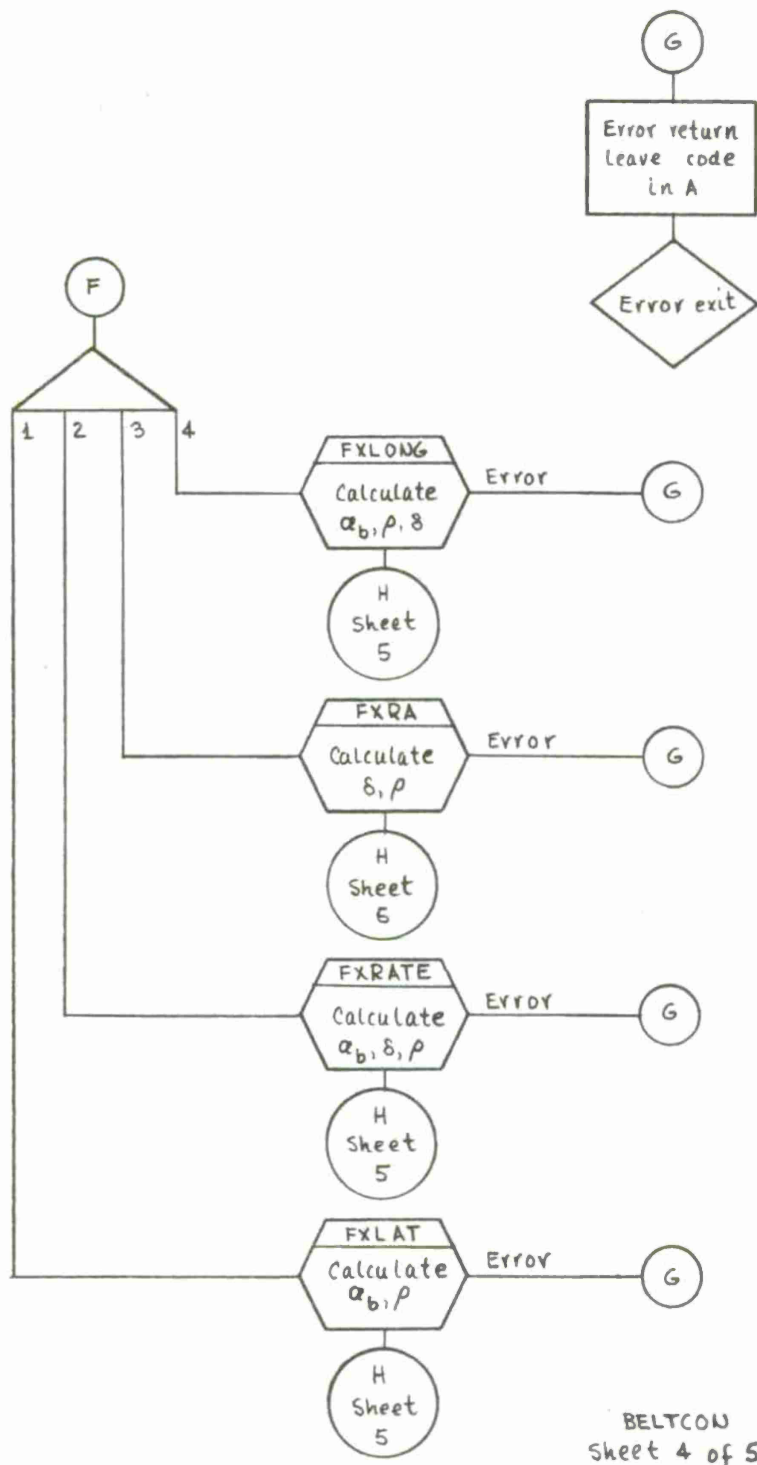


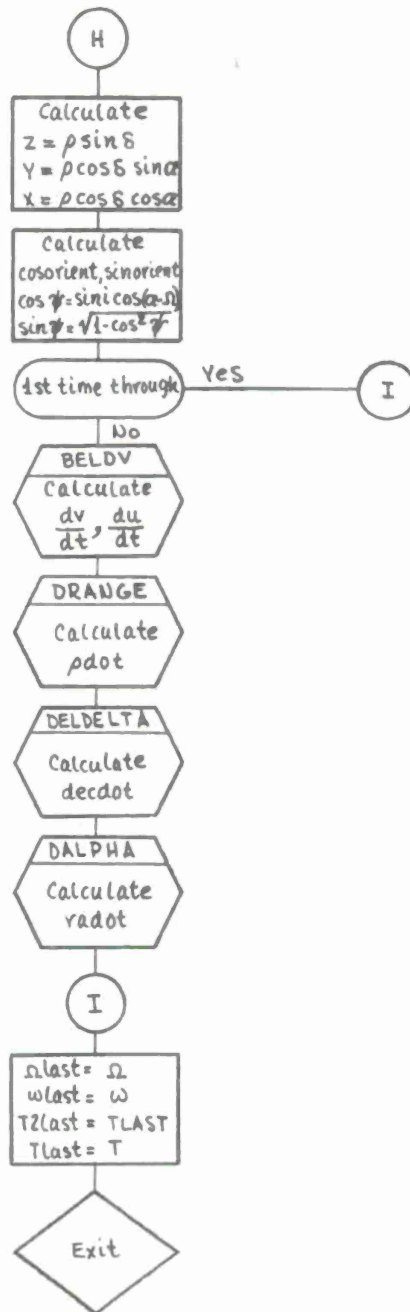
BELTCOM
 sheet 1 of 5



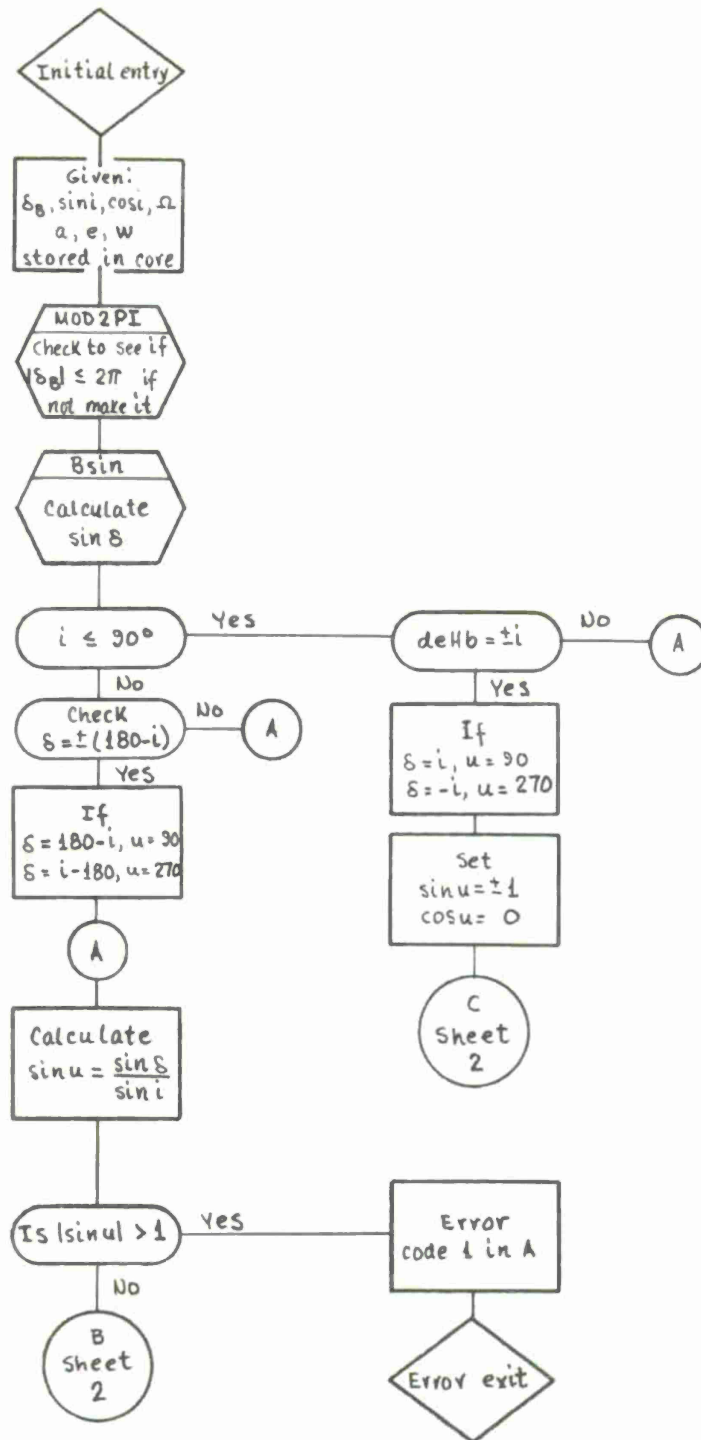
BELTCO
Sheet 2 of 5



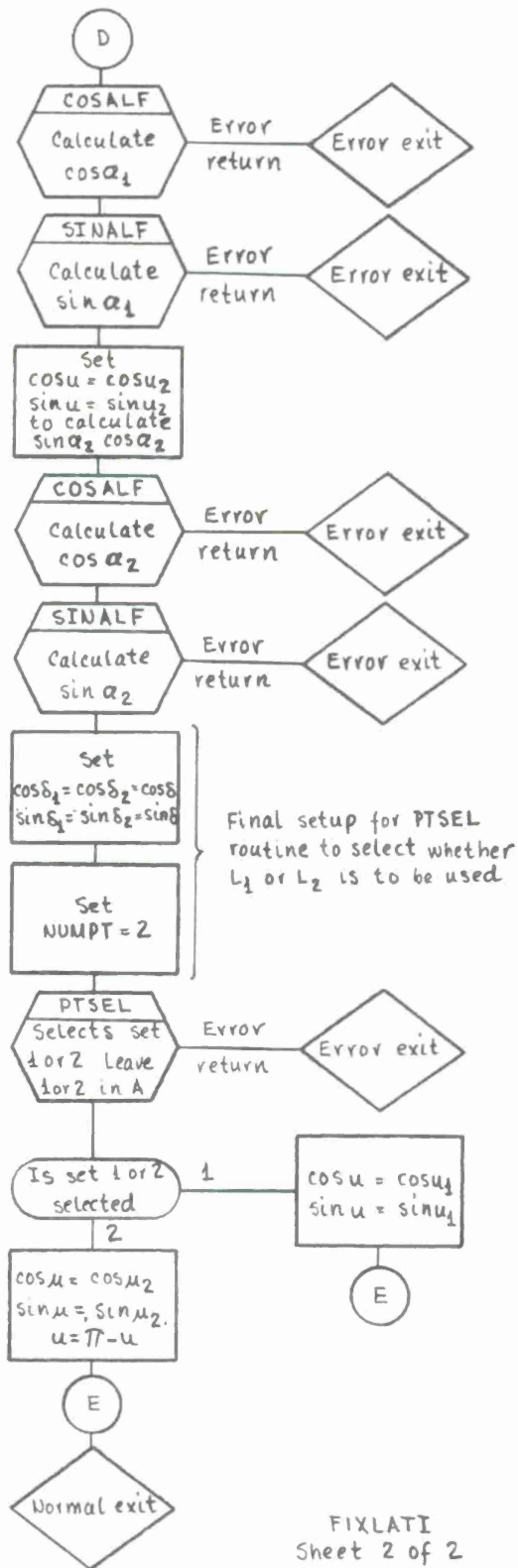
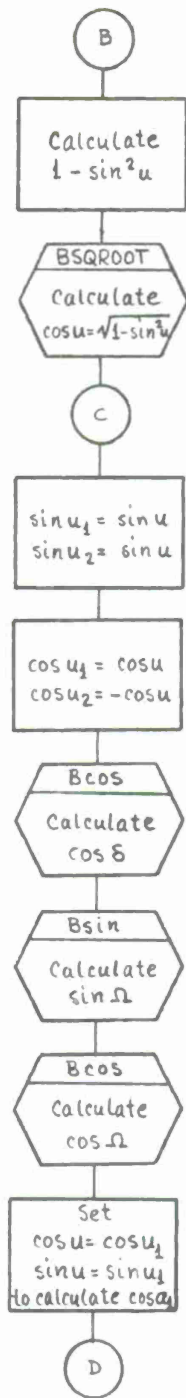




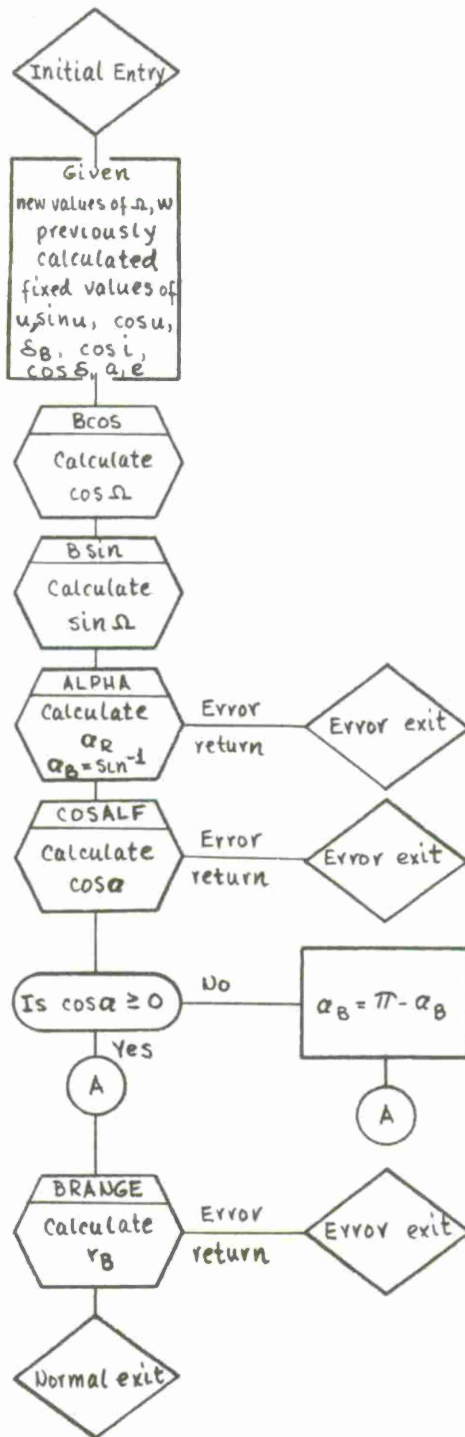
BELTCO
sheet 5 of 5



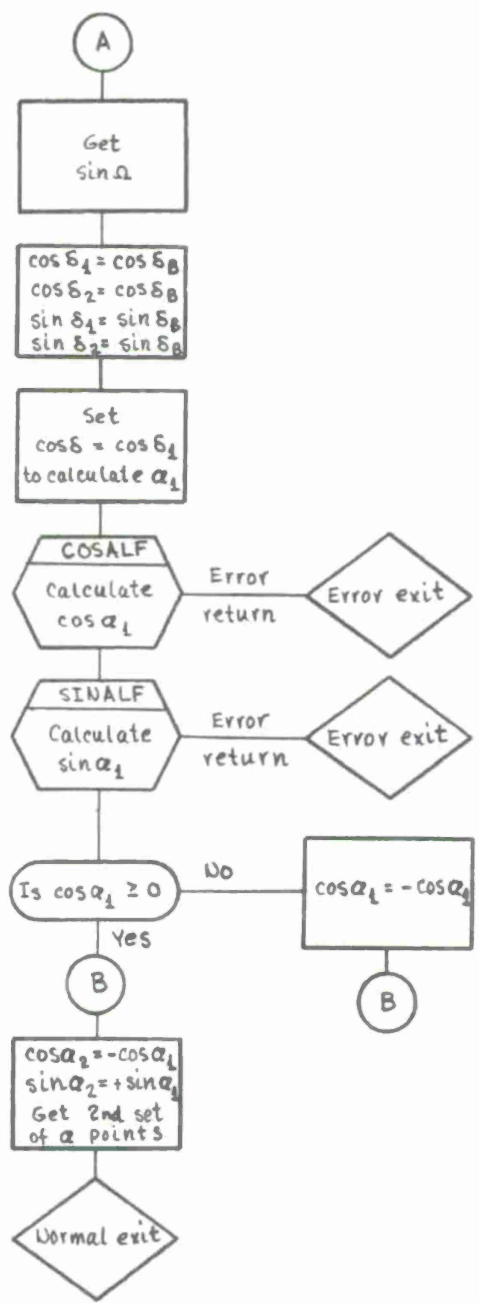
FIXLATI
Sheet 1 of 2



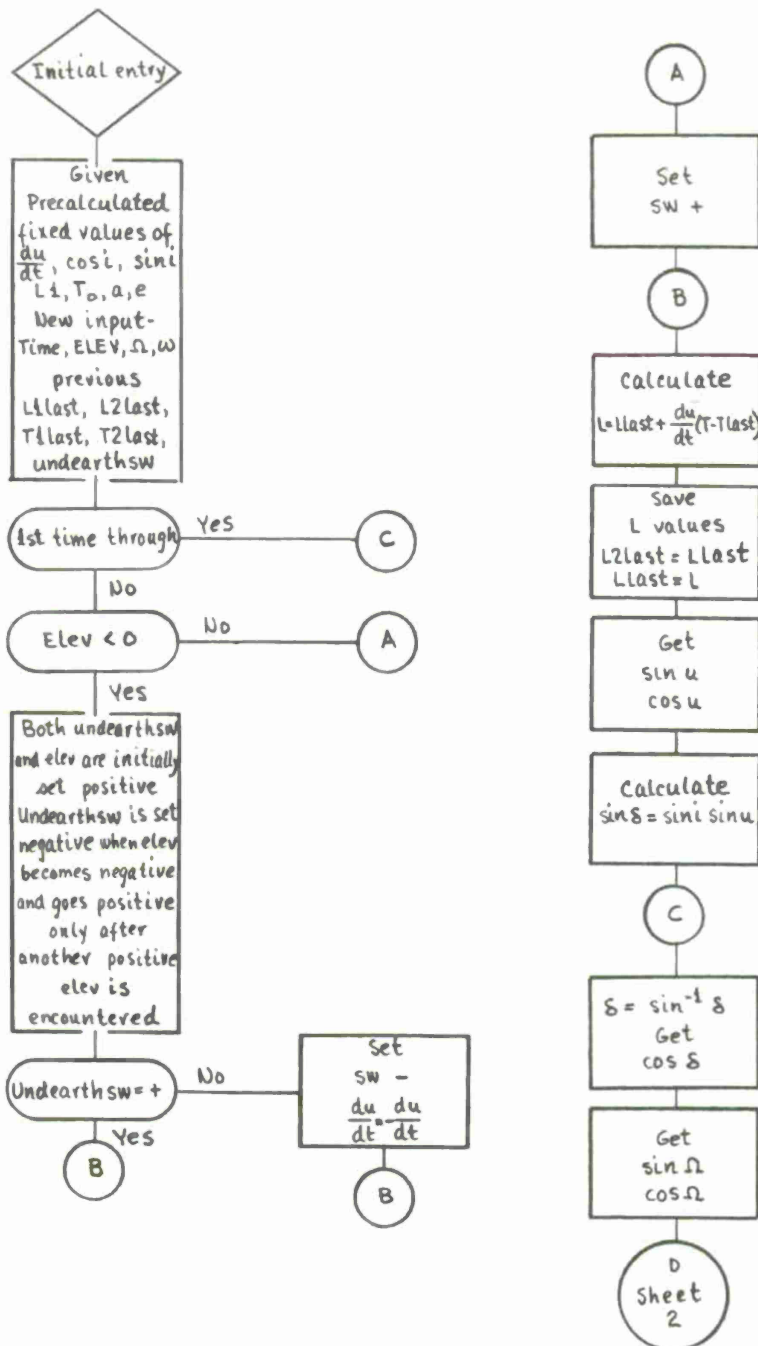
FIXLATI
Sheet 2 of 2



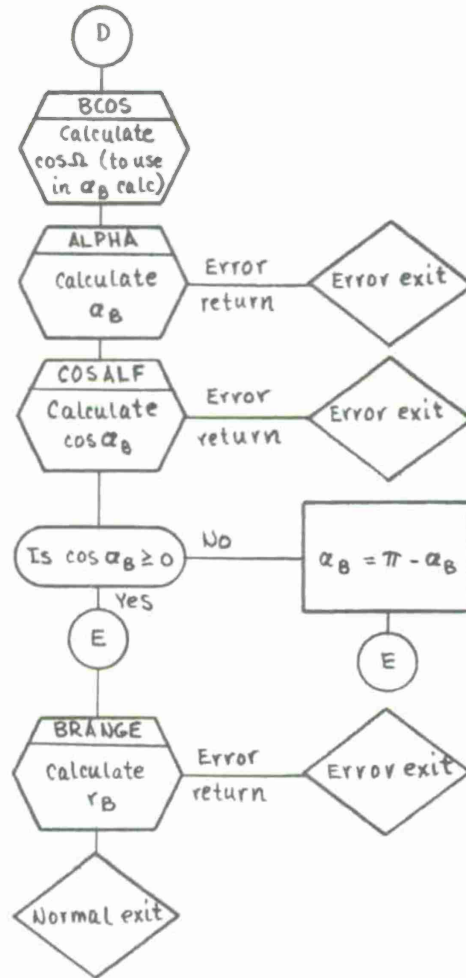
FIXLAT



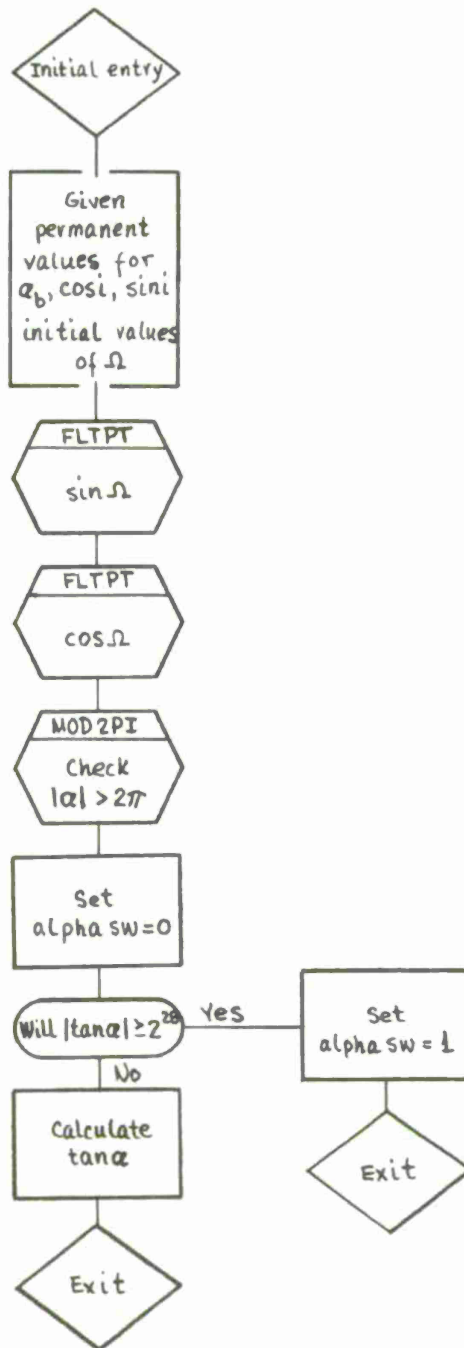
FIXRATI



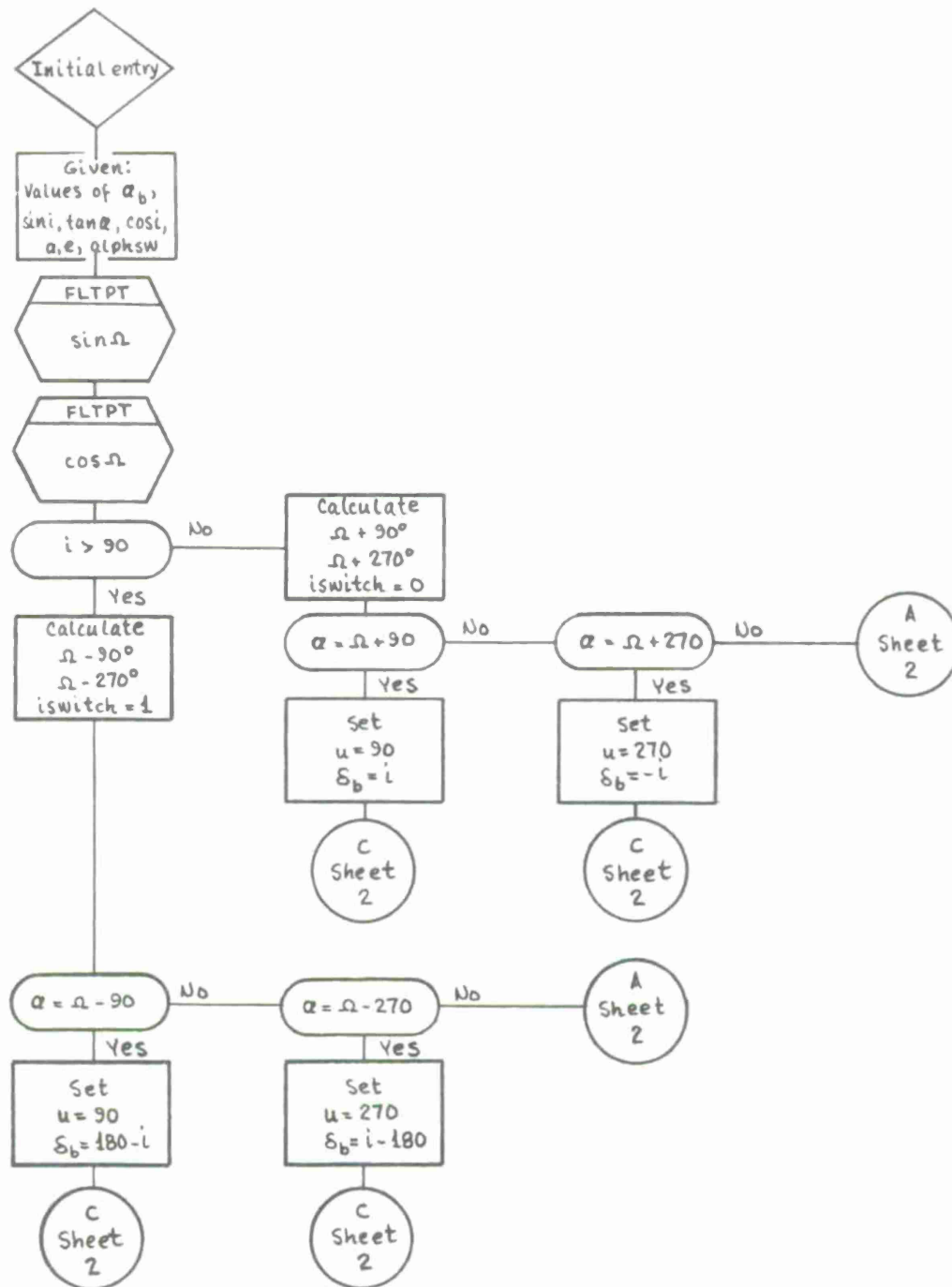
FXRATE
Sheet 1 of 2



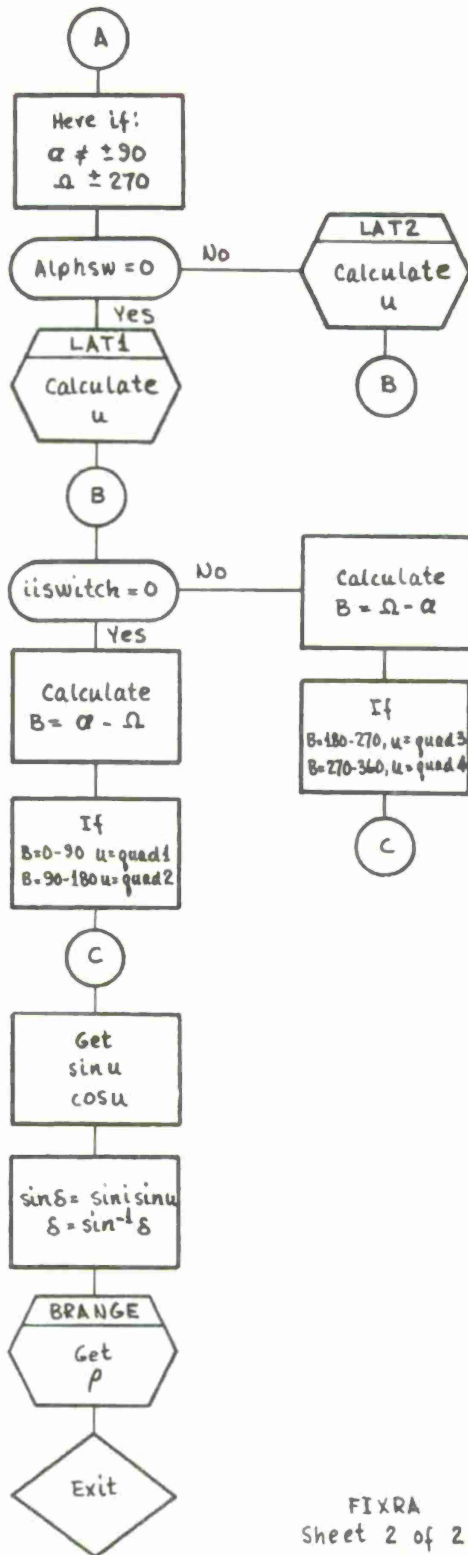
FIXRATE
Sheet 2 of 2



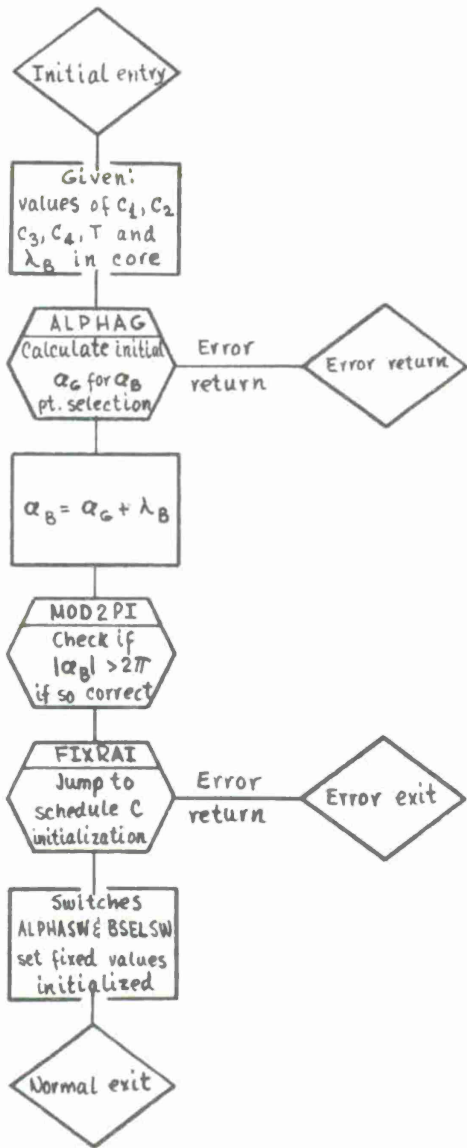
FIXRAI



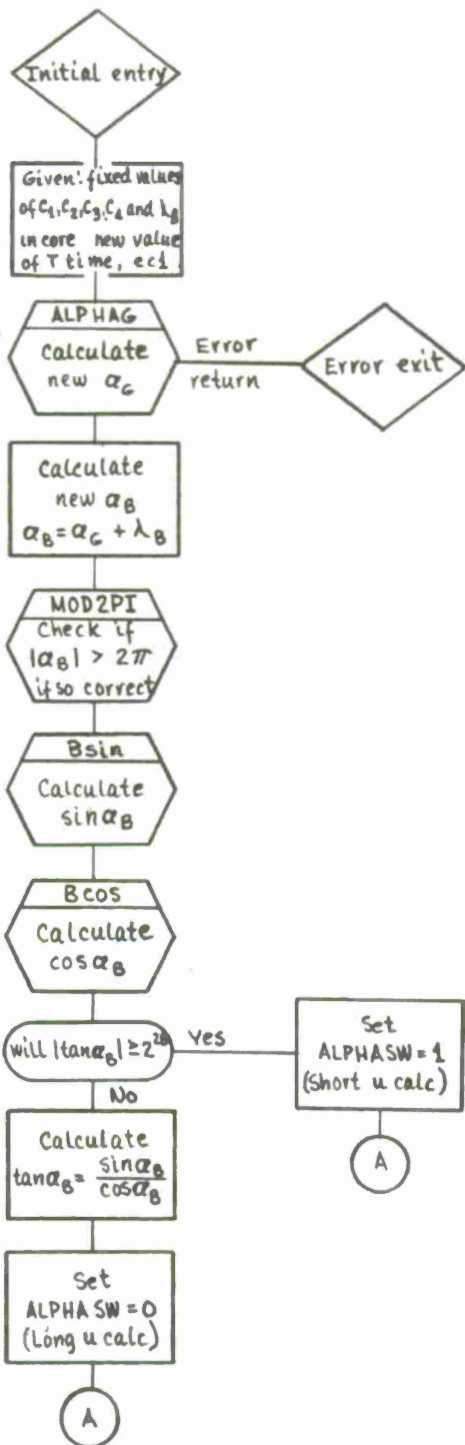
FIXRA
Sheet 1 of 2



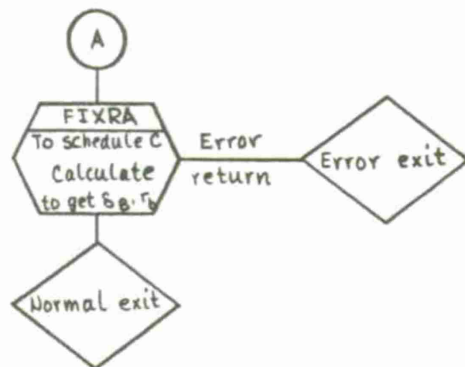
FIXRA
Sheet 2 of 2

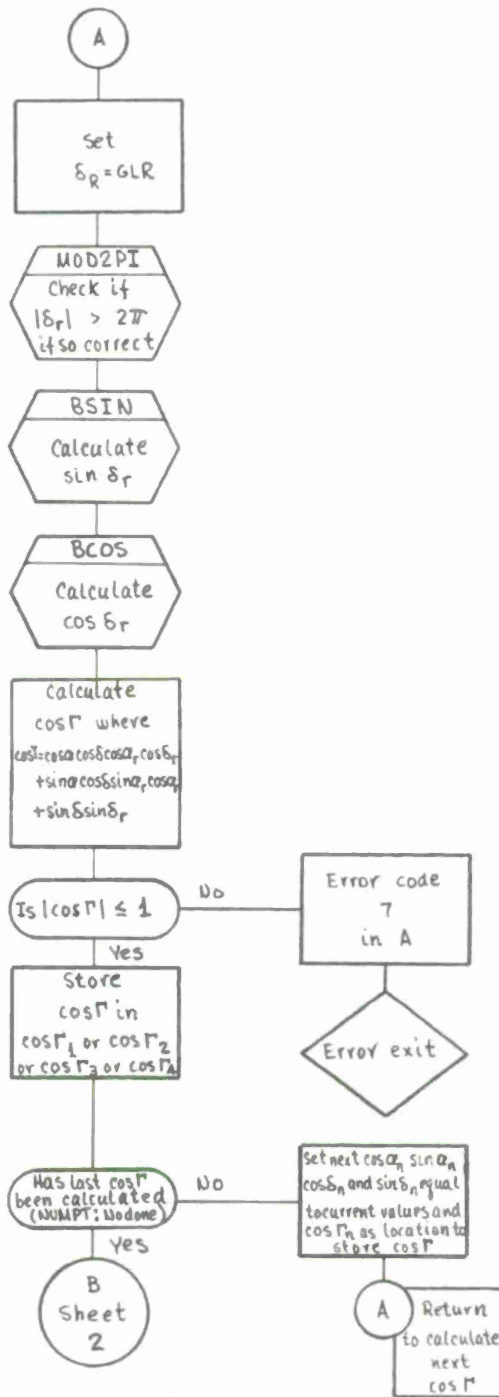
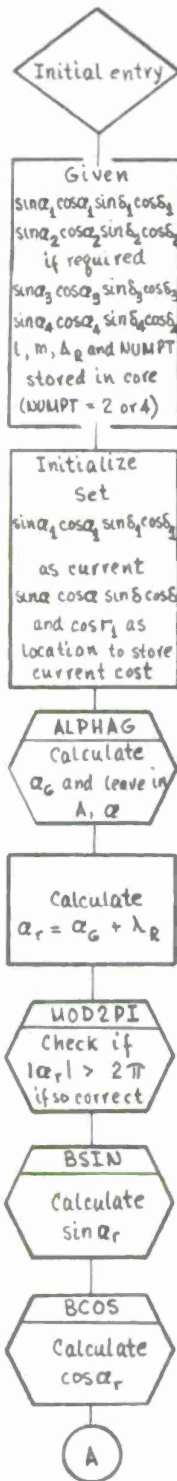


FIXLONGI

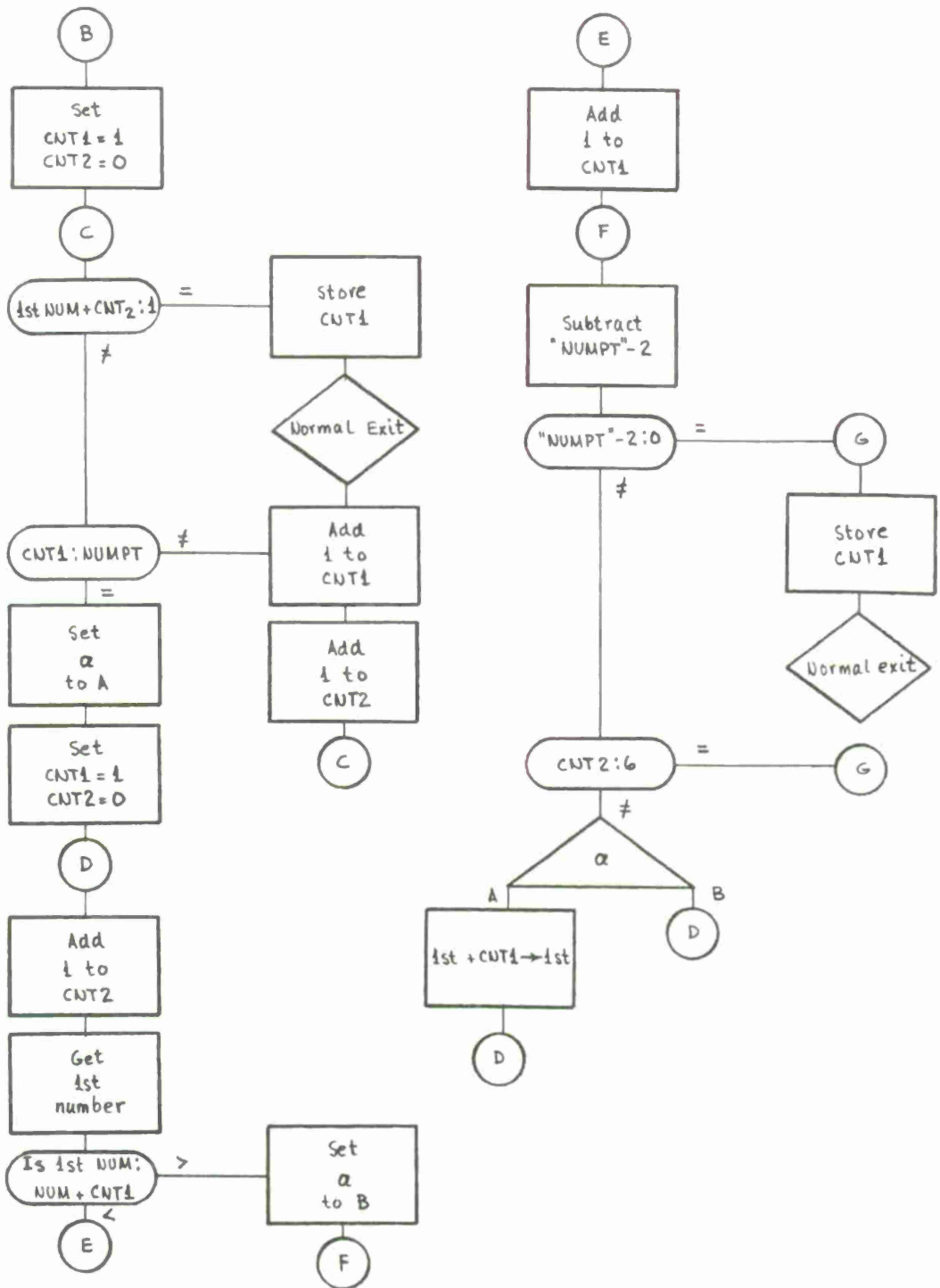


FIXLONG

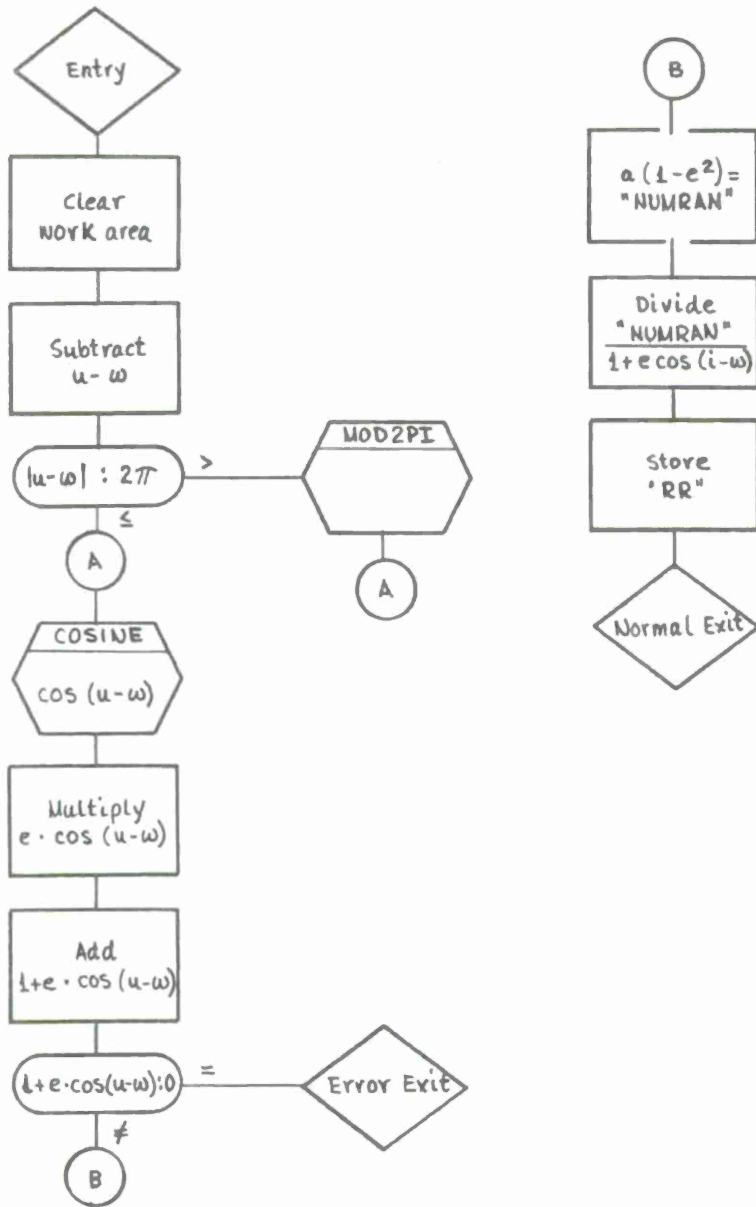




PTSEL
sheet 1 of 2

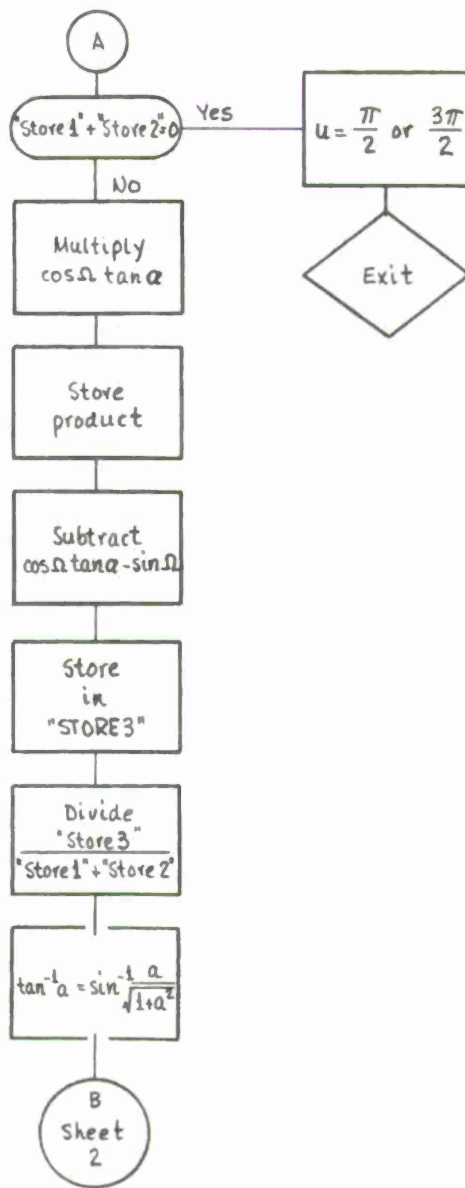
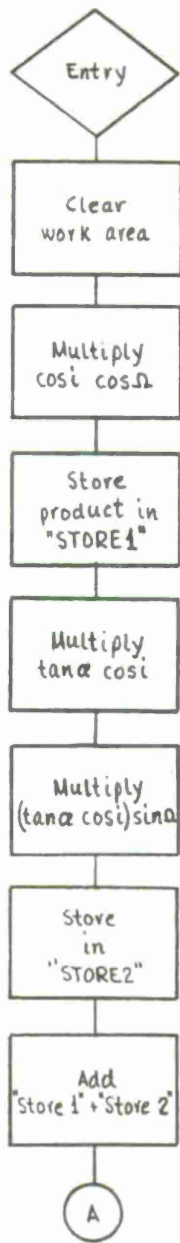


PTSEL
Sheet 2 of 2



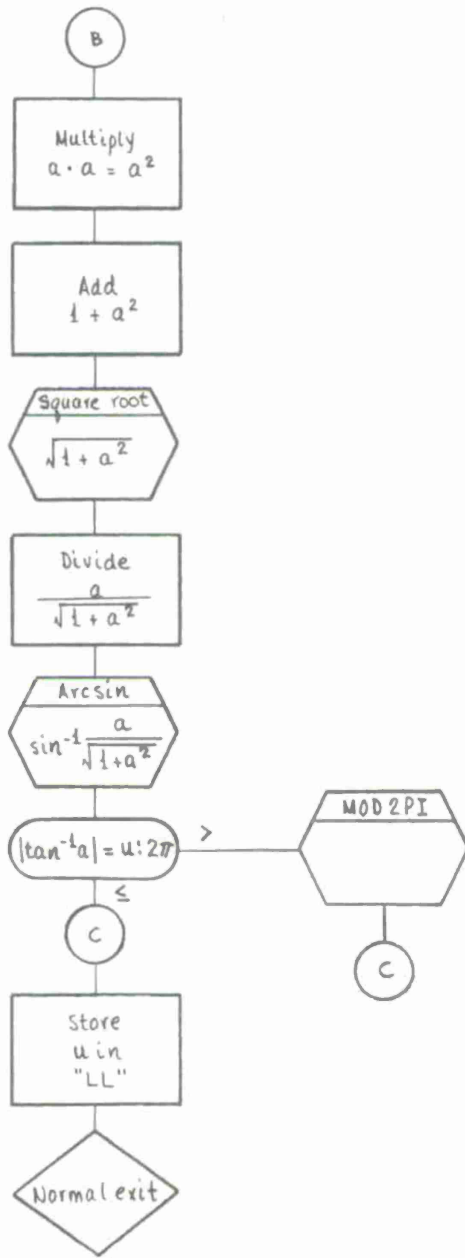
$$P = \frac{a(1-e^2)}{1+e \cos(u-w)}$$

BRANGE

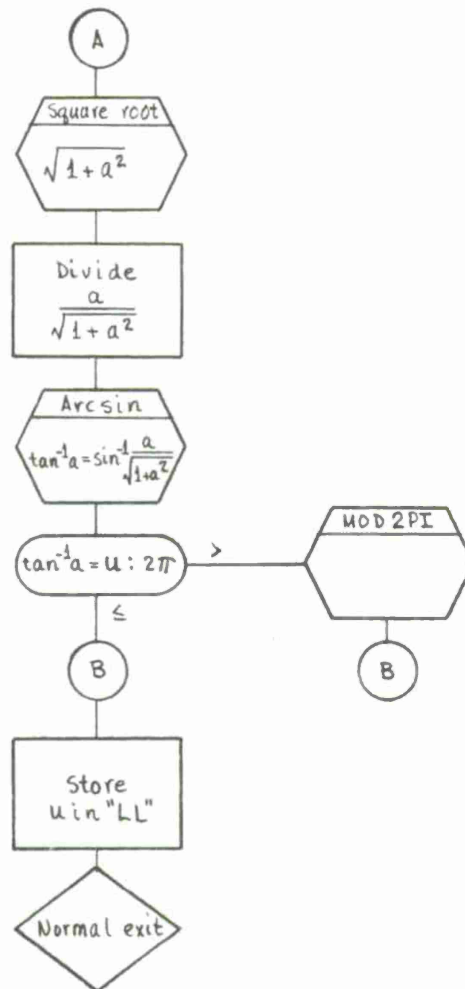
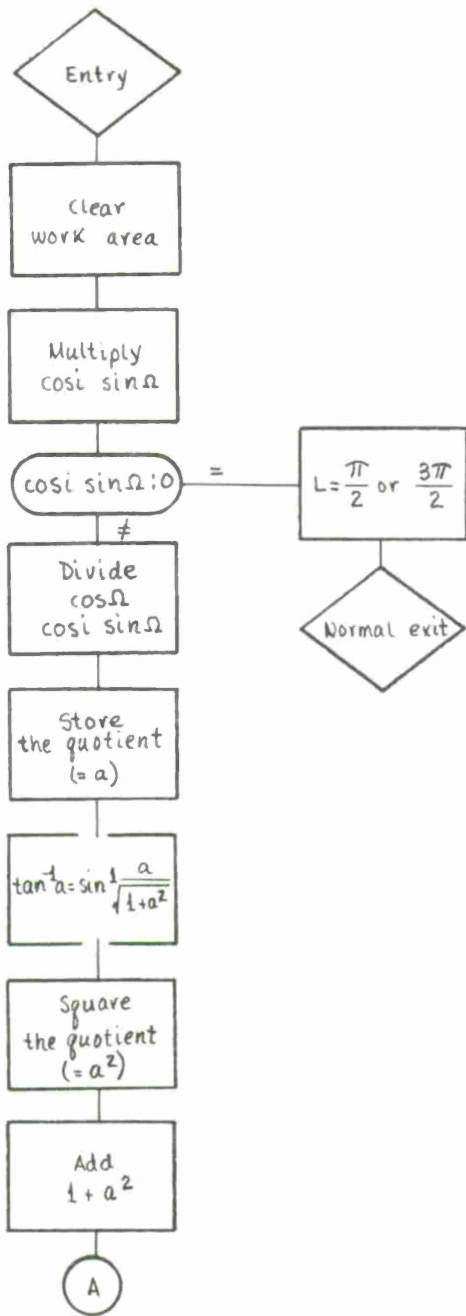


$$u = \tan^{-1} \left(\frac{\cos \omega \tan \alpha - \sin \omega}{\tan \alpha \cos \omega \sin \omega + \cos \omega \cos \omega} \right)$$

LATI
Sheet 1 of 2

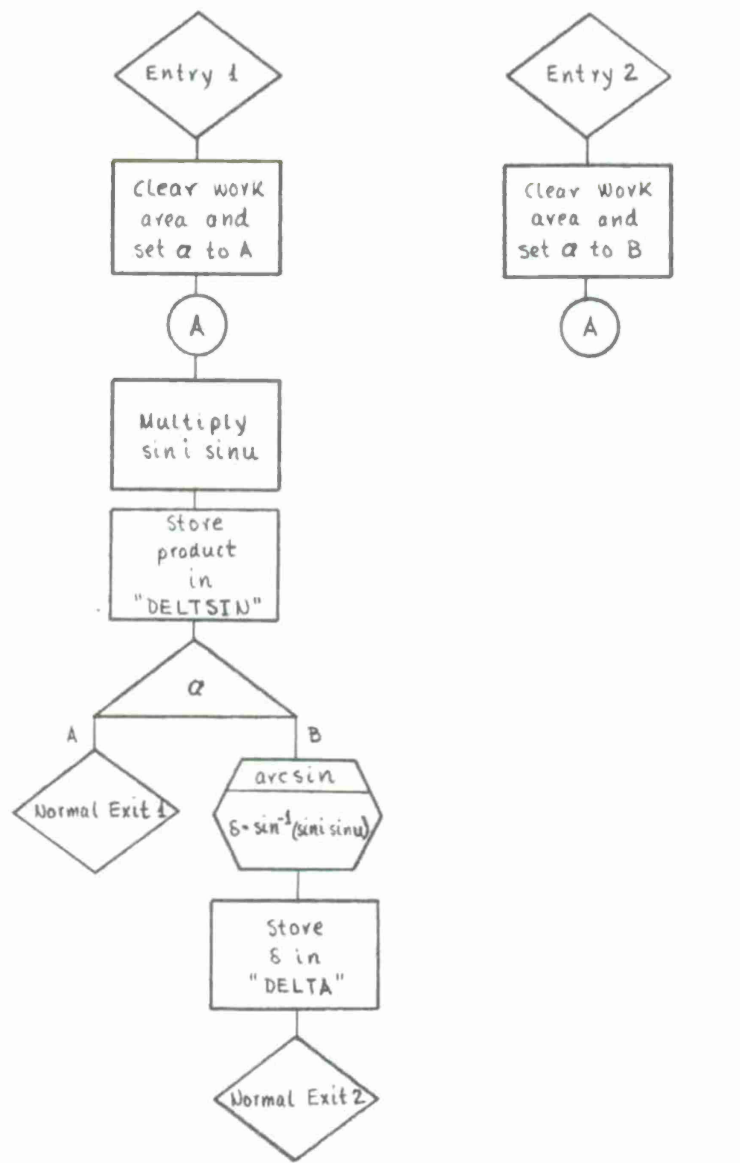


LATI
Sheet 2 of 2



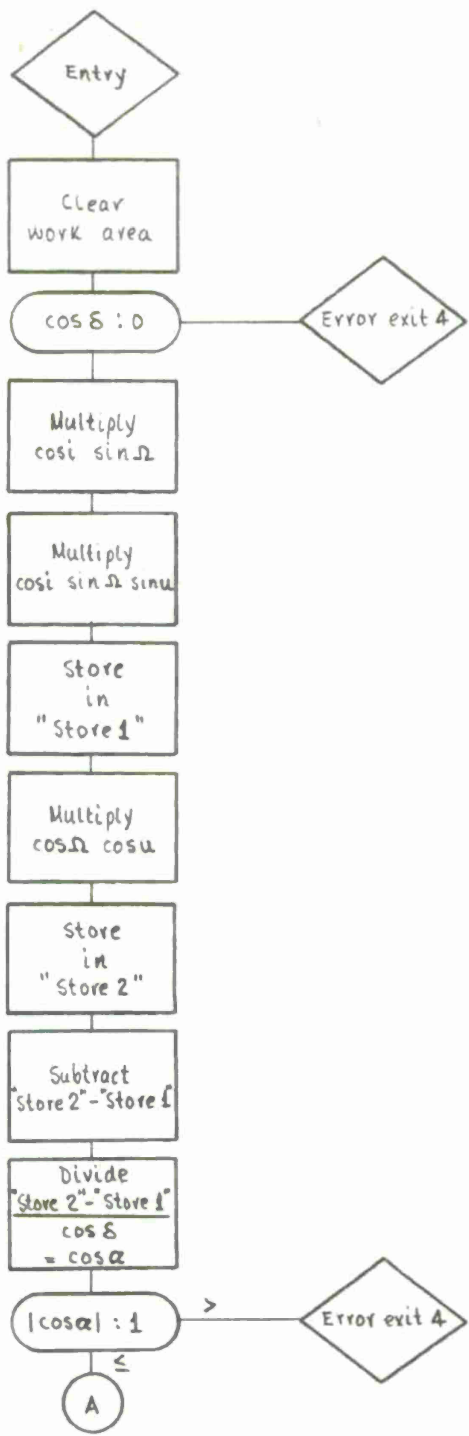
$$u = \tan^{-1} \left(\frac{\cos \Omega}{\cos \Omega \sin \Omega} \right)$$

LAT2



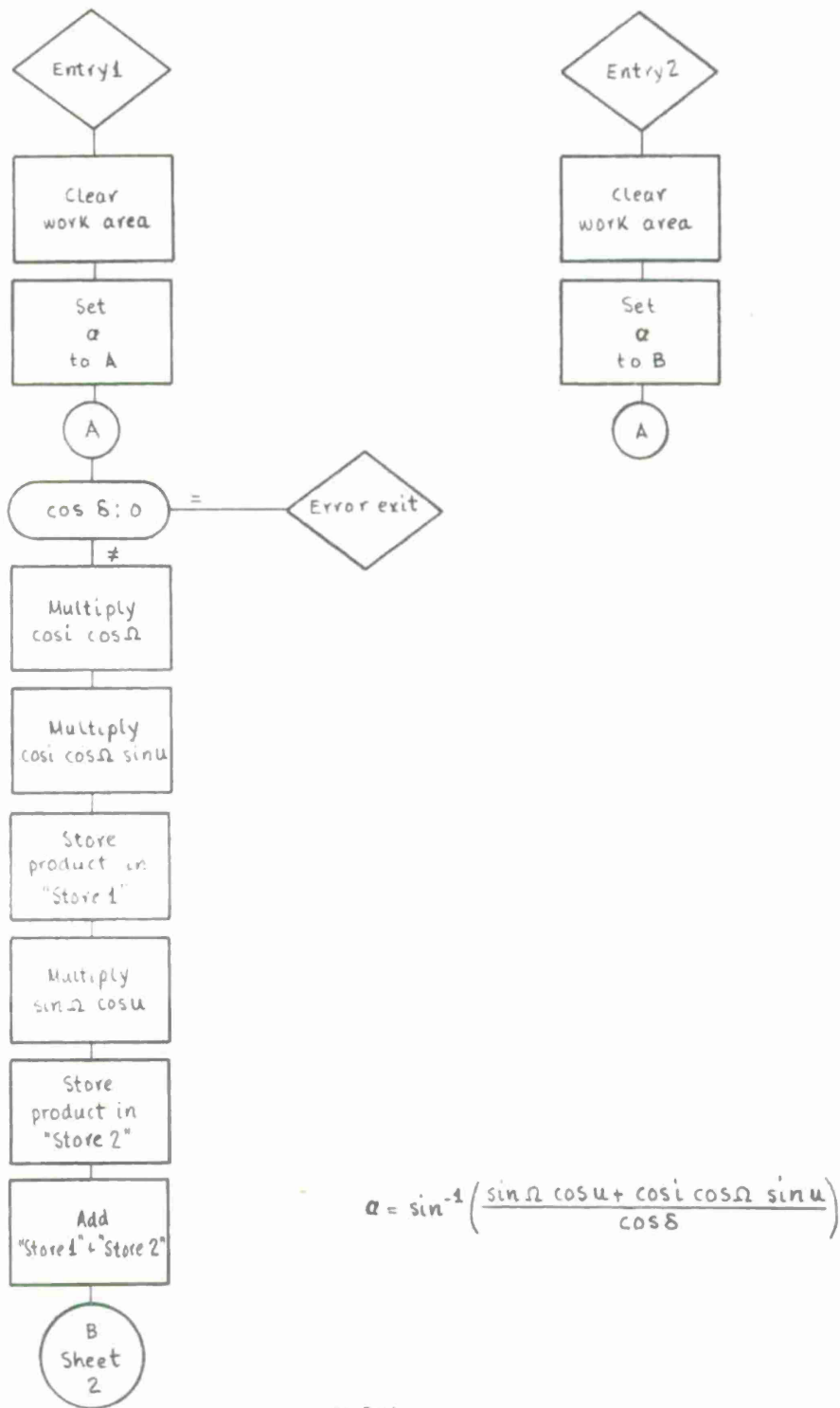
$$\delta = \sin^{-1}(\text{sini sinu})$$

DECLIN
&
SINDECLIN

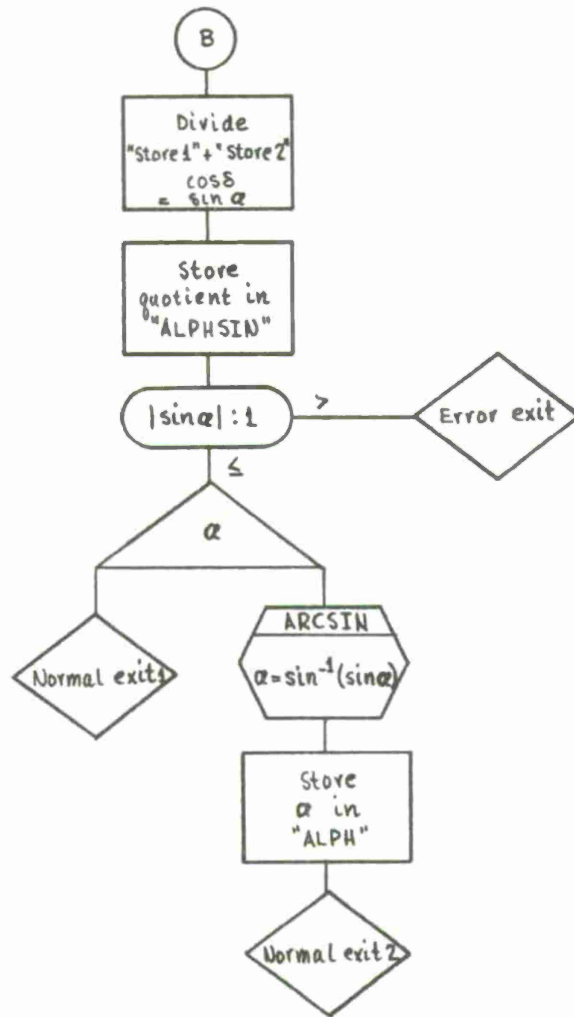


$$\cos \alpha = \frac{\cos \Omega \cos u - \cos i \sin \Omega \sin u}{\cos \delta}$$

COSALF

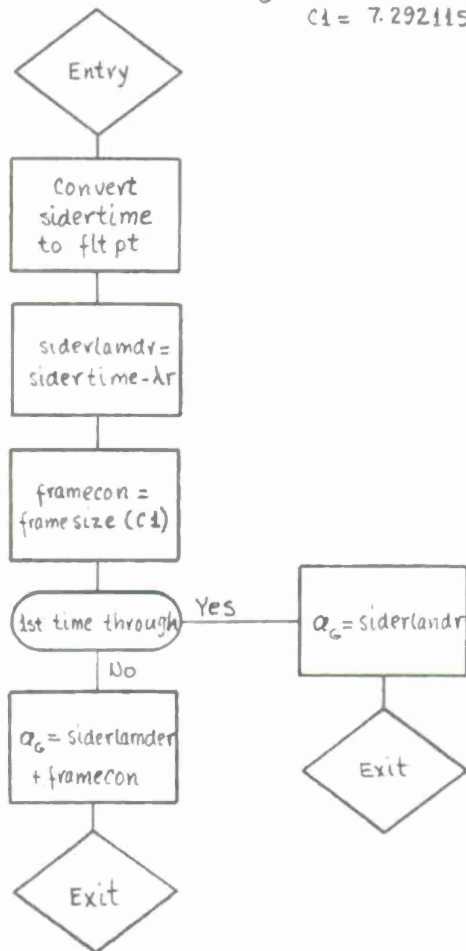


$$\alpha = \sin^{-1} \left(\frac{\sin \Omega \cos u + \cos i \cos \Omega \sin u}{\cos \delta} \right)$$

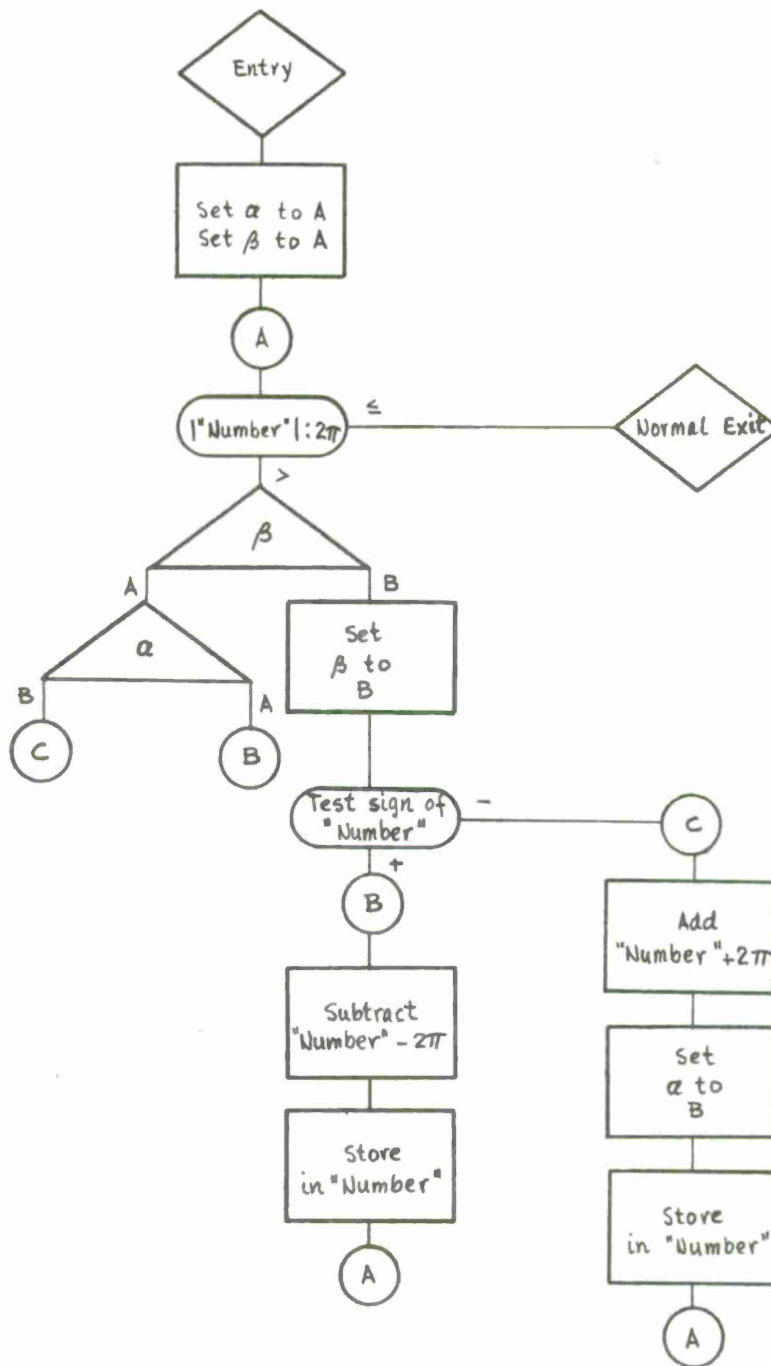


ALPHA
Sheet 2 of 2

$$a_0 = \text{sidertime} - \lambda_r + \text{framesize} (c1) \text{ where } c1 = 7.292115847 \times 10^{-5}$$



ALPHAGNEW.



MOD2PI

CARDS	LI	ID	LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
.	00000		BELTP		PROGRAM PONTON*7/1/65					
.	00001				CALL FLTPT					
.	00002		BELTP		U-TAG BELTC2*BELTCON	00000	00644	00002		
.	00003				FD 1*BELTP	00001	07122	13125		
.	00004		BELTCON		ENTRY	00002	61000	00000		FIRST
.	00005				STR B4*L(BELTCB4)	00003	16410	00634		
.	00006				STR B5*L(BELTCB5)	00004	16510	00635		
.	00007				STR B6*L(BELTCB6)	00005	16610	00636		
.	00010				STR B7*L(BELTCB7)	00006	16710	00637		
.	00011				STR B1*L(BELTCB1)	00007	16110	00633		
.	00012				CL W(ELEV)	00010	16030	63054		
.	00013				CL W(UNDEARTH SW)	00011	16030	05677		INITIALIZE
.	00014				CL W(NCODE)	00012	16030	05703		
.	00015				ENT A*L(DAY)	00013	11010	63150		
.	00016				LSH A*3	00014	06000	00003		
.	00017				ADD A*W(JULDAY064)	00015	20030	06125		
.	00020				STR A*W(CURJULDAYF)	00016	15030	05516		
.	00021				ENT B4*3	00017	12400	00003		
.	00022				ENT B5*CURJULDAYF	00020	12500	05516		
.	00023				ENT B6*CURJULDAY	00021	12600	05514		
.	00024				FNT B7*10	00022	12700	00010		
.	00025				RJP FLTPT	00023	65000	06266		
.	00026				ENT B4*0	00024	12400	00000		CONVERT TO FLTPT
.	00027				ENT B4*280	00025	12400	00034		
.	00030				ENT B5*CEL TIME	00026	12500	63133		
.	00031				ENT B6*TIMETEMP	00027	12600	05472		
.	00032				ENT B7*10	00030	12700	00010		
.	00033				RJP FLTPT	00031	65000	06266		
.	00034				ENT B4*TIMETEMP	00032	12400	05472		
.	00035				ENT B5*TCNV	00033	12500	06130		
.	00036				ENT B6*TIME	00034	12600	05466		
.	00037				ENT B7*02	00035	12700	00002		
.	00040				RJP FLTPT	00036	65000	06266		
.	00041				ENT Q*36610	00037	10000	36610		
.	00042				STR Q*U(BELTCB7X)	00040	14020	00640		
.	00043				ENT Q*61000	00041	10000	61000		
.	00044				STR Q*U(BELTC SW)	00042	14020	00766		
.	00045				RJP BRESTORE	00043	65000	05355		
.	00046				RJP DATAIN	00044	65000	01255		
.	00047				RJP BCONVERT	00045	65000	05306		
.	00050				ENT A*W(VMONTH)	00046	11030	05446		EPOCH MONTH
.	00051				SUB A*1	00047	21000	00001		
.	00052				ENT B7*A	00050	12770	00000		
.	00053				ENT A*W(VYEAR)	00051	11030	05444		
.	00054				SEL CL*X77774	00052	52040	77774		
.	00055				ENT Q*A	00053	10070	00000		
.	00056				ENT A*W(DYPRMO+B7)	00054	11037	06177		
.	00057				ADD Q*0*QZERO	00055	26400	00000		
.	00060				JP \$*3	00056	61000	00061		
.	00061				COM A*59D*YMORE	00057	04700	00073		
.	00062				ADD A*1	00060	20000	00001		
.	00063				STR A*W(BDAY)	00061	15030	05474		
.	00064				ENT A*U(YEAR MONTH)	00062	11020	63147		

CAROS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	00065	SUB A=19570	00063	21000	03645		
.	00066	ENT B7=A	00064	12770	00000		
.	00067	ENT A=W(OYPRYR+B7)	00065	11037	06213		
.	00070	AOD A=L(DAY)	00066	20010	63150		
.	00071	STR A=W(BDAYNOW)	00067	15030	05476		
.	00072	ENT A=W(VYEAR)	00070	11030	05444		
.	00073	SUB A=19570	00071	21000	03645		
.	00074	ENT B7=A	00072	12770	00000		
.	00075	ENT A=W(DYPRYR+B7)	00073	11037	06213		
.	00076	ADD A=W(BDAY)	00074	20030	05474		
.	00077	STR A=W(BDAY1)	00075	15030	06232		
.	00100	ENT B4=0	00076	12400	00000		CONVERT BDAY TO FLTPT
.	00101	ENT B5=BDAY1	00077	12500	06232		
.	00102	ENT B6=FLTBDAY	00100	12600	05500		
.	00103	ENT B7=10	00101	12700	00010		
.	00104	RJP FLTPT	00102	65000	06266		
.	00105	ENT B4=FLTBDAY	00103	12400	05500		ADD DAYS TO CALCULATED EPOCH D AYS
.	00106	ENT B5=VOAY	00104	12500	05450		
.	00107	ENT B6=NSTIME	00105	12600	05506		
.	00110	ENT B7=00	00106	12700	00000		
.	00111	RJP FLTPT	00107	65000	06266		
.	00112	ENT B4=0	00110	12400	00000		
.	00113	ENT B5=BDAYNOW	00111	12500	05476		
.	00114	ENT B6=FLTNDAY	00112	12600	05502		
.	00115	ENT B7=10	00113	12700	00010		
.	00116	RJP FLTPT	00114	65000	06266		
.	00117	ENT B4=FLTNQAY	00115	12400	05502		
.	00120	ENT B5=TIMETEMP	00116	12500	05472		
.	00121	ENT B6=NTIME1	00117	12600	05504		
.	00122	ENT B7=00	00120	12700	00000		
.	00123	RJP FLTPT	00121	65000	06266		
.	00124	ENT B4=NTIME1	00122	12400	05504		
.	00125	ENT B5=NSTIME	00123	12500	05506		
.	00126	ENT B6=FLTDIFF	00124	12600	05512		
.	00127	ENT B7=01	00125	12700	00001		
.	00130	RJP FLTPT	00126	65000	06266		
.	00131	ENT B4=FLTDIFF	00127	12400	05512		
.	00132	ENT B5=TCNV	00130	12500	06130		
.	00133	ENT B6=FLTSECDIFF	00131	12600	05510		
.	00134	ENT B7=02	00132	12700	00002		
.	00135	RJP FLTPT	00133	65000	06266		
.	00136	ENT B4=200	00134	12400	00024		
.	00137	ENT B5=LONGITUDE	00135	12500	63320		
.	00140	ENT B6=LAMDR	00136	12600	05765		
.	00141	ENT B7=10	00137	12700	00010		
.	00142	RJP FLTPT	00140	65000	06266		
.	00143	ENT B5=GEOCNLAT	00141	12500	63322		
.	00144	ENT B6=GLR	00142	12600	06161		
.	00145	RJP FLTPT	00143	65000	06266		
.	00146	ENT B4	00144	12400	00000		
.	00147	ENT B4=LAMOR	00145	12400	05765		
.	00150	ENT B5=ANGCONV	00146	12500	06126		

CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	00151	ENT B6*LAMDR	00147	12600	05765		
.	00152	ENT B7*02	00150	12700	00002		
.	00153	RJP FLTPT	00151	65000	06266		
.	00154	ENT B4*GLR	00152	12400	06161		
.	00155	ENT B6*GLR	00153	12600	06161		
.	00156	RJP FLTPT	00154	65000	06266		
.	00157	ENT B4*EE	00155	12400	05430		CALCULATE E\$\$\$
.	00160	ENT B5*EE	00156	12500	05430		X
.	00161	ENT B6*BELPROD	00157	12600	06242		X
.	00162	ENT B7*02	00160	12700	00002		X
.	00163	ENT B1*1	00161	12100	00001		
.	00164	RJP FLTPT	00162	65000	06266		
.	00165	ENT B4*FLTONE	00163	12400	06136		CALCULATE I-E\$\$\$
.	00166	ENT B5*BELPROD	00164	12500	06242		X
.	00167	ENT B6*BELDIFF	00165	12600	06236		X
.	00170	ENT B7*01	00166	12700	00001		X
.	00171	ENT B1*1	00167	12100	00001		
.	00172	RJP FLTPT	00170	65000	06266		X XEC SUB
.	00173	ENT B4*BELDIFF	00171	12400	06236		CALCULATE A\$(1-E\$\$\$)
.	00174	ENT B5*AA	00172	12500	05426		X
.	00175	ENT B6*NUMRAN	00173	12600	06163		X
.	00176	ENT B7*02	00174	12700	00002		X
.	00177	ENT B1*1	00175	12100	00001		
.	00200	RJP FLTPT	00176	65000	06266		CALCULATION STORED IN NUMRAN
.	00201	ENT A*W(II)	00177	11030	05432		
.	00202	ENT Q*W(II+1)	00200	10030	05433		
.	00203	RJP M002P1	00201	65000	03752		
.	00204	STR A*W(II)	00202	15030	05432		
.	00205	STR Q*W(II+1)	00203	14030	05433		CORRECTED I
.	00206	ENT B4*II	00204	12400	05432		CALCULATE SIN I
.	00207	ENT B6*II SIN	00205	12600	05540		
.	00210	ENT B7*13	00206	12700	00013		
.	00211	ENT B1*1	00207	12100	00001		
.	00212	RJP FLTPT	00210	65000	06266		SIN I
.	00213	ENT B6*IICOS	00211	12600	05542		
.	00214	ENT B7*14	00212	12700	00014		
.	00215	ENT B1*1	00213	12100	00001		
.	00216	RJP FLTPT	00214	65000	06266		COS I
.	00217	ENT B4*DRAM	00215	12400	05442		
.	00220	ENT B5*FLTSECDIFF	00216	12500	05510		
.	00221	ENT B6*BELPROD	00217	12600	06242		
.	00222	ENT B7*02	00220	12700	00002		
.	00223	ENT B1*1	00221	12100	00001		
.	00224	RJP FLTPT	00222	65000	06266		MUL RAM X SUBTRACTION
.	00225	ENT B4*SRAM	00223	12400	05440		
.	00226	ENT B5*BELPROD	00224	12500	06242		
.	00227	ENT B6*RAM	00225	12600	05727		
.	00230	ENT B7*00	00226	12700	00000		
.	00231	ENT B1*1	00227	12100	00001		
.	00232	RJP FLTPT	00230	65000	06266		ADD STARTING RAM TO MULT=RAM
.	00233	ENT B4*DOMEGA	00231	12400	05436		

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CAROS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	00234	ENT B5*FLTSECDIFF	00232	12500	05510		
.	00235	ENT B6*BELPROD	00233	12600	06242		
.	00236	ENT B7*02	00234	12700	00002		MUL OMEGA X SUBTRACTION
.	00237	ENT B1*1	00235	12100	00001		
.	00240	RJP FLTPT	00236	65000	06266		
.	00241	ENT B4*SOMEGA	00237	12400	05434		
.	00242	ENT B5*BELPROD	00240	12500	06242		
.	00243	ENT B6*ZOMEGA	00241	12600	05725		
.	00244	ENT B7*00	00242	12700	00000		
.	00245	ENT B1*1	00243	12100	00001		
.	00246	RJP FLTPT	00244	65000	06266		CALCULATED OMEGA
.	00247	ENT Q*W(ZOMEGA+1)	00245	10030	05726		FRAC IN Q REG
.	00250	ENT A*W(ZOMEGA)	00246	11030	05725		EXP IN A REG
.	00251	RJP M002PI	00247	65000	03752		CORRECTION OMEGA
.	00252	STR A*W(ZOMEGA)	00250	15030	05725		CORRECTED OMEGA
.	00253	STR Q*W(ZOMEGA+1)	00251	14030	05726		
.	00254	ENT A*W(RAM)	00252	11030	05727		RAM EXP IN A REG
.	00255	ENT Q*W(RAM+1)	00253	10030	05730		RAM FRAC IN Q REG
.	00256	RJP M002PI	00254	65000	03752		IS ABS VAL RAM LESS OR =2PI
.	00257	STR A*W(RAM)	00255	15030	05727		CORRECTED RAM
.	00260	STR Q*W(RAM+1)	00256	14030	05730		
.	00261	PUT W(RAM)*W(RAMLAST)	00257	10030	05727		
.	00262	PUT W(RAM+1)*W(RAMLAST+1)	00260	14030	05757		
.	00262	PUT W(RAM+1)*W(RAMLAST+1)	00261	10030	05730		
.	00263	CL W(TLAST)	00262	14030	05760		
.	00264	CL W(TLAST+1)	00263	16030	05520		
.	00265	MOVE 2*NSTIME*TIME2LAST	00264	16030	05521		
.	00265	MOVE 2*NSTIME*TIME2LAST	00265	10030	05506		
.	00266	PUT W(ZOMEGA)*W(MEGALAST)	00266	14030	05522		
.	00266	PUT W(ZOMEGA)*W(MEGALAST)	00267	10030	05507		
.	00267	PUT W(ZOMEGA+1)*W(MEGALAST+1)	00270	14030	05523		
.	00267	PUT W(ZOMEGA+1)*W(MEGALAST+1)	00271	10030	05725		
.	00270	NO-OP CALCULATE	00272	14030	05761		
.	00271	ENT B4*NUMRAN	00273	10030	05726		
.	00272	ENT B5*B4	00274	14030	05762		
.	00273	ENT B6*PP	00275	12000	00000		N FOR DOPPLERS
.	00274	ENT B7*02	00276	12400	06163		
.	00275	RJP FLTPT	00277	12504	00000		
.	00276	ENT B4*EE	00300	12600	06065		
.	00277	ENT B5*EE	00301	12700	00002		
.	00300	ENT B6*EE2	00302	65000	06266		
.	00301	ENT B7*02	00303	12400	05430		
.	00302	RJP FLTPT	00304	12500	05430		
.	00303	ENT B4*FLTONE	00305	12600	06047		
.	00304	ENT B5*EE2	00306	12700	00002		
.	00305	ENT B6*EE2M1	00307	65000	06266		E\$\$2
.	00306	ENT B7*01	00310	12400	06136		
.	00307	RJP FLTPT	00311	12500	06047		
.	00310	ENT B4*EE2M1	00312	12600	06051		
.	00311	ENT B6*FACTOR6	00313	12700	00001		
.	00311	ENT B6*FACTOR6	00314	65000	06266		I-E\$\$2
.	00311	ENT B6*FACTOR6	00315	12400	06051		
.	00311	ENT B6*FACTOR6	00316	12600	06037		

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CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	00312	ENT B7*12	00317	12700	00012		
.	00313	RJP FLTPT	00320	65000	06266		SQRT(I-E\$\$2)
.	00314	ENT B4*IISIN	00321	12400	05540		
.	00315	ENT B5*IISIN	00322	12500	05540		
.	00316	ENT B6*IISIN2	00323	12600	05670		
.	00317	ENT B7*02	00324	12700	00002		
.	00320	RJP FLTPT	00325	65000	06266		SINI\$\$2
.	00321	ENT B4*THRF	00326	12400	06155		
.	00322	ENT B5*IISIN2	00327	12500	05670		
.	00323	ENT B6*FACTOR5	00330	12600	06035		
.	00324	ENT B7*02	00331	12700	00002		
.	00325	RJP FLTPT	00332	65000	06266		3/2 SINI\$\$2
.	00326	ENT B4*FLTONE	00333	12400	06136		
.	00327	ENT B5*FACTOR5	00334	12500	06035		
.	00330	ENT B6*FACTOR4	00335	12600	06033		
.	00331	ENT B7*01	00336	12700	00001		
.	00332	RJP FLTPT	00337	65000	06266		1-3/2 SINI\$\$2
.	00333	ENT B4*A2	00340	12400	06173		
.	00334	ENT B5*PP	00341	12500	06065		
.	00335	ENT B6*FACTOR3	00342	12600	06031		
.	00336	ENT B7*03	00343	12700	00003		
.	00337	RJP FLTPT	00344	65000	06266		A2/P\$\$2
.	00340	ENT B4*WONETH	00345	12400	06132		
.	00341	ENT B5*FACTOR3	00346	12500	06031		
.	00342	ENT B6*FACTOR2	00347	12600	06027		
.	00343	ENT B7*02	00350	12700	00002		
.	00344	RJP FLTPT	00351	65000	06266		1/3 (A2/P\$\$2)
.	00345	ENT B4*FACTOR2	00352	12400	06027		
.	00346	ENT B5*FACTOR4	00353	12500	06033		
.	00347	ENT B6*FACTOR1	00354	12600	06025		
.	00350	ENT B7*02	00355	12700	00002		
.	00351	RJP FLTPT	00356	65000	06266		1/3(A2/P\$\$2)(1-3/2SINI\$\$2)
.	00352	ENT B4*FACTOR1	00357	12400	06025		
.	00353	ENT B5*FACTOR6	00360	12500	06037		
.	00354	ENT B6*FACTOR11X	00361	12600	06077		
.	00355	RJP FLTPT	00362	65000	06266		ABOVE(I-E\$\$2)\$\$1/2
.	00356	ENT B4*FLTONE	00363	12400	06136		
.	00357	ENT B5*FACTOR11X	00364	12500	06077		
.	00360	ENT B6*FACTOR10	00365	12600	06041		
.	00361	ENT B7*01	00366	12700	00001		
.	00362	RJP FLTPT	00367	65000	06266		1-ABOVE
.	00363	ENT B4*AA	00370	12400	05426		
.	00364	ENT B5*FACTOR10	00371	12500	06041		
.	00365	ENT B6*KKNCALC	00372	12600	06055		
.	00366	ENT B7*03	00373	12700	00003		
.	00367	RJP FLTPT	00374	65000	06266		A/ABOVE
.	00370	ENT B4*KKNCALC	00375	12400	06055		
.	00371	ENT B5*ERCON	00376	12500	06171		
.	00372	ENT B6*KKCM	00377	12600	06075		
.	00373	ENT B7*02	00400	12700	00002		
.	00374	RJP FLTPT	00401	65000	06266		CONVERT K TO CM
.	00375	ENT B4*FLTONE	00402	12400	06136		
.	00376	ENT B5*KKCM	00403	12500	06075		

BELTP

CARDS	LI	ID	LABEL	TA	STATEMENT	LOC	F	JK ^B	Y	NOTES
.	00377			ENT	B6•KRECIP	00404	12600	06057		
.	00400			ENT	B7•03	00405	12700	00003		
.	00401			RJP	FLTPT	00406	65000	06266		1/K
.	00402			ENT	B4•GM	00407	12400	06167		
.	00403			ENT	B5•KRECIP	00410	12500	06057		
.	00404			ENT	B5•GMK	00411	12600	06061		
.	00405			ENT	B7•02	00412	12700	00002		
.	00406			RJP	FLTPT	00415	65000	06266		GM/K
.	00407			ENT	B4•GMK	00414	12400	06061		
.	00410			ENT	B6•FACTOR 11	00415	12600	06043		
.	00411			ENT	B7•12	00416	12700	00012		
.	00412			RJP	FLTPT	00417	65000	06266		SQRT (GM/K)
.	00413			ENT	B4•FACTOR 11	00420	12400	06043		
.	00414			ENT	B5•KRECIP	00421	12500	06057		
.	00415			ENT	B6•NN	00422	12600	05743		
.	00416			ENT	B7•02	00423	12700	00002		
.	00417			RJP	FLTPT	00424	65000	06266		N=1/K(SQRT(GM/K))
.	00420			ENT	B4•L(SCHDSW)	00425	12410	05425		SCHEDULE INDICATOR
.	00421			RJP	L(BELTCTAB+B4)	00426	65014	00770		JUMP TO SCHEDULE AS INDICATED
.	00422			JP	BELTCERR	00427	61000	00761		ERROR RETURN
.	00423	BELTC3		RJP	L(BELTCTABA+B4)	00430	65014	00774		
.	00424			JP	BELTCERR	00431	61000	00761		
.	00425			ENT	B4•DELTA	00432	12400	05452		
.	00426			ENT	B6•DELTSIN	00433	12600	05550		
.	00427			ENT	B7•13	00434	12700	00013		
.	00430			RJP	FLTPT	00435	65000	06266		
.	00431			ENT	B6•DELTCOS	00436	12600	05562		
.	00432			ENT	B7•14	00437	12700	00014		
.	00433			RJP	FLTPT	00440	65000	06266		
.	00434			ENT	B4•ALPHB	00441	12400	05460		
.	00435			ENT	B6•ALPHCOS	00442	12600	05606		
.	00436			RJP	FLTPT	00443	65000	06266		
.	00437			ENT	B6•ALPHSIN	00444	12600	05574		
.	00440			ENT	B7•13	00445	12700	00013		
.	00441			RJP	FLTPT	00446	65000	06266		
.	00442			ENT	B4•RANGER	00447	12400	05731		
.	00443			ENT	B5•DELTSIN	00450	12500	05550		
.	00444			ENT	B6•ZZ	00451	12600	06023		
.	00445			ENT	B7•02	00452	12700	00002		
.	00446			RJP	FLTPT	00453	65000	06266		
.	00447			ENT	B5•DELTCOS	00454	12500	05562		
.	00450			ENT	B6•TXX1	00455	12600	06017		
.	00451			RJP	FLTPT	00456	65000	06266		
.	00452			ENT	B4•ALPHSIN	00457	12400	05574		
.	00453			ENT	B5•TXX1	00460	12500	06017		
.	00454			ENT	B6•YY	00461	12600	06021		
.	00455			RJP	FLTPT	00462	65000	06266		
.	00456			ENT	B4•ALPHCOS	00463	12400	05606		
.	00457			ENT	B6•TXX	00464	12600	06015		
.	00460			RJP	FLTPT	00465	65000	06266		
.	00461			ENT	B4•ALPHB	00466	12400	05460		SET UP FOR COS ORIENT
.	00462			ENT	B5•RAM	00467	12500	05727		X

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CAROS	LI IO LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	00463	ENT 86*CHI	00470	12600	05773	X	
.	00464	ENT 87*01	00471	12700	00001	X	
.	00465	RJP FLTPT	00472	65000	06266	X	
.	00466	ENT A*W(CHI)	00473	11030	05773	MAKE CHI MOD I 2PI	
.	00467	ENT Q*W(CHI+1)	00474	10030	05774	X	
.	00470	RJP M002PI	00475	65000	03752	X	
.	00471	STR A*W(CHI)	00476	15030	05773	X	
.	00472	STR Q*W(CHI+1)	00477	14030	05774	X	
.	00473	ENT 84*CHI	00500	12400	05773	COS OF CHI	
.	00474	ENT 86*COSCHI	00501	12600	05660	X	
.	00475	ENT 87*14	00502	12700	00014	X	
.	00476	RJP FLTPT	00503	65000	06266	X	
.	00477	ENT 84*IISIN	00504	12400	05540	SIN I X COS CHI	
.	00500	ENT 85*COSCHI	00505	12500	05660	X	
.	00501	ENT 86*COSCHI	00506	12600	05660	X	
.	00502	ENT 87*02	00507	12700	00002	X	
.	00503	RJP FLTPT	00510	65000	06266	X	
.	00504	ENT A*W(COSCHI)	00511	11030	05660	CHECK BALUE OF COS	
.	00505	SUB A*40001*APOS	00512	21600	40001	IS COS GRTR 1	
.	00506	JP BELTCC	00513	61000	00531	NO	
.	00507	JP \$+3*AZERO	00514	60400	00517	MAYBE	
.	00510 BELTCERR	ENT A*11	00515	11000	00011	YES	
.	00511	JP BELTCERR	00516	61000	00761		
.	00512	ENT A*W(COSCHI+1)*APOS	00517	11630	05661	CHECK FRACTION	
.	00513	CP A*	00520	15040	00000	FRACTION NEG MAKE IT +	
.	00514	SUB A*W(FLTONE+1)*ANDT	00521	21530	06137		
.	00515	JP BELTCC	00522	61000	00531		
.	00516	COM A*77*YMORE	00523	04700	00077		
.	00517	JP BELTCERR	00524	61000	00515		
.	00520	ENT A*W(FLTONE+1)	00525	11030	06137		
.	00521	ENT Q*W(COSCHI+1)*QPOS	00526	10230	05661		
.	00522	STR A*CPW(COSCHI+1)*SKIP	00527	15170	05661		
.	00523	STR A*W(COSCHI+1)	00530	15030	05661		
.	00524 BELTCC	ENT 84*COSCHI	00531	12400	05660		
.	00525	ENT 85*COSCHI	00532	12500	05660	X	
.	00526	ENT 86*COSCHI2	00533	12600	05775	X	
.	00527	ENT 87*02	00534	12700	00002	X	
.	00530	RJP FLTPT	00535	65000	06266	X	
.	00531	ENT 84*FLTONE	00536	12400	06136	1-COS X COS	
.	00532	ENT 85*COSCHI2	00537	12500	05775	X	
.	00533	ENT 86*SINCHI	00540	12600	05662	X	
.	00534	ENT 87*01	00541	12700	00001	X	
.	00535	RJP FLTPT	00542	65000	06266	X	
.	00536	ENT 84*SINCHI	00543	12400	05662	SQRT OF 1-COS X COS	
.	00537	ENT 86*SINCHI	00544	12600	05662	X	
.	00540	ENT 87*12	00545	12700	00012	X	
.	00541	RJP FLTPT	00546	65000	06266	X	
.	00542	ENT 84*ALPHB	00547	12400	05460	CONVERT TO REVOLUTIONS	
.	00543	ENT 85*BEL2PI	00550	12500	06165	X	
.	00544	ENT 86*ALPHB1	00551	12600	05767	X	
.	00545	ENT 87*03	00552	12700	00003	X	
.	00546	RJP FLTPT	00553	65000	06266	X	
.	00547	ENT 84*DELTB	00554	12400	05452	CONVERT TO REVOLUTIONS	

..... SPURT OUTPUT NO. 210
 BELTP PONTON*7/1/65

CARDS	LI	ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	00550		ENT B6*DELTB1	00555	12600	05771		X
.	00551		ENT B7*03	00556	12700	00003		X
.	00552		RJP FLTPT	00557	65000	06266		
.	00553		ENT B4*27D	00560	12400	00033		
.	00554		ENT B5*ALPHB1	00561	12500	05767		X
.	00555		ENT B6*RA	00562	12600	63002		X
.	00556		ENT B7*11	00563	12700	00011		X
.	00557		RJP FLTPT	00564	65000	06266		
.	00560		ENT B4*27D	00565	12400	00033		
.	00561		ENT B5*OELTB1	00566	12500	05771		X
.	00562		ENT B6*DEC	00567	12600	63003		X
.	00563		ENT B7*11	00570	12700	00011		X
.	00564		RJP FLTPT	00571	65000	06266		
.	00565		ENT A*W(SINCHI+1)*ANOT	00572	11530	05663		
.	00566		JP SCHICON	00573	61000	00613		
.	00567		ENT A*W(COSCHI+1)*ANOT	00574	11530	05661		
.	00570		JP CCHICON	00575	61000	00617		
.	00571		ENT B4*29D	00576	12400	00035		
.	00572		ENT B5*SINCHI	00577	12500	05662		X
.	00573		ENT B6*SINORIENT	00600	12600	63064		X
.	00574		RJP FLTPT	00601	65000	06266		
.	00575		ENT B4*29D	00602	12400	00035		
.	00576		ENT B5*COSCHI	00603	12500	05660		X
.	00577		ENT B6*COSORIENT	00604	12600	63065		X
.	00600		RJP FLTPT	00605	65000	06266		
.	00601		ENT B4*22D	00606	12400	00026		CONVERT RADIUS TO FIXED PT.
.	00602		ENT B5*RANGEB	00607	12500	05731		X
.	00603		ENT B6*RADIUS	00610	12600	63006		X
.	00604		RJP FLTPT	00611	65000	06266		
.	00605		JP BELTJUMP	00612	61000	00622		
.	00606	SCHICON	ENT A*3777777777	00613	11030	07734		
.	00607		STR A*W(COSORIENT)	00614	15030	63065		
.	00610		CL W(SINORIENT)	00615	16030	63064		
.	00611		JP BELTJUMP	00616	61000	00622		
.	00612	CCHICON	ENT A*3777777777	00617	11030	07734		
.	00613		STR A*W(SINORIENT)	00620	15030	63064		
.	00614		CL W(COSORIENT)	00621	16030	63065		
.	00615	BELTJUMP	JP BELTEMSW	00622	61000	01000		
.	00616		MOVE 2*TLAST*TIME2LAST	00623	10030	05520		
				00624	14030	05522		
				00625	10030	05521		
				00626	14030	05523		
.	00617		MOVE 2*TIME*TLAST	00627	10030	05466		
				00630	14030	05520		
				00631	10030	05467		
				00632	14030	05521		
.	00620	BELTCB1	ENT B1*0	00633	12100	00000		
.	00621	BELTCB4	ENT B4*0	00634	12400	00000		
.	00622	BELTCB5	ENT B5*0	00635	12500	00000		
.	00623	BELTCB6	ENT B6*0	00636	12600	00000		
.	00624	BELTCB7	ENT B7*0	00637	12700	00000		
.	00625	BELTCB7X	RPL Y+1*L(BELTCB1)*SKIP	00640	36110	00002		
.	00626		RPL Y+1*L(BELTC2)*SKIP	00641	36110	00644		

CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	00627	JP BELTCN	00642	61000	00002		
.	00630	JP BELTC2	00643	61000	00644		
.	00631	BELTC2 ENTRY	00644	61000	00000		NEXT POINT ENTRY
.	00632	STR B1=L(BELTCB1)	00645	16110	00633		
.	00633	STR B4=L(BELTCB4)	00646	16410	00634		
.	00634	STR B5=L(BELTCB5)	00647	16510	00635		
.	00635	STR B6=L(BELTCB6)	00650	16610	00636		
.	00636	CL Q*	00651	10000	00000		
.	00637	ENT Q*12000	00652	10000	12000		
.	00640	STR Q*U(BELTC5W)	00653	14020	00766		
.	00641	STR Q*U(BELTCB7X)	00654	14020	00640		
.	00642	PUT I*W(INCODE)	00655	10000	00001		
.			00656	14030	05703		
.	00643	ENT B4*28D	00657	12400	00034		
.	00644	ENT B5*CELTIME	00660	12500	63133		
.	00645	ENT B6*TIME	00661	12600	05466		X
.	00646	ENT B7*10	00662	12700	00010		X
.	00647	RJP FLTPT	00663	65000	06266		
.	00650	ENT B4*TIME	00664	12400	05466		CONVERT TO SECONDS
.	00651	ENT B5*TCONV	00665	12500	06130		
.	00652	ENT B6*TIME	00666	12600	05466		X
.	00653	ENT B7*02	00667	12700	00002		
.	00654	RJP FLTPT	00670	65000	06266		X
.	00655	SYSTART1 ENT B4*TIME	00671	12400	05466		
.	00656	ENT B5*TLAST	00672	12500	05520		
.	00657	ENT B6*BELDIFF	00673	12600	06236		
.	00660	ENT B7*01	00674	12700	00001		
.	00661	ENT B1*1	00675	12100	00001		
.	00662	RJP FLTPT	00676	65000	06266		
.	00663	ENT B4*BELOIFF	00677	12400	06236		
.	00664	ENT B5*DRAM	00700	12500	05442		
.	00665	ENT B6*BELPROD	00701	12600	06242		
.	00666	ENT B7*02	00702	12700	00002		
.	00667	ENT B1*1	00703	12100	00001		
.	00670	RJP FLTPT	00704	65000	06266		MUL SUBT X DERIV OF RAM
.	00671	ENT B4*BELPROD	00705	12400	06242		
.	00672	ENT B5*RAMLAST	00706	12500	05757		
.	00673	ENT B6*RAM	00707	12600	05727		
.	00674	ENT B7*00	00710	12700	00000		
.	00675	ENT B1*1	00711	12100	00001		
.	00676	RJP FLTPT	00712	65000	06266		CALCULATED RAM
.	00677	RSH AQ*30D	00713	03000	00036		RAM FRAC IN QREG
.	00700	ENT A*W(RAM)	00714	11030	05727		RAM EXP I AREG
.	00701	RJP MOD2PI	00715	65000	03752		NUMBER MUST BE BETWEEN 0R =0 A ND 2PI
.	00702	STR A*W(RAM)	00716	15030	05727		CORRECTED RAM
.	00703	STR Q*W(RAM+1)	00717	14030	05730		
.	00704	ENT B4*TIME	00720	12400	05466		CALCULATE NEW OMEGA
.	00705	ENT B5*TLAST	00721	12500	05520		
.	00706	ENT B6*BELDIFF	00722	12600	06236		
.	00707	ENT B7*01	00723	12700	00001		
.	00710	ENT B1*1	00724	12100	00001		
.	00711	RJP FLTPT	00725	65000	06266		SUB T-TLAST

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BELTP

CARDS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	00712	ENT B4*BELDIFF	00726	12400	06236		
.	00713	ENT B5*DOMEGA	00727	12500	05436		
.	00714	ENT B6*BELPROD	00730	12600	06242		
.	00715	ENT B7*O2	00731	12700	00002		
.	00716	ENT B1*1	00732	12100	00001		
.	00717	RJP FLTPT	00733	65000	06266		MUL SUBT X DERIV OMEGA
.	00720	ENT B4*MEGALAST	00734	12400	05761		
.	00721	ENT B5*BELPROD	00735	12500	06242		
.	00722	ENT B6*ZOMEGA	00736	12600	05725		
.	00723	ENT B7*00	00737	12700	00000		
.	00724	ENT B1*1	00740	12100	00001		
.	00725	RJP FLTPT	00741	65000	06266		NEW OMEGA CALCULATED
.	00726	ENT A*W(ZOMEGA)	00742	11030	05725		OMEGA EXP IN AREG
.	00727	ENT Q*W(ZOMEGA+1)	00743	10030	05726		
.	00730	RJP M002PI	00744	65000	03752		
.	00731	STR A*W(ZOMEGA)	00745	15030	05725		CORRECTED OMEGA
.	00732	STR Q*W(ZOMEGA+1)	00746	14030	05726		
.	00733	PUT W(RAM)*W(RAMLAST)	00747	10030	05727		RAM = RAMLAST
.	00734	PUT W(RAM+1)*W(RAMLAST+1)	00750	14030	05757		
.	00735	PUT W(ZOMEGA)W(MEGALAST)	00751	10030	05730		
.	00736	PUT W(ZOMEGA+1)W(MEGALAST+1)	00752	14030	05760		OMEGA = OMEGALAST
.	00737	ENT B4*L(SCHOSW)	00753	10030	05725		
.	00740	JP BELTC3	00754	14030	05761		
.	00741 BELTCERR	ENT B4*L(BELTCB4)	00755	10030	05726		
.	00742	ENT B5*L(BELTCB5)	00756	14030	05762		
.	00743	ENT B6*L(BELTCB6)	00757	12410	05425		
.	00744	ENT B7*L(BELTCB7)	00760	61000	00430		
.	00745	ENT B1*L(BELTCB1)	00761	12410	00634		
.	00746 BELTCSW	JP BELTCON	00762	12510	00635		
.	00747	JP BELTC2	00763	12610	00636		
.	00750 BELTCTAB	O FIXLATI	00764	12710	00637		
.	00751	O FIXRATI	00765	12110	00633		
.	00752	O FIXRAI	00766	61000	00002		
.	00753	O FIXLONGI	00767	61000	00644		
.	00754 BELTCTABA	O FIXLAT	00770	00000	01764		
.	00755	O FIXRATE	00771	00000	02376		
.	00756	O FIXRA	00772	00000	02751		
.	00757	O FIXLONG	00773	00000	03610		
.	00760 BELTEMSW	RJP BELDV	00774	00000	02320		
.	00761	JP BELTCERR	00775	00000	02552		
.	00762	RJP ORANGE	00776	00000	03060		
.	00763	JP BELTCERR	00777	00000	03652		
.	00764	RJP DELDELTA	01000	65000	01011		
.	00765	JP BELTCERR	01001	61000	00761		
.	00766	RJP DALPHA	01002	65000	01073		
.	00767	JP BELTCERR	01003	61000	00761		
.	00770	JP BELTJUMP+1	01004	65000	01143		
.	00771 BELDV	ENTRY	01005	61000	00761		
.	00772	STR B4*L(BELDV84)	01006	65000	01203		
.			01007	61000	00761		
.			01010	61000	00623		
.			01011	61000	00000		
.			01012	16410	01064		

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BELTP

CARDS	LI IO LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	00773	STR B5=L(BELOVB5)	01013	16510	01065		
.	00774	STR B6=L(BELOVB6)	01014	16610	01066		
.	00775	STR B7=L(BELOVB7)	01015	16710	01067		
.	00776	ENT B4=LL	01016	12400	05707		
.	00777	ENT B5=ZOMEGA	01017	12500	05725		
.	01000	ENT B6=VV	01020	12600	05733		
.	01001	ENT B7=O1	01021	12700	00001		
.	01002	RJP FLTPT	01022	65000	06266		
.	01003	ENT B4=VV	01023	12400	05733		
.	01004	ENT B6=VVSIN	01024	12600	05530		
.	01005	ENT B7=13	01025	12700	00013		
.	01006	RJP FLTPT	01026	65000	06266		
.	01007	ENT B4=NN	01027	12400	05743		DV=(N\$A\$\$2\$SQRT(1-E\$\$2))/R\$\$2
.	01010	ENT B5=AA	01030	12500	05426		X
.	01011	ENT B6=BELPROD	01031	12600	06242		X
.	01012	ENT B7=O2	01032	12700	00002		X
.	01013	RJP FLTPT	01033	65000	06266		X N\$A
.	01014	ENT B4=BELPROD	01034	12400	06242		X
.	01015	RJP FLTPT	01035	65000	06266		X N\$A\$\$2
.	01016	ENT B4=FACTOR6	01036	12400	06037		
.	01017	ENT B5=BELPROD	01037	12500	06242		X
.	01020	ENT B6=BELPROD	01040	12600	06242		X
.	01021	ENT B7=O2	01041	12700	00002		X
.	01022	RJP FLTPT	01042	65000	06266		X N\$A\$\$2\$SQRT(1-E\$\$2)
.	01023	ENT B4=RANGEB	01043	12400	05731		
.	01024	ENT B5=RANGEB	01044	12500	05731		X
.	01025	ENT B6=BELSTOR1	01045	12600	06250		X
.	01026	ENT B7=O2	01046	12700	00002		X
.	01027	RJP FLTPT	01047	65000	06266		X R\$\$2
.	01030	ENT A=W(BELSTOR1+1)*ANOT	01050	11530	06251		
.	01031	JP BELOVERR	01051	61000	01071		
.	01032	ENT B4=BELPROD	01052	12400	06242		X
.	01033	ENT B5=BELSTOR1	01053	12500	06250		X N\$A\$\$2\$SQRT(1-E\$\$2)/R\$\$2 =DV/OT
.	01034	ENT B6=OV	01054	12600	05745		X
.	01035	ENT B7=O3	01055	12700	00003		X
.	01036	RJP FLTPT	01056	65000	06266		X
.	01037 BELDU	ENT B4=OV	01057	12400	05745		DU/DT= DV/OT +OW/OT
.	01040	ENT B5=OMEGA	01060	12500	05436		X
.	01041	ENT B6=OU	01061	12600	05747		X
.	01042	ENT B7=OO	01062	12700	00000		X
.	01043	RJP FLTPT	01063	65000	06266		X OU/DT CALCULATED
.	01044 BELOVB4	ENT B4=O	01064	12400	00000		
.	01045 BELOVB5	ENT B5=O	01065	12500	00000		
.	01046 BELOVB6	ENT B6=O	01066	12600	00000		
.	01047 BELOVB7	ENT B7=O	01067	12700	00000		
.	01050	RPL Y+1=L(BELOV)*SKIP	01070	36110	01011		
.	01051 BELOVERR	ENT A=BD	01071	11000	00010		
.	01052	EXIT	01072	61010	01011		X
.	01053 DRANGE	ENTRY	01073	61000	00000		CALCULATE CHANGE IN RANGE
.	01054	STR B4=L(DRANGEB4)	01074	16410	01134		X INITIALIZATION
.	01055	STR B5=L(DRANGEB5)	01075	16510	01135		X
.	01056	STR B6=L(DRANGEB6)	01076	16610	01136		X

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BELTP

CARDS	L1 IO LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	01057	STR B7*L(DRANGEB7)	01077	16710	01137	X	
.	01060	ENT B4*AA	01100	12400	05426	X	X((A\$E\$N)/SQRT(1-E\$S2))\$SINV
.	01061	ENT B5*EE	01101	12500	05430	X	
.	01062	ENT B6*BELPROD	01102	12600	06242	X	
.	01063	ENT B7*O2	01103	12700	00002	X	
.	01064	RJP FLTPT	01104	65000	06266	X	A\$E
.	01065	ENT B4*BELPROD	01105	12400	06242	X	
.	01066	ENT B5*NN	01106	12500	05743	X	
.	01067	RJP FLTPT	01107	65000	06266	X	A\$E\$N
.	01070	ENT B4*BELPROD	01110	12400	06242	X	
.	01071	ENT B5*FACTOR6	01111	12500	06037	X	
.	01072	ENT B6*BELQUOT	01112	12600	06246	X	
.	01073	ENT B7*O3	01113	12700	00003	X	
.	01074	RJP FLTPT	01114	65000	06266	X	(A\$E\$N)/SQRT(1-E\$S2)
.	01075	ENT B4*BELQUOT	01115	12400	06246	X	
.	01076	ENT B5*VVSIN	01116	12500	05530	X	
.	01077	ENT B6*BELDR	01117	12600	05753	X	
.	01100	ENT B7*O2	01120	12700	00002	X	X((A\$E\$N)/SQRT(1-E\$S2))\$SINV
.	01101	RJP FLTPT	01121	65000	06266	X	CONVERT FROM FLOATING TO FIXED POINT
.	01102	ENT B4*BELDR	01122	12400	05753	X	CONVERT TO N.M.
.	01103	ENT B5*NMCON	01123	12500	06134	X	
.	01104	ENT B6*NMBELDR	01124	12600	06063	X	
.	01105	ENT B7*O2	01125	12700	00002	X	
.	01106	RJP FLTPT	01126	65000	06266	X	
.	01107	ENT B4*260	01127	12400	00032	X	
.	01110	ENT B5*NMBELOR	01130	12500	06063	X	
.	01111	ENT B6*RADIUSDOT	01131	12600	63011	X	
.	01112	ENT B7*11	01132	12700	00011	X	
.	01113	RJP FLTPT	01133	65000	06266	X	
.	01114 DRANGEB4	ENT B4*0	01134	12400	00000	X	
.	01115 DRANGEB5	ENT B5*0	01135	12500	00000	X	
.	01116 DRANGEB6	ENT B6*0	01136	12600	00000	X	
.	01117 DRANGEB7	ENT B7*0	01137	12700	00000	X	
.	01120	RPL Y+1*L(DRANGE)*SKIP	01140	36110	01073	X	
.	01121 DRANGERR	ENT A=80	01141	11000	00010	X	
.	01122	EXIT	01142	61010	01073	X	NORMAL EXIT
.	01123 DELDELTA	ENTRY	01143	61000	00000	X	
.	01124	STR B4*L(DELOELTAB41	01144	16410	01174	X	
.	01125	STR B5*L(DELOELTAB5)	01145	16510	01175	X	
.	01126	STR B6*L(DELOELTAB61	01146	16610	01176	X	
.	01127	STR B7*L(DELOELTAB71	01147	16710	01177	X	
.	01130	ENT B4*IISIN	01150	12400	05540	X	SINI\$COSU\$DU/OT /COSDELTA
.	01131	ENT B5*LLCOS	01151	12500	05630	X	
.	01132	ENT B6*BELPROD	01152	12600	06242	X	
.	01133	ENT B7*O2	01153	12700	00002	X	
.	01134	RJP FLTPT	01154	65000	06266	X	SINI\$COSU
.	01135	ENT B4*BELPROD	01155	12400	06242	X	
.	01136	ENT B5*OELTCOS	01156	12500	05562	X	
.	01137	ENT B6*BELQUOT	01157	12600	06246	X	
.	01140	ENT B7*O3	01160	12700	00003	X	
.	01141	RJP FLTPT	01161	65000	06266	X	SINI\$COSU/COSDELTA
.	01142	ENT B4*BELQUOT	01162	12400	06246	X	X

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BELTP

CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	01143	ENT 85*DU	01163	12500	05747	X	X
.	01144	ENT 86*DOELT	01164	12600	05751		
.	01145	ENT 87*O2	01165	12700	00002	X	X
.	01146	RJP FLTPT	01166	65000	06266	X	X \$ DU/OT DDELT/OT CALCULATED
.	01147	ENT 84*370	01167	12400	00045		CONVERT FROM FLT TO FIXED PT
.	01150	ENT 85*DOELT	01170	12500	05751		
.	01151	ENT 86*DECDOT	01171	12600	63010		
.	01152	ENT 87*11	01172	12700	00011		
.	01153	RJP FLTPT	01173	65000	06266		
.	01154	DEDELTA84	01174	12400	00000		
.	01155	DELOELTA85	01175	12500	00000		
.	01156	DEDELTA86	01176	12600	00000		
.	01157	DEDELTA87	01177	12700	00000		
.	01160	RPL Y+1=L(OEDELTA)	01200	36010	01143		
.	01161	DEDELTAER	01201	11000	00000		
.	01162	EXIT	01202	61010	01143		
.	01163	DALPHA	01203	61000	00000		CALCULATE CHANGE IN ALPHA
.	01164	STR 84*L(DALPHA84)	01204	16410	01246	X	INITIALIZATION
.	01165	STR 85*L(DALPHA85)	01205	16510	01247	X	
.	01166	STR 86*L(DALPHA86)	01206	16610	01250	X	
.	01167	STR 87*L(DALPHA87)	01207	16710	01251	X	
.	01170	ENT 84*DELTCOS	01210	12400	05562	X	DRAM/DT+(COSI/COS\$\$2D)\$DU/OT
.	01171	ENT 85*DELTCOS	01211	12500	05562	X	J
.	01172	ENT 86*BELPROO	01212	12600	06242	X	
.	01173	ENT 87*O2	01213	12700	00002	X	
.	01174	RJP FLTPT	01214	65000	06266	X	COSI/COS\$20
.	01175	ENT 84*IICOS	01215	12400	05542	X	
.	01176	ENT 85*BELPROO	01216	12500	06242	X	
.	01177	ENT 86*BELQUOT	01217	12600	06246	X	COSI/COS\$\$20
.	01200	ENT 87*O3	01220	12700	00003	X	
.	01201	RJP FLTPT	01221	65000	06266	X	
.	01202	ENT 84*8ELQUOT	01222	12400	06246	X	
.	01203	ENT 85*OU	01223	12500	05747	X	
.	01204	ENT 86*BELPROD	01224	12600	06242	X	
.	01205	ENT 87*O2	01225	12700	00002	X	
.	01206	RJP FLTPT	01226	65000	06266	X	COSI/COS\$\$20)\$DU/OT
.	01207	ENT 84*DRAM	01227	12400	05442	X	
.	01210	ENT 85*BELPROO	01230	12500	06242	X	
.	01211	ENT 86*DELALPH	01231	12600	05755	X	
.	01212	ENT 87*O0	01232	12700	00000	X	
.	01213	RJP FLTPT	01233	65000	06266	X	DRAM/DT+(COSI/COS\$\$2D)\$DU/OT =DALPHA
.	01214	ENT 84*DELTCOS	01234	12400	05562		
.	01215	ENT 85*DELALPH	01235	12500	05755		
.	01216	ENT 86*DELALPH	01236	12600	05755		
.	01217	ENT 87*2	01237	12700	00002		
.	01220	RJP FLTPT	01240	65000	06266		
.	01221	ENT 84*370	01241	12400	00045		CONVERT FROM FLT TO FIXED PDIN T
.	01222	ENT 85*DELALPH	01242	12500	05755	X	
.	01223	ENT 86*RAOOT	01243	12600	63007	X	

SPURT OUTPUT NO. 210
 BELTP PONTON*7/1/65

CARDS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	01224	ENT B7=11	01244	12700	00011	X	
.	01225	RJP FLTPT	01245	65000	06266	X	
.	01226	DALPHAB4 ENT B4=0	01246	12400	00000		
.	01227	OALPHAB5 ENT B5=0	01247	12500	00000		
.	01230	OALPHAB6 ENT B6=0	01250	12600	00000		
.	01231	OALPHAB7 ENT B7=0	01251	12700	00000		
.	01232	RPL Y+1=L(OALPHA)+SKIP	01252	36110	01203		
.	01233	OALPHAERR ENT A=0	01253	11000	00000		
.	01234	EXIT	01254	61010	01203		NORMAL EXIT
.	01235	DATAIN ENTRY	01255	61000	00000		
.	01236	STR B6=L(OATA09)	01256	16610	01342		
.	01237	ENT A=L(SYSTAT1)=AZERO	01257	11410	63313		ZERO IF REINIT, NON ZERO IF IN INITIAL
.	01240	JP DATA10	01260	61000	01344		TO INITIAL ENTRY PORTION
.	01241	RJP U(INTERCOM	01261	65020	63426		PRINT REINIT MESSAGE
.	01242	U-TAG OATOMESA=0	01262	01464	00000		
.	01243	CL A=	01263	11000	00000		STORE A ZERO IN THE UPPER PORT ION
.	01244	ENT B6=630	01264	12600	00077		
.	01245	DATA01 ENT B6=B6-2	01265	12606	77775		X SPEC TABLES FOR INTERCOM TO PRINT
.	01246	BJP B6=S+1	01266	72600	01267		
.	01247	STR A=U(DATA0A+1+B6)	01267	15026	01365		X PRESENT VALUES OF PARAMETERS
.	01250	BJP B6=DATA01	01270	72600	01265		X
.	01251	DATA01 ENT B6=DATA0A	01271	12600	01364		
.	01252	STR B6=U(OATA02)	01272	16620	01277		X AND INPUT IF DESIRED NEW VAL UES
.	01253	ENT B6=OATIA	01273	12600	01577		X UP TO AND INCLUDING SCHEDULE
.	01254	STR B6=L(OATA02)	01274	16610	01277		X
.	01255	ENT B6=100	01275	12600	00012		
.	01256	RJP U(INTERCOM)	01276	65020	63426		X
.	01257	DATA02 U-TAG OATA0A+DATIA	01277	01364	01577		X
.	01260	ENT A=U(OATA02)	01300	11020	01277		X
.	01261	ADD A=4	01301	20000	00004		X
.	01262	STR A=U(OATA02)	01302	15020	01277		X
.	01263	ENT A=L(OATA02)	01303	11010	01277		X
.	01264	ADD A=6	01304	20000	00006		X
.	01265	STR A=L(OATA02)	01305	15010	01277		X
.	01266	BJP B6=OATA02-1	01306	72600	01276		X
.	01267	DATA03 ENT A=W(OATASCHEOA)	01307	11030	01733		
.	01270	COM A=S+YMORE	01310	04700	00005		
.	01271	JP OATA04	01311	61000	01322		NO GOOD
.	01272	SUB A=1	01312	21000	00001		
.	01273	ENT B6=A	01313	12670	00000		SCHEDULE CODE TO XR
.	01274	STR A=W(SCHOSW)	01314	15030	05425		AND TO SWITCH WORD
.	01275	JP L(S+1+B6)	01315	61016	01316		INPUT REMAINDER OF PARAMETERS
.	01276	0 DATA05	01316	00000	01325		X ACCORING TO SCHEDULE
.	01277	0 DATA06	01317	00000	01330		X
.	01300	0 DATA07	01320	00000	01335		X
.	01301	0 DATA08	01321	00000	01340		X

SPURT OUTPUT NO. 210
 BELTP PONTON=7/1/65

CARDS	LI IO LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	01302	DATA04 RJP U(INTERCOM	01322	65020	63426		PRINT SCHEDULE ERROR MESSAGE
.	01303	U-TAG OATOERRA=OATISCHED	01323	01470	01673		
.	01304	JP DATA03	01324	61000	01307		
.	01305	DATA05 RJP U(INTERCOM)	01325	65020	63426		DEC
.	01306	U-TAG DATODEC=DATIDEC	01326	01440	01675		
.	01307	JP DATA09	01327	61000	01342		EXIT
.	01310	DATA06 RJP U(INTERCOM)	01330	65020	63426		K
.	01311	U-TAG DATOK=DATIK	01331	01444	01703		
.	01312	RJP U(INTERCOM	01332	65020	63426		LZERO
.	01313	U-TAG DATOLZERO=DATILZERO	01333	01450	01711		
.	01314	JP DATA09	01334	61000	01342		EXIT
.	01315	DATA07 RJP U(INTERCOM)	01335	65020	63426		ALPHA
.	01316	U-TAG DATOALPHA=DATIALPHA	01336	01454	01717		
.	01317	JP OATA09	01337	61000	01342		EXIT
.	01320	DATA08 RJP U(INTERCOM	01340	65020	63426		LONG
.	01321	U-TAG DATOLONG=DATILONG	01341	01460	01725		
.	01322	DATA09 ENT B6=00	01342	12600	00000		EXIT
.	01323	EXIT	01343	61010	01255		
.	01324	DATA10 ENT A=U(YEARMONTH)	01344	11020	63147		
.	01325	STR A=W(VYEAR)	01345	15030	05444		
.	01326	ENT A=L(YEARMONTH)	01346	11010	63147		
.	01327	STR A=W(VMONTH)	01347	15030	05446		
.	01330	RJP U(INTERCOM)	01350	65020	63426		
.	01331	U-TAG OATOMESB=0	01351	01466	00000		
.	01332	ENT A=77777	01352	11000	77777		STORE 77777 IN INTERCOM CALLIN G
.	01333	ENT B6=63D	01353	12600	00077		
.	01334	DATA11 ENT B6=B6-2	01354	12606	77775		
.	01335	BJP B6=B+1	01355	72600	01356		
.	01336	STR A=U(DATO+1+B6)	01356	15026	01365		X
.	01337	BJP B6=DATA11	01357	72600	01354		X
.	01340	CL A=	01360	11000	00000		
.	01341	STR A=U(DATOTBASE+1)	01361	15020	01421		
.	01342	STR A=U(DATOMO+1)	01362	15020	01425		
.	01343	JP OATASAME	01363	61000	01271		
.	01344	DATA0A FO 1=A	01364	06050	50505		
.	01345	O OATAA	01365	00000	01472		A =
.	01346	FO O=F7	01366	13670	50505		
.	01347	77777 AA	01367	77777	05426		
.	01350	OATOE FO 1=A	01370	06050	50505		
.	01351	O OATAE	01371	00000	01475		E =
.	01352	FO O=F7	01372	13670	50505		
.	01353	77777 EE	01373	77777	05430		
.	01354	DATA0I FO 1=A	01374	06050	50505		
.	01355	O OATAI	01375	00000	01500		I =
.	01356	FO O=F7	01376	13670	50505		
.	01357	77777 II	01377	77777	05432		
.	01360	DATOW FO 1=A	01400	06050	50505		
.	01361	O OATAW	01401	00000	01503		
.	01362	FO O=F7	01402	13670	50505		
.	01363	77777 SOMEGA	01403	77777	05434		
.	01364	DATOWDOT FO 1=A	01404	06050	50505		
.	01365	O DATAWDOT	01405	00000	01506		WOOT =

CARDS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	01366	FD 0=F7	01406	13670	50505		
.	01367	77777 DOMEGA	01407	77777	05436		
.	01370 DATORAM	FD 1=A	01410	06050	50505		
.	01371	O OATARAM	01411	00000	01512		RAM =
.	01372	FD 0=F7	01412	13670	50505		
.	01373	77777 SRAM	01413	77777	05440		
.	01374 DATORAMDOT	FD 1=A	01414	06050	50505		
.	01375	O DATARAMDOT	01415	00000	01515		RAMDOT =
.	01376	FD 0=F7	01416	13670	50505		
.	01377	77777 DRAM	01417	77777	05442		
.	01400 DATOTBASE	FD 1=A	01420	06050	50505		
.	01401	O DATATBASE	01421	00000	01520		
.	01402	FD 0=D	01422	11050	50505		
.	01403	77777 VYEAR	01423	77777	05444		
.	01404 DATOMO	FD 1=A	01424	06050	50505		
.	01405	O OATAMO	01425	00000	01524		
.	01406	FD 0=D	01426	11050	50505		
.	01407	77777 VMONTH	01427	77777	05446		
.	01410 DATODY	FD 1=A	01430	06050	50505		
.	01411	O DATADY	01431	00000	01531		
.	01412	FD 0=F	01432	13050	50505		
.	01413	77777 VDAY	01433	77777	05450		
.	01414 DATOSCHED	FD 1=A	01434	06050	50505		
.	01415	O DATASCHED	01435	00000	01537		SCHEDULE =
.	01416	FD 0=D	01436	11050	50505		
.	01417	77777 DATASCHEDA	01437	77777	01733		
.	01420 DATODEC	FD 1=A	01440	06050	50505		
.	01421	O DATADEC	01441	00000	01551		DEC =
.	01422	FD 0=F7	01442	13670	50505		
.	01423	77777 DECT	01443	77777	05452		
.	01424 DATOK	FD 1=A	01444	06050	50505		
.	01425	O DATAK	01445	00000	01555		K =
.	01426	FD 0=F7	01446	13670	50505		
.	01427	77777 KK	01447	77777	05454		
.	01430 DATOLZERO	FD 1=A	01450	06050	50505		
.	01431	O DATALZERO	01451	00000	01561		SLAT
.	01432	FD 0=F7	01452	13670	50505		
.	01433	77777 LZERO	01453	77777	05456		
.	01434 DATOALPHA	FD 1=A	01454	06050	50505		
.	01435	O DATAALPHA	01455	00000	01566		ALPHA =
.	01436	FD 0=F7	01456	13670	50505		
.	01437	77777 ALPHB	01457	77777	05460		
.	01440 DATOLONG	FD 1=A	01460	06050	50505		
.	01441	O DATALONG	01461	00000	01572		LONG =
.	01442	FD 0=F7	01462	13670	50505		
.	01443	77777 LONG	01463	77777	05462		
.	01444 DATOMESA	FD 1=A	01464	06050	50505		
.	01445	77777 DATAMESA	01465	77777	01750		
.	01446 DATOMESB	FD 1=A	01466	06050	50505		
.	01447	77777 DATAMESB	01467	77777	01756		
.	01450 DATOERRA	FD 1=A	01470	06050	50505		
.	01451	77777 DATOERRMA	01471	77777	01735		
.	01452 DATAA	FD 0=A(E.R.) =	01472	06511	27527		

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CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	01453	77777 77777	01473	75400	50544		
.	01454 DATAE	FD O=E =	01474	77777	77777		
.	01455	77777 77777	01475	12050	50505		
.	01456 DATAI	FD O=I =	01476	05050	50544		
.	01457	77777 77777	01477	77777	77777		
.	01460 DATAM	FD O=OMEGA =	01500	16050	50505		
.	01461	77777 77777	01501	05050	50544		
.	01462 DATAMDOT	FD O=OMEGA DOT =	01502	77777	77777		
.	01463	77777 77777	01503	24221	21406		
.	01464 DATARAM	FD O=DRAGON =	01504	05050	50544		
.	01465	77777 77777	01505	77777	77777		
.	01466 DATARAMDOT	FD O=DRAGONDOT=	01506	24221	21406		
.	01467	77777 77777	01507	05112	43105		
.	01470 DATATBASE	FD O=EPOCH YEAR	01510	44050	50505		
.	01471	77777 77777	01511	77777	77777		
.	01472 DATAMO	FD O= MONTH(1-12)	01512	11270	61424		
.	01473	77777 77777	01513	23050	50544		
.	01474 DATADY	FD O= DAY(0.000-31.999)	01514	77777	77777		
.	01475	77777 77777	01515	11270	61424		
.	01476 DATASCHED	FD O=FIXDEC(1) SCAN(2) FIXRA(3) FIXLONG(4)	01516	23112	43144		
.	01477	77777 77777	01517	77777	77777		
.	01500 DATADEC	FD O=DEC(DEGREES) =	01517	77777	77777		
.	01501	77777 77777	01520	12252	41015		
.	01502 DATAK	FD O=PERIOD(MIN)=	01521	05050	53612		
			01522	06270	50505		
			01523	77777	77777		
			01524	05050	50505		
			01525	05050	52224		
			01526	23311	55161		
			01527	41616	24005		
			01530	77777	77777		
			01531	05050	50505		
			01532	05050	51106		
			01533	36512	47524		
			01534	24244	16361		
			01535	75717	17140		
			01536	77777	77777		
			01537	13163	51112		
			01540	10516	14005		
			01541	05053	01006		
			01542	23516	24005		
			01543	05051	31635		
			01544	27065	16340		
			01545	05050	51316		
			01546	35212	42314		
			01547	51644	00505		
			01550	77777	77777		
			01551	11121	05111		
			01552	12142	71212		
			01553	30400	54405		
			01554	77777	77777		
			01555	25122	71624		
			01556	11512	21623		

CARDS	LI IO LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
	01503	77777 77777	01557	40440	50505		
.	01504	FD 0*ARG OF LAT(DEGREES)=	01560	77777	77777		
			01561	06271	40524		
			01562	13052	10631		
			01563	51111	21427		
			01564	12123	04044		
.	01505	77777 77777	01565	77777	77777		
.	01506	FD 0*RA(DEGREES) =	01566	27065	11112		
			01567	14271	21230		
			01570	40054	40505		
.	01507	77777 77777	01571	77777	77777		
.	01510	FD 0*EAST LONG(DEGREES) =	01572	12063	03105		
			01573	21242	31451		
			01574	11121	42712		
			01575	12304	00544		
.	01511	77777 77777	01576	77777	77777		
.	01512	FD 1*F	01577	13050	50505		
.	01513	10 AA	01600	00010	05426		
.	01514	0 40001	01601	00000	40001		
.	01515	10000 0	01602	10000	00000		
.	01516	0 40005	01603	00000	40005		UPPER LIMIT = 25
.	01517	14400 00000	01604	14400	00000		
.	01520	FD 1*F	01605	13050	50505		
.	01521	10 EE	01606	00010	05430		
.	01522	0 0	01607	00000	00000		LOWER LIMIT = 0
.	01523	0 0	01610	00000	00000		
.	01524	0 40000	01611	00000	40000		
.	01525	16314 63146	01612	16314	63146		
.	01526	FD 1*F	01613	13050	50505		
.	01527	10 II	01614	00010	05432		
.	01530	40010	01615	00000	40010		
.	01531	64577 77777	01616	64577	77777		
.	01532	0 40010	01617	00000	40010		
.	01533	13200 0	01620	13200	00000		
.	01534	FD 1*F	01621	13050	50505		
.	01535	10 SOMEGA	01622	00010	05434		
.	01536	0 40011	01623	00000	40011		
.	01537	64577 77777	01624	64577	77777		
.	01540	0 40011	01625	00000	40011		
.	01541	13200 0	01626	13200	00000		
.	01542	FD 1*F	01627	13050	50505		
.	01543	10 DOMEGA	01630	00010	05436		
.	01544	0 40011	01631	00000	40011		
.	01545	64577 77777	01632	64577	77777		
.	01546	0 40011	01633	00000	40011		
.	01547	13200 0	01634	13200	00000		
.	01550	FD 1*F	01635	13050	50505		
.	01551	10 SRAM	01636	00010	05440		
.	01552	0 40011	01637	00000	40011		
.	01553	64577 77777	01640	64577	77777		
.	01554	0 40011	01641	00000	40011		
.	01555	13200 0	01642	13200	00000		
.	01556	FD 1*F	01643	13050	50505		

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CARDS	LI	ID	LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
.	01557			10	DRAM	01644	00010	05442		
.	01560			0	40007	01645	00000	40007		
.	01561			64577	77777	01646	64577	77777		
.	01562			0	40007	01647	00000	40007		
.	01563			13200	0	01650	13200	00000		
.	01564	OATITBASE		FO	0=D	01651	11050	50505		
.	01565			10	VYEAR	01652	00010	05444		
.	01566			0	3644	01653	00000	03644		
.	01567			0	3654	01654	00000	03654		
.	01570			0	0	01655	00000	00000		
.	01571			0	0	01656	00000	00000		
.	01572	OATIMO		FO	0=D	01657	11050	50505		
.	01573			10	VMONTH	01660	00010	05446		
.	01574			0	0	01661	00000	00000		
.	01575			0	37	01662	00000	00037		
.	01576			0	0	01663	00000	00000		
.	01577			0	0	01664	00000	00000		
.	01600	DATIDY		FO	0=F	01665	13050	50505		
.	01601			10	VDAY	01666	00010	05450		
.	01602			0	0	01667	00000	00000		
.	01603			0	0	01670	00000	00000		
.	01604			0	40006	01671	00000	40006		
.	01605			10000	0	01672	10000	00000		
.	01606	DATISCHED		FO	0=D	01673	11050	50505		
.	01607			0	DATASCHEDA	01674	00000	01733		
.	01610	DATIDEC		FO	1=F	01675	13050	50505		
.	01611			10	DECT	01676	00010	05452		
.	01612			0	40011	01677	00000	40011		
.	01613			64577	77777	01700	64577	77777		
.	01614			0	40011	01701	00000	40011		
.	01615			13200	0	01702	13200	00000		
.	01616	DATIK		FO	1=F	01703	13050	50505		
.	01617			00	KK	01704	00000	05454		
.	01620			0	40007	01705	00000	40007		
.	01621			64577	77777	01706	64577	77777		
.	01622			0	40007	01707	00000	40007		
.	01623			13200	0	01710	13200	00000		
.	01624	DATILZERO		FO	1=F	01711	13050	50505		
.	01625			10	LZERO	01712	00010	05456		
.	01626			0	40011	01713	00000	40011		
.	01627			64577	77777	01714	64577	77777		
.	01630			0	40011	01715	00000	40011		
.	01631			13200	0	01716	13200	00000		
.	01632	DATIALPHA		FO	1=F	01717	13050	50505		
.	01633			10	ALPHB	01720	00010	05460		
.	01634			0	40011	01721	00000	40011		
.	01635			64577	77777	01722	64577	77777		
.	01636			0	40011	01723	00000	40011		
.	01637			13200	0	01724	13200	00000		
.	01640	DATILONG		FO	1=F	01725	13050	50505		
.	01641			10	LONG	01726	00010	05462		
.	01642			0	40011	01727	00000	40011		
.	01643			64577	77777	01730	64577	77777		

CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	01644	0 40011	01731	00000	40011		
.	01645	13200 0	01732	13200	00000		
.	01646 DATASCHEDA	0 0	01733	00000	00000		
.	01647	77777 77777	01734	77777	77777		
.	01650 DATOERRMA	FD 0=SCHEDULE INDICATOR MUST BE 1,2,3, OR 4. REINPUT	01735	30101	51211		
			01736	32211	20516		
			01737	23111	61006		
			01740	31242	70522		
			01741	32303	10507		
			01742	12056	15662		
			01743	56635	60524		
			01744	27056	47505		
			01745	27121	62325		
			01746	32310	50505		
.	01651	77777 77777	01747	77777	77777		
.	01652 DATAMESA	FD 0=BELT REINITIALIZATION	01750	07122	13105		
			01751	27121	62316		
			01752	31160	62116		
			01753	37063	11624		
			01754	23050	50505		
.	01653	77777 77777	01755	77777	77777		
.	01654 DATAMESB	FD 0=BELT INITIALIZATION	01756	07122	13105		
			01757	16231	63116		
			01760	06211	63706		
			01761	31162	42305		
.	01655	77777 77777	01762	77777	77777		
.	01656 DATA99	U-TAG DATA*DATA	01763	01364	01577		
.	01657 FIXLATI	ENTRY	01764	61000	00000		
.	01660	STR B4=L(FXLTIXT+1)	01765	16410	02313		SAVE IR-S
.	01661	STR B5=L(FXLTIXT+2)	01766	16510	02314		
.	01662	STR B6=L(FXLTIXT+3)	01767	16610	02315		
.	01663	STR B1=L(FXLTIXT+4)	01770	16110	02316		
.	01664	ENT Q=W(DELTB+1)	01771	10030	05453		FRACTION TO Q
.	01665	ENT A=L(DELTB)	01772	11010	05452		EXP TO A
.	01666	RJP MOD2PI	01773	65000	03752		MAKE NO MOD 2PI
.	01667	STR A=L(DELTB)	01774	15010	05452		
.	01670	STR Q=W(DELTB+1)	01775	14030	05453		
.	01671	AOD Q=0*QPOS	01776	26600	00000		
.	01672	CP Q=	01777	14000	00000		
.	01673	SUB A=40001*ANOT	02000	21500	40001		
.	01674	JP B1234XYZ	02001	61000	02007		
.	01675	SUB A=2*AZERO	02002	21400	00002		
.	01676	JP B1234X	02003	61000	02011		
.	01677	SUB Q=W(THFPI+1)*QNOT	02004	27530	06154		
.	01700	JP FXLTIXT+1	02005	61000	02313		
.	01701	JP B1234X	02006	61000	02011		
.	01702 B1234XYZ	SUB Q=W(HFPI+1)*QNOT	02007	27530	06151		
.	01703	JP FXLTIXT+1	02010	61000	02313		
.	01704 B1234X	NO-OP	02011	12000	00000		
.	01705	ENT A=W(IISIN+1)*ANOT	02012	11530	05541		
.	01706	JP FXLTIXT+1	02013	61000	02313		
.	01707	ENT B1=1	02014	12100	00001		

CAROS	L1 IO LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	01710	ENT B4*DELTB	02015	12400	05452		CALCULATE DELTSIN
.	01711	ENT B6*OELTSIN	02016	12600	05550		
.	01712	ENT B7*13	02017	12700	00013		
.	01713	RJP FLTPT	02020	65000	06266		
.	01714	COMMENT CHECK					
.	01715	IIOECOM MOVE 2*IISIN*IISINPOS	02021	10030	05540		IF DELT = II . IF SO SET SIN L = +,-1
			02022	14030	05666		
			02023	10030	05541		
			02024	14030	05667		
.	01716	IIDECOM1 ENT B1*0	02025	12100	00000		
.	01717	MOVE 2*OELTSIN*DELTINPOS	02026	10030	05550		
			02027	14030	05664		
			02030	10030	05551		
			02031	14030	05665		
			02032	11730	05551		
.	01720	ENT A*W(DELTIN+1)*ANEG	02033	61000	02036		
.	01721	JP \$+3	02034	15040	00000		
.	01722	CP A*	02035	12101	77776		
.	01723	ENT B1*B1-1	02036	15030	05665		
.	01724	STR A*W(DELTINPOS+1)	02037	11730	05541		
.	01725	ENT A*W(IISIN+1)*ANEG	02040	61000	02043		
.	01726	JP \$+3	02041	15040	00000		
.	01727	CP A*	02042	12101	00001		
.	01730	ENT B1*B1+1	02043	15030	05667		
.	01731	STR A*W(IISINPOS+1)	02044	12400	05664		
.	01732	ENT B4*OELTSINPOS	02045	12500	05666		
.	01733	ENT B5*IISINPOS	02046	12600	06011		
.	01734	ENT B6*IIDELTDIFF	02047	12700	00001		
.	01735	ENT B7*01	02050	65000	06266		
.	01736	RJP FLTPT	02051	11430	06012		
.	01737	ENT A*W(IIDELTDIFF+1)*AZERO	02052	61000	02062		
.	01740	JP GETLL	02053	10030	06137		
.	01741	ENT Q*W(FLTONE+1)	02054	11401	00000		
.	01742	ENT A*B1*AZERO	02055	14170	05623		
.	01743	STR Q*CPW(LLSIN+1)*SKIP	02056	14030	05623		
.	01744	STR Q*W(LLSIN+1)	02057	11030	06136		
.	01745	ENT A*W(FLTONE)	02060	15030	05622		
.	01746	STR A*W(LLSIN)	02061	61000	02070		
.	01747	JP GOTLL	02062	12400	05550		
.	01750	GETLL ENT B4*OELTSIN	02063	12100	00001		
.	01751	ENT B1*1	02064	12500	05540	DELTSIN/IISIN	
.	01752	ENT B5*IISIN	02065	12600	05622		
.	01753	ENT B6*LLSIN	02066	12700	00003		
.	01754	ENT B7*03	02067	65000	06266		
.	01755	RJP FLTPT	02070	11010	05622	CHECK LLSIN LESS OR = 1	
.	01756	GOTLL ENT A*L(LLSIN)	02071	04600	40001		
.	01757	COM A*40001*YLESS	02072	61000	02113	NO WITHIN LIMITS	
.	01760	JP FXLTII+2	02073	10000	77777		
.	01761	ENT Q*77777	02074	43400	40001		
.	01762	COM MASK*40001*AZERO	02075	61000	02111		
.	01763	JP FXLTII	02076	11630	05623	FRACTION + OR -	
.	01764	ENT A*W(LLSIN+1)*APOS	02077	15040	00000		
.	01765	CP A*					

CAROS	L1 IO LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	01766	SUB A*W(FLSTONE+1)*APOS	02100	21630	06137		
.	01767	JP FXLT11+2	02101	61000	02113		
.	01770	COM A*77*YMORE	02102	04700	00077		
.	01771	JP FXLT11	02103	61000	02111		
.	01772	ENT A*W(FLSTONE+1)	02104	11030	06137		
.	01773	ENT Q*W(LLSIN+1)*QNEG	02105	10330	05623		
.	01774	STR A*W(LLSIN+1)*SKIP	02106	15130	05623		
.	01775	STR A*CPW(LLSIN+1)	02107	15070	05623		
.	01776	JP \$+3	02110	61000	02113	YES	
.	01777 FXLT11	ENT A*1	02111	11000	00001		
.	02000	JP FXLTIXT+1	02112	61000	02313	ERROR EXIT	
.	02001	ENT B4*LLSIN	02113	12400	05622	GET L	
						X	
.	02002	ENT B6*LL	02114	12600	05707	X	
.	02003	ENT B7*17	02115	12700	00017	X	
.	02004	RJP FLTPT	02116	65000	06266	X	
.	02005	ENT B1*1	02117	12100	00001		
.	02006	ENT B4*LLSIN	02120	12400	05622	CALCULATE LLCOS	
.	02007	ENT B5*LLSIN	02121	12500	05622	1. GET LLSIN SQRD	
.	02010	ENT B6*LLSIN2	02122	12600	05672		
.	02011	ENT B7*02	02123	12700	00002		
.	02012	RJP FLTPT	02124	65000	06266		
.	02013	ENT B1*1	02125	12100	00001		
.	02014	ENT B4*WONE	02126	12400	06136	2. GET 1-LLSIN2=LLSIN2	
.	02015	ENT B5*LLSIN2	02127	12500	05672		
.	02016	ENT B6*LLSIN2	02130	12600	05672		
.	02017	ENT B7*01	02131	12700	00001		
.	02020	RJP FLTPT	02132	65000	06266		
.	02021	ENT B1*1	02133	12100	00001		
.	02022	ENT B4*LLSIN2	02134	12400	05672	3. LLCOS=SQRT(LLSIN2)	
.	02023	ENT B6*LLCOS	02135	12600	05630		
.	02024	ENT B7*12	02136	12700	00012		
.	02025	RJP FLTPT	02137	65000	06266		
.	02026	PUT L(LLSIN)*L(LL1SIN)	02140	10010	05622	LLSIN=LL1SIN1	
			02141	14010	05624		
.	02027	PUT W(LLSIN+1)*W(LL1SIN+1)	02142	10030	05623		
			02143	14030	05625		
.	02030	PUT L(LL1SIN1)*L(LL2SIN)	02144	10010	05624	LL1SIN=LL2SIN	
			02145	14010	05626		
.	02031	PUT W(LL1SIN+1)*W(LL2SIN+1)	02146	10030	05625		
			02147	14030	05627		
.	02032	PUT L(LLCOS)*L(LL1COS)	02150	10010	05630	LLCOS=LL1COS	
			02151	14010	05632		
.	02033	PUT W(LLCOS+1)*W(LL1COS+1)	02152	10030	05631		
			02153	14030	05633		
.	02034	PUT L(LL1COS)*L(LL2COS)	02154	10010	05632	-LL1COA+=LL2COS	
			02155	14010	05634		
.	02035	PUT W(LL1COS+1)*CPW(LL2COS+1)	02156	10030	05633		
			02157	14070	05635		
.	02036	ENT B1*1	02160	12100	00001		
.	02037	ENT B4*DELTB	02161	12400	05452	CALCULATE DELTCOS	
.	02040	ENT B6*DELT COS	02162	12600	05562		
.	02041	ENT B7*14	02163	12700	00014		

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CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	02042	RJP FLTPT	02164	65000	06266		
.	02043	ENT B1=1	02165	12100	00001		
.	02044	ENT B4=RAM	02166	12400	05727		GET RAMSIN
.	02045	ENT B6=RAMSIN	02167	12600	05544		
.	02046	ENT B7=13	02170	12700	00013		
.	02047	RJP FLTPT	02171	65000	06266		
.	02050	ENT B1=1	02172	12100	00001		
.	02051	ENT B6=RAMCOS	02173	12600	05546		GET RAMCOS
.	02052	ENT B7=14	02174	12700	00014		
.	02053	RJP FLTPT	02175	65000	06266		
.	02054	PUT L(LL1COS)*L(LLCOS)	02176	10010	05632		
.	02055	PUT W(LL1COS+1)*W(LLCOS+1)	02177	14010	05630		
.	02056	PUT L(LL1SIN)*L(LLSIN)	02200	10030	05633		COSL=COSL1
.	02057	PUT W(LL1SIN+1)*W(LLSIN+1)	02201	14030	05631		
.	02060	RJP COSALF	02202	10010	05624		
.	02061	JP FXLTIXT+1	02203	14010	05622		
.	02062	STR A=L(ALPH1COS)	02204	10030	05625		
.	02063	STR Q=W(ALPH1COS+1)	02205	14030	05623		
.	02064	RJP SINALF	02206	65000	04556		ERROR EXIT
.	02065	JP FXLTIXT+1	02207	61000	02313		
.	02066	STR A=L(ALPH1SIN)	02210	15010	05610		
.	02067	STR Q=W(ALPH1SIN+1)	02211	14030	05611		
.	02070	PUT L(LL2COS)*L(LLCOS)	02212	65000	04317		
.	02071	PUT W(LL2COS+1)*W(LLCOS+1)	02213	61000	02313		ERROR EXIT
.	02072	PUT L(LL2SIN)*L(LLSIN)	02214	15010	05576		
.	02073	PUT W(LL2SIN+1)*W(LLSIN+1)	02215	14030	05577		
.	02074	RJP COSALF	02216	10010	05634		COSL=COSL2
.	02075	JP FXLTIXT+1	02217	14010	05630		
.	02076	STR A=L(ALPH2COS)	02220	10030	05635		
.	02077	STR Q=W(ALPH2COS+1)	02221	14030	05631		
.	02100	RJP SINALF	02222	10010	05626		SINL=SINL2
.	02101	JP FXLTIXT+1	02223	14010	05622		
.	02102	STR A=L(ALPH2SIN)	02224	10030	05627		
.	02103	STR Q=W(ALPH2SIN+1)	02225	14030	05623		
.	02104	PUT L(DELT COS)*L(DELT COS)	02226	65000	04556		ERROR EXIT
.	02105	PUT L(DELT COS)*L(DELT2COS)	02227	61000	02313		
.	02106	PUT W(DELT COS+1)*W(DELT COS+1)	02230	15010	05612		
.	02107	PUT W(DELT COS+1)*W(DELT2COS+1)	02231	14030	05613		
.	02110	PUT L(DELT SIN)*L(DELT SIN)	02232	65000	04317		ERROR EXIT
.	02111	PUT L(DELT SIN)*L(DELT2SIN)	02233	61000	02313		
.			02234	15010	05600		
.			02235	14030	05601		
.			02236	10010	05562		COSD1=COSD2=COSD
.			02237	14010	05564		
.			02240	10010	05562		
.			02241	14010	05566		
.			02242	10030	05563		
.			02243	14030	05565		
.			02244	10030	05563		
.			02245	14030	05567		
.			02246	10010	05550		
.			02247	14010	05552		
.			02250	10010	05550		SIND1=SIND2=SIND

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CARDS	LI	ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	02112		PUT W(OELTSIN+1)*W(OELT1SIN+1)	02251	14010	05554		
.	02113		PUT W(OELTSIN+1)*W(OELT2SIN+1)	02252	10030	05551		
.	02114		PUT 2*W(NUMPT)	02253	14030	05553		
.	02115		RJP PTSEL	02254	10030	05551		
.	02116		JP FXLTIXT+1	02255	14030	05555		
.	02117		COM A=2*YMORE	02256	10000	00002		NUMPT=2
.	02120		JP FXLT12	02257	14030	05700		
.	02121		PUT L(LL1COS)*L(LLCOS)	02260	65000	05004		
.	02122		PUT W(LL1COS+1)*W(LLCOS+1)	02261	61000	02313		ERROR EXIT
.	02123		PUT L(LL1SIN)*L(LLSIN)	02262	04700	00002		
.	02124		PUT W(LL1SIN+1)*W(LLSIN+1)	02263	61000	02275		
.	02125		JP FXLTIXT	02264	10010	05632		A=1
.	02126	FXLT12	PUT L(LL2COS)*L(LLCOS)	02265	14010	05630		
.	02127		PUT W(LL2COS+1)*W(LLCOS+1)	02266	10030	05633		COSL=COSL1
.	02130		PUT L(LL2SIN)*L(LLSIN)	02267	14030	05631		
.	02131		PUT W(LL2SIN+1)*W(LLSIN+1)	02270	10010	05624		
.	02132		ENT B4*BELPIXX	02271	14010	05622		
.	02133		ENT B5*LL	02272	10030	05625		SINL=SINL1
.	02134		ENT B6*LL	02273	14030	05623		
.	02135		ENT B7*01	02274	61000	02312		
.	02136		RJP FLTPT	02275	10010	05634		A=2
.	02137	FXLTIXT	RPL Y+1*L(FIXLAT1)	02276	14010	05630		
.	02140		ENT B4*NIL	02277	10030	05635		COSL=COSL2
.	02141		ENT B5*NIL	02300	14030	05631		
.	02142		ENT B6*NIL	02301	10010	05626		
.	02143		ENT B1*NIL	02302	14010	05622		
.	02144		EXIT	02303	10030	05627		SINL=SINL2
.	02145	FIXLAT	ENTRY	02304	14030	05623		
.	02146		STR B4*L(FXLTX+1)	02305	12400	06175		L=PI-L
.	02147		STR B5*L(FXLTX+2)	02306	12500	05707		
.	02150		STR B6*L(FXLTX+3)	02307	12600	05707		
.	02151		STR B1*L(FXLTX+4)	02310	12700	00001		
.	02152		ENT B1*1	02311	65000	06266		
.	02153		ENT B4*RAM	02312	36010	01764		
.	02154		ENT B6*RAMCOS	02313	12400	00000		RESTORE IR-S
.	02155		ENT B7*14	02314	12500	00000		
.	02156		RJP FLTPT	02315	12600	00000		
.	02157		ENT B1*1	02316	12100	00000		
.	02160		ENT B6*RAMSIN	02317	61010	01764		NORMAL EXIT
.	02161		ENT B7*13	02320	61000	00000		
.	02162		RJP FLTPT	02321	16410	02371		SAVE IR-S
.				02322	16510	02372		
.				02323	16610	02373		
.				02324	16110	02374		
.				02325	12100	00001		
.				02326	12400	05727		GET RAMCOS
.				02327	12600	05546		
.				02330	12700	00014		
.				02331	65000	06266		
.				02332	12100	00001		
.				02333	12600	05544		GET RAMSIN
.				02334	12700	00013		
.				02335	65000	06266		

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CARDS	LI	ID	LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
.			02163	RJP	ALPHA	02336	65000	04325		GET ALPHA
.			02164	JP	FXLTXT+1	02337	61000	02371		ERROR EXIT
.			02165	STR	A=L(ALPHB1)	02340	15010	05460		
.			02166	STR	Q=W(ALPHB+1)	02341	14030	05461		
.			02167	RJP	COSALF	02342	65000	04556		GET ALPHCOS
.			02170	JP	FXLTXT+1	02343	61000	02371		ERROR RETURN
.			02171	STR	A=L(ALPHCOS1)	02344	15010	05606		
.			02172	STR	Q=W(ALPHCOS+1)*QNEG	02345	14330	05607		ALPHCOS LESS ZERO
.			02173	JP	FXLT1	02346	61000	02355		NO
.			02174	ENT	B1=1	02347	12100	00001		
.			02175	ENT	B4=PI	02350	12400	06175		YES - ALPHB=PI-ALPHB
.			02176	ENT	B5=ALPHB	02351	12500	05460		
.			02177	ENT	B6=ALPHB	02352	12600	05460		
.			02200	ENT	B7=01	02353	12700	00001		
.			02201	RJP	FLTPT	02354	65000	06266		
.			02202	RJP	BRANGE	02355	65000	04463		
.			02203	JP	FXLTXT+1	02356	61000	02371		ERROR RETURN
.			02204	STR	A=L(RANGEB1)	02357	15010	05731		
.			02205	STR	Q=W(RANGEB+1)	02360	14030	05732		
.			02206	ENT	A=W(ALPHB+1)*ANEG	02361	11730	05461		
.			02207	JP	\$+6	02362	61000	02370		
.			02210	ENT	B4=ALPHB	02363	12400	05460		
.			02211	ENT	B5=TTWPI	02364	12500	06165		
.			02212	ENT	B6=ALPHB	02365	12600	05460		
.			02213	ENT	B7=00	02366	12700	00000		
.			02214	RJP	FLTPT	02367	65000	06266		
.			02215	RPL	Y+1=L(FIXLAT1)	02370	36010	02320		NORMAL RETURN
.			02216	ENT	B4=NIL	02371	12400	00000		RESTORE IR-S
.			02217	ENT	B5=NIL	02372	12500	00000		
.			02220	ENT	B6=NIL	02373	12600	00000		
.			02221	ENT	B1=NIL	02374	12100	00000		
.			02222	EXIT		02375	61010	02320		
.			02223	ENTRY		02376	61000	00000		
.			02224	STR	B4=L(FXRTIXT+1)	02377	16410	02545		SAVE IR-S
.			02225	STR	B4=L(FXRTIXT+2)	02400	16410	02546		
.			02226	STR	B6=L(FXRTIXT+3)	02401	16610	02547		
.			02227	STR	B1=L(FXRTIXT+4)	02402	16110	02550		
.			02230	ENT	B1=1	02403	12100	00001		
.			02231	ENT	B4=FLTONE	02404	12400	06136		
.			02232	ENT	B5=KK	02405	12500	05454		
.			02233	ENT	B6=DLLB	02406	12600	05715		
.			02234	ENT	B7=03	02407	12700	00003		
.			02235	RJP	FLTPT	02410	65000	06266		
.			02236	ENT	A=L(LL1)	02411	11010	05456		GET LI MOD 2PI
.			02237	ENT	Q=W(LL1+1)	02412	10030	05457		
.			02240	RJP	MOD2PI	02413	65000	03752		
.			02241	STR	A=L(LL1)	02414	15010	05456		
.			02242	STR	Q=W(LL1+1)	02415	14030	05457		
.			02243	STR	A=L(LL)	02416	15010	05707		
.			02244	STR	Q=W(LL+1)	02417	14030	05710		
.			02245	MOVE	2*LL=LL1LAST	02420	10030	05707		LLAST=L
						02421	14030	05711		
						02422	10030	05710		

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CARDS	LI TO LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	02246	MOVE 2*LL1*LL2LAST	02423	14030	05712		
			02424	10030	05456		L2NDLAST=L1
			02425	14030	05713		
			02426	10030	05457		
			02427	14030	05714		
			02430	12100	00001		
.	02247	ENT 81*1	02431	12400	05707		GET SINL
.	02250	ENT 84*LL	02432	12600	05622		
.	02251	ENT 86*LLSIN	02433	12700	00013		
.	02252	ENT 87*13	02434	65000	06266		
.	02253	RJP FLTPT	02435	12100	00001		
.	02254	ENT 81*1	02436	12600	05630		GET COS
.	02255	ENT 86*LLCOS	02437	12700	00014		
.	02256	ENT 87*14	02440	65000	06266		
.	02257	RJP FLTPT	02441	12100	00001		
.	02260	ENT 81*1	02442	12400	05540		GET SIND
.	02261	ENT 84*ISIN	02443	12500	05622		=ISIN(LSIN)
.	02262	ENT 85*LLSIN	02444	12600	05550		
.	02263	ENT 86*OELTSIN	02445	12700	00002		
.	02264	ENT 87*02	02446	65000	06266		
.	02265	RJP FLTPT	02447	12100	00001		
.	02266	ENT 81*1	02450	12400	05550		GET DELTCOS
.	02267	ENT 84*DELTSIN	02451	12500	05550		1.SIND(SIND)=TIMTP
.	02270	ENT 85*OELTSIN	02452	12600	06234		
.	02271	ENT 86*TIMTP	02453	12700	00002		
.	02272	ENT 87*02	02454	65000	06266		
.	02273	RJP FLTPT	02455	12100	00001		
.	02274	ENT 81*1	02456	12400	06136		2.1-TIMTP=TIMTP
.	02275	ENT 84*WONE	02457	12500	06234		
.	02276	ENT 85*TIMTP	02460	12600	06234		
.	02277	ENT 86*TIMTP	02461	12700	00001		
.	02300	ENT 87*01	02462	65000	06266		
.	02301	RJP FLTPT	02463	12100	00001		
.	02302	ENT 81*1	02464	12400	06234		3.SQRT(TIMTP)=DELT COS
.	02303	ENT 84*TIMTP	02465	12600	05562		
.	02304	ENT 86*DELT COS	02466	12700	00012		
.	02305	ENT 87*12	02467	65000	06266		
.	02306	RJP FLTPT	02470	12100	00001		
.	02307	ENT 81*1	02471	12400	05727		GET RAMCOS
.	02310	ENT 84*RAM	02472	12600	05546		
.	02311	ENT 86*RAMCOS	02473	12700	00014		
.	02312	ENT 87*14	02474	65000	06266		
.	02313	RJP FLTPT	02475	12100	00001		
.	02314	ENT 81*1	02476	12600	05544		GET RAMSIN
.	02315	ENT 86*RAMSIN	02477	12700	00013		
.	02316	ENT 87*13	02500	65000	06266		
.	02317	RJP FLTPT	02501	10030	05550		SIND=SIND1
.	02320	MOVE 2*OELTSIN*DELTISIN	02502	14030	05552		
			02503	10030	05551		
			02504	14030	05553		
.	02321	MOVE 2*DELTSIN*DELT2SIN	02505	10030	05550		SIND=SIND2
			02506	14030	05554		
			02507	10030	05551		

CARDS	LI	IO LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	02322		MOVE 2*DELTCOS*DELTCOS	02510	14030	05555		
				02511	10030	05562		COSD=COS01
				02512	14030	05564		
				02513	10030	05563		
				02514	14030	05565		
.	02323		MOVE 1*DELTCOS*DELTCOS	02515	10030	05562		
				02516	14030	05566		
.	02324		PUT W(DELTCOS+1)*CPW(DELTCOS+1)	02517	10030	05563		
				02520	14070	05567		
.	02325		RJP COSALF	02521	65000	04556		GET ALPHCOS1
.	02326		JP FXRTXT+1	02522	61000	02545		ERROR RETURN
.	02327		STR A=L(ALPHICOS)*QPOS	02523	15210	05610		
.	02330		STR Q=CPW(ALPHICOS+1)*SKIP	02524	14170	05611		
.	02331		STR Q=W(ALPHICOS+1)	02525	14030	05611		
.	02332		RJP SINALF	02526	65000	04317		GET SINAI
.	02333		JP FXRTXT+1	02527	61000	02545		ERROR RETURN
.	02334		STR A=L(ALPHISIN)	02530	15010	05576		
.	02335		STR Q=W(ALPHISIN+1)	02531	14030	05577		
.	02336		MOVE 2*ALPHISIN*ALPH2SIN	02532	10030	05576		
				02533	14030	05600		
				02534	10030	05577		
				02535	14030	05601		
.	02337		PUT W(ALPHICOS)*W(ALPH2COS)	02536	10030	05610		
				02537	14030	05612		
.	02340		PUT W(ALPH2COS+1)*CPW(ALPH2COS+1)	02540	10030	05613		
				02541	14070	05613		
.	02341		PUT 2*W(NUMPT)	02542	10000	00002		NUMPT=2
				02543	14030	05700		
.	02342	FXRTXT	RPL Y+1=L(FIXRATI)	02544	36010	02376		NORMAL EXIT
.	02343		ENT B4*NIL	02545	12400	00000		RESTORE IR-S
.	02344		ENT B5*NIL	02546	12500	00000		
.	02345		ENT B6*NIL	02547	12600	00000		
.	02346		ENT B1*NIL	02550	12100	00000		
.	02347		EXIT	02551	61010	02376		
.	02350	FIXRATE	ENTRY	02552	61000	00000		
.	02351		STR B4=L(FXRTXT+1)	02553	16410	02744		SAVE IR-S
.	02352		STR B5=L(FXRTXT+2)	02554	16510	02745		
.	02353		STR B6=L(FXRTXT+3)	02555	16610	02746		
.	02354		STR B1=L(FXRTXT+4)	02556	16110	02747		
.	02355		ENT A=W(INCODE)*ANOT	02557	11530	05703		
.	02356		JP FXRT20	02560	61000	02667		
.	02357		ENT A=W(ELEV)*ANEG	02561	11730	63054		REVERSE DIRECTION
.	02360		JP FXRT1	02562	61000	02612		NO
.	02361		ENT A=W(UNDEARTH SW)*APOS	02563	11630	05677		MAYB-DONE LAST TIME
.	02362		JP FXRT1+1	02564	61000	02613		YES
								X
.	02363		CP A*	02565	15040	00000		
.	02364		STR A=W(UNOEARTH SW)	02566	15030	05677		
.	02365		ENT A=W(OLLB+1)	02567	11030	05716		NO
.	02366		STR A=CPW(DLLB+1)	02570	15070	05716		OL/DT = -OL/DT REVERSE DIRECT
								ION
.	02367		ENT B1=1	02571	12100	00001		
.	02370		ENT B4=TIME	02572	12400	05466		CALC NEW LL

CARDS	L1 IO LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	02371	ENT B5*TIMEILAST	02573	12500	05520		
.	02372	ENT B6*LL	02574	12600	05707		
.	02373	ENT B7*01	02575	12700	00001		
.	02374	RJP FLTPT	02576	65000	06266		
.	02375	ENT B1*1	02577	12100	00001		
.	02376	ENT B4*DLLB	02600	12400	05715		2.L=OL/OTIL)
.	02377	ENT B5*LL	02601	12500	05707		
.	02400	ENT B7*02	02602	12700	00002		
.	02401	RJP FLTPT	02603	65000	06266		
.	02402	ENT B1*1	02604	12100	00001		
.	02403	ENT B4*LLILAST	02605	12400	05711		
.	02404	ENT B5*LL	02606	12500	05707		
.	02405	ENT B7*00	02607	12700	00000		
.	02406	RJP FLTPT	02610	65000	06266		NOW HAVE ACTUAL LL
.	02407	JP FXRT12X	02611	61000	02633		
.	02410 FXRT1	CL W(UNDEARTHSH)	02612	16030	05677		RESET SWITCH
.	02411	ENT B4*TIME	02613	12400	05466		OIRECTION CORRECT PROCEED
.	02412	ENT B1*1	02614	12100	00001		
.	02413	ENT B5*TIMEILAST	02615	12500	05520		NEW L
.	02414	ENT B6*LL	02616	12600	05707		1.L=T-TLAST
.	02415	ENT B7*01	02617	12700	00001		
.	02416	RJP FLTPT	02620	65000	06266		
.	02417	ENT B1*1	02621	12100	00001		
.	02420	ENT B4*LL	02622	12400	05707		2.L=L(DL/DT)
.	02421	ENT B5*DLLB	02623	12500	05715		
.	02422	ENT B7*02	02624	12700	00002		
.	02423	RJP FLTPT	02625	65000	06266		
.	02424	ENT B1*1	02626	12100	00001		
.	02425	ENT B4*LLILAST	02627	12400	05711		3.L=LLAST+L
.	02426	ENT B5*LL	02630	12500	05707		
.	02427	ENT B7*00	02631	12700	00000		
.	02430	RJP FLTPT	02632	65000	06266		HAVE ACTUAL LL
.	02431 FXRT12X	MOVE 2*LLILAST*LL2LAST	02633	10030	05711		
			02634	14030	05713		
			02635	10030	05712		
			02636	14030	05714		
.	02432 FXRT2	ENT A*L(LL)	02637	11010	05707		MAKE L MOD 2PI
.	02433	ENT Q*W(LL+1)	02640	10030	05710		
.	02434	RJP MOD2PI	02641	65000	03752		
.	02435	STR A*L(LL)	02642	15010	05707		
.	02436	STR Q*W(LL+1)	02643	14030	05710		
.	02437	MOVE 2*LL*LLILAST	02644	10030	05707		LL=LLAST
			02645	14030	05711		
			02646	10030	05710		
			02647	14030	05712		
.	02440	ENT B1*1	02650	12100	00001		
.	02441	ENT B4*LL	02651	12400	05707		GET SINL
.	02442	ENT B6*LLSIN	02652	12600	05622		
.	02443	ENT B7*13	02653	12700	00013		
.	02444	RJP FLTPT	02654	65000	06266		
.	02445	ENT B1*1	02655	12100	00001		
.	02446	ENT B6*LLCOS	02656	12600	05630		GET COSL
.	02447	ENT B7*14	02657	12700	00014		

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BELTP

CARDS	L1 IO LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	02450	RJP FLTPT	02660	65000	06266		
.	02451	ENT B1*1	02661	12100	00001		
.	02452	ENT B4*LLSIN	02662	12400	05622		GET SINO=SINL(SINI)
.	02453	ENT B5*IISIN	02663	12500	05540		
.	02454	ENT B6*DELSIN	02664	12600	05550		
.	02455	ENT B7*02	02665	12700	00002		
.	02456	RJP FLTPT	02666	65000	06266		
.	02457 FXRT20	ENT B1*1	02667	12100	00001		
.	02460	ENT B4*DELSIN	02670	12400	05550		GET DELTB=ARCSIN(DLTBSIN)
.	02461	ENT B6*DELTB	02671	12600	05452		
.	02462	ENT B7*17	02672	12700	00017		
.	02463	RJP FLTPT	02673	65000	06266		
.	02464 FXRT3	ENT B4*DELTB	02674	12400	05452		GET DELTCOS
.	02465	ENT B1*1	02675	12100	00001		
.	02466	ENT B6*DELTCOS	02676	12600	05562		
.	02467	ENT B7*14	02677	12700	00014		
.	02470	RJP FLTPT	02700	65000	06266		GET RAM MOD 2PI
.	02471	ENT B1*1	02701	12100	00001		
.	02472	ENT B4*RAM	02702	12400	05727		GET SINRAM
.	02473	ENT B6*RAMSIN	02703	12600	05544		
.	02474	ENT B7*13	02704	12700	00013		
.	02475	RJP FLTPT	02705	65000	06266		
.	02476	ENT B1*1	02706	12100	00001		
.	02477	ENT B6*RAMCOS	02707	12600	05546		GET COSRAM
.	02500	ENT B7*14	02710	12700	00014		
.	02501	RJP FLTPT	02711	65000	06266		
.	02502	RJP ALPHA	02712	65000	04325		GET ALPHAB
.	02503	JP FXRTXT+1	02713	61000	02744		ERROR RETURN
.	02504	STR A*L(ALPHB)	02714	15010	05460		
.	02505	STR Q*W(ALPHB+1)*QNEG	02715	14330	05461		
.	02506	JP FXRT4XX	02716	61000	02724		
.	02507	ENT B4*ALPHB	02717	12400	05460		
.	02510	ENT B5*TTWPI	02720	12500	06165		
.	02511	ENT B6*ALPHB	02721	12600	05460		
.	02512	ENT B7*00	02722	12700	00000		
.	02513	RJP FLTPT	02723	65000	06266		
.	02514 FXRT4XX	RJP COSALF	02724	65000	04556		
.	02515	JP FXRTXT+1	02725	61000	02744		ERROR RETURN
.	02516	STR A*L(ALPHCOS)	02726	15010	05606		
.	02517	STR Q*W(ALPHCOS+1)*QNEG	02727	14330	05607		
.	02520	JP FXRT4	02730	61000	02737		COS PLUS CONT
.	02521	ENT B1*1	02731	12100	00001		
.	02522	ENT B4*PI	02732	12400	06175		FIX ALPHA
.	02523	ENT B5*ALPHB	02733	12500	05460		ALF=PI-ALF
.	02524	ENT B6*ALPHB	02734	12600	05460		
.	02525	ENT B7*01	02735	12700	00001		
.	02526	RJP FLTPT	02736	65000	06266		
.	02527 FXRT4	RJP BRANGE	02737	65000	04463		
.	02530	JP FXRTXT+1	02740	61000	02744		ERROR RETURN
.	02531	STR A*L(RANGEB)	02741	15010	05731		
.	02532	STR Q*W(RANGEB+1)	02742	14030	05732		
.	02533 FXRTXT	RPL Y+1*L(FIXRATE)	02743	36010	02552		
.	02534	ENT B4*NIL	02744	12400	00000		

CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	02535	ENT B5=NIL	02745	12500	00000		
.	02536	ENT B6=NIL	02746	12600	00000		
.	02537	ENT B1=NIL	02747	12100	00000		
.	02540	EXIT	02750	61010	02552		
.	02541	FIXRAI ENTRY	02751	61000	00000		
.	02542	STR B4=L(FXRAIXT+1)	02752	16410	03053		
.	02543	STR B5=L(FXRAIXT+2)	02753	16510	03054		
.	02544	STR B6=L(FXRAIXT+3)	02754	16610	03055		
.	02545	STR B1=L(FXRAIXT+4)	02755	16110	03056		
.	02546	ENT B1=1	02756	12100	00001		
.	02547	ENT B4=RAM	02757	12400	05727		GET RAMSIN
.	02550	ENT B6=RAMSIN	02760	12600	05544		
.	02551	ENT B7=13	02761	12700	00013		
.	02552	RJP FLTPT	02762	65000	06266		
.	02553	ENT B1=1	02763	12100	00001		
.	02554	ENT B6=RAMCOS	02764	12600	05546		GET RAMCOS
.	02555	ENT B7=14	02765	12700	00014		
.	02556	RJP FLTPT	02766	65000	06266		
.	02557	ENT Q=W(ALPHB+1)=QNEG	02767	10330	05461		IS RA NEG
.	02560	JP \$+7	02770	61000	02777		NO CONTINUE
.	02561	ENT B4=ALPHB	02771	12400	05460		YES ADD 360 DEGREES
.	02562	ENT B5=TTWPI	02772	12500	06165		
.	02563	ENT B6=B4	02773	12604	00000		
.	02564	ENT B7=00	02774	12700	00000		
.	02565	RJP FLTPT	02775	65000	06266		
.	02566	ENT Q=W(ALPHB+1)	02776	10030	05461		
.	02567	ENT A=L(ALPHB)	02777	11010	05460		MAKE ALPHA MOD-2PI
.	02570	RJP MOD2PI	03000	65000	03752		
.	02571	STR A=L(ALPHB)	03001	15010	05460		
.	02572	STR Q=W(ALPHB+1)	03002	14030	05461		
.	02573	ENT B1=1	03003	12100	00001		
.	02574	ENT B4=ALPHB	03004	12400	05460		GET SINA
.	02575	ENT B6=ALPHSIN	03005	12600	05574		
.	02576	ENT B7=13	03006	12700	00013		
.	02577	RJP FLTPT	03007	65000	06266		
.	02600	ENT B1=1	03010	12100	00001		
.	02601	ENT B6=ALPHCOS	03011	12600	05606		GET COSA
.	02602	ENT B7=14	03012	12700	00014		
.	02603	RJP FLTPT	03013	65000	06266		
.	02604	ENT A=L(ALPHSIN)	03014	11010	05574		YES-CHECK ACTUAL
.	02605	SUB A=L(ALPHCOS)	03015	21010	05606		VALUE OF TAN EXP
.	02606	COM A=270=YLESS	03016	04600	00033		
.	02607	JP FXRAI4	03017	61000	03023		USE LONG CALC OF L
.	02610	PUT 1=W(ALPHASW)	03020	10000	00001		ASW=1
.	02611	JP FXRAIXT	03021	14030	05702		
.	02612	FXRAI4 CL W(ALPHASW)	03022	61000	03052		
.	02613	ENT B1=1	03023	16030	05702		
.	02614	ENT B4=ALPHSIN	03024	12100	00001		
.	02615	ENT B5=ALPHCOS	03025	12400	05574		LONG CALC-GET TAN
.	02616	ENT B6=ALPHDIFF	03026	12500	05606		
.	02617	ENT B7=01	03027	12600	06067		
.	02620	RJP FLTPT	03030	12700	00001		
.			03031	65000	06266		

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CARDS	LI	ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	02621		ENT A*W(ALPHDIFF+1)*AZERO	03032	11430	06070		
.	02622		JP GOON	03033	61000	03046		SIN NOT EQUAL TO COS CONTINUE
.	02623		MOVE 2*FLTONE*ALPHTAN	03034	10030	06136		
				03035	14030	05620		
				03036	10030	06137		
				03037	14030	05621		
.	02624		ENT A*W(ALPHTAN+1)	03040	11030	05621		
.	02625		ENT Q*W(ALPHSIN+1)*QPOS	03041	10230	05575		
.	02626		CP A*	03042	15040	00000		
.	02627		ENT Q*W(ALPHCOS+1)*QPOS	03043	10230	05607		
.	02630		CP A*	03044	15040	00000		
.	02631		JP FXRAIXT	03045	61000	03052		
.	02632	GOON	ENT B4*ALPHSIN	03046	12400	05574		
.	02633		ENT B6*ALPHTAN	03047	12600	05620		
.	02634		ENT B7*03	03050	12700	00003		
.	02635		RJP FLTPT	03051	65000	06266		
.	02636	FXRAIXT	RPL Y+1=L(FIXRAI)	03052	36010	02751		
.	02637		ENT B4*NIL	03053	12400	00000		
.	02640		ENT B5*NIL	03054	12500	00000		
.	02641		ENT B6*NIL	03055	12600	00000		
.	02642		ENT B1*NIL	03056	12100	00000		
.	02643		EXIT	03057	61010	02751		
.	02644	FIXRA	ENTRY	03060	61000	00000		
.	02645		STR B4*L(FXRAXT+1)	03061	16410	03564		SAVE IR-S
.	02646		STR B5*L(FXRAXT+2)	03062	16510	03565		
.	02647		STR B6*L(FXRAXT+3)	03063	16610	03566		
.	02650		STR B1*L(FXRAXT+4)	03064	16110	03567		
.	02651		ENT B1*1	03065	12100	00001		
.	02652		ENT B4*RAM	03066	12400	05727		RAMSIN
.	02653		ENT B6*RAMSIN	03067	12600	05544		
.	02654		ENT B7*13	03070	12700	00013		
.	02655		RJP FLTPT	03071	65000	06266		
.	02656		ENT Q*W(ALPHB+1)*QNEG	03072	10330	05461		IS RA NEG
.	02657		JP \$+6	03073	61000	03101		CONTINUS
.	02660		ENT B4*ALPHB	03074	12400	05460		YES ADD 360 DEGREES
.	02661		ENT B5*TTWPI	03075	12500	06165		
.	02662		ENT B6*B4	03076	12604	00000		
.	02663		ENT B7*00	03077	12700	00000		
.	02664		RJP FLTPT	03100	65000	06266		
.	02665		ENT B1*1	03101	12100	00001		
.	02666		ENT B6*RAMCOS	03102	12600	05546		RAMCOS
.	02667		ENT B7*14	03103	12700	00014		
.	02670		RJP FLTPT	03104	65000	06266		
.	02671		ENT A*W(I1)	03105	11030	05432		
.	02672		COM A*W(HFPI)*YLESS	03106	04630	06150		CHECK I VS 90
.	02673		JP IILESS	03107	61000	03167		NO I LESS THAN 90
.	02674		SUB A*W(HFPI)*AZERO	03110	21430	06150		CHECK EQUAL
.	02675		JP \$+4	03111	61000	03115		I GRTR THAN 90
.	02676		ENT A*W(HFPI+1)	03112	11030	06151		MAYBE DECK FRACTION
.	02677		COM A*W(I1+1)*YMORE	03113	04730	05433		
.	02700		JP IILESS	03114	61000	03167		GO ON
.	02701		PUT 1*W(I1SWITCH)	03115	10000	00001		

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BELTP

CAROS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	02702	ENT B4*RAM	03116	14030	05676		
.	02703	ENT B5*HFPI	03117	12400	05727		YES I GRTR 90
.	02704	ENT B6*RAMI90	03120	12500	06150		
.	02705	ENT B7*01	03121	12600	06071		RAM-90
.	02706	RJP FLTPT	03122	12700	00001		
.	02707	ENT B5*THFPI	03123	65000	06266		
.	02710	ENT B6*RAMI270	03124	12500	06153		
.	02711	RJP FLTPT	03125	12600	06073		
.	02712	ENT A*W(ALPHB)	03126	65000	06266		RAM-270
.	02713	ENT Q*777777777	03127	11030	05460		RA
.	02714	COM MASK*W(RAMI90)*AZERO	03130	10040	77777		
.	02715	JP CHE270	03131	43430	06071		
.	02716	ENT A*W(RAMI90+1)	03132	61000	03150		CHECK RAM-270
.	02717	COM MASK*W(ALPHB+1)*AZERO	03133	11030	06072		
.	02720	JP FXRAX1	03134	43430	05461		
.	02721	MOVE 2*HFPI*LL	03135	61000	03236		GO ON
			03136	10030	06150		RA= RAM-90
			03137	14030	05707		
			03140	10030	06151		
.	02722	ENT B4*BELPIXX	03141	14030	05710		
.	02723	ENT B5*II	03142	12400	06175		SET L=90 AND
.	02724	ENT B6*OELTB	03143	12500	05432		OEC= 180-2
.	02725	ENT B7*01	03144	12600	05452		
.	02726	RJP FLTPT	03145	12700	00001		
.	02727	JP FXRADNX	03146	65000	06266		
.	02730 CHE270	COM MASK*W(RAMI270)*AZERO	03147	61000	03571		
.	02731	JP FXRAX1	03150	43430	06073		CHECK RAM-270
.	02732	ENT A*W(ALPHB+1)	03151	61000	03236		GO TO REGULAR CALC
.	02733	COM MASK*W(RAMI270+1)*AZERO	03152	11030	05461		
.	02734	JP FXRAX1	03153	43430	06074		
.	02735	ENT B4*II	03154	61000	03236		
.	02736	ENT B5*BELPIXX	03155	12400	05432		RA= RAM-270
.	02737	ENT B6*OELTB	03156	12500	06175		SET L=270
.	02740	ENT B7*01	03157	12600	05452		OEC= I-180
.	02741	RJP FLTPT	03160	12700	00001		
.	02742	MOVE 2*THFPI*LL	03161	65000	06266		
			03162	10030	06153		
			03163	14030	05707		
			03164	10030	06154		
			03165	14030	05710		
.	02743	JP FXRAONY	03166	61000	03600		
.	02744 IILESS	CL W(IISWITCH)	03167	16030	05676		
.	02745	ENT B4*RAM	03170	12400	05727		
.	02746	ENT B5*HFPI	03171	12500	06150		
.	02747	ENT B6*RAMI90	03172	12600	06071		
.	02750	ENT B7*00	03173	12700	00000		
.	02751	RJP FLTPT	03174	65000	06266		RAM+90
.	02752	ENT B5*THFPI	03175	12500	06153		
.	02753	ENT B6*RAMI270	03176	12600	06073		
.	02754	RJP FLTPT	03177	65000	06266		RAM+270
.	02755	ENT A*W(ALPHB)	03200	11030	05460		
.	02756	ENT Q*777777777	03201	10040	77777		
.	02757	COM MASK*W(RAMI90)*AZERO	03202	43430	06071		

CARDS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	02760	JP IICHE270	03203	61000	03220		CHECK 270
.	02761	ENT A*W(ALPHB+1)	03204	11030	05461		CHECK FRACTION
.	02762	COM MASK*W(RAMI90+1)*AZERO	03205	43430	06072		
.	02763	JP FXRAX1	03206	61000	03236		NOT SPECIAL CASE
.	02764	MOVE 2*HFPI*LL	03207	10030	06150		RA=RAM+90 L=90
			03210	14030	05707		
			03211	10030	06151		
			03212	14030	05710		
.	02765	MOVE 2*II*DELTB	03213	10030	05432		II=DELTB
			03214	14030	05452		
			03215	10030	05433		
			03216	14030	05453		
.	02766	JP FXRADNX	03217	61000	03571		
.	02767 IICHE270	COM MASK*W(RAMI270)*AZERO	03220	43430	06073		
.	02770	JP FXRAX1	03221	61000	03236		CONTINUE
.	02771	ENT A*W(ALPHB+1)	03222	11030	05461		CHECK FRACTION
.	02772	COM MASK*W(RAMI270+1)*AZERO	03223	43430	06074		
.	02773	JP FXRAX1	03224	61000	03236		
.	02774	MOVE 2*THFPI*LL	03225	10030	06153		RA=FAH+270 L=270
			03226	14030	05707		
			03227	10030	06154		
			03230	14030	05710		
.	02775	PUT W(II)*W(DELTB)	03231	10030	05432		DEC= - II
			03232	14030	05452		
.	02776	PUT W(II+1)*CPW(DELTB+1)	03233	10030	05433		
			03234	14070	05453		
.	02777	JP FXRADNY	03235	61000	03600		
.	03000 FXRAX1	ENT A*W(ALPHASW)*ANOT	03236	11530	05702		CHECK ALPSW=0
.	03001	JP \$+4	03237	61000	03243		YES-LONG FORMULA
.	03002	RJP LAT2	03240	65000	04036		NO SHORT FORMULA
.	03003	JP FXRAXT+1	03241	61000	03564		
.	03004	JP \$+3	03242	61000	03245		
.	03005	RJP LAT1	03243	65000	04146		YES
.	03006	JP FXRAXT+1	03244	61000	03564		
.	03007	RJP MOD2PI	03245	65000	03752		
.	03010	STR A*L(LL)	03246	15010	05707		
.	03011	STR Q*W(LL+1)	03247	14030	05710		
.	03012	ENT A*W(IISWITCH)*AZERO	03250	11430	05676		
.	03013	JP \$+7	03251	61000	03260		X
.	03014	ENT B4*ALPHB	03252	12400	05460		I LESS THAN 90
							X
.	03015	3 ENT B5*RAM	03253	12500	05727		X
.	03016	ENT B6*RAMI90	03254	12600	06071		X
.	03017	ENT B7*01	03255	12700	00001		X
.	03020	RJP FLTPT	03256	65000	06266		RA-RAM
							X
.	03021	JP \$+6	03257	61000	03265		X
.	03022	ENT B4*RAM	03260	12400	05727		I GRTR THAN 90
							X
.	03023	ENT B5*ALPHB	03261	12500	05460		X
.	03024	ENT B6*RAMI90	03262	12600	06071		X
.	03025	ENT B7*01	03263	12700	00001		X
.	03026	RJP FLTPT	03264	65000	06266		RAM-RA

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CAROS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	03027	ENT A=W(RAMI90)	03265	11030	06071	X	X
.	03030	ENT Q=W(RAMI90+1)	03266	10030	06072	X	
.	03031	RJP MOD2PI	03267	65000	03752	X	
.	03032	STR A=W(RAMI90)	03270	15030	06071	X	
.	03033	STR Q=W(RAMI90+1)	03271	14030	06072	X	
.	03034	A00 Q=O=QNEG	03272	26700	00000		
.	03035	JP \$+6	03273	61000	03301	NO -	
.	03036	ENT B4=RAMI90	03274	12400	06071	X	YESS ADD 360
.	03037	ENT B5=TTWPI	03275	12500	06165	X	X
.	03040	ENT B6=RAMI90	03276	12600	06071	X	
.	03041	ENT B7=00	03277	12700	00000	X	
.	03042	RJP FLTPT	03300	65000	06266	X	
.	03043	ENT A=W(RAMI90+1)*ANOT	03301	11530	06072	X	
.	03044	JP RARAMO	03302	61000	03503	X	
.	03045	ENT B4=RAMI90	03303	12400	06071		B BETWEEN 0 TO 180
.	03046	ENT B5=BELPIXX	03304	12500	06175		
.	03047	ENT B6=RAMI270	03305	12600	06073		
.	03050	ENT B7=01	03306	12700	00001		
.	03051	RJP FLTPT	03307	65000	06266		
.	03052	ENT A=W(RAMI270+1)*ANOT	03310	11530	06074		
.	03053	JP RARAM180	03311	61000	03454		B=180
.	03054	JP QUAOL12*ANEG	03312	60700	03377		
.	03055	ENT B4=RAMI90	03313	12400	06071		B GRTR 180=360
.	03056	ENT B5=TTWPI	03314	12500	06165		
.	03057	ENT B6=RAMI270	03315	12600	06073		
.	03060	ENT B7=01	03316	12700	00001		
.	03061	RJP FLTPT	03317	65000	06266		
.	03062	ENT A=W(RAMI270+1)*ANOT	03320	11530	06074		
.	03063	JP RARAMO	03321	61000	03503		=360
.	03064 QUADL34	ENT A=W(LL+1)*ANEG	03322	11730	05710		L IN GUAD 3 OR 4
.	03065	JP FXRAX36	03323	61000	03331		X
.	03066	ENT B4=LL	03324	12400	05707		L NEG MAKE POS-A0D 360
.	03067	ENT B5=TTWPI	03325	12500	06165		
.	03070	ENT B6=LL	03326	12600	05707		
.	03071	ENT B7=00	03327	12700	00000		
.	03072	RJP FLTPT	03330	65000	06266		
.	03073 FXRAX36	ENT A=W(BELPIXX)	03331	11030	06175		CHECK L GRTR THAN 180
.	03074	COM A=W(LL)*YLESS	03332	04630	05707		
.	03075	JP FXRAY34	03333	61000	03346		X
.	03076	SUB A=W(LL)*AZERO	03334	21430	05707		
.	03077	JP FXRAX37	03335	61000	03341		NOT = A0D 180
.	03100	ENT A=W(LL+1)	03336	11030	05710		
.	03101	COM A=W(BELPIXX)*YMORE	03337	04730	06175		
.	03102	JP FXRAY34	03340	61000	03346		X
.	03103 FXRAX37	ENT B4=LL	03341	12400	05707		ADD 180 TO L
.	03104	ENT B5=BELPIXX	03342	12500	06175		
.	03105	ENT B6=LL	03343	12600	05707		
.	03106	ENT B7=00	03344	12700	00000		
.	03107	RJP FLTPT	03345	65000	06266		

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CARDS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	03110	FXRAY34	ENT	B4	RAMI90	03346	12400 06071 X
.	03111		ENT	B5	THFPI	03347	12500 06153 X
.	03112		ENT	B6	RAMCHECK	03350	12600 06103 X
.	03113		ENT	B7	01	03351	12700 00001 X
.	03114		RJP	FL	TPT	03352	65000 06266 X
.	03115		ENT	A=W	(RAMCHECK+1)*ANEG	03353	11730 06104 X
.	03116		JP	FX	QUAD4	03354	61000 03374 X
.	03117	FXQUAD3	ENT	A=W	(FXINST1)	03355	11030 06120
.	03120		STR	A=W	(FXSWITCH2)	03356	15030 03364
.	03121		ENT	B4	LL	03357	12400 05707 X
.	03122		ENT	B5	THFPI	03360	12500 06153 X
.	03123		ENT	B6	LLMINUS	03361	12600 06101 X
.	03124		ENT	B7	01	03362	12700 00001 X
.	03125		RJP	FL	TPT	03363	65000 06266 X
.	03126	FXSWITCH2	ENT	A=W	(LLMINUS+1)*APOS	03364	11630 06102 X
.	03127		JP	FX	RAX2	03365	61000 03530 X
.	03130		ENT	B4	HFP1	03366	12400 06150
.	03131		ENT	B5	LL	03367	12500 05707 X
.	03132		ENT	B6	LL	03370	12600 05707 X
.	03133		ENT	B7	01	03371	12700 00001 X
.	03134		RJP	FL	TPT	03372	65000 06266 X
.	03135		JP	FX	RAX2	03373	61000 03530 X
.	03136	FXQUAD4	ENT	A=W	(FXINST)	03374	11030 06117 X
.	03137		STR	A=W	(FXSWITCH2)	03375	15030 03364
.	03140		JP	FX	QUAD3+2	03376	61000 03357 X
.	03141	QUADL 12	ENT	A=W	(LL+1)*ANEG	03377	11730 05710
.	03142		JP	FX	RAX14	03400	61000 03406
.	03143		ENT	B4	LL	03401	12400 05707 L NEG I ADD 360 BEFORE CHECK
.	03144		ENT	B5	TTWPI	03402	12500 06165
.	03145		ENT	B6	LL	03403	12600 05707
.	03146		ENT	B7	00	03404	12700 00000
.	03147		RJP	FL	TPT	03405	65000 06266
.	03150	FXRAX14	ENT	A=W	(BELPIXX)	03406	11030 06175 L = OR LESS THAN 180
.	03151		COM	A=W	(LL)*YLESS	03407	04630 05707
.	03152		JP	FX	RAX15	03410	61000 03416 TOO BIG - SUB 180
.	03153		SUB	A=W	(LL)*AZERO	03411	21430 05707
.	03154		JP	FX	RAY12	03412	61000 03423 X
.	03155		ENT	A=W	(BELPIXX+1)	03413	11030 06176 YES = CHECK FRACTION
.	03156		COM	A=W	(LL+1)*YMORE	03414	04730 05710
.	03157		JP	FX	RAY12	03415	61000 03423 X
.	03160	FXRAX15	ENT	B4	LL	03416	12400 05707 SUBTRACT L-180
.	03161		ENT	B5	BELPIXX	03417	12500 06175
.	03162		ENT	B6	LL	03420	12600 05707
.	03163		ENT	B7	01	03421	12700 00001
.	03164		RJP	FL	TPT	03422	65000 06266
.	03165	FXRAY12	ENT	B4	RAMI90	03423	12400 06071 X
.	03166		ENT	B5	HFP1	03424	12500 06150 X
.	03167		ENT	B6	RAMCHECK	03425	12600 06103 X
.	03170		ENT	B7	01	03426	12700 00001 X
.	03171		RJP	FL	TPT	03427	65000 06266 X
.	03172		ENT	A=W	(RAMCHECK+1)*ANEG	03430	11730 06104 X
.	03173		JP	FX	QUAD2	03431	61000 03451 X
.	03174	FXQUAD1	ENT	A=W	(FXINST1)	03432	11030 06120 X

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CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	03175	STR A=W(FXSWITCH)	03433	15030	03441	X	
.	03176	ENT B4*LL	03434	12400	05707	X	
.	03177	ENT B5*HFPI	03435	12500	06150	X	
.	03200	ENT B6*LLMINUS	03436	12600	06101	X	
.	03201	ENT B7*O1	03437	12700	00001	X	
.	03202	RJP FLTPT	03440	65000	06266	X	
.	03203 FXSWITCH	ENT A=W(LLMINUS+1)*APOS	03441	11630	06102		
.	03204	JP FXRAX2	03442	61000	03530	X	
.	03205	ENT B4*HFPI	03443	12400	06150		
.	03206	ENT B5*LL	03444	12500	05707	X	
.	03207	ENT B6*LL	03445	12600	05707	X	
.	03210	ENT B7*O1	03446	12700	00001	X	
.	03211	RJP FLTPT	03447	65000	06266	X	
.	03212	JP FXRAX2	03450	61000	03530	X	
.	03213 FXQUAD2	ENT A=W(FXINST)	03451	11030	06117	X	
.	03214	STR A=W(FXSWITCH)	03452	15030	03441	X	
.	03215	JP FXQUAD1+2	03453	61000	03434	X	
.	03216 RARAM180	MOVE 2*BELPIX*LL	03454	10030	06175	X	
			03455	14030	05707		
			03456	10030	06176		
			03457	14030	05710		
.	03217	PUT W(FLTONE)*W(LLCOS)	03460	10030	06136		
.	03220	PUT W(FLTONE+1)*CPW(LLCOS+1)	03461	14030	05630		
			03462	10030	06137		
			03463	14070	05631		
.	03221	CL W(LLSIN)	03464	16030	05622		
.	03222	CL W(LLSIN+1)	03465	16030	05623		
.	03223	PUT W(IISIN)*W(DELT SIN)	03466	10030	05540		
			03467	14030	05550		
.	03224	PUT W(IISIN+1)CPW(DELT SIN+1)	03470	10030	05541		
			03471	14070	05551		
.	03225	PUT W(II)*W(OELTB)	03472	10030	05432		
			03473	14030	05452		
.	03226	PUT W(II+1)*CPW(OELTB+1)	03474	10030	05433		
			03475	14070	05453		
.	03227	MOVE 2*IICOS*DELT COS	03476	10030	05542		
			03477	14030	05562		
			03500	10030	05543		
			03501	14030	05563		
.	03230	JP FXRADN	03502	61000	03557		TO RANGE ROUTINE
.	03231 RARAMO	CL W(LL)	03503	16030	05707		
.	03232	CL W(LL+1)	03504	16030	05710		
.	03233	MOVE 2*FLTONE*LLCOS	03505	10030	06136		
			03506	14030	05630		
			03507	10030	06137		
			03510	14030	05631		
.	03234	CL W(LLSIN)	03511	16030	05622		
.	03235	CL W(LLSIN+1)	03512	16030	05623		
.	03236	MOVE 2*IISIN*DELT SIN	03513	10030	05540		
			03514	14030	05550		
			03515	10030	05541		
			03516	14030	05551		
.	03237	MOVE 2*IICOS*DELT COS	03517	10030	05542		

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CARDS	LI	ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
				03520	14030	05562		
				03521	10030	05543		
				03522	14030	05563		
.	03240		MOVE 2*II*DELTB	03523	10030	05432		
				03524	14030	05452		
				03525	10030	05433		
				03526	14030	05453		
.	03241		JP FXRADN	03527	61000	03557		TO RANGE ROUTINE
.	03242	FXRAX2	ENT B1*1	03530	12100	00001		
.	03243		ENT B4*LL	03531	12400	05707		CALC SINL
.	03244		ENT B6*LLSIN	03532	12600	05622		
.	03245		ENT B7*13	03533	12700	00013		
.	03246		RJP FLTPT	03534	65000	06266		
.	03247		ENT B1*1	03535	12100	00001		
.	03250		ENT B4*IISIN	03536	12400	05540		
.	03251		ENT B5*LLSIN	03537	12500	05622		
.	03252		ENT B6*DELTSIN	03540	12600	05550		
.	03253		ENT B7*02	03541	12700	00002		
.	03254		RJP FLTPT	03542	65000	06266		
.	03255		ENT B1*1	03543	12100	00001		
.	03256		ENT B4*DELTSIN	03544	12400	05550		GET ARCSIN DELTB
.	03257		ENT B6*DELTB	03545	12600	05452		
.	03260		ENT B7*17	03546	12700	00017		
.	03261		RJP FLTPT	03547	65000	06266		
.	03262		ENT B4*DELTB	03550	12400	05452		
.	03263		ENT B6*DELT COS	03551	12600	05562		
.	03264		ENT B7*14	03552	12700	00014		
.	03265		RJP FLTPT	03553	65000	06266		
.	03266		ENT B4*LL	03554	12400	05707		X
.	03267		ENT B6*LLCOS	03555	12600	05630		X
.	03270		RJP FLTPT	03556	65000	06266		X
.	03271	FXRADN	RJP BRANGE	03557	65000	04463		
.	03272		JP FXRAXT+1	03560	61000	03564		ERROR EXIT
.	03273		STR A*L(RANGEB)	03561	15010	05731		
.	03274		STR Q*W(RANGEB+1)	03562	14030	05732		
.	03275	FXRAXT	RPL Y+1*L(FIXRA1)	03563	36010	03060		
.	03276		ENT B4*NIL	03564	12400	00000		
.	03277		ENT B5*NIL	03565	12500	00000		
.	03300		ENT B6*NIL	03566	12600	00000		
.	03301		ENT B1*NIL	03567	12100	00000		
.	03302		EXIT	03570	61010	03060		
.	03303	FXRADNX	MOVE 2*FLTONE*LLSIN	03571	10030	06136		
				03572	14030	05622		
				03573	10030	06137		
				03574	14030	05623		
.	03304		CL W(LLCOS)	03575	16030	05630		
.	03305		CL W(LLCOS+1)	03576	16030	05631		
.	03306		JP FXRADN	03577	61000	03557		
.	03307	FXRADNY	PUT W(FLTONE)*W(LLSIN)	03600	10030	06136		
				03601	14030	05622		
.	03310		PUT W(FLTONE+1)*CPW(LLSIN+1)	03602	10030	06137		
				03603	14070	05623		
.	03311		CL W(LLCOS)	03604	16030	05630		

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CARDS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	03312	CL W(LLCOS+1)	03605	16030	05631		
.	03313	JP FXRADN	03606	61000	03557		
.	03314	FXRAXERR JP \$	03607	61000	03607		
.	03315	FIXLONGI ENTRY	03610	61000	00000		
.	03316	STR B4=L(FXLGIXT+1)	03611	16410	03645		SAVE IR-S
.	03317	STR B5=L(FXLGIXT+2)	03612	16510	03646		
.	03320	STR B6=L(FXLGIXT+3)	03613	16610	03647		
.	03321	STR B1=L(FXLGIXT+4)	03614	16110	03650		
.	03322	RJP ALPHAGNEW	03615	65000	04730		NEW RA(GREENWICH)CALC X
.	03323	STR A=L(ALPHG)	03616	15010	05717		
.	03324	STR Q=W(ALPHG+1)	03617	14030	05720		
.	03325	ENT B1=1	03620	12100	00001		
.	03326	ENT B4=ALPHG	03621	12400	05717		GET ALPHB=ALPHG+LAMDB
.	03327	ENT B5=LAMDB	03622	12500	05462		
.	03330	ENT B6=ALPHB	03623	12600	05460		
.	03331	ENT B7=00	03624	12700	00000		
.	03332	RJP FLTPT	03625	65000	06266		
.	03333	ENT Q=W(ALPHB+1)*QNEG	03626	10330	05461		IS RA NEG
.	03334	JP \$+7	03627	61000	03636		NO CONTINUE
.	03335	ENT B4=ALPHB	03630	12400	05460		YES ADD 360 DEGREES
.	03336	ENT B5=TTWPI	03631	12500	06165		
.	03337	ENT B6=B4	03632	12604	00000		
.	03340	ENT B7=00	03633	12700	00000		
.	03341	RJP FLTPT	03634	65000	06266		
.	03342	ENT Q=W(ALPHB+1)	03635	10030	05461		
.	03343	ENT A=L(ALPHB)	03636	11010	05460		GET ALPHB MOD 2PI
.	03344	RJP MOD2PI	03637	65000	03752		
.	03345	STR A=L(ALPHB)	03640	15010	05460		
.	03346	STR Q=W(ALPHB+1)	03641	14030	05461		
.	03347	RJP FIXRAI	03642	65000	02751		
.	03350	JP FXLGIXT+1	03643	61000	03645		ERROR RETURN
.	03351	FIXLGIXT RPL Y+1=L(FIXLONGI)	03644	36010	03610		NORMAL EXIT
.	03352	ENT B4=NIL	03645	12400	00000		RESTORE IR-S
.	03353	ENT B5=NIL	03646	12500	00000		
.	03354	ENT B6=NIL	03647	12600	00000		
.	03355	ENT B1=NIL	03650	12100	00000		
.	03356	EXIT	03651	61010	03610		
.	03357	FIXLONG ENTRY	03652	61000	00000		
.	03360	STR B4=L(FXLGXT+1)	03653	16410	03745		SAVE IR-S
.	03361	STR B5=L(FXLGXT+2)	03654	16510	03746		
.	03362	STR B6=L(FXLGXT+3)	03655	16610	03747		
.	03363	STR B1=L(FXLGXT+4)	03656	16110	03750		
.	03364	RJP ALPHAGNEW	03657	65000	04730		NEW RA(GREENWICH)CALC X
.	03365	STR A=L(ALPHG)	03660	15010	05717		
.	03366	STR Q=W(ALPHG+1)	03661	14030	05720		
.	03367	ENT B1=1	03662	12100	00001		
.	03370	ENT B4=ALPHG	03663	12400	05717		CALC ALPHB=ALPHG+LAMDG
.	03371	ENT B5=LAMDB	03664	12500	05462		
.	03372	ENT B6=ALPHB	03665	12600	05460		
.	03373	ENT B7=00	03666	12700	00000		
.	03374	RJP FLTPT	03667	65000	06266		

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BELTP

CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	03375	ENT Q*W(ALPHB+1)*QNEG	03670	10330	05461		IS RA NEG
.	03376	JP \$+7	03671	61000	03700		NO CONTINUE
.	03377	ENT B4*ALPHB	03672	12400	05460		YES ADD 360 DEGREES
.	03400	ENT B5*TTWPI	03673	12500	06165		
.	03401	ENT B6*B4	03674	12604	00000		
.	03402	ENT B7*00	03675	12700	00000		
.	03403	RJP FLTPT	03676	65000	06266		
.	03404	ENT Q*W(ALPHB+1)	03677	10030	05461		
.	03405	ENT A*L(ALPHB)	03700	11010	05460		MAKE ALPHB MOD 2PI
.	03406	RJP M002PI	03701	65000	03752		
.	03407	STR A*L(ALPHB)	03702	15010	05460		
.	03410	STR Q*W(ALPHB+1)	03703	14030	05461		
.	03411	ADD Q*0*QNEG	03704	26700	00000		RA POS
.	03412	JP \$+6	03705	61000	03713		X YES
.	03413	ENT B4*ALPHB	03706	12400	05460		X NO-ADD 360
.	03414	ENT B5*TTWPI	03707	12500	06165		X
.	03415	ENT B6*B4	03710	12604	00000		X
.	03416	ENT B7*00	03711	12700	00000		X
.	03417	RJP FLTPT	03712	65000	06266		X
.	03420	ENT B1*1	03713	12100	00001		
.	03421	ENT B4*ALPHB	03714	12400	05460		GET ALPHSIN
.	03422	ENT B6*ALPHSIN	03715	12600	05574		
.	03423	ENT B7*13	03716	12700	00013		
.	03424	RJP FLTPT	03717	65000	06266		
.	03425	ENT B1*1	03720	12100	00001		
.	03426	ENT B6*ALPHCOS	03721	12600	05606		GET ALPHCOS
.	03427	ENT B7*14	03722	12700	00014		
.	03430	RJP FLTPT	03723	65000	06266		
.	03431	ENT A*L(ALPHSIN)	03724	11010	05574		
.	03432	SUB A*L(ALPHCOS)	03725	21010	05606		
.	03433	COM A*27D*YMORE	03726	04700	00033		TEST VAL OF TAN
.	03434	JP FXLG1	03727	61000	03740		ASW=1 (SHORT CALC
.	03435	ENT B1*1	03730	12100	00001		
.	03436	ENT B4*ALPHSIN	03731	12400	05574		NEED TAN FOR LONG CALC
.	03437	ENT B5*ALPHCOS	03732	12500	05606		
.	03440	ENT B6*ALPHTAN	03733	12600	05620		
.	03441	ENT B7*03	03734	12700	00003		
.	03442	RJP FLTPT	03735	65000	06266		
.	03443	CL W(ALPHASW)	03736	16030	05702		
.	03444	JP FXLG1+2	03737	61000	03742		
.	03445	PUT 1*W(ALPHASW)	03740	10000	00001		ASW=1
.	03446	RJP FIXRA	03742	65000	03060		
.	03447	JP FXLGXT+1	03743	61000	03745		ERROR RETURN
.	03450	RPL Y+1*L(FIXLONG)	03744	36010	03652		
.	03451	ENT B4*NIL	03745	12400	00000		
.	03452	ENT B5*NIL	03746	12500	00000		
.	03453	ENT B6*NIL	03747	12600	00000		
.	03454	ENT B1*NIL	03750	12100	00000		
.	03455	EXIT	03751	61010	03652		

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CARDS	L1	ID	LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
.	03456	MOD2PI			ENTRY	03752	61000	00000		
.	03457				STR B1*L(MODB1)	03753	16110	03777		
.	03460				STR B4*L(MO0B4)	03754	16410	04000		
.	03461				STR B5*L(MODB5)	03755	16510	04001		
.	03462				STR B6*L(MO0B6)	03756	16610	04002		
.	03463				STR B7*L(MO0B7)	03757	16710	04003		
.	03464				STR A*W(MODNUM)	03760	15030	06256		IS EXP LESS THAN OR
.	03465				STR Q*W(MOONUM+1)	03761	14030	06257		EQUAL TO 40003
.	03466				ENT Q*61000	03762	10000	61000		INITIALIZATION
.	03467				STR Q*U(MO01)	03763	14020	04005		
.	03470				STR Q*U(MO02)	03764	14020	04006		
.	03471	MOD5			COM A*40004*YMORE	03765	04700	40004		
.	03472				JP MOD1	03766	61000	04005		NO ERROR
.	03473				SUB A*40003*AZERO	03767	21400	40003		IS EXP 40003
.	03474				JP MODNORM	03770	61000	03775		NO NUMBER GOOD
.	03475				ENT A*W(MODNUM+1)*APOS	03771	11630	06257		TEST FRAC POS
.	03476				CP A	03772	15040	00000		
.	03477				COM A*W(BEL2PI1+1)*YMORE	03773	04730	06141		
.	03500				JP MO01	03774	61000	04005		NO ERROR
.	03501	MODNORM			ENT A*W(MODNUM)	03775	11030	06256		NORMAL EXIT
.	03502				ENT Q*W(MODNUM+1)	03776	10030	06257		FRAC IN Q
.	03503	MO0B1			ENT B1*0	03777	12100	00000		
.	03504	MO0B4			ENT B4*0	04000	12400	00000		
.	03505	MO0B5			ENT B5*0	04001	12500	00000		
.	03506	MO0B6			ENT B6*0	04002	12600	00000		
.	03507	MO0B7			ENT B7*0	04003	12700	00000		
.	03510				EXIT	04004	61010	03752		EXP IN A
.	03511	MO01			JP MO03	04005	61000	04010		SW BETA JP TO
.	03512	MO02			JP MO04	04006	61000	04014		SW ALPHA
.	03513				JP MO06	04007	61000	04024		
.	03514	MOD3			ENT Q*12000	04010	10000	12000		SET BETA TO B
.	03515				STR Q*U(MOD1)	04011	14020	04005		
.	03516				ENT A*W(MOONUM+1)*APOS	04012	11630	06257		TEST NUM FOR POS
.	03517				JP MO06	04013	61000	04024		NO JP TO NEG ROUT
.	03520	MOD4			ENT B4*MOONUM	04014	12400	06256		SUB 2PI FROM NUM
.	03521				ENT B5*BEL2PI	04015	12500	06165		
.	03522				ENT B6*MOONUM	04016	12600	06256		STORE IN NUMBER
.	03523				ENT B7*01	04017	12700	00001		
.	03524				ENT B1*1	04020	12100	00001		
.	03525				RJP FLTPT	04021	65000	06266		
.	03526				ENT A*W(MOONUM)	04022	11030	06256		EXP IN A REGISTER
.	03527				JP MO05	04023	61000	03765		JP TO TEST FOR LESS THAN OR = 2PI
.	03530	MOD6			ENT B4*MODNUM	04024	12400	06256		
.	03531				ENT B5*BEL2PI	04025	12500	06165		
.	03532				ENT B6*MOONUM	04026	12600	06256		STORE IN NUMBER
.	03533				ENT B7*00	04027	12700	00000		
.	03534				ENT B1*1	04030	12100	00001		
.	03535				EXECUTE FLTPT	04031	65000	06266		ADD 2PI TO NEG NUM
.	03536				ENT Q*12000	04032	10000	12000		
.	03537				STR Q*U(MO02)	04033	14020	04006		
.	03540				ENT A*W(MOONUM)	04034	11030	06256		EXP IN A
.	03541				JP MO05	04035	61000	03765		JP TO TEST FOR LESS THAN OR =

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CARDS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
							2PI
.	03542	LAT2 ENTRY	04036	61000	00000		
.	03543	STR B4=L(LAT21)	04037	16410	04127		INITIALIZATION
.	03544	STR B1=L(LAT25)	04040	16110	04133		
.	03545	STR B5=L(LAT22)	04041	16510	04130		
.	03546	STR B6=L(LAT23)	04042	16610	04131		
.	03547	STR B7=L(LAT24)	04043	16710	04132		
.	03550	ENT B4=IICOS	04044	12400	05542		
.	03551	ENT B5=RAMSIN	04045	12500	05544		
.	03552	ENT B6=BELPROD	04046	12600	06242		
.	03553	ENT B7=02	04047	12700	00002		MUL COSI BY SINLOMEGA
.	03554	ENT B1=1	04050	12100	00001		
.	03555	RJP FLTPT	04051	65000	06266		
.	03556	ADD A=0*ANOT	04052	20500	00000		TEST DENOMINATOR = 0
.	03557	JP LAT2PI	04053	61000	04140		L=90DEGREES OR 270
.	03560	ENT B4=RAMCOS	04054	12400	05546		
.	03561	ENT B5=BELPROD	04055	12500	06242		
.	03562	ENT B6=BELQUOT	04056	12600	06246		
.	03563	ENT B7=03	04057	12700	00003		
.	03564	ENT B1=1	04060	12100	00001		
.	03565	RJP FLTPT	04061	65000	06266		DIV COSLOMEGA BY PROD
.	03566	PUT W(BELQUOT)*W(BELSTOR1)	04062	10030	06246		
.			04063	14030	06250		
.	03567	PUT W(BELQUOT+1)*W(BELSTOR1+1)	04064	10030	06247		ARCTAN=ARCSIN OF A SSQ DIV
.			04065	14030	06251		
.	03570	ENT B4=BELQUOT	04066	12400	06246		BY SQ RT 1+A SQ
.	03571	ENT B5=BELQUOT	04067	12500	06246		
.	03572	ENT B6=BELPROD	04070	12600	06242		A SQUARED
.	03573	ENT B7=02	04071	12700	00002		
.	03574	ENT B1=1	04072	12100	00001		
.	03575	RJP FLTPT	04073	65000	06266		
.	03576	ENT B4=FLTONE	04074	12400	06136		
.	03577	ENT B5=BELPROD	04075	12500	06242		
.	03600	ENT B6=BELSUM	04076	12600	06244		
.	03601	ENT B7=00	04077	12700	00000		
.	03602	ENT B1=1	04100	12100	00001		
.	03603	RJP FLTPT	04101	65000	06266		1+A SQ
.	03604	ENT B4=BELSUM	04102	12400	06244		
.	03605	ENT B6=BELSTOR2	04103	12600	06252		
.	03606	ENT B7=12	04104	12700	00012		SQ RT OF SUM
.	03607	ENT B1=1	04105	12100	00001		
.	03610	RJP FLTPT	04106	65000	06266		
.	03611	ENT B4=BELSTOR1	04107	12400	06250		
.	03612	ENT B5=BELSTOR2	04110	12500	06252		
.	03613	ENT B6=BELQUOT	04111	12600	06246		
.	03614	ENT B7=03	04112	12700	00003		DIBISION OF A BY SQ RT
.	03615	ENT B1=1	04113	12100	00001		
.	03616	RJP FLTPT	04114	65000	06266		
.	03617	ENT B4=BELQUOT	04115	12400	06246		ARC SIN
.	03620	ENT B6=LL	04116	12600	05707		
.	03621	ENT B7=17	04117	12700	00017		
.	03622	ENT B1=1	04120	12100	00001		
.	03623	RJP FLTPT	04121	65000	06266		

CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	03624	ENT A=W(LL)	04122	11030	05707		TEST L LESS THAN OR = 2PI
.	03625	ENT Q=W(LL+1)	04123	10030	05710		
.	03626	RJP MOD2PI	04124	65000	03752		JP TO 2PI MODULUS
.	03627	STR A=W(LL)	04125	15030	05707		
.	03630	STR Q=W(LL+1)	04126	14030	05710		
.	03631 LAT21	ENT B4=0	04127	12400	00000		NORMAL EXIT
.	03632 LAT22	ENT B5=0	04130	12500	00000		
.	03633 LAT23	ENT B6=0	04131	12600	00000		
.	03634 LAT24	ENT B7=0	04132	12700	00000		
.	03635 LAT25	ENT B1=0	04133	12100	00000		
.	03636	RPL Y+1=L(LAT2)	04134	36010	04036		
.	03637	ENT A=W(LL)	04135	11030	05707		
.	03640	ENT Q=W(LL+1)	04136	10030	05710		
.	03641	EXIT	04137	61010	04036		
.	03642 LAT2PI	ENT A=W(RAMCOS+1)*APOS	04140	11630	05547		WILL TAN BE + OR -
.	03643	ENT A=W(THFPI)*SKIP	04141	11130	06153		- L = 270
.	03644	ENT A=W(HFPI)*SKIP	04142	11130	06150		P L= 90
.	03645	ENT Q=W(THFPI+1)*SKIP	04143	10130	06154		
.	03646	ENT Q=W(HFPI+1)	04144	10030	06151		
.	03647	JP LAT21-3	04145	61000	04124		
.	03650 LAT1	ENTRY	04146	61000	00000		
.	03651	STR B1=L(LAT15)	04147	16110	04300		
.	03652	STR B4=L(LAT11)	04150	16410	04274		INITIALIZATION
.	03653	STR B5=L(LAT12)	04151	16510	04275		
.	03654	STR B6=L(LAT13)	04152	16610	04276		
.	03655	STR B7=L(LAT14)	04153	16710	04277		
.	03656	CL W(LATEM)	04154	16030	05704		
.	03657	ENT B4=ICOS	04155	12400	05542		
.	03660	ENT B5=RAMCOS	04156	12500	05546		
.	03661	ENT B6=BELSTOR1	04157	12600	06250		
.	03662	ENT B7=02	04160	12700	00002		
.	03663	ENT B1=1	04161	12100	00001		
.	03664	RJP FLTPT	04162	65000	06266		
.	03665	ENT B5=ALPHTAN	04163	12500	05620		
.	03666	ENT B6=BELPROD	04164	12600	06242		
.	03667	ENT B1=1	04165	12100	00001		
.	03670	RJP FLTPT	04166	65000	06266		MULT TANALPHA BY COSI
.	03671	ENT B4=BELPROD	04167	12400	06242		
.	03672	ENT B5=RAMSIN	04170	12500	05544		
.	03673	ENT B1=1	04171	12100	00001		
.	03674	RJP FLTPT	04172	65000	06266		MUL PREVIOUS PROD BY SINLOMEGA
.	03675	ENT B4=BELPROD	04173	12400	06242		
.	03676	ENT B5=BELSTOR1	04174	12500	06250		
.	03677	ENT B6=BELSTOR1	04175	12600	06250		ADD STORED PRODUCT AND
.	03700	ENT B7=00	04176	12700	00000		PREVIOUS PRODUCT AND STORE
.	03701	ENT B1=1	04177	12100	00001		
.	03702	RJP FLTPT	04200	65000	06266		
.	03703	SUB A=0*ANOT	04201	21500	00000		TEST DENOMINATOR = 0
.	03704	RJP LAT1PI	04202	65000	04305		L=90OR 270DEGREES
.	03705	ENT B4=RAMCOS	04203	12400	05546		
.	03706	ENT B5=ALPHTAN	04204	12500	05620		
.	03707	ENT B6=BELPROD	04205	12600	06242		

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CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	03710	ENT B7*02	04206	12700	00002		
.	03711	ENT B1*1	04207	12100	00001		
.	03712	RJP FLTPT	04210	65000	06266		MUL TANALPHA BY COSLOMEGA
.	03713	ENT B4*BELPROD	04211	12400	06242		
.	03714	ENT B5*RAHSIN	04212	12500	05544		
.	03715	ENT B6*BELOIFF	04213	12600	06236		
.	03716	ENT B7*01	04214	12700	00001		SUB SINLOMEGA FROM PROD
.	03717	ENT B1*1	04215	12100	00001		
.	03720	RJP FLTPT	04216	65000	06266		
.	03721	ENT A*W(LATEM)*AZERO	04217	11430	05704		CODE TO INDICATE IF TAN INFINI TE YES
.	03722	JP LATIPI1	04220	61000	04311		
.	03723	ENT B4*BELOIFF	04221	12400	06236		
.	03724	ENT B5*BELSTOR1	04222	12500	06250		
.	03725	ENT B6*BELQUOT	04223	12600	06246		
.	03726	ENT B7*03	04224	12700	00003		
.	03727	ENT B1*1	04225	12100	00001		
.	03730	RJP FLTPT	04226	65000	06266		DIV ABOVE DIFF BY STOR1 (DENOM)
.	03731	PUT W(BELQUOT)*W(BELSTOR1)	04227	10030	06246		
.	03732	PUT W(BELQUOT+1)*W(BELSTOR1+1)	04230	14030	06250		
.	03733	ENT B4*BELQUOT	04231	10030	06247		ARCTAN=ARCSIN OF A SSQ DIV
.	03734	ENT B5*BELQUOT	04232	14030	06251		
.	03735	ENT B6*BELPROD	04233	12400	06246		BY SQ RT 1+A SQ
.	03736	ENT B7*02	04234	12500	06246		
.	03737	ENT B1*1	04235	12600	06242		A SQUARED
.	03740	RJP FLTPT	04236	12700	00002		
.	03741	ENT B4*FLTONE	04237	12100	00001		
.	03742	ENT B5*BELPROD	04240	65000	06266		
.	03743	ENT B6*BELSUM	04241	12400	06136		
.	03744	ENT B7*00	04242	12500	06242		
.	03745	ENT B1*1	04243	12600	06244		
.	03746	RJP FLTPT	04244	12700	00000		
.	03747	ENT B4*BELSUM	04245	12100	00001		1+A SQ
.	03750	ENT B6*BELSTOR2	04246	65000	06266		
.	03751	ENT B7*12	04247	12400	06244		
.	03752	ENT B1*1	04250	12600	06252		SQ RT OF SUM
.	03753	RJP FLTPT	04251	12700	00012		
.	03754	ENT B4*BELSTOR1	04252	12100	00001		
.	03755	ENT B5*BELSTOR2	04253	65000	06266		
.	03756	ENT B6*BELQUOT	04254	12400	06250		
.	03757	ENT B7*03	04255	12500	06252		
.	03760	ENT B1*1	04256	12600	06246		DIBISION OF A BY SQ RT
.	03761	RJP FLTPT	04257	12700	00003		
.	03762	ENT B4*BELQUOT	04260	12100	00001		
.	03763	ENT B6*LL	04261	65000	06266		ARC SIN
.	03764	ENT B7*17	04262	12400	06246		
.	03765	ENT B1*1	04263	12600	05707		
.	03766	RJP FLTPT	04264	12700	00017		
.	03767	ENT A*W(LL)	04265	12100	00001		
.	03770	ENT Q*W(LL+1)	04266	65000	06266		TEST ARCTAN LESS OR =2PI
.			04267	11030	05707		
.			04270	10030	05710		

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CARDS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	03771	RJP MOD2PI	04271	65000	03752		I LESS OR =2PI
.	03772	STR A=W(LL)	04272	15030	05707		
.	03773	STR Q=W(LL+1)	04273	14030	05710		
.	03774 LAT11	ENT B4*0	04274	12400	00000		NORMAL EXIT
.	03775 LAT12	ENT B5*0	04275	12500	00000		
.	03776 LAT13	ENT B6*0	04276	12600	00000		
.	03777 LAT14	ENT B7*0	04277	12700	00000		
.	04000 LAT15	ENT B1*0	04300	12100	00000		
.	04001	RPL Y+1=L(LAT1)	04301	36010	04146		
.	04002	ENT A=W(LL)	04302	11030	05707		
.	04003	ENT Q=W(LL+1)	04303	10030	05710		
.	04004	EXIT	04304	61010	04146		
.	04005 LATIPI	ENTRY	04305	61000	00000		
.	04006	PUT 1=W(LATEM)	04306	10000	00001		
.			04307	14030	05704		
.	04007	EXIT	04310	61010	04305		
.	04010 LATIPI1	ENT A=W(BELDIFF)*APOS	04311	11630	06236		TAN P OR -
.	04011	ENT A=W(HFPI)*SKIP	04312	11130	06153		TAN - L = 270
.	04012	ENT A=W(HFPI)*SKIP	04313	11130	06150		TAN P L= 90
.	04013	ENT Q=W(HFPI+1)*SKIP	04314	10130	06154		
.	04014	ENT Q=W(HFPI+1)	04315	10030	06151		
.	04015	JP LAT11-3	04316	61000	04271		
.	04016 SINALF	ENTRY	04317	61000	00000		
.	04017	ENT Q=61000	04320	10000	61000		INITIALIZATION
.	04020	STR Q=U(ALP7)	04321	14020	04431		
.	04021	STR Q=U(ALP2)	04322	14020	04416		SET SW TO B
.	04022	STR Q=U(ALP9)	04323	14020	04457		
.	04023	JP ALP1	04324	61000	04332		
.	04024 ALPHA	ENTRY	04325	61000	00000		
.	04025	ENT Q=12000	04326	10000	12000		INITIALIZATION
.	04026	STR Q=U(ALP9)	04327	14020	04457		
.	04027	STR Q=U(ALP7)	04330	14020	04431		
.	04030	STR Q=U(ALP2)	04331	14020	04416		SET SW TO A
.	04031 ALP1	STR B4=L(ALP3)	04332	16410	04424		
.	04032	STR B5=L(ALP4)	04333	16510	04425		
.	04033	STR B6=L(ALP5)	04334	16610	04426		
.	04034	STR B7=L(ALP6)	04335	16710	04427		
.	04035	STR B1=L(ALP10)	04336	16110	04430		
.	04036	ENT A=37765	04337	11000	37765		
.	04037	COM A=W(DELT COS)*YMORE	04340	04730	05562		TEST EXPONENT SMALL=0
.	04040	JP ALPERR2	04341	61000	04461		
.	04041	ENT B4=IIC05	04342	12400	05542		
.	04042	ENT B5=RAMCOS	04343	12500	05546		
.	04043	ENT B6=BELPROD	04344	12600	06242		
.	04044	ENT B7=02	04345	12700	00002		
.	04045	ENT B1=1	04346	12100	00001		
.	04046	RJP FLTPT	04347	65000	06266		
.	04047	ENT B4=LLSIN	04350	12400	05622		
.	04050	ENT B5=BELPROD	04351	12500	06242		
.	04051	ENT B6=BELSTOR1	04352	12600	06250		
.	04052	ENT B1=1	04353	12100	00001		
.	04053	RJP FLTPT	04354	65000	06266		MUL PROD BY SINL
.	04054	ENT B4=RAMSIN	04355	12400	05544		

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CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	04055	ENT B5•LLCOS	04356	12500	05630		
.	04056	ENT B6•BELPROD	04357	12600	06242		
.	04057	ENT B7•02	04360	12700	00002		
.	04060	ENT B1•1	04361	12100	00001		
.	04061	RJP FLTPT	04362	65000	06266		MUL SINRAM X COSL
.	04062	ENT B4•BELPROD	04363	12400	06242		
.	04063	ENT B5•BELSTOR1	04364	12500	06250		
.	04064	ENT B6•BELSUM	04365	12600	06244		
.	04065	ENT B7•00	04366	12700	00000		
.	04066	ENT B1•1	04367	12100	00001		
.	04067	RJP FLTPT	04370	65000	06266		ADD PROD + MULTIPLY STORAGE
.	04070	ENT B4•BELSUM	04371	12400	06244		
.	04071	ENT B5•DELTCOS	04372	12500	05562		
.	04072	ENT B6•ALPHSIN	04373	12600	05574		
.	04073	ENT B7•03	04374	12700	00003		
.	04074	ENT B1•1	04375	12100	00001		
.	04075	RJP FLTPT	04376	65000	06266		DIVIDE SUM BY COSDELTA
.	04076	ENT A•W(ALPHSIN)	04377	11030	05574		TEST SINALPHA LESS OR = TO 1
.	04077	COM A•40002•YMORE	04400	04700	40002		EXP 1 OR LESS
.	04100	JP ALPERR2	04401	61000	04461		
.	04101	SUB A•40001•AZERO	04402	21400	40001		EXP 1
.	04102	JP ALP2	04403	61000	04416		EXP LESS THAN 1 NUM GOOD
.	04103	ENT A•W(ALPHSIN+1)•APOS	04404	11630	05575		
.	04104	CP A•	04405	15040	00000		NO COMPLEMENT
.	04105	SUB A•W(FLTONE+1)•ANOT	04406	21530	06137		
.	04106	JP ALP2	04407	61000	04416		
.	04107	COM A•77•YMORE	04410	04700	00077		
.	04110	JP ALPERR2	04411	61000	04461		
.	04111	ENT A•W(FLTONE+1)	04412	11030	06137		
.	04112	ENT Q•W(ALPHSIN+1)•QNEG	04413	10330	05575		
.	04113	STR A•W(ALPHSIN+1)•SKIP	04414	15130	05575		
.	04114	STR A•CPW(ALPHSIN+1)	04415	15070	05575		
.	04115 ALP2	JP ALP3	04416	61000	04424		
.	04116	ENT B4•ALPHSIN	04417	12400	05574		
.	04117	ENT B6•ALPH	04420	12600	05460		
.	04120	ENT B7•17	04421	12700	00017		
.	04121	ENT B1•1	04422	12100	00001		
.	04122	RJP FLTPT	04423	65000	06266		ARCSIN ROUTINE
.	04123 ALP3	ENT B4•0	04424	12400	00000		NORMAL EXIT
.	04124 ALP4	ENT B5•0	04425	12500	00000		
.	04125 ALP5	ENT B6•0	04426	12600	00000		
.	04126 ALP6	ENT B7•0	04427	12700	00000		
.	04127 ALP10	ENT B1•0	04430	12100	00000		
.	04130 ALP7	JP ALP8	04431	61000	04446		
.	04131	RPL Y+1=L(ALPHA)	04432	36010	04325		EXIT FOR ALPHA
.	04132	ENT A•W(ALPH)	04433	11030	05460		
.	04133	ENT Q•W(ALPHB+1)•QNEG	04434	10330	05461		
.	04134	JP \$+6	04435	61000	04443		YES X
.	04135	ENT B4•ALPH	04436	12400	05460		
.	04136	ENT B5•TTWPI	04437	12500	06165		X
.	04137	ENT B6•B4	04440	12604	00000		X

CARDS	LI	ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	04140		ENT B7*00	04441	12700	00000		X
.	04141		RJP FLTPT	04442	65000	06266		X
.	04142		ENT A*W(ALPHI	04443	11030	05460		
.	04143		ENT Q*W(ALPH+1)	04444	10030	05461		
.	04144		EXIT	04445	61010	04325		
.	04145	ALP8	RPL Y+1*L(SINALF)	04446	36010	04317		
.	04146		ENT A*W(ALPHSIN)	04447	11030	05574		
.	04147		ENT Q*W(ALPHSIN+1)	04450	10030	05575		
.	04150		JP SINALF	04451	61000	04317		
.	04151	ALPERR	ENT B4*L(ALP3)	04452	12410	04424		
.	04152		ENT B5*L(ALP4)	04453	12510	04425		
.	04153		ENT B6*L(ALP5)	04454	12610	04426		
.	04154		ENT B7*L(ALP6)	04455	12710	04427		
.	04155		ENT B1*L(ALP10)	04456	12110	04430		
.	04156	ALP9	JP SINALF	04457	61000	04317		ECIT SINALPHA
.	04157		JP ALPHA	04460	61000	04325		EXIT ALPHA
.	04160	ALPERR2	ENT A*2	04461	11000	00002		
.	04161		JP ALPERR	04462	61000	04452		
.	04162	BRANGE	ENTRY	04463	61000	00000		
.	04163		STR B4*L(RAN1)	04464	16410	04535		INITIALIZATION
.	04164		STR B5*L(RAN2)	04465	16510	04536		
.	04165		STR B6*L(RAN3)	04466	16610	04537		
.	04166		STR B7*L(RAN4)	04467	16710	04540		
.	04167		STR B1*L(RAN6)	04470	16110	04541		
.	04170		ENT B4*LL	04471	12400	05707		
.	04171		ENT B5*ZOMEGA	04472	12500	05725		
.	04172		ENT B6*BELOIFF	04473	12600	06236		
.	04173		ENT B7*01	04474	12700	00001		
.	04174		ENT B1*1	04475	12100	00001		
.	04175		RJP FLTPT	04476	65000	06266		
.	04176		ENT A*W(BELDIFF)	04477	11030	06236		
.	04177		ENT Q*W(BELDIFF+1)	04500	10030	06237		
.	04200		RJP MOD2PI	04501	65000	03752		IS ABS VAL OMG LESS OR=2PI
.	04201	RANS	STR A*W(BELDIFF)	04502	15030	06236		
.	04202		STR Q*W(BELDIFF+1)	04503	14030	06237		
.	04203		ENT B4*BELDIFF	04504	12400	06236		COS ROUTINE
.	04204		ENT B6*BELCOS	04505	12600	06240		
.	04205		ENT B7*14	04506	12700	00014		
.	04206		ENT B1*1	04507	12100	00001		
.	04207		RJP FLTPT	04510	65000	06266		COS OF L- OMEGA
.	04210		ENT B4*EE	04511	12400	05430		
.	04211		ENT B5*BELCOS	04512	12500	06240		
.	04212		ENT B6*BELPROD	04513	12600	06242		
.	04213		ENT B7*02	04514	12700	00002		
.	04214		ENT B1*1	04515	12100	00001		
.	04215		RJP FLTPT	04516	65000	06266		MUL E TIMES COS
.	04216		ENT B4*FLTONE	04517	12400	06136		
.	04217		ENT B5*BELPROD	04520	12500	06242		
.	04220		ENT B6*BELSUM	04521	12600	06244		
.	04221		ENT B7*00	04522	12700	00000		ASS 1+(E X COS)
.	04222		ENT B1*1	04523	12100	00001		
.	04223		RJP FLTPT	04524	65000	06266		
.	04224		ENT A*W(BELSUM+1)*ANOT	04525	11530	06245		

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CARDS	LI	ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	04225		JP RANERR24	04526	61000	04554		YES ERROR IT IS DENOMINATOR
.	04226		ENT B4*NUMRAN	04527	12400	06163		
.	04227		ENT B5*BELSUM	04530	12500	06244		
.	04230		ENT B6*RR	04531	12600	05731		
.	04231		ENT B7*O3	04532	12700	00003		
.	04232		ENT B1*1	04533	12100	00001		
.	04233		RJP FLTPT	04534	65000	06266		
.	04234	RAN1	ENT B4*O	04535	12400	00000		NORMAL EXIT
.	04235	RAN2	ENT B5*O	04536	12500	00000		
.	04236	RAN3	ENT B6*O	04537	12600	00000		
.	04237	RAN4	ENT B7*O	04540	12700	00000		
.	04240	RAN6	ENT B1*O	04541	12100	00000		
.	04241		RPL Y+1=L(BRANGE)	04542	36010	04463		
.	04242		ENT A*W(RR)	04543	11030	05731		
.	04243		ENT Q*W(RR+1)	04544	10030	05732		
.	04244		EXIT	04545	61010	04463		
.	04245	RANERR	ENT B4*L(RAN1)	04546	12410	04535		ERROR EXIT
.	04246		ENT B5*L(RAN2)	04547	12510	04536		
.	04247		ENT B6*L(RAN3)	04550	12610	04537		
.	04250		ENT B7*L(RAN4)	04551	12710	04540		
.	04251		ENT B1*L(RAN6)	04552	12110	04541		
.	04252		EXIT	04553	61010	04463		
.	04253	RANERR24	ENT A*5	04554	11000	00005		
.	04254		JP RANERR	04555	61000	04546		
.	04255	COSALF	ENTRY	04556	61000	00000		
.	04256		STR B4*L(COSA2)	04557	16410	04646		INITIALIZATION
.	04257		STR B5*L(COSA3)	04560	16510	04647		
.	04260		STR B6*L(COSA4)	04561	16610	04650		
.	04261		STR B7*L(COSA5)	04562	16710	04651		
.	04262		STR B1*L(COSA6)	04563	16110	04652		
.	04263		ENT B4*IICOS	04564	12400	05542		
.	04264		ENT B5*RAMSIN	04565	12500	05544		
.	04265		ENT B6*BELPROD	04566	12600	06242		
.	04266		ENT B7*O2	04567	12700	00002		MUL COSI.SINLOMEGA
.	04267		ENT B1*1	04570	12100	00001		
.	04270		RJP FLTPT	04571	65000	06266		
.	04271		ENT B4*BELPROD	04572	12400	06242		
.	04272		ENT B5*LLSIN	04573	12500	05622		
.	04273		ENT B6*BELSTOR1	04574	12600	06250		MUL PREVIOUS PROD BY SINL AND STORE
.	04274		ENT B1*1	04575	12100	00001		
.	04275		RJP FLTPT	04576	65000	06266		
.	04276		ENT B4*RAMCOS	04577	12400	05546		
.	04277		ENT B5*LLCOS	04600	12500	05630		
.	04300		ENT B6*BELPROD	04601	12600	06242		
.	04301		ENT B1*1	04602	12100	00001		
.	04302		RJP FLTPT	04603	65000	06266		MUL COSLOMEGA X COSL
.	04303		ENT B4*BELPROD	04604	12400	06242		
.	04304		ENT B5*BELSTOR1	04605	12500	06250		
.	04305		ENT B6*BELDIFF	04606	12600	06236		
.	04306		ENT B7*O1	04607	12700	00001		SUB STORED PROD FROM
.	04307		ENT B1*1	04610	12100	00001		
.	04310		RJP FLTPT	04611	65000	06266		COSLOMEGA X COSL

CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	04311	ENT B4=BELDIFF	04612	12400	06236		
.	04312	ENT B5=DELTCOS	04613	12500	05562		
.	04313	ENT B6=ALPHCOS	04614	12600	05606		
.	04314	ENT B7=03	04615	12700	00003		DIVIDE DIFF BY COSDELTA
.	04315	ENT B1=1	04616	12100	00001		
.	04316	RJP FLTPT	04617	65000	06266		
.	04317	ENT A=W(ALPHCOS)	04620	11030	05606		TEST COSALPHA =1
.	04320	COM A=40002=YMORE	04621	04700	40002		EXP LESS THAN 2
.	04321	JP COSAERR22	04622	61000	04657		
.	04322	SUB A=40001=AZERO	04623	21400	40001		
.	04323	JP COSA2	04624	61000	04646		
.	04324	ENT A=W(ALPHCOS+1)=APOS	04625	11630	05607		TEST FRA POS
.	04325	CP A	04626	15040	00000		
.	04326	SUB A=W(FLTONE+1)=ANOT	04627	21530	06137		TEST FOR FRA NOT =1
.	04327	JP COSA2	04630	61000	04646		
.	04330	COM A=77=YMORE	04631	04700	00077		
.	04331	JP COSAERR	04632	61000	04640		
.	04332	ENT A=W(FLTONE+1)	04633	11030	06137		
.	04333	ENT Q=W(ALPHCOS+1)=QNEG	04634	10330	05607		
.	04334	STR A=W(ALPHCOS+1)=SKIP	04635	15130	05607		
.	04335	STR A=CPW(ALPHCOS+1)	04636	15070	05607		
.	04336	JP COSA2	04637	61000	04646		
.	04337 COSAERR	ENT B4=L(COSA2)	04640	12410	04646		ERROR EXIT
.	04340	ENT B5=L(COSA3)	04641	12510	04647		
.	04341	ENT B6=L(COSA4)	04642	12610	04650		
.	04342	ENT B7=L(COSA5)	04643	12710	04651		
.	04343	ENT B1=L(COSA6)	04644	12110	04652		
.	04344	EXIT	04645	61010	04556		
.	04345 COSA2	ENT B4=0	04646	12400	00000		
.	04346 COSA3	ENT B5=0	04647	12500	00000		
.	04347 COSA4	ENT B6=0	04650	12600	00000		
.	04350 COSA5	ENT B7=0	04651	12700	00000		
.	04351 COSA6	ENT B1=0	04652	12100	00000		
.	04352	RPL Y+1=L(COSALF)	04653	36010	04556		
.	04353	ENT A=W(ALPHCOS)	04654	11030	05606		
.	04354	ENT Q=W(ALPHCOS+1)	04655	10030	05607		
.	04355	EXIT	04656	61010	04556		
.	04356 COSAERR22	ENT A=4	04657	11000	00004		
.	04357	JP COSAERR	04660	61000	04640		
.	04360 OECLIN	ENTRY	04661	61000	00000		
.	04361	ENT Q=12000	04662	10000	12000		INITIALIZATION
.	04362	STR Q=U(SIND2)	04663	14020	04705		
.	04363	STR Q=U(SIND10)	04664	14020	04725		
.	04364	JP SIND1	04665	61000	04672		
.	04365 SINDECLIN	ENTRY	04666	61000	00000		
.	04366	ENT Q=61000	04667	10000	61000		
.	04367	STR Q=U(SIND2)	04670	14020	04705		
.	04370	STR Q=U(SIND10)	04671	14020	04725		
.	04371 SIND1	STR B4=L(SIND4)	04672	16410	04720		
.	04372	STR B5=L(SIND5)	04673	16510	04721		
.	04373	STR B6=L(SIND6)	04674	16610	04722		
.	04374	STR B7=L(SIND7)	04675	16710	04723		
.	04375	STR B1=L(SIND8)	04676	16110	04724		

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CARDS	LT ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	04376	ENT 84*IISIN	04677	12400	05540		
.	04377	ENT 85*LLSIN	04700	12500	05622		
.	04400	ENT 86*DELTSIN	04701	12600	05550		
.	04401	ENT 87*02	04702	12700	00002		MULT SINI BY SINL
.	04402	ENT 81*1	04703	12100	00001		
.	04403	RJP FLTPT	04704	65000	06266		
.	04404 SIND2	JP SIND3	04705	61000	04716		
.	04405	ENT 84*DELTSIN	04706	12400	05550		
.	04406	ENT 86*DEL	04707	12600	05452		
.	04407	ENT 87*17	04710	12700	00017		
.	04410	ENT 81*1	04711	12100	00001		
.	04411	RJP FLTPT	04712	65000	06266		
.	04412	ENT A*W(DEL)	04713	11030	05452		
.	04413	ENT Q*W(DEL+1)	04714	10030	05453		
.	04414	JP SIND4	04715	61000	04720		
.	04415 SIND3	ENT Q*W(DELTSIN+1)	04716	10030	05551		LEAVE FRA IN Q
.	04416	ENT A*W(DELTSIN)	04717	11030	05550		LEAVE EXP IN A
.	04417 SIND4	ENT 84*0	04720	12400	00000		NORMAL EXIT
.	04420 SIND5	ENT 85*0	04721	12500	00000		
.	04421 SIND6	ENT 86*0	04722	12600	00000		
.	04422 SIND7	ENT 87*0	04723	12700	00000		
.	04423 SIND8	ENT 81*0	04724	12100	00000		
.	04424 SIND10	JP SIND9	04725	61000	04727		
.	04425	JP DECLIN	04726	61000	04661		
.	04426 SIND9	JP SINDECLIN	04727	61000	04666		
.	04427 ALPHAGNEW	ENTRY	04730	61000	00000		X
.	04430	STR 84*L(ASTRB4)	04731	16410	04777		X
.	04431	STR 85*L(ASTRB5)	04732	16510	05000		X
.	04432	STR 86*L(ASTRB6)	04733	16610	05001		X
.	04433	STR 87*L(ASTRB7)	04734	16710	05002		X
.	04434	ENT 84*32	04735	12400	00032		X
.	04435	ENT 85*SIDERTIME	04736	12500	63012		X
.	04436	ENT 86*SIDERFLTPT	04737	12600	06111		X
.	04437	ENT 87*10	04740	12700	00010		X
.	04440	RJP FLTPT	04741	65000	06266		CONVERT SIDERTIME TO FLTPT
.	04441	ENT 84*86	04742	12406	00000		X
.	04442	ENT 85*LAMDR	04743	12500	05765		X
.	04443	ENT 86*SIDERLAMDR	04744	12600	06113		X
.	04444	ENT 87*01	04745	12700	00001		X
.	04445	RJP FLTPT	04746	65000	06266		SIDER - LAMDR
.	04446	ENT 84*0	04747	12400	00000		X
.	04447	ENT 85*FRAMESIZE	04750	12500	63101		X
.	04450	ENT 86*FRAMEFLTPT	04751	12600	06107		X
.	04451	ENT 87*10	04752	12700	00010		X
.	04452	RJP FLTPT	04753	65000	06266		CONVERT FRAMESIZE
.	04453	ENT 84*86	04754	12406	00000		X
.	04454	ENT 85*RAGREENCON	04755	12500	06121		X
.	04455	ENT 86*FRAMECON	04756	12600	06105		X
.	04456	ENT 87*02	04757	12700	00002		X
.	04457	RJP FLTPT	04760	65000	06266		CON TIMES FRAMESIZE

CARDS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
							X
.	04460	ENT A*W(NCODE)*ANOT	04761	11530	05703		
.	04461	JP \$+7	04762	61000	04771		
.	04462	ENT B4*B6	04763	12406	00000		X
.	04463	ENT B5*SIDERLAMDR	04764	12500	06113		X
.	04464	ENT B6*ALPHG	04765	12600	05717		X
.	04465	ENT B7*00	04766	12700	00000		RA - LAMDR + FRAMESIZE (CON)
							X
.	04466	RJP FLTPT	04767	65000	06266		
.	04467	JP \$+5	04770	61000	04775		
.	04470	MOVE 2*SIDERLAMDR*ALPHG	04771	10030	06113		
			04772	14030	05717		
			04773	10030	06114		
			04774	14030	05720		
.	04471	ENT A*W(ALPHG)	04775	11030	05717		X
.	04472	ENT Q*W(ALPHG+1)	04776	10030	05720		X
.	04473 ASTRB4	ENT B4*0	04777	12400	00000		X
.	04474 ASTRB5	ENT B5*0	05000	12500	00000		X
.	04475 ASTRB6	ENT B6*0	05001	12600	00000		X
.	04476 ASTRB7	ENT B7*0	05002	12700	00000		X
.	04477	EXIT	05003	61010	04730		X
.	04500 PTSEL	ENTRY	05004	61000	00000		
.	04501	ENT Q*12000	05005	10000	12000		INITIALIZATION
.	04502	STR Q*U(PTS2)	05006	14020	05037		
.	04503	STR B1*L(PTS81)	05007	16110	05276		
.	04504	STR B2*L(PTS82)	05010	16210	05277		
.	04505	STR B3*L(PTS83)	05011	16310	05300		
.	04506	STR B4*L(PTS84)	05012	16410	05301		
.	04507	STR B5*L(PTS85)	05013	16510	05302		
.	04510	STR B6*L(PTS86)	05014	16610	05303		
.	04511	STR B7*L(PTS87)	05015	16710	05304		
.	04512	ENT B3*0	05016	12300	00000		
.	04513 PTS1	PUT W(ALPHISIN+B3)*W(ALPHSIN)	05017	10033	05576		
			05020	14030	05574		
.	04514	PUT W(ALPHISIN+1+B3)*W(ALPHSIN+1)	05021	10033	05577		
			05022	14030	05575		
.	04515	PUT W(ALPHICOS+B3)*W(ALPHCOS)	05023	10033	05610		
			05024	14030	05606		
.	04516	PUT W(ALPHICOS+1+B3)*W(ALPHCOS+1)	05025	10033	05611		
			05026	14030	05607		
.	04517	PUT W(DELTISIN+B3)*W(DELTISIN)	05027	10033	05552		
			05030	14030	05550		
.	04520	PUT W(DELTISIN+1+B3)*W(DELTISIN+1)	05031	10033	05553		
			05032	14030	05551		
.	04521	PUT W(DELTICOS+B3)*W(DELTICOS)	05033	10033	05564		
			05034	14030	05562		
.	04522	PUT W(DELTICOS+1+B3)*W(DELTICOS+1)	05035	10033	05565		
			05036	14030	05563		
.	04523 PTS2	JP PTS3	05037	61000	05107		
.	04524	RJP ALPHAGNEW	05040	65000	04730		
.	04525	ENT B2*1	05041	12200	00001		
.	04526	ENT B3*0	05042	12300	00000		
.	04527	ENT B4*ALPHG	05043	12400	05717		

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BELTP

CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	04530	ENT B5*LAMDR	05044	12500	05765		
.	04531	ENT B6*ALPHR	05045	12600	05723		
.	04532	ENT B7*00	05046	12700	00000		
.	04533	ENT B1*1	05047	12100	00001		
.	04534	RJP FLTPT	05050	65000	06266		
.	04535	ENT A*W(ALPHR)	05051	11030	05723		EXP IN A REG
.	04536	ENT Q*W(ALPHR+1)	05052	10030	05724		
.	04537	RJP MOD2PI	05053	65000	03752		
.	04540	STR A*W(ALPHR)	05054	15030	05723		STORE NEW NUMBER IN ALPHAR
.	04541	STR Q*W(ALPHR+1)	05055	14030	05724		
.	04542	ENT B4*ALPHR	05056	12400	05723		
.	04543	ENT B6*ALPHRSIN	05057	12600	05636		
.	04544	ENT B7*13	05060	12700	00013		
.	04545	ENT B1*1	05061	12100	00001		
.	04546	RJP FLTPT	05062	65000	06266		SINE OF ALPHAR
.	04547	ENT B6*ALPHRCOS	05063	12600	05640		
.	04550	ENT B7*14	05064	12700	00014		COS OF ALPHAR
.	04551	ENT B1*1	05065	12100	00001		
.	04552	RJP FLTPT	05066	65000	06266		
.	04553	ENT A*W(GLR)	05067	11030	06161		
.	04554	ENT Q*W(GLR+1)	05070	10030	06162		
.	04555	RJP MOD2PI	05071	65000	03752		
.	04556	STR A*W(DELTR)	05072	15030	05721		NEW OELTAR
.	04557	STR Q*W(DELTR+1)	05073	14030	05722		
.	04560	STR A*W(GLR)	05074	15030	06161		
.	04561	STR Q*W(GLR+1)	05075	14030	06162		
.	04562	ENT B4*OELTR	05076	12400	05721		
.	04563	ENT B6*OELTRSIN	05077	12600	05642		
.	04564	ENT B7*13	05100	12700	00013		
.	04565	ENT B1*1	05101	12100	00001		
.	04566	RJP FLTPT	05102	65000	06266		SIN OELTAR
.	04567	ENT B6*OELTRCOS	05103	12600	05644		
.	04570	ENT B7*14	05104	12700	00014		
.	04571	ENT B1*1	05105	12100	00001		
.	04572	RJP FLTPT	05106	65000	06266		COS OELTAR
.	04573	ENT Q*61000	05107	10000	61000		CALCULATE COS GAMMA
.	04574	STR Q*U(PTS2)	05110	14020	05037		
.	04575	ENT B4*DELTSIN	05111	12400	05550		
.	04576	ENT B5*OELTRSIN	05112	12500	05642		
.	04577	ENT B6*BELSTOR1	05113	12600	06250		
.	04600	ENT B7*02	05114	12700	00002		MUL SINOELTA BY SINOELTAR
.	04601	ENT B1*1	05115	12100	00001		
.	04602	RJP FLTPT	05116	65000	06266		AND STORE IN BELSTOR1
.	04603	ENT B4*OELTRCOS	05117	12400	05644		
.	04604	ENT B5*ALPHRSIN	05120	12500	05636		
.	04605	ENT B6*BELPROD	05121	12600	06242		
.	04606	ENT B1*1	05122	12100	00001		
.	04607	RJP FLTPT	05123	65000	06266		MUL SINALPHAR BY COSALPHAR
.	04610	ENT B4*BELPROD	05124	12400	06242		
.	04611	ENT B5*OELTCOS	05125	12500	05562		
.	04612	ENT B1*1	05126	12100	00001		
.	04613	RJP FLTPT	05127	65000	06266		MUL PROD BY COSDELTA
.	04614	ENT B4*BELPROD	05130	12400	06242		

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BELTP

CARDS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	04615	ENT B5*ALPHSIN	05131	12500	05574		
.	04616	ENT B6*BELSTOR2	05132	12600	06252		
.	04617	ENT B7*02	05133	12700	00002		MUL PROD BY SINALPHA
.	04620	ENT B1*1	05134	12100	00001		
.	04621	RJP FLTPT	05135	65000	06266		AND STORE IN 2
.	04622	ENT B4*DELTRCOS	05136	12400	05644		
.	04623	ENT B5*ALPHRCOS	05137	12500	05640		
.	04624	ENT B6*BELPROD	05140	12600	06242		
.	04625	ENT B7*02	05141	12700	00002		
.	04626	ENT B1*1	05142	12100	00001		
.	04627	RJP FLTPT	05143	65000	06266		MUL COSDELTA BY COSALP
.	04630	ENT B4*BELPROD	05144	12400	06242		
.	04631	ENT B5*OELTCOS	05145	12500	05562		
.	04632	ENT B1*1	05146	12100	00001		
.	04633	RJP FLTPT	05147	65000	06266		MUL PROD BY COSDELTA
.	04634	ENT B4*BELPROD	05150	12400	06242		
.	04635	ENT B5*ALPHCOS	05151	12500	05606		
.	04636	ENT B6*BELPROD	05152	12600	06242		
.	04637	ENT B7*02	05153	12700	00002		
.	04640	ENT B1*1	05154	12100	00001		
.	04641	RJP FLTPT	05155	65000	06266		MUL PROD BY COSALPHA
.	04642	ENT B4*BELPROD	05156	12400	06242		
.	04643	ENT B5*BELSTOR2	05157	12500	06252		
.	04644	ENT B6*BELSUM	05160	12600	06244		
.	04645	ENT B7*00	05161	12700	00000		ADD PROD AND STORE2
.	04646	ENT B1*1	05162	12100	00001		
.	04647	RJP FLTPT	05163	65000	06266		
.	04650	ENT B4*BELSUM	05164	12400	06244		
.	04651	ENT B5*BELSTOR1	05165	12500	06250		
.	04652	ENT B6*GAMCOS	05166	12600	05650		COS GAMMA CALCULATED
.	04653	ENT B1*1	05167	12100	00001		
.	04654	RJP FLTPT	05170	65000	06266		
.	04655	ENT A*W(GAMCOS)	05171	11030	05650		
.	04656	COM A*40002*YMORE	05172	04700	40002		IS EXP 40001 OR LESS
.	04657	JP PTSERR	05173	61000	05275		NO ERROR
.	04660	SUB A*40001*AZERO	05174	21400	40001		
.	04661	JP PTS15	05175	61000	05210		
.	04662	ENT A*W(GAMCOS+1)*APOS	05176	11630	05651		IS FRAC POS
.	04663	CP A	05177	15040	00000		
.	04664	SUB A*W(FLTONE+1)*ANOT	05200	21530	06137		
.	04665	JP PTS15	05201	61000	05210		
.	04666	COM A*77*YMORE	05202	04700	00077		
.	04667	JP PTSERR	05203	61000	05275		
.	04670	ENT A*W(FLTONE+1)	05204	11030	06137		
.	04671	ENT Q*W(GAMCOS+1)*QNEG	05205	10330	05651		
.	04672	STR A*W(GAMCOS+1)*SKIP	05206	15130	05651		
.	04673	STR A*CPW(GAMCOS+1)	05207	15070	05651		
.	04674	PUT W(GAMCOS)*W(GAMCOS+B3)	05210	10030	05650		
.			05211	14033	05646		
.	04675	PUT W(GAMCOS+1)*W(GAMCOS+1+B3)	05212	10030	05651		
.			05213	14033	05647		
.	04676	ENT B3*2+B3	05214	12303	00002		
.	04677	BSK B2*L (NUMPT)	05215	71210	05700		

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CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	04700	JP PTS1	05216	61000	05017		
.	04701 PTS11X	ENT B1*1	05217	12100	00001		
.	04702	ENT B2*0	05220	12200	00000		
.	04703 PTS11	ENT B2*2+B2	05221	12202	00002		
.	04704	ENT B4*FLTWO	05222	12400	06142		
.	04705	ENT B5*GAMICOS	05223	12500	05646		
.	04706	ENT B6*GAMITEMP	05224	12600	06001		
.	04707	ENT B7*00	05225	12700	00000		
.	04710	RJP FLTPT	05226	65000	06266		
.	04711	ENT B5*GAMICOS+B2	05227	12502	05646		
.	04712	ENT B6*GAM2TEMP	05230	12600	06003		
.	04713	RJP FLTPT	05231	65000	06266		
.	04714	ENT A*W(GAM2TEMP)	05232	11030	06003		
.	04715	ENT Q*W(GAM2TEMP+1)*APOS	05233	10630	06004		
.	04716	JP PTSERR	05234	61000	05275		
.	04717	LSH AQ*27D	05235	07000	00033		
.	04720	STR A*W(GTEMP2)	05236	15030	06007		
.	04721	ENT A*W(GAMITEMP)	05237	11030	06001		
.	04722	ENT Q*W(GAMITEMP+1)*APOS	05240	10630	06002		
.	04723	JP PTSERR	05241	61000	05275		
.	04724	LSH AQ*27D	05242	07000	00033		
.	04725	STR A*W(GTEMP1)	05243	15030	06005		
.	04726	COM A*W(GTEMP2)*YLESS	05244	04630	06007		
.	04727	JP PTS9X	05245	61000	05252		
.	04730	ENT A*W(NUMPT)	05246	11030	05700		
.	04731	SUB A*2*AZERO	05247	21400	00002		
.	04732	JP PTS9XXX	05250	61000	05267		
.	04733	JP PTSNORM	05251	61000	05273		
.	04734 PTS9X	ENT B1*1+B1	05252	12101	00001		
.	04735	ENT A*W(NUMPT)	05253	11030	05700		
.	04736	SUB A*2*AZERO	05254	21400	00002		
.	04737	JP PTS9XX	05255	61000	05257		
.	04740	JP PTSNORM	05256	61000	05273		
.	04741 PTS9XX	ENT A*B2	05257	11002	00000		
.	04742	SUB A*6*ANOT	05260	21500	00006		
.	04743	JP PTSNORM	05261	61000	05273		
.	04744	PUT W(GAMICOS+B2)*W(GAMICOS)	05262	10032	05646		
.	04745	PUT W(GAMICOS+1+B2)*W(GAMICOS+1)	05263	14030	05646		
.	04746	JP PTS11	05264	10032	05647		
.	04747 PTS9XXX	ENT A*B2	05265	14030	05647		
.	04750	SUB A*6*ANOT	05266	61000	05221		
.	04751	JP PTSNORM	05267	11002	00000		
.	04752	JP PTS11	05270	21500	00006		
.	04753 PTSNORM	RPL Y+1*L(PTSEL)	05271	61000	05273		
.	04754	ENT A*B1*SKIP	05272	61000	05221		
.	04755 PTSERR	ENT A*7	05273	36010	05004		
.	04756 PTSB1	ENT A*7	05274	11101	00000		
.	04757 PTSB2	ENT B1*0	05275	11000	00007		
.	04760 PTSB3	ENT B1*0	05276	12100	00000		
.	04761 PTSB4	ENT B2*0	05277	12200	00000		
.	04762 PTSB5	ENT B3*0	05300	12300	00000		
.		ENT B4*0	05301	12400	00000		
.		ENT B5*0	05302	12500	00000		

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BELTP

CARDS	LI	ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	04763	PTS86	ENT 86*0	05303	12600	00000		
.	04764	PTS87	ENT 87*0	05304	12700	00000		
.	04765		EXIT	05305	61010	05004		
.	04766	BCONVERT	ENTRY	05306	61000	00000		
.	04767		ENT 81*1	05307	12100	00001		
.	04770		ENT 87*02	05310	12700	00002		
.	04771		ENT 85*ANGCONV	05311	12500	06126		
.	04772	BCON1	ENT 84*II	05312	12400	05432		
.	04773		ENT 86*II	05313	12600	05432		
.	04774		RJP FLTPT	05314	65000	06266		
.	04775		ENT 86*86+2	05315	12606	00002		
.	04776		ENT 84*86	05316	12406	00000		
.	04777		ENT A*86	05317	11006	00000		
.	05000		COM A*VYEAR*YLESS	05320	04600	05444		
.	05001		JP BCON1+2	05321	61000	05314		
.	05002		ENT 86*OECT	05322	12600	05452		
.	05003		ENT 84*86	05323	12406	00000		
.	05004		RJP FLTPT	05324	65000	06266		
.	05005		ENT 86*LZERO	05325	12600	05456		
.	05006	BCON2	ENT 84*86	05326	12406	00000		
.	05007		RJP FLTPT	05327	65000	06266		
.	05010		ENT 86*86+2	05330	12606	00002		
.	05011		ENT A*86	05331	11006	00000		
.	05012		COM A*LONG+2*YLESS	05332	04600	05464		
.	05013		JP BCON2	05333	61000	05326		
.	05014		ENT 84*DOMEGA	05334	12400	05436		
.	05015		ENT 85*TCNV	05335	12500	06130		
.	05016		ENT 86*DOMEGA	05336	12600	05436		
.	05017		ENT 87*03	05337	12700	00003		
.	05020		RJP FLTPT	05340	65000	06266		
.	05021		ENT 84*ORAM	05341	12400	05442		
.	05022		ENT 86*DRAM	05342	12600	05442		
.	05023		RJP FLTPT	05343	65000	06266		
.	05024		ENT 84*KK	05344	12400	05454		
.	05025		ENT 85*CON60	05345	12500	06146		
.	05026		ENT 86*B4	05346	12404	00000		
.	05027		ENT 87*02	05347	12700	00002		
.	05030		RJP FLTPT	05350	65000	06266		
.	05031		ENT 85*ANGCONV	05351	12500	06126		
.	05032		ENT 87*03	05352	12700	00003		
.	05033		RJP FLTPT	05353	65000	06266		
.	05034		EXIT	05354	61010	05306		
.	05035	BRESTORE	ENTRY	05355	61000	00000		
.	05036		ENT 87*03	05356	12700	00003		
.	05037		ENT 85*ANGCONV	05357	12500	06126		
.	05040	BRE1	ENT 84*II	05360	12400	05432		
.	05041		ENT 86*II	05361	12600	05432		
.	05042		RJP FLTPT	05362	65000	06266		
.	05043		ENT 86*86+2	05363	12606	00002		
.	05044		ENT 84*86	05364	12406	00000		
.	05045		ENT A*86	05365	11006	00000		
.	05046		COM A*VYEAR*YLESS	05366	04600	05444		
.	05047		JP BRE1+2	05367	61000	05362		

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CARDS	LI	ID	LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
.	05050			ENT	B6*DECT	05370	12600	05452		
.	05051			ENT	B4*B6	05371	12406	00000		
.	05052			RJP	FLTPT	05372	65000	06266		
.	05053			ENT	B6*LZERO	05373	12600	05456		
.	05054	BRE2		ENT	B4*B6	05374	12406	00000		
.	05055			RJP	FLTPT	05375	65000	06266		
.	05056			ENT	B6*B6+2	05376	12606	00002		
.	05057			ENT	A*B6	05377	11006	00000		
.	05060			COM	A*LONG+2*YLESS	05400	04600	05464		
.	05061			JP	BRE2	05401	61000	05374		
.	05062			ENT	B4*OMEGA	05402	12400	05436		
.	05063			ENT	B5*TCONV	05403	12500	06130		
.	05064			ENT	B6*OMEGA	05404	12600	05436		
.	05065			ENT	B7*O2	05405	12700	00002		
.	05066			RJP	FLTPT	05406	65000	06266		
.	05067			ENT	B4*DRAM	05407	12400	05442		
.	05070			ENT	B6*DRAM	05410	12600	05442		
.	05071			RJP	FLTPT	05411	65000	06266		
.	05072			ENT	B4*KK	05412	12400	05454		
.	05073			ENT	B5*ANGCONV	05413	12500	06126		
.	05074			ENT	B6*B4	05414	12604	00000		
.	05075			RJP	FLTPT	05415	65000	06266		
.	05076			ENT	B5*CON60	05416	12500	06146		
.	05077			ENT	B7*O3	05417	12700	00003		
.	05100			RJP	FLTPT	05420	65000	06266		
.	05101			EXIT		05421	61010	05355		
.	05102			NO-OP		05422	12000	00000		
.	05103			COMMENT	VARIABLES					AND CONSTANTS
.	05104			NO-OP		05423	12000	00000		
.	05105			COMMENT	A.					INPUT PARAMETERS
.	05106			NO-OP		05424	12000	00000		
.	05107	SCHDSW		0	0	05425	00000	00000		
.	05110	AA		0	0	05426	00000	00000		
.	05111			0	0	05427	00000	00000		
.	05112	EE		0	0	05430	00000	00000		
.	05113			0	0	05431	00000	00000		
.	05114	II		0	0	05432	00000	00000		
.	05115			0	0	05433	00000	00000		
.	05116	SOMEGA		0	0	05434	00000	00000		
.	05117			0	0	05435	00000	00000		
.	05120	OMEGA		0	0	05436	00000	00000		
.	05121			0	0	05437	00000	00000		
.	05122	SRAM		0	0	05440	00000	00000		
.	05123			0	0	05441	00000	00000		
.	05124	DRAM		0	0	05442	00000	00000		
.	05125			0	0	05443	00000	00000		
.	05126	VYEAR		0	0	05444	00000	00000		
.	05127			0	0	05445	00000	00000		
.	05130	VMONTH		0	0	05446	00000	00000		
.	05131			0	0	05447	00000	00000		
.	05132	VDAY		0	0	05450	00000	00000		
.	05133			0	0	05451	00000	00000		
.	05134	DECT		0	0	05452	00000	00000		

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CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	05135	0 0	05453	00000	00000		
.	05136 KK	0 0	05454	00000	00000		
.	05137	0 0	05455	00000	00000		
.	05140 LZERO	0 0	05456	00000	00000		
.	05141	0 0	05457	00000	00000		
.	05142 ALPHB	0 0	05460	00000	00000		
.	05143	0 0	05461	00000	00000		
.	05144 LONG	0 0	05462	00000	00000		
.	05145	0 0	05463	00000	00000		
.	05146	NO-OP	05464	12000	00000		
.	05147	COMMENT B.					TIME VALUES
.	05150	NO-OP	05465	12000	00000		
.	05151 TIME	0 0	05466	00000	00000		
.	05152	0 0	05467	00000	00000		
.	05153 TIME1	0 0	05470	00000	00000		
.	05154	0 0	05471	00000	00000		
.	05155 TIMETEMP	0 0	05472	00000	00000		
.	05156	0 0	05473	00000	00000		
.	05157 BDAY	0 0	05474	00000	00000		
.	05160	0 0	05475	00000	00000		
.	05161 BDAYNOW	0 0	05476	00000	00000		
.	05162	0 0	05477	00000	00000		
.	05163 FLTBOAY	0 0	05500	00000	00000		
.	05164	0 0	05501	00000	00000		
.	05165 FLTNDAY	0 0	05502	00000	00000		
.	05166	0 0	05503	00000	00000		
.	05167 NTIME1	0 0	05504	00000	00000		
.	05170	0 0	05505	00000	00000		
.	05171 NSTIME	0 0	05506	00000	00000		
.	05172	0 0	05507	00000	00000		
.	05173 FLTSECDIFF	0 0	05510	00000	00000		
.	05174	0 0	05511	00000	00000		
.	05175 FLTOIFF	0 0	05512	00000	00000		
.	05176	0 0	05513	00000	00000		
.	05177 CURJULOAY	0 0	05514	00000	00000		
.	05200	0 0	05515	00000	00000		
.	05201 CURJULDAYF	0 0	05516	00000	00000		
.	05202	0 0	05517	00000	00000		
.	05203 TIME1LAST	0 0	05520	00000	00000		
.	05204	0 0	05521	00000	00000		
.	05205 TIME2LAST	0 0	05522	00000	00000		
.	05206	0 0	05523	00000	00000		
.	05207 TIMEOIFF	0 0	05524	00000	00000		
.	05210	0 0	05525	00000	00000		
.	05211	NO-OP	05526	12000	00000		
.	05212	COMMENT C.					TRIGONOMETRIC VALUES
.	05213	NO-OP	05527	12000	00000		
.	05214 VVSIN	0 0	05530	00000	00000		
.	05215	0 0	05531	00000	00000		
.	05216 VVCOS	0 0	05532	00000	00000		
.	05217	0 0	05533	00000	00000		
.	05220 EECOS	0 0	05534	00000	00000		
.	05221	0 0	05535	00000	00000		

CARDS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	05222	EESIN	0	0	05536	00000	00000
.	05223		0	0	05537	00000	00000
.	05224	IISIN	0	0	05540	00000	00000
.	05225		0	0	05541	00000	00000
.	05226	IICOS	0	0	05542	00000	00000
.	05227		0	0	05543	00000	00000
.	05230	RAMSIN	0	0	05544	00000	00000
.	05231		0	0	05545	00000	00000
.	05232	RAMCOS	0	0	05546	00000	00000
.	05233		0	0	05547	00000	00000
.	05234	DELTSIN	0	0	05550	00000	00000
.	05235		0	0	05551	00000	00000
.	05236	DELT1SIN	0	0	05552	00000	00000
.	05237		0	0	05553	00000	00000
.	05240	DELT2SIN	0	0	05554	00000	00000
.	05241		0	0	05555	00000	00000
.	05242	DELT3SIN	0	0	05556	00000	00000
.	05243		0	0	05557	00000	00000
.	05244	DELT4SIN	0	0	05560	00000	00000
.	05245		0	0	05561	00000	00000
.	05246	DELTCOS	0	0	05562	00000	00000
.	05247		0	0	05563	00000	00000
.	05250	DELT1COS	0	0	05564	00000	00000
.	05251		0	0	05565	00000	00000
.	05252	DELT2COS	0	0	05566	00000	00000
.	05253		0	0	05567	00000	00000
.	05254	DELT3COS	0	0	05570	00000	00000
.	05255		0	0	05571	00000	00000
.	05256	DELT4COS	0	0	05572	00000	00000
.	05257		0	0	05573	00000	00000
.	05260	ALPHSIN	0	0	05574	00000	00000
.	05261		0	0	05575	00000	00000
.	05262	ALPH1SIN	0	0	05576	00000	00000
.	05263		0	0	05577	00000	00000
.	05264	ALPH2SIN	0	0	05600	00000	00000
.	05265		0	0	05601	00000	00000
.	05266	ALPH3SIN	0	0	05602	00000	00000
.	05267		0	0	05603	00000	00000
.	05270	ALPH4SIN	0	0	05604	00000	00000
.	05271		0	0	05605	00000	00000
.	05272	ALPHCOS	0	0	05606	00000	00000
.	05273		0	0	05607	00000	00000
.	05274	ALPH1COS	0	0	05610	00000	00000
.	05275		0	0	05611	00000	00000
.	05276	ALPH2COS	0	0	05612	00000	00000
.	05277		0	0	05613	00000	00000
.	05300	ALPH3COS	0	0	05614	00000	00000
.	05301		0	0	05615	00000	00000
.	05302	ALPH4COS	0	0	05616	00000	00000
.	05303		0	0	05617	00000	00000
.	05304	ALPHTAN	0	0	05620	00000	00000
.	05305		0	0	05621	00000	00000
.	05306	LLSIN	0	0	05622	00000	00000

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CARDS	LI	ID	LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
.			05307	0	0	05623	00000	00000		
.			05310	LL	1SIN	05624	00000	00000		
.			05311			05625	00000	00000		
.			05312	LL	2SIN	05626	00000	00000		
.			05313			05627	00000	00000		
.			05314	LL	COS	05630	00000	00000		
.			05315			05631	00000	00000		
.			05316	LL	1COS	05632	00000	00000		
.			05317			05633	00000	00000		
.			05320	LL	2COS	05634	00000	00000		
.			05321			05635	00000	00000		
.			05322	AL	PHRSIN	05636	00000	00000		
.			05323			05637	00000	00000		
.			05324	AL	PHRCOS	05640	00000	00000		
.			05325			05641	00000	00000		
.			05326	DEL	TRSIN	05642	00000	00000		
.			05327			05643	00000	00000		
.			05330	DEL	TRCOS	05644	00000	00000		
.			05331			05645	00000	00000		
.			05332	GAM	1COS	05646	00000	00000		
.			05333			05647	00000	00000		
.			05334	GAM	2COS	05650	00000	00000		
.			05335			05651	00000	00000		
.			05336	GAM	2COS	05652	00000	00000		
.			05337			05653	00000	00000		
.			05340	GAM	3COS	05654	00000	00000		
.			05341			05655	00000	00000		
.			05342	GAM	4COS	05656	00000	00000		
.			05343			05657	00000	00000		
.			05344	COS	CHI	05660	00000	00000		
.			05345			05661	00000	00000		
.			05346	SIN	CHI	05662	00000	00000		
.			05347			05663	00000	00000		
.			05350	DEL	SINPOS	05664	00000	00000		
.			05351			05665	00000	00000		
.			05352	IIS	INPOS	05666	00000	00000		
.			05353			05667	00000	00000		
.			05354	IIS	IN2	05670	00000	00000		
.			05355			05671	00000	00000		
.			05356	LL	SIN2	05672	00000	00000		
.			05357			05673	00000	00000		
.			05360		NO-OP	05674	12000	00000		
.			05361		COMMENT					O.
.			05362		NO-OP					
.			05363	IIS	WITCH	05675	12000	00000		SWITCHES AND INDICATORS
.			05364	UN	EARTH SW	05676	00000	00000		
.			05365	NUM	PT	05677	00000	00000		
.			05366	BSEL	SW	05700	00000	00000		
.			05367	AL	PHASW	05701	00000	00000		
.			05370	N	CODE	05702	00000	00000		
.			05371	L	ATEM	05703	00000	00000		
.			05372		NO-OP	05704	00000	00000		
.			05373		COMMENT	05705	12000	00000		E.
										COMPUTED VALUES

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CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	05374	NO-OP	05706	12000	00000		
.	05375 LL	0 0	05707	00000	00000		
.	05376	0 0	05710	00000	00000		
.	05377 LL1LAST	0 0	05711	00000	00000		
.	05400	0 0	05712	00000	00000		
.	05401 LL2LAST	0 0	05713	00000	00000		
.	05402	0 0	05714	00000	00000		
.	05403 DLLB	0 0	05715	00000	00000		
.	05404	0 0	05716	00000	00000		
.	05405 ALPHG	0 0	05717	00000	00000		
.	05406	0 0	05720	00000	00000		
.	05407 DELTR	0 0	05721	00000	00000		
.	05410	0 0	05722	00000	00000		
.	05411 ALPHR	0 0	05723	00000	00000		
.	05412	0 0	05724	00000	00000		
.	05413 ZOMEGA	0 0	05725	00000	00000		
.	05414	0 0	05726	00000	00000		
.	05415 RAM	0 0	05727	00000	00000		
.	05416	0 0	05730	00000	00000		
.	05417 RANGEB	0 0	05731	00000	00000		
.	05420	0 0	05732	00000	00000		
.	05421 VV	0 0	05733	00000	00000		
.	05422	0 0	05734	00000	00000		
.	05423 BELM	0 0	05735	00000	00000		
.	05424	0 0	05736	00000	00000		
.	05425 MILAST	0 0	05737	00000	00000		
.	05426	0 0	05740	00000	00000		
.	05427 M2LAST	0 0	05741	00000	00000		
.	05430	0 0	05742	00000	00000		
.	05431 NN	0 0	05743	00000	00000		
.	05432	0 0	05744	00000	00000		
.	05433 DV	0 0	05745	00000	00000		
.	05434	0 0	05746	00000	00000		
.	05435 DU	0 0	05747	00000	00000		
.	05436	0 0	05750	00000	00000		
.	05437 DDELTA	0 0	05751	00000	00000		
.	05440	0 0	05752	00000	00000		
.	05441 BELDR	0 0	05753	00000	00000		
.	05442	0 0	05754	00000	00000		
.	05443 DELALPH	0 0	05755	00000	00000		
.	05444	0 0	05756	00000	00000		
.	05445 RAMLAST	0 0	05757	00000	00000		
.	05446	0 0	05760	00000	00000		
.	05447 MEGALAST	0 0	05761	00000	00000		
.	05450	0 0	05762	00000	00000		
.	05451 DELTSIN2	0 0	05763	00000	00000		
.	05452	0 0	05764	00000	00000		
.	05453 LAMDR	0 0	05765	00000	00000		
.	05454	0 0	05766	00000	00000		
.	05455 ALPHB1	0 0	05767	00000	00000		
.	05456	0 0	05770	00000	00000		
.	05457 DELTB1	0 0	05771	00000	00000		
.	05460	0 0	05772	00000	00000		

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CARDS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	05461	CHI	0	0	05773	00000	00000
.	05462		0	0	05774	00000	00000
.	05463	COSCHI2	0	0	05775	00000	00000
.	05464		0	0	05776	00000	00000
.	05465	LLL	0	0	05777	00000	00000
.	05466		0	0	06000	00000	00000
.	05467	GAMITEMP	0	0	06001	00000	00000
.	05470		0	0	06002	00000	00000
.	05471	GAM2TEMP	0	0	06003	00000	00000
.	05472		0	0	06004	00000	00000
.	05473	GTEMP1	0	0	06005	00000	00000
.	05474		0	0	06006	00000	00000
.	05475	GTEMP2	0	0	06007	00000	00000
.	05476		0	0	06010	00000	00000
.	05477	IIDELTDIFF	0	0	06011	00000	00000
.	05500		0	0	06012	00000	00000
.	05501	PTTEM	0	0	06013	00000	00000
.	05502		0	0	06014	00000	00000
.	05503	TXX	0	0	06015	00000	00000
.	05504		0	0	06016	00000	00000
.	05505	TXX1	0	0	06017	00000	00000
.	05506		0	0	06020	00000	00000
.	05507	YY	0	0	06021	00000	00000
.	05510		0	0	06022	00000	00000
.	05511	ZZ	0	0	06023	00000	00000
.	05512		0	0	06024	00000	00000
.	05513	FACTOR1	0	0	06025	00000	00000
.	05514		0	0	06026	00000	00000
.	05515	FACTOR2	0	0	06027	00000	00000
.	05516		0	0	06030	00000	00000
.	05517	FACTOR3	0	0	06031	00000	00000
.	05520		0	0	06032	00000	00000
.	05521	FACTOR4	0	0	06033	00000	00000
.	05522		0	0	06034	00000	00000
.	05523	FACTORS5	0	0	06035	00000	00000
.	05524		0	0	06036	00000	00000
.	05525	FACTOR6	0	0	06037	00000	00000
.	05526		0	0	06040	00000	00000
.	05527	FACTOR10	0	0	06041	00000	00000
.	05530		0	0	06042	00000	00000
.	05531	FACTOR11	0	0	06043	00000	00000
.	05532		0	0	06044	00000	00000
.	05533	FACTOR12	0	0	06045	00000	00000
.	05534		0	0	06046	00000	00000
.	05535	EE2	0	0	06047	00000	00000
.	05536		0	0	06050	00000	00000
.	05537	EE2M1	0	0	06051	00000	00000
.	05540		0	0	06052	00000	00000
.	05541	KNCAL	0	0	06053	00000	00000
.	05542		0	0	06054	00000	00000
.	05543	KKNCALC	0	0	06055	00000	00000
.	05544		0	0	06056	00000	00000
.	05545	KRECIP	0	0	06057	00000	00000

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CARDS	LI	ID LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
.	05546		0	0	06060	00000	00000		
.	05547	GMK	0	0	06061	00000	00000		
.	05550		0	0	06062	00000	00000		
.	05551	NMBELDR	0	0	06063	00000	00000		
.	05552		0	0	06064	00000	00000		
.	05553	PP	0	0	06065	00000	00000		
.	05554		0	0	06066	00000	00000		
.	05555	ALPHDIFF	0	0	06067	00000	00000		
.	05556		0	0	06070	00000	00000		
.	05557	RAMI90	0		06071	00000	00000		
.	05560		0		06072	00000	00000		
.	05561	RAMI270	0		06073	00000	00000		
.	05562		0		06074	00000	00000		
.	05563	KKCM	0		06075	00000	00000		
.	05564		0		06076	00000	00000		
.	05565	FACTOR11X	0		06077	00000	00000		
.	05566		0		06100	00000	00000		
.	05567	LLMINUS	0		06101	00000	00000		X
.	05570		0		06102	00000	00000		X
.	05571	RAMCHECK	0		06103	00000	00000		X
.	05572		0		06104	00000	00000		X
.	05573	FRAMECON	0		06105	00000	00000		X
.	05574		0		06106	00000	00000		X
.	05575	FRAMEFLTPT	0		06107	00000	00000		X
.	05576		0		06110	00000	00000		X
.	05577	SIDERFLTPT	0		06111	00000	00000		X
.	05600		0		06112	00000	00000		X
.	05601	SIDERLAMDR	0		06113	00000	00000		X
.	05602		0		06114	00000	00000		X
.	05603			NO-OP	06115	12000	00000		
.	05604			COMMENT F.					CONSTANTS
.	05605			NO-OP	06116	12000	00000		
.	05606	FXINST		ENT A*W(LLMINUS+1)*ANEQ	06117	11730	06102		X
.	05607	FXINST1		ENT A*W(LLMINUS+1)*APOS	06120	11630	06102		X
.	05610	RAGREENCON	0	37763	06121	00000	37763		7.292115847\$10\$-5
.	05611			11435 51772	06122	11435	51772		X
.	05612	PTCON	0	40001	06123	00000	40001		
.	05613			10013 15564	06124	10013	15564		
.	05614	JULDAY064	1123	23724	06125	01123	23724		
.	05615	ANGCONV	0	37773	06126	00000	37773		
.	05616			10737 21521	06127	10737	21521		
.	05617	TCONV	0	40021	06130	00000	40021		
.	05620			12430 0	06131	12430	00000		
.	05621	WONETH	0	37777	06132	00000	37777		
.	05622			12525 25253	06133	12525	25253		
.	05623	NMCON	0	40014	06134	00000	40014		
.	05624			15343 15136	06135	15343	15136		
.	05625	FLTONE	00000	40001	06136	00000	40001		
.	05626		10000	00000	06137	10000	00000		
.	05627	BEL2P11	00000	40003	06140	00000	40003		
.	05630		14441	77653	06141	14441	77653		
.	05631	FLTWO	0	40002	06142	00000	40002		

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CARDS	LI ID LABEL	TA STATEMENT	LOC	F JKB Y	NOTES
.	05632	10000 0	06143	10000 00000	
.	05633 FLTFOUR	00000 40003	06144	00000 40003	
.	05634	10000 00000	06145	10000 00000	
.	05635 CON60	0 40006	06146	00000 40006	
.	05636	17000 0	06147	17000 00000	
.	05637 HFPI	0 40001	06150	00000 40001	
.	05640	14441 76652	06151	14441 76652	
.	05641 BONE	00000 00001	06152	00000 00001	
.	05642 THFPI	0 40003	06153	00000 40003	
.	05643	11331 37377	06154	11331 37377	
.	05644 THRF	0 40001	06155	00000 40001	
.	05645	14000 0	06156	14000 00000	
.	05646 BELTEM	0 40015	06157	00000 40015	
.	05647	11610 0	06160	11610 00000	
.	05650 GLR	0 0	06161	00000 00000	
.	05651	0 0	06162	00000 00000	
.	05652 NUMRAN	0 0	06163	00000 00000	
.	05653	0 0	06164	00000 00000	
.	05654 TTWPI	0 40003	06165	00000 40003	
.	05655	14441 76652	06166	14441 76652	
.	05656 GM	0 40105	06167	00000 40105	
.	05657	12633 56575	06170	12633 56575	
.	05660 ERCON	0 40036	06171	00000 40036	
.	05661	11402 11655	06172	11402 11655	
.	05662 A2	0 37767	06173	00000 37767	
.	05663	15231 47546	06174	15231 47546	
.	05664 PI	0 40002	06175	00000 40002	FP PI
.	05665	14441 76652	06176	14441 76652	
.	05666 DYPRMO	0 0	06177	00000 00000	DAYS PER MONTH
.	05667	0 37	06200	00000 00037	/
.	05670	0 73	06201	00000 00073	/
.	05671	0 132	06202	00000 00132	/
.	05672	0 170	06203	00000 00170	/
.	05673	0 227	06204	00000 00227	/
.	05674	0 265	06205	00000 00265	/
.	05675	0 324	06206	00000 00324	/
.	05676	0 363	06207	00000 00363	/
.	05677	0 421	06210	00000 00421	/
.	05700	0 460	06211	00000 00460	/
.	05701	0 516	06212	00000 00516	/
.	05702 DYPRYR	0 556	06213	00000 00556	
.	05703	0 1333	06214	00000 01333	
.	05704	0 2110	06215	00000 02110	
.	05705	0 2665	06216	00000 02665	
.	05706	0 3443	06217	00000 03443	
.	05707	0 4220	06220	00000 04220	
.	05710	0 4775	06221	00000 04775	
.	05711	0 5552	06222	00000 05552	
.	05712	0 6330	06223	00000 06330	
.	05713	0 7105	06224	00000 07105	
.	05714	0 7662	06225	00000 07662	
.	05715	0 10437	06226	00000 10437	
.	05716	0 11214	06227	00000 11214	

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CARDS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	05717	0 11771	06230	00000	11771		
.	05720	0 12546	06231	00000	12546		
.	05721	BDAY1 0 0	06232	00000	00000		
.	05722	0 0	06233	00000	00000		
.	05723	TIMTP 0 0	06234	00000	00000		
.	05724	0 0	06235	00000	00000		
.	05725	BELDIFF 0 0	06236	00000	00000		
.	05726	0 0	06237	00000	00000		
.	05727	BELCOS 0 0	06240	00000	00000		
.	05730	0 0	06241	00000	00000		
.	05731	BELPROD 0 0	06242	00000	00000		
.	05732	0 0	06243	00000	00000		
.	05733	BELSUM 0 0	06244	00000	00000		
.	05734	0 0	06245	00000	00000		
.	05735	BELQUOT 0 0	06246	00000	00000		
.	05736	0 0	06247	00000	00000		
.	05737	BELSTOR1 0 0	06250	00000	00000		
.	05740	0 0	06251	00000	00000		
.	05741	BELSTOR2 0 0	06252	00000	00000		
.	05742	0 0	06253	00000	00000		
.	05743	LL4 0 0	06254	00000	00000		
.	05744	0 0	06255	00000	00000		
.	05745	MODNUM 0 0	06256	00000	00000		
.	05746	0 0	06257	00000	00000		
.	05747	NO-OP	06260	12000	00000		
.	05750	COMMENT G.					EQUIVALENT
.	05751	NO-OP	06261	12000	00000		
.	05752	BELPIXX EQUALS PI					
.	05753	TLAST EQUALS TIME I LAST					
.	05754	OELT EQUALS OECT					
.	05755	RR EQUALS RANGE B					
.	05756	ALPH EQUALS ALPH B					
.	05757	FLTTWO EQUALS FLTWO					
.	05760	WONE EQUALS FLTONE					
.	05761	BELC5 EQUALS BELC3					
.	05762	BANGLEX EQUALS THFPI					
.	05763	BANGLE EQUALS HFPI					
.	05764	BEL2PI EQUALS TTWPI					
.	05765	DELTB EQUALS DECT					
.	05766	LL1 EQUALS LZERO					
.	05767	LAMDB EQUALS LONG					
.	05770	NIL EQUALS 0					
.	05771	NO-OP	06262	12000	00000		
.	05772	NO-OP	06263	12000	00000		
.	05773	NO-OP	06264	12000	00000		
.	05774	NO-OP	06265	12000	00000		DUMMY
.	05775	FLTPT PROGRAM CORR8*16MAR64					
.	05776	IGNORE FLTPT					
.	05777	PTR MEANS C4					
.	06000	POUT MEANS C4					
.	06001	FLTPT ENTRY	06266	61000	00000		
.	06002	STR B1=L(FP1)	06267	16110	06275		
.	06003	STR B4=L(FP4)	06270	16410	06276		

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CAROS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	06004	STR B5=L(FP5)	06271	16510	06277		
.	06005	STR B6=L(FP6)	06272	16610	06300		
.	06006	STR B7=L(FP7)	06273	16710	06301		
.	06007	RJP L(EFP+B7)	06274	65017	06303		
.	06010 FP1	ENT B1=0	06275	12100	00000		
.	06011 FP4	ENT B4=0	06276	12400	00000		
.	06012 FP5	ENT B5=0	06277	12500	00000		
.	06013 FP6	ENT B6=0	06300	12600	00000		
.	06014 FP7	ENT B7=0	06301	12700	00000		
.	06015	EXIT	06302	61010	06266		
.	06016 EFP	0 ADD	06303	00000	06325		ADDITION
.	06017	0 SUB	06304	00000	06364		SUBTRACTION I
.	06020	0 MPL	06305	00000	06374		MULTIPLICATION
.	06021	0 DIV	06306	00000	06406		DIVISION
.	06022	0 STARTREAD	06307	00000	07166		DATA INPUT
.	06023	0 PUNCH	06310	00000	06531		PUNCH OUTPUT
.	06024	0 TYPE	06311	00000	06527		TYPE OUTPUT
.	06025	0 SET	06312	00000	06472		SET OUTPUT LENGTH
.	06026	0 FXTOFL	06313	00000	06474		FIX TO FLOAT
.	06027	0 FLTOFX	06314	00000	06504		FLOAT TO FIX
.	06030	0 SQR	06315	00000	06555		SQUARE ROOT
.	06031	0 SIN	06316	00000	07601		SINE OF ARGUMENT
.	06032	0 COS	06317	00000	07710		COS OF ARGUMENT
.	06033	0 ATAN	06320	00000	06647		ARCTANGENT OF ARGUMENT
.	06034	0 EXP	06321	00000	06727		EXPONENTIAL OF ARGUMENT
.	06035	0 ASIN	06322	00000	07171		
.	06036	0 ACOS	06323	00000	07375		
.	06037	0 LOGE	06324	00000	07420		
.	06040 AOD	ENTRY	06325	61000	00000		
.	06041	ENT A=L(B4)	06326	11014	00000		
.	06042	SUB A=L(B5)*ANEG	06327	21715	00000		C1 MINUS C2
.	06043	JP POS	06330	61000	06343		
.	06044	ENT Q=L(B5)	06331	10015	00000		C2 IS THE
.	06045	STR Q=W(B6)	06332	14036	00000		RESULTANT CHARACTERISTIC
.	06046	SEL CP=X77777	06333	51040	77777		C2 MINUS C1
.	06047	COM A=35*YLESS	06334	04600	00035		C2-C1 GREATER THAN 28
.	06050	STR A=L(SFT1)*SKIP	06335	15110	06354		NO
.	06051	JP MTR1	06336	61000	06361		YES
.	06052	ENT A=W(1+B5)	06337	11035	00001		
.	06053	STR A=W(WS)	06340	15030	06533		STORE LARGER MANTISSA
.	06054	ENT A=W(1+B4)	06341	11034	00001		
.	06055	JP SFT	06342	61000	06353		
.	06056 POS	ENT Q=L(B4)	06343	10014	00000		C1 IS THE RESULTANT
.	06057	STR Q=W(B6)	06344	14036	00000		CHARACTERISTIC
.	06060	COM A=35*YLESS	06345	04600	00035		C1-C2 GREATER THAN 28
.	06061	STR A=L(SFT1)*SKIP	06346	15110	06354		NO
.	06062	JP MTR	06347	61000	06360		YES
.	06063	ENT A=W(1+B4)	06350	11034	00001		
.	06064	STR A=W(WS)	06351	15030	06533		STORE LARGER MANTISSA
.	06065	ENT A=W(1+B5)	06352	11035	00001		
.	06066 SFT	ENT Q=0	06353	10000	00000		
.	06067 SFT1	RSH AQ=0	06354	03000	00000		SET RADIX POINTS
.	06070	AOD A=W(WS)	06355	20030	06533		AOD LARGER MANTISSA

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BELTP

CARDS	LI	ID	LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
.	06071			RJP	SCL	06356	65000	06426		TO SCALE
.	06072			EXIT		06357	61010	06325		
.	06073	MTR		ENT	A*W(1+B4)*SKIP	06360	11134	00001		M1 RESULTANT MANTISSA
.	06074	MTR1		ENT	A*W(1+B5)	06361	11035	00001		M2 RESULTANT MANTISSA
.	06075			STR	A*W(1+B6)	06362	15036	00001		STORE RESULTANT
.	06076			EXIT		06363	61010	06325		
.	06077	SUB		ENTRY		06364	61000	00000		
.	06100			ENT	A*L(B5)	06365	11015	00000		
.	06101			STR	A*L(WS2)	06366	15010	06535		C2
.	06102			ENT	A*W(1+B5)	06367	11035	00001		
.	06103			STR	A*CPH(WS3)	06370	15070	06536		COMPLEMENT M2
.	06104			ENT	B5*WS2	06371	12500	06535		SET B5
.	06105			RJP	ADD	06372	65000	06325		JUMP TO ADD ROUTINE
.	06106			EXIT		06373	61010	06364		
.	06107	MPL		ENTRY		06374	61000	00000		
.	06110			ENT	A*L(B4)	06375	11014	00000		
.	06111			ADD	A*L(B5)	06376	20015	00000		C1 + C2
.	06112			SUB	A*40000	06377	21000	40000		RESULTANT C
.	06113			STR	A*W(B6)	06400	15036	00000		
.	06114			ENT	Q*W(1+B4)	06401	10034	00001		
.	06115			MUL	W(1+B5)	06402	22035	00001		(M1)(M2)
.	06116			LSH	AQ*2	06403	07000	00002		SHIFT FOR SCALE
.	06117			RJP	SCL	06404	65000	06426		TO SCALE
.	06120			EXIT		06405	61010	06374		
.	06121	DIV		ENTRY		06406	61000	00000		
.	06122			ENT	A*W(1+B5)*AZERO	06407	11435	00001		
.	06123			ENT	A*L(B4)*SKIP	06410	11114	00000		
.	06124			JP	ERR	06411	61000	07055		ZERO DIVISOR
.	06125			SUB	A*L(B5)	06412	21015	00000		C1-C2
.	06126			ADD	A*40000	06413	20000	40000		RESULTANT C
.	06127			STR	A*L(B6)	06414	15016	00000		
.	06130			ENT	Q*0	06415	10000	00000		
.	06131			ENT	A*W(1+B4)	06416	11034	00001		M1
.	06132			RSH	AQ*2	06417	03000	00002		PREPARE FOR DIVISION
.	06133			DIV	W(1+B5)	06420	23035	00001		M1 DIVIDED BY M2
.	06134			STR	Q*A*APOS	06421	14640	00000		QUOTIENT TO A. IS IT POS
.	06135			ENT	Q*X-0*SKIP	06422	10140	77777		NO SET NEG
.	06136			CL	Q	06423	10000	00000		YES SO SET TO PLUS ZERO
.	06137			RJP	SCL	06424	65000	06426		TO SCALE
.	06140			EXIT		06425	61010	06406		
.	06141	SCL		ENTRY		06426	61000	00000		
.	06142			JP	NEG*ANEG	06427	60700	06441		
.	06143			RPT	36	06430	70000	00036		
.	06144			LSH	AQ*1*ANEG	06431	07700	00001		
.	06145			JP	ZERO	06432	61000	06463		RESULT ZERO
.	06146			SEL	CL*1	06433	52000	00001		
.	06147			ADD	A*2*APOS	06434	20600	00002		
.	06150			JP	AQR	06435	61000	06450		
.	06151			RPL	Y+1*W(B6)	06436	36036	00000		ADD 1 TO C
.	06152			ENT	A*W(SCL2)	06437	11030	06467		40000 00000 TO A
.	06153			JP	AQR	06440	61000	06450		
.	06154	NEG		RPT	36	06441	70000	00036		
.	06155			LSH	AQ*1*APOS	06442	07600	00001		

CAROS	L1 IO LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	06156	JP ZERO	06443	61000	06463		RESULT ZERO
.	06157	SUB A=2*ANEG	06444	21700	00002		
.	06160	JP AQR	06445	61000	06450		NO CHANGE
.	06161	RPL Y+1=W(B6)	06446	36036	00000		
.	06162	ENT A=W(SCL2+1)	06447	11030	06470		37777 77777 TO A
.	06163 AQR	RSH AQ*2	06450	03000	00002		SET RADIX PT
.	06164	SEL CP=W(SCL2+2)	06451	51030	06471		SET FIRST TWO BITS 0
.	06165	STR A=W(1+B6)	06452	15036	00001		RESULTANT MANTISSA
.	06166	STR B7*Q	06453	16700	00000		SHIFTS
.	06167	ADO Q=W(B6)	06454	26036	00000		CR + SHIFTS
.	06170	SUB Q=34*QNEG	06455	27700	00034		CR + SHIFTS -28, SKIP IF Q NEG
.	06171	STR Q=W(B6)*SKIP	06456	14136	00000		STORE RESULTANT CHARACTERISTIC
.	06172	JP ZERO	06457	61000	06463		RESULT ZERO
.	06173	SUB Q=77777*QPOS	06460	27600	77777		
.	06174	EXIT	06461	61010	06426		
.	06175	JP ERR	06462	61000	07055		OVERFLOW
.	06176 ZERO	STR B0=W(B6)	06463	16036	00000		
.	06177	STR B0=W(1+B6)	06464	16036	00001		RESULT IS ZERO
.	06200	ENT A=0	06465	11000	00000		
.	06201 SCL1	EXIT	06466	61010	06426		
.	06202 SCL2	40000 00000	06467	40000	00000		
.	06203	37777 77777	06470	37777	77777		
.	06204	60000 00000	06471	60000	00000		
.	06205 SET	ENTRY	06472	61000	00000		
.	06206	EXIT	06473	61010	06472		
.	06207 FXTOFL	ENTRY	06474	61000	00000		
.	06210	ENT Q=X(B4)	06475	10044	00000		SCALING POINT TO Q
.	06211	ENT Y-Q=40034	06476	31000	40034		40034-S
.	06212	STR A=W(B6)	06477	15036	00000		CHARACTERISTIC
.	06213	ENT Q=0	06500	10000	00000		
.	06214	ENT A=W(B5)	06501	11035	00000		FIX NO
.	06215	RJP SCL	06502	65000	06426		SCALE
.	06216	EXIT	06503	61010	06474		
.	06217 FLTOFX	ENTRY	06504	61000	00000		
.	06220	ENT Q=X(B4)	06505	10044	00000		SCALING PT WITH SIGN
.	06221	ADO Q=L(B5)	06506	26015	00000		CHARACTERISTIC
.	06222	SUB Q=40000	06507	27000	40000		
.	06223	ENT Y-Q=34*APOS	06510	31600	00034		
.	06224	JP FLTOFX2	06511	61000	06521		TO NEG BRANCH
.	06225	STR A=L(FLTOFX1)	06512	15010	06516		SETUP SHIFT
.	06226	SUB A=36*ANEG	06513	21700	00036		TEST FOR S GREATER THAN 29
.	06227	ENT A=0*SKIP	06514	11100	00000		CLEAR SHIFT GREATER THAN 30
.	06230	ENT A=W(1+B5)	06515	11035	00001		MANTISSA
.	06231 FLTOFX1	RSH A=0	06516	02000	00000		SHIFT
.	06232	STR A=W(B6)	06517	15036	00000		RESULTS
.	06233	EXIT	06520	61010	06504		
.	06234 FLTOFX2	COM A=X77776*YLESS	06521	04640	77776		
.	06235	JP ERR12	06522	61000	07075		LEFT SHIFT GREATER THAN 1
.	06236	ENT A=W(1+B5)	06523	11035	00001		MANTISSA
.	06237	LSH A=1	06524	06000	00001		SHIFT
.	06240	STR A=W(B6)	06525	15036	00000		RESULT

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CARDS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	06241	EXIT	06526	6	1010	06504	
.	06242	TYPE ENTRY	06527	6	1000	00000	
.	06243	EXIT	06530	6	1010	06527	
.	06244	PUNCH ENTRY	06531	6	1000	00000	
.	06245	EXIT	06532	6	1010	06531	
.	06246	WS 0 0	06533	0	0000	00000	
.	06247	WS1 0 0	06534	0	0000	00000	
.	06250	WS2 0 0	06535	0	0000	00000	
.	06251	WS3 0 0	06536	0	0000	00000	
.	06252	WS4 0 0	06537	0	0000	00000	
.	06253	WS5 0 0	06540	0	0000	00000	
.	06254	WS6 0 0	06541	0	0000	00000	
.	06255	WS7 0 0	06542	0	0000	00000	
.	06256	WS10 0 0	06543	0	0000	00000	
.	06257	WS11 0 0	06544	0	0000	00000	
.	06260	WS12 0 0	06545	0	0000	00000	
.	06261	WS13 0 0	06546	0	0000	00000	
.	06262	WS14 0 0	06547	0	0000	00000	
.	06263	WS15 0 0	06550	0	0000	00000	
.	06264	WS16 0 0	06551	0	0000	00000	
.	06265	RZERO STR BO=W(B6)	06552	1	6036	00000	
.	06266	STR BO=W(B6+1)	06553	1	6036	00001	
.	06267	JP FP4	06554	6	1000	06276	
.	06270	SQR ENTRY	06555	6	1000	00000	
.	06271	ENT A=W(1+B4)*APDS	06556	1	1634	00001	IS MANTISSA POSITIVE
.	06272	JP ERR13	06557	6	1000	07077	NO ERROR EXIT
.	06273	ENT Q=W(SQR1)*ANOT	06560	1	0530	06626	MASK FOR 2 EXP(-2), 2 EXP(-3)
.	06274	STR A=L(B6)*SKIP	06561	1	5116	00000	RESULT CHARACTERISTIC ZERO
.	06275	STR LP=A*SKIP	06562	4	7140	00000	EXTRACT RANGE FACTOR, SCALED 2 5
.	06276	STR A=W(1+B6)*SKIP	06563	1	5136	00001	RESULT MANTISSA ZERO
.	06277	RSH A=25D*SKIP	06564	0	2100	00031	RANGE FACTOR SCALED 0
.	06300	EXIT	06565	6	1010	06555	
.	06301	ENT B5=A	06566	1	2570	00000	LOAD B5 WITH FACTOR
.	06302	ENT Q=W(1+B4)	06567	1	0034	00001	M SCALED 28
.	06303	MUL W(SQR2+B5)	06570	2	2035	06633	TIMES K SCALED 2
.	06304	RSH AQ=2	06571	0	3000	00002	M(1) SCALED 28
.	06305	STR Q=W(WS)	06572	1	4030	06533	SAVE M(1)
.	06306	RSH Q=3	06573	0	1000	00003	TIMES 1/8
.	06307	ADO Q=W(SQR1+1)	06574	2	6030	06627	MINUS B
.	06310	MUL W(WS)	06575	2	2030	06533	
.	06311	RSH AQ=29D	06576	0	3000	00035	SCALED 27
.	06312	ADD Q=W(SQR1+2)	06577	2	6030	06630	MINUS C
.	06313	STR Q=W(WS+1)	06600	1	4030	06534	SAVE -A SCALED 27
.	06314	CL Q	06601	1	0000	00000	SET UP
.	06315	ENT A=W(WS)	06602	1	1030	06533	M(1)
.	06316	RSH AQ=4	06603	0	3000	00004	SCALED 54
.	06317	DIV W(WS+1)	06604	2	3030	06534	M(1)/(-A) SCALED 27
.	06320	ADD Q=W(WS+1)	06605	2	6030	06534	MINUS A
.	06321	STR Q=W(WS)	06606	1	4030	06533	SAVE -2(SQRT M(1))
.	06322	ENT A=L(B4)	06607	1	1014	00000	CHARACTERISTIC
.	06323	ADD A=W(SQR1+3)	06610	2	0030	06631	PLUS BIAS

CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	06324	LSH A=29D	06611	06000	00035		HALVED
.	06325	STR A=L(B6)*ANEG	06612	15716	00000		TO RESULT CHECK EVEN/ODD
.	06326	MUL W(SQR3+B5)*SKIP	06613	22135	06637		EVEN CHAR CORRECTION SCALED 29
.	06327	MUL W(SQR4+B5)	06614	22035	06643		000 CHAR
.	06330	RSH AQ=28D	06615	03000	00034		N SCALED 28
.	06331	COM Q=W(SQR1+4)*YLESS	06616	04230	06632		IS N NORMALIZED
.	06332	JP SQR1	06617	61000	06624		YES
.	06333	ENT A=L(B6)	06620	11016	00000		ADD 1
.	06334	AOD A=1	06621	20000	00001		TO
.	06335	STR A=L(B6)	06622	15016	00000		CHAR.
.	06336	RSH Q=1	06623	01000	00001		NORMALIZE
.	06337 SQR1	STR Q=W(1+B6)	06624	14036	00001		STORE RESULT
.	06340	EXIT	06625	61010	06555		
.	06341 SQR1	0600000000	06626	06000	00000		MASK
.	06342	6376776144	06627	63767	76144		-B SCALED 28
.	06343	7500402153	06630	75004	02153		-C SCALED 27
.	06344	0000040000	06631	00000	40000		BIAS
.	06345	2000000000	06632	20000	00000		1.0 SCALED 28
.	06346 SQR2	0000000007	06633	00000	00007		K(3) FOR BITS 00
.	06347	0000000006	06634	00000	00006		K(2) 01
.	06350	0000000005	06635	00000	00005		K(1) 10
.	06351	0000000004	06636	00000	00004		K(0) 11
.	06352 SQR3	6371733412	06637	63717	33412		7 EXP(-1/2)+2*10 EXP(-9) SCALE D 29
.	06353	6273720435	06640	62737	20435		6 EXP(-1/2)
.	06354	6154066433	06641	61540	66433		5 EXP(-1/2)
.	06355	5777777776	06642	57777	77776		4 EXP(-1/2)
.	06356 SQR4	5671230431	06643	56712	30431		(2/7) EXP(1/2)
.	06357	5541454270	06644	55414	54270		(1/3) EXP(1/2)
.	06360	5360566233	06645	53605	66233		(2/5) EXP(1/2)
.	06361	5127660627	06646	51276	60627		(1/2) EXP(1/2)
.	06362 ATAN	ENTRY	06647	61000	00000		
.	06363	ENT Q=L(B4)	06650	10014	00000		C
.	06364	COM Q=40001*YMORE	06651	04300	40001		LESS THAN 40001
.	06365	JP ERR16	06652	61000	07103		NO-ARGUMENT TOO LARGE
.	06366	COM Q=37745*YLESS	06653	04200	37745		
.	06367	JP RZERO	06654	61000	06552		
.	06370 ATAN1	ENT A=40000	06655	11000	40000		
.	06371	STR A=Q*W(W55)	06656	33030	06540		TO A SET UP SHIFT
.	06372	ENT Q=W(1+B4)	06657	10034	00001		MANTISSA
.	06373	RSH Q=A	06660	01070	00000		CONVERT TO FIXED POINT
.	06374	STR Q=W(W55)	06661	14030	06540		M
.	06375	MUL W(W55)	06662	22030	06540		M2
.	06376	RSH AQ=33	06663	03000	00033		
.	06377	STR Q=W(W56)	06664	14030	06541		M2
.	06400	ENT B5=0	06665	12500	00000		
.	06401	ENT Q=W(ATAN5)	06666	10030	06721		
.	06402 ATAN2	MUL W(W56)	06667	22030	06541		HASTINGS CONSTANT
.	06403	RSH AQ=35	06670	03000	00035		TO Q
.	06404	AOD Q=W(ATAN5+B5+1)	06671	26035	06722		
.	06405	BSK B5=4	06672	71500	00004		
.	06406	JP ATAN2	06673	61000	06667		
.	06407	MUL W(W55)	06674	22030	06540		M

BELTP

CARDS	LI	ID	LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
.	06410				RSH AQ*34	06675	03000	00034		
.	06411				JP ATAN3*QNEG	06676	60300	06710		
.	06412				RPT 36	06677	70000	00036		POS RESULT
.	06413				LSH Q*1*QNEG	06700	05300	00001		
.	06414				JP RZERO	06701	61000	06552		
.	06415				ENT A*37743+B7	06702	11007	37743		
.	06416				STR A*W(B6)	06703	15036	00000		OF RESULT
.	06417				ENT A*0	06704	11000	00000		CLEAR
.	06420				LSH AQ*34	06705	07000	00034		
.	06421				STR A*W(1+B6)	06706	15036	00001		MANTISSA OF RESULT
.	06422				EXIT	06707	61010	06647		
.	06423	ATAN3			RPT 36	06710	70000	00036		NEG RESULT
.	06424				LSH Q*1*QPOS	06711	05200	00001		
.	06425				JP RZERO	06712	61000	06552		
.	06426				ENT A*37743+B7	06713	11007	37743		
.	06427				STR A*W(B6)	06714	15036	00000		OF RESULT
.	06430				ENT A*3	06715	11000	00003		NEG SIGN
.	06431				LSH AQ*34	06716	07000	00034		
.	06432				STR A*W(1+B6)	06717	15036	00001		MANTISSA FOR RESULT
.	06433				EXIT	06720	61010	06647		
.	06434	ATANS			77477 75334	06721	77477	75334		K 11
.	06435				01536 53004	06722	01536	53004		K9
.	06436				74214 27222	06723	74214	27222		K7
.	06437				06143 01016	06724	06143	01016		K5
.	06440				65266 23005	06725	65266	23005		K3
.	06441				37777 50120	06726	37777	50120		K1
.	06442	EXP			ENTRY	06727	61000	00000		
.	06443				ENT Q*W(1+B4)*QPOS	06730	10234	00001		MANTISSA
.	06444				JP EXP2	06731	61000	06744		
.	06445				ENT A*L(B4)	06732	11014	00000		CHARACTERISTIC
.	06446				COM A*40034*YMORE	06733	04700	40034		C LESS THAN 40034
.	06447				JP ERR17	06734	61000	07110		NO-OVERFLOW
.	06450				COM A*37744*YMORE	06735	04700	37744		C LESS THAN 37744
.	06451				JP EXP4	06736	61000	06751		NO
.	06452	EXP1			ENT A*40001	06737	11000	40001		
.	06453				STR A*W(B6)	06740	15036	00000		RESULT IS
.	06454				ENT A*W(EXP10)	06741	11030	07006		ONE
.	06455				STR A*W(1+B6)	06742	15036	00001		
.	06456				EXIT	06743	61010	06727		
.	06457	EXP2			ENT A*L(B4)	06744	11014	00000		
.	06460				COM A*40034*YMORE	06745	04700	40034		
.	06461				JP RZERO	06746	61000	06552		
.	06462	EXP3			COM A*37744*YLESS	06747	04600	37744		C LESS THAN 37744
.	06463				JP EXP1	06750	61000	06737		YES
.	06464	EXP4			MUL W(EXP10+1)	06751	22030	07007		LOGE1/LN10
.	06465				STR A*W(WS12)	06752	15030	06545		
.	06466				ENT A*40032	06753	11000	40032		
.	06467				SUB A*W(B4)	06754	21034	00000		CHARACTERISTIC
.	06470				STR A*W(WS13)	06755	15030	06546		SET UP SHIFT
.	06471				ENT A*W(WS12)	06756	11030	06545		
.	06472				RSH AQ*W(WS13)*APOS	06757	03630	06546		CONVERT TO FIXED POINT
.	06473				JP EXP7	06760	61000	07003		NEG NUMBER
.	06474				ADD A*40001	06761	20000	40001		

CARDS	L1 IO LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	06475	STR A=W(B6)	06762	15036	00000		
.	06476 EXP5	ENT A=0	06763	11000	00000		
.	06477	RSH AQ=1	06764	03000	00001		
.	06500	MUL W(EXP10+2)	06765	22030	07010		
.	06501	RSH AQ=35	06766	03000	00035		
.	06502	STR Q=W(WS14)	06767	14030	06547		
.	06503	ENT B5=0	06770	12500	00000		CLEAR
.	06504	ENT Q=W(EXP10+3)	06771	10030	07011		K6
.	06505 EXP6	MUL W(WS14)	06772	22030	05547		K6X
.	06506	RSH AQ=34	06773	03000	00034		
.	06507	ADD Q=W(EXP10+B5+4)	06774	26035	07012		
.	06510	BSK B5=5	06775	71500	00005		
.	06511	JP EXP6	06776	61000	06772		
.	06512	ENT A=0	06777	11000	00000		
.	06513	LSH AQ=35	07000	07000	00035		
.	06514	STR A=W(1+B6)	07001	15036	00001		RESULT
.	06515	EXIT	07002	61010	06727		
.	06516 EXP7	AOD A=40000	07003	20000	40000		
.	06517	STR A=W(B6)	07004	15036	00000		
.	06520	JP EXP5	07005	61000	06763		
.	06521 EXP10	10000 0	07006	10000	00000		MANTISSA OF 1
.	06522	27052 43542	07007	27052	43542		LOGE1/LN10
.	06523	11504 04651	07010	11504	04651		PROGRAM CONSTANT
.	06524	00056 24630	07011	00056	24630		K
.	06525	00155 74340	07012	00155	74340		K5
.	06526	01152 16565	07013	01152	16565		K4
.	06527	04035 41132	07014	04035	41132		K3
.	06530	12466 00553	07015	12466	00553		K2
.	06531	22327 26210	07016	22327	26210		K1
.	06532	20000 0	07017	20000	00000		FIXED POINT 1
.	06533 AERR1	STR A=L(AERR2+2)	07020	15010	07042		
.	06534	CONS0LE HOLO	07021	64120	00142		
.			07022	03000	00000		
.	06535	TYPET \$CR\$\$LF\$\$LF\$FP ERROR\$CR\$ADOR\$S07023	61000	07030			
.		P\$\$SP\$					
.			07024	04030	31325		
.			07025	05122	72724		
.			07026	27040	61111		
.			07027	27050	50000		
.			07030	64120	00142		
.			07031	00000	00022		
.			07032	00000	07024		
.	06536	ENT Q=L(FLTPT)	07033	10010	06266		
.	06537	SUB Q=1	07034	27000	00001		
.	06540	TYPEC Q=\$SP\$+\$SP\$+\$SP\$+\$SP\$	07035	64110	00141		
.			07036	00000	00000		
.			07037	77050	50505		
.	06541 AERR2	TYPE 100*AERR2	07040	64120	00142		
.			07041	00000	00012		
.			07042	00000	07040		
.	06542	ENT B4=L(FP4)	07043	12410	06276		
.	06543	ENT B5=L(FP5)	07044	12510	06277		
.	06544	ENT B6=L(FP6)	07045	12610	06300		

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CARDS	LI	ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	06545		ENT B7*L(FP7)	07046	12710	06301		
.	06546		CL A	07047	11000	00000		
.	06547		CL Q	07050	10000	00000		
.	06550		CONSOLE RELEASE	07051	64120	00142		
.	06551	FPSTOP	REX STOPRUN	07052	04000	00000		
.	06552	ERR	ENT B7*L(FP7)	07053	64120	00142		
.	06553		ENT A*L(AERR+B71	07054	05000	00000		
.	06554		JP AERR1	07055	12710	06301		
.	06555	AERR	O ADOFL	07056	11017	07060		
.	06556		O SBOFL	07057	61000	07020		
.	06557		O MLOFL	07060	00000	07064		
.	06560		O DVOFL	07061	00000	07066		
.	06561	ADOFL	0611110524	07062	00000	07070		
.	06562		1321050505	07063	00000	07072		
.	06563	SBOFL	3032070524	07064	06111	10524		
.	06564		1321050505	07065	13210	50505		
.	06565	MLOFL	2232210524	07066	30320	70524		
.	06566		1321050505	07067	13210	50505		
.	06567	DVOFL	1116330524	07070	22322	10524		
.	06570		1321050505	07071	13210	50505		
.	06571	ERR11	ENT A*ERR20*SKIP	07072	11163	30524		
.	06572	ERR12	ENT A*ERR21	07073	13210	50505		
.	06573		JP AERR1	07074	11100	07112		
.	06574	ERR13	ENT A*ERR22*SKIP	07075	11000	07114		
.	06575	ERR14	ENT A*ERR23	07076	61000	07020		
.	06576		JP AERR1	07077	11100	07116		
.	06577	ERR15	ENT A*ERR24*SKIP	07100	11000	07120		
.	06600	ERR16	ENT A*ERR25	07101	61000	07020		
.	06601		JP AERR1	07102	11100	07122		
.	06602	ERR16A	ENT A*ERR40	07103	11000	07124		
.	06603		JP AERR1	07104	61000	07020		
.	06604	ERR10	ENT A*ERR27*SKIP	07105	11000	07132		LOG ERROR
.	06605	ERR17	ENT A*ERR26	07106	61000	07020		
.	06606		JP AERR1	07107	11100	07130		
.	06607	ERR20	1621210530	07110	11000	07126		
.	06610		1231052324	07111	61000	07020		
.	06611	ERR21	3010062112	07112	16212	10530		ILL SET NO
.	06612		0524132105	07113	12310	52324		
.	06613	ERR22	3026270523	07114	30100	62112		SCALE OFL
.	06614		1214052324	07115	05241	32105		
.	06615	ERR23	3016230524	07116	30262	70523		
.	06616		1321050505	07117	12140	52324		
.	06617	ERR24	10243 00524	07120	30162	30524		
.	06620		1321050505	07121	13210	50505		
.	06621	ERR25	0631062305	07122	10243	00524		
.	06622		2413210505	07123	13210	50505		
.	06623	ERR26	1235250524	07124	06310	62305		
.	06624		1321050505	07125	24132	10505		
.	06625	ERR27	2432312532	07126	12352	50524		
.	06626		3105241321	07127	13210	50505		
.	06627	ERR40	2124141205	07130	24323	12532		
.				07131	31052	41321		
.				07132	21241	41205		

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CARD	LI	IO	LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
.	06630				1227272427	07133	12272	72427		
.	06631	LERR		STR	A=L(LERR+3)	07134	15010	07137		
.	06632			RPL	Y+1=L(POW14)	07135	36010	07170		
.	06633			STR	A=L(FLTPT)	07136	15010	06266		
.	06634			ENT	A=0	07137	11000	00000		
.	06635			JP	AERR1	07140	61000	07020		
.	06636	ERR2		ENT	A=ERR30*SKIP	07141	11100	07152		
.	06637	ERR3		ENT	A=ERR31	07142	11000	07154		
.	06640			JP	LERR	07143	61000	07134		
.	06641	ERR4		ENT	A=ERR32*SKIP	07144	11100	07156		
.	06642	ERR5		ENT	A=ERR33	07145	11000	07160		
.	06643			JP	LERR	07146	61000	07134		
.	06644	ERR6		ENT	A=ERR34*SKIP	07147	11100	07162		
.	06645	ERR7		ENT	A=ERR35	07150	11000	07164		
.	06646			JP	LERR	07151	61000	07134		
.	06647	ERR30			2324310524	07152	23243	10524		
.	06650				1031050505	07153	10310	50505		
.	06651	ERR31			2324053106	07154	23240	53106		NO TAB
.	06652				0705050505	07155	07050	50505		
.	06653	ERR32			2324310511	07156	23243	10511		NOT DEC
.	06654				1210050505	07157	12100	50505		
.	06655	ERR33			2324051112	07160	23240	51112		NO DEC PT
.	06656				1005253105	07161	10052	53105		
.	06657	ERR34			2706231412	07162	27062	31412		RANGE ERR
.	06660				0512272705	07163	05122	72705		
.	06661	ERR35			1223110510	07164	12231	10510		END CODE
.	06662				2411120505	07165	24111	20505		
.	06663	STARTREAD		ENTRY		07166	61000	00000		
.	06664			EXIT		07167	61010	07166		
.	06665	POW14		NO-OP		07170	12000	00000		
.	06666	ASIN		ENTRY		07171	61000	00000		
.	06667			ENT	A=40001	07172	11000	40001		BIASED CHAR EQUALS 1
.	06670			SUB	A=L(B4)*APOS	07173	21614	00000		1-C, TEST C GREATER THAN 1
.	06671			JP	ERR16	07174	61000	07103		YES ERROR
.	06672			ENT	B5=A	07175	12570	00000		B5 EQUALS 1-C TEST C EQUALS 1
.	06673			JP	ASIN4*AZERO	07176	60400	07340		
.	06674			SUB	A=1*ANOT	07177	21500	00001		-C TEST C EQUALS 0
.	06675			JP	ASIN3	07200	61000	07261		YES TO TEST ABS(M) EQUALS 1/2
.	06676			COM	A=140*YMORE	07201	04700	00016		
.	06677			ENT	A=0*SKIP	07202	11100	00000		
.	06700	HERE		ENT	A=H(1+B4)*SKIP	07203	11134	00001		
.	06701			JP	ASIN2	07204	61000	07255		
.	06702			LSH	A=1	07205	06000	00001		SCALED 29
.	06703			STR	A=W(WS)	07206	15030	06533		SAVED
.	06704			RSH	AQ=290+B5	07207	03005	00035		M=2*C EQUALS Y SCALED 29 EQU LS X
.	06705			STR	Q=W(WS+1)	07210	14030	06534		
.	06706			MUL	W(WS+1)	07211	22030	06534		
.	06707			RSH	AQ=290	07212	03000	00035		SCALED 29 0 IN A
.	06710	ASIN1		STR	A=W(WS+1)	07213	15030	06534		STORE P
.	06711			MUL	W(ASINK)	07214	22030	07357		K=X**2

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CARDS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	06712	RSH AQ•29D	07215	03000	00035		SCALED 29 EQUALS Z
.	06713	ENT Y+Q•W(ASINK+31	07216	30030	07362		Z+C
.	06714	STR A•W(WS+2)	07217	15030	06535		SAVE D
.	06715	ENT A•W(ASINK+1)	07220	11030	07360		A
.	06716	STR A+Q•Q	07221	32000	00000		+Z
.	06717	MUL A	07222	22070	00000		(A+Z1)••2
.	06720	RSH AQ•29D	07223	03000	00035		SCALED 29
.	06721	ADD Q•W(ASINK+21	07224	26030	07361		+B EQUALS U
.	06722	STR Q•W(WS+31	07225	14030	06536		SAVE U
.	06723	MUL W(WS+2)	07226	22030	06535		U•(Z+C)
.	06724	RSH AQ•29D	07227	03000	00035		SCALED 29 EQUALS V
.	06725	ENT Y+Q•W(ASINK+41	07230	30030	07363		V+D
.	06726	SUB Q•W(WS+31	07231	27030	06536		V-D
.	06727	ADD Q•W(ASINK+5)	07232	26030	07364		+E
.	06730	STR A•W(WS+31	07233	15030	06536		
.	06731	MUL W(WS+3)	07234	22030	06536		
.	06732	RSH AQ•29D	07235	03000	00035		SCALED 29
.	06733	ADD Q•W(ASINK+61	07236	26030	07365		+F EQUALS ARCSIN X/2X
.	06734	MUL W(WS1	07237	22030	06533		*M EQUALS (1/2)ARCSIN X SCALED 28+C
.	06735	RSH AQ•27D+B5	07240	03005	00033		•(4•2••C1) EQUALS 2ARCSIN X SC 28
.	06736	ENT A•W(WS+1)•AZERO	07241	11430	06534		P SCALED 28 SKIP IF P EQUALS D
.	06737	STR A+Q•Q•SKIP	07242	32100	00000		P-2•ARCSIN X EQUALS ARCSIN Y
.	06740	RSH Q•1	07243	01000	00001		ARCSIN Y SCALED 28
.	06741	STR Q•A•QPOS	07244	14240	00000		TEST M LESS THAN 0
.	06742	STR A•A	07245	15040	00000		YES FORM ABS(M)
.	06743	RPT 29D	07246	70000	00035		NORMALIZE
.	06744	LSH A•1•ANEG	07247	06700	00001		SCALED 30
.	06745	JP ASIN2+2	07250	61000	07257		M EQUALS 0
.	06746	LSH A•29D	07251	06000	00035		PRESERVE SIGN
.	06747	RSH A•1•QPOS	07252	02200	00001		M SCALED 28 TEST M LESS THAN D
.	06750	STR A•A	07253	15040	00000		YES -ABS(M)
.	06751	ENT Q•37745+B7•SKIP	07254	10107	37745		C EQUALS (27-SF)-27+BIAS
.	06752 ASIN2	ENT Q•A	07255	10070	00000		C EQUALS 0
.	06753	STR Q•L(B6)	07256	14016	00000		STORE ARCSIN Y
.	06754	STR A•W(1+B61	07257	15036	00001		AS C,M
.	06755	EXIT	07260	61010	07171		
.	06756 ASIN3	ENT Q•W(1+B4)	07261	10034	00001		M EQUALS Y SCALED 28
.	06757	STR Q•A•QNEG	07262	14340	00000		FORM
.	06760	STR A•A	07263	15040	00000		-ABS(Y)
.	06761	ADD A•W(ASINP+21•ANOT	07264	20530	07370		1/2-ABS(Y) TEST ZERO
.	06762	JP ASIN5	07265	61000	07347		YES USE (PI1/6
.	06763	ADD A•W(ASINP+21)•QPOS	07266	20230	07370		(1-ABS(Y))/2 SCALED 29
.	06764	STR A•CPW(WS+11)•SKIP	07267	15170	06534		STORE X••2 AND
.	06765	STR A•W(WS+11	07270	15030	06534		SAVE SIGN DF Y
.	06766	RPT 29D•	07271	70000	00035		NORMALIZE
.	06767	LSH A•1•ANEG	07272	06700	00001		SCALED 30
.	06770	JP ASIN5-1	07273	61000	07346		ABS(X1) LESS THAN 2••-13 USE (P 1)/2
.	06771	ENT Q•A	07274	10070	00000		SAVE X••2
.	06772	STR B7•A	07275	16740	00000		26-SF

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CAROS	L1 IO LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	06773	SUB A•300	07276	21000	00036		-(2+SF) EQUALS -(2-2C1
.	06774	LSH A•290•ANEG	07277	06700	00035		-(1-C1 TEST SF EVEN
.	06775	LSH Q•270•SKIP	07300	05100	00033		NO (1/4)•X••2 SCALED 29EQUALS T/2
.	06776	LSH Q•28D	07301	05000	00034		YES (1/21)•X••2 SCALED 29 EQUAL S T/2
.	06777	STR A•A	07302	15040	00000		1-C
.	07000	ENT B5•A	07303	12570	00000		TO B5
.	07001	STR Q•W(WS+2)	07304	14030	06535		SAVE T/2
.	07002	MUL W(ASINQ)	07305	22030	07372		A(T/21
.	07003	RSH AQ•29D	07306	03000	00035		SCALED 29
.	07004	ADD Q•W(ASINQ+1)	07307	26030	07373		+(B/2)
.	07005	MUL W(WS+2)	07310	22030	06535		•(T/21
.	07006	RSH AQ•29D	07311	03000	00035		SCALED 29 0 IN A-REG
.	07007	ADD Q•W(ASINQ+2)	07312	26030	07374		+(C/4)
.	07010	STR Q•W(WS)	07313	14030	06533		EQUALS (T••1/21)/4 APPROX EQUA LS R1
.	07011	ENT Q•W(WS+2)	07314	10030	06535		T/2
.	07012	LSH AQ•26D	07315	07000	00032		•(1/8) EQUALS T/16 SCALED 58
.	07013	DIV W(WS)	07316	23030	06533		(T/16)/R1
.	07014	ADD Q•W(WS)	07317	26030	06533		+R1
.	07015	RSH Q•1	07320	01000	00001		•(1/2) EQUALS R2
.	07016	STR Q•W(WS)	07321	14030	06533		SAVE R2
.	07017	ENT A•W(WS+2)	07322	11030	06535		ONE MORE
.	07020	CL Q	07323	10000	00000		ITERATION
.	07021	RSH AQ•4	07324	03000	00004		YIELDS
.	07022	DIV W(WS)	07325	23030	06533		(T••1/2)/2
.	07023	ADD Q•W(WS)	07326	26030	06533		•2
.	07024	LSH AQ•31D	07327	07000	00037		EQUALS T••1/2 SCALED 29 EQUAL S ABS(M1
.	07025	ENT Q•W(WS+11)•QNEG	07330	10330	06534		X••2 TEST SIGN
.	07026	STR A•CPW(WS)•SKIP	07331	15170	06533		STORE -M
.	07027	STR A•W(WS)	07332	15030	06533		STORE -M
.	07030	ENT A•W(ASINP+1)•QPOS	07333	11230	07367		(PI)/2 SCALED 28
.	07031	STR Q•Q•SKIP	07334	14100	00000		CHANGE SIGN
.	07032	JP ASIN1	07335	61000	07213		TO CALC FOR Y GREATER .5
.	07033	STR A•A	07336	15040	00000		-(PI)/2
.	07034	JP ASIN1	07337	61000	07213		TO CALC FOR Y LESS THAN -.5
.	07035 ASIN4	ENT Q•W(1+B4)	07340	10034	00001		M
.	07036	STR Q•A•QNEG	07341	14340	00000		FORM
.	07037	STR A•A	07342	15040	00000		-ABS(M)
.	07040	ADD A•W(ASINP+2)•AZERO	07343	20430	07370		+(1/21 TEST AZERJ
.	07041	JP ERR16	07344	61000	07103		NO ERROR
.	07042	ENT B5•40001	07345	12500	40001		C FOR (PI)/2
.	07043	JP ASIN5+1	07346	61000	07350		
.	07044 ASIN5	ENT B5•40000	07347	12500	40000		C FOR (PI)/6
.	07045	ENT A•W(ASINP-40000+B5)•QPOS	07350	11235	47365		(PI)/6OR(PI)/2 TEST M LESS
.	07046	STR A•A	07351	15040	00000		YES -(PI)/6 OR -(PI)/2
.	07047	RSH A•1	07352	02000	00001		M SCALED 28
.	07050	STR B5•Q	07353	16500	00000		C
.	07051	STR Q•L(B61	07354	14016	00000		STORE ARCSIN Y
.	07052	STR A•W(1+B6)	07355	15036	00001		AS C,M

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BELTP

CARDS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	07053	EXIT	07356	61010	07171		
.	07054	ASINK 2041015167	07357	20410	15167	K	
.	07055	1070502075	07360	10705	02075	A	
.	07056	1507662270	07361	15076	62270	B	
.	07057	0125170245	07362	01251	70245	C	
.	07060	0151206634	07363	01512	06634	D	
.	07061	3121124150	07364	31211	24150	E	
.	07062	1720500666	07365	17205	00666	F	
.	07063	ASINP 2060251072	07366	20602	51072	(PI)/6 SCALED 29	
.	07064	3110375526	07367	31103	75526	(PI)/2 SCALED 28	
.	07065	1000000000	07370	10000	00000	1/2 SCALED 28	
.	07066	1444176653	07371	14441	76653	(PI)/2 SCALED 27	
.	07067	ASINQ 6570132340	07372	65701	32340	-A SCALED 29	
.	07070	2065211354	07373	20652	11354	B/2 SCALED 29	
.	07071	0204600545	07374	02046	00545	C/4 SCALED 29	
.	07072	ACOS ENTRY	07375	61000	00000		
.	07073	RJP ASIN	07376	65000	07171	GET ARCSIN Y	
.	07074	ENT A=40001	07377	11000	40001	BIASED CHARACTERISTIC	
.	07075	SUB A=L(B6)	07400	21016	00000	1-C	
.	07076	ENT Q=W(1+B6)	07401	10036	00001	M SCALED 28	
.	07077	RSH Q=A	07402	01070	00000	ARCSIN Y SCALED 27	
.	07100	SUB Q=W(ASINP+31*QNEG	07403	27730	07371	-(PI)/2 SCALED 27	
.	07101	JP ACOS1	07404	61000	07414	ARCOS Y EQUALS 0	
.	07102	RPT 290	07405	70000	00035	NORMALIZE (-ARCOS Y)	
.	07103	LSH Q=1*QPOS	07406	05200	00001	WITH 26+C IN B7	
.	07104	JP ACOS1	07407	61000	07414	(ARCOS Y EQUALS 0)	
.	07105	LSH Q=29D	07410	05000	00035	SAVE SIGN OF -M	
.	07106	RSH Q=1	07411	01000	00001	ANO SCALE 28	
.	07107	STR B7=A	07412	16740	00000	26+C	
.	07110	ADD A=37746*SKIP	07413	20100	37746	+BIAS-26 EQUALS C	
.	07111	ACOS1 STR Q=Q	07414	14000	00000	SET FOR C EQUALS 0	
.	07112	STR A=L(B6)	07415	15016	00000	STORE ARCOS Y	
.	07113	STR Q=CPW(1+B6)	07416	14076	00001	AS C,M	
.	07114	EXIT	07417	61010	07375		
.	07115	LOGE ENTRY	07420	61000	00000	LN(Y) IN FLOATING PT	
.	07116	ENT Q=W(1+B4)	07421	10034	00001	MANTISSAEQMEQ	
.	07117	COM Q=W(LOGER)*YMORE	07422	04330	07531	TEST M LESS 1	
.	07120	JP ERR16A	07423	61000	07105		
.	07121	ENT Y=Q+W(LOGER+1)*ANEG	07424	31730	07532	TEST M GREATER 1/2	
.	07122	JP LOGE1	07425	61000	07454	NO, TRY M EQ 1/2	
.	07123	ENT LP=W(LOGER+2)	07426	40030	07533	GET I	
.	07124	RSH A=24D	07427	02000	00030	FOR K(I)	
.	07125	ENT B5=A	07430	12570	00000	IN TABLE	
.	07126	MUL W(LOGEK+B5)	07431	22035	07553	K(I)=Q	
.	07127	RSH AQ=290	07432	03000	00035	SCALED 27	
.	07130	SUB Q=W(LOGER+1)	07433	27030	07532	-1 EQ X	
.	07131	ENT Y+Q=W(LOGEA+2)	07434	30030	07537	X+C	
.	07132	STR A=W(WS1)	07435	15030	06533	SAVED	
.	07133	ENT Y+Q=W(LOGEA1	07436	30030	07535	X+A	
.	07134	STR A=W(WS+1)	07437	15030	06534		
.	07135	MUL W(WS+1)	07440	22030	06534		
.	07136	RSH AQ=27D	07441	03000	00033	SCALED 27	
.	07137	STR Q=W(WS+1)	07442	14030	06534	SAVED	

CARDS	L1 ID LABEL	TA STATEMENT	LOC.	F	JKB	Y	NOTES
.	07140	ADD Q=W(LOGEA+1)	07443	26030	07536		Z+B
.	07141	MUL W(WS)	07444	22030	06533		*(X+C)
.	07142	RSH AQ=27D	07445	03000	00033		SCALED 27 EQ W
.	07143	ENT Y+Q=W(LOGEA+4)	07446	30030	07541		W+E
.	07144	ADD Q=W(LOGER+3)	07447	26030	07534		W-3
.	07145	ADD Q=W(LOGEA+3)	07450	26030	07540		+(D+3)
.	07146	ADD Q=W(WS+1)	07451	26030	06534		+Z
.	07147	STR A=W(WS+1)	07452	15030	06534		
.	07150	MUL W(WS+1)*SKIP	07453	22130	06534		
.	07151 LOGE1	ENT Q=W(LOGEA+5)*SKIP	07454	10130	07542		LN(2)
.	07152	DIV W(LOGER+3)*SKIP	07455	23130	07534		(-1/6) EQLN(X)-F*(-1/6)
.	07153	STR Q=Q*SKIP	07456	14100	00000		-LN(2)
.	07154	ADD Q=W(LOGEF+B5)*SKIP	07457	26135	07543		+F*(-1/L)-LN(K(I))
.	07155	JP ERR16A*ANOT	07460	60500	07105		
.	07156	STR Q=W(WS)	07461	14030	06533		EQ LN(Q) SCALED28
.	07157	ENT A=L(B4)	07462	11014	00000		CHAR EQ P+2**14
.	07160	SUB A=40000*ANOT	07463	21500	40000		-BIASEQP,TEST P EQO
.	07161	JP LOGE2	07464	61000	07511		YES SKIP CALC
.	07162	ENT Q=A*QPOS	07465	10270	00000		TEST PLESSO
.	07163	STR Q=Q	07466	14000	00000		USE ABS(P)
.	07164	RPT 4=ADV	07467	70100	00004		RANGE DF P
.	07165	COM Q=L(LOGES)*YMORE	07470	04310	07563		TO DETR MIN SHIFTS
.	07166	JP LOGEM	07471	61000	07567		
.	07167	ENT B5=U(LOGES+B7)	07472	12527	07563		FOR SCALING
.	07170 LOGE1A	MUL W(LOGEA+5)	07473	22030	07542		
.	07171	LSH AQ=B5	07474	07005	00000		SCALED 45 47 50 53 56
.	07172	JP LOGEM+2	07475	61000	07571		
.	07173	RPT L(COUNT)	07476	70010	07600		NORMALIZE
.	07174	LSH AQ=1*ANEG	07477	07700	00001		PRODUCT
.	07175	JP ERR16A	07500	61000	07105		
.	07176	LSH AQ=58D	07501	07000	00072		RETURN SIGN SCALED 28
.	07177	ENT Q=L(B4)	07502	10014	00000		P
.	07200	COM Q=40000*YLESS	07503	04200	40000		TEST P LESS 0
.	07201	STR A=A	07504	15040	00000		YES -ABS(P)*LN(2)
.	07202	ENT Q=W(WS)	07505	10030	06533		LN(Q)
.	07203	ENT B5=B7-26D	07506	12507	77745		
.	07204	BJP B5=LOGE2-1	07507	72500	07510		
.	07205	RSH Q=B5*SKIP	07510	01105	00000		
.	07206 LOGE2	ENT B7=27D	07511	12700	00033		SET FOR NO SHIFTS(P EQ 0)
.	07207	STR A+Q=Q*QPOS	07512	32200	00000		LN(Y)
.	07210	STR Q=Q	07513	14000	00000		ABS(LN(Y))
.	07211	JP LOGE3*AZERO	07514	60400	07525		SKIP IF Y EQ 1
.	07212	STR B7=W(WS)	07515	16730	06533		SAVE FACTOR
.	07213	RPT 29D	07516	70000	00035		NORMALIZE
.	07214	LSH Q=1*QNEG	07517	05300	00001		ABS(LN(Y))
.	07215	JP ERR16A	07520	61000	07105		
.	07216	LSH Q=28D=APOS	07521	05600	00034		RETURN SIGN SCALED 28
.	07217	STR Q=Q	07522	14000	00000		AS MANTISSA
.	07220	ENT A=W(WS)	07523	11030	06533		FORM
.	07221	ADD A=37712+B7*SKIP	07524	20107	37712		CHARACTERISTIC
.	07222 LOGE3	CL Q	07525	10000	00000		
.	07223	STR A=L(B6)	07526	15016	00000		STORE
.	07224	STR Q=W(1+B6)	07527	14036	00001		RESULT

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PONTON*7/1/65

BELTP

CARDS	LI ID LABEL	TA STATEMENT	LOC	F JKB Y	NOTES
.	07225	EXIT	07530	61010 07420	
.	07226	LOGER 2000000000	07531	20000 00000	1SCALED 28
.	07227	1000000000	07532	10000 00000	1/2SCALED28
.	07230	0700000000	07533	07000 00000	MASK FOR I
.	07231	4777777777	07534	47777 77777	-3 SCALED 27 -6 SCALED26
.	07232	LOGEA 5770232732	07535	57702 32732	A SCALED 27
.	07233	3427564132	07536	34275 64132	B
.	07234	0724376530	07537	07243 76530	C
.	07235	4341324241	07540	43413 24241	D+3
.	07236	5712656427	07541	57126 56427	E
.	07237	1305620600	07542	13056 20600	LN(2) SCALED 28
.	07240	LOGEF 5366557053	07543	53665 57053	
.	07241	5557247242	07544	55572 47242	1
.	07242	5733156444	07545	57331 56444	2
.	07243	6074650576	07546	60746 50576	3
.	07244	6225723447	07547	62257 23447	4
.	07245	6347732466	07550	63477 32466	5
.	07246	6463606732	07551	64636 06732	6
.	07247	6572323037	07552	65723 23037	7
.	07250	LOGEK 3600000000	07553	36000 00000	I EQ 0 IN K(I) EQ15/(8+I) SCAL ED 28
.	07251	3252525253	07554	32525 25253	1
.	07252	3000000000	07555	30000 00000	2
.	07253	2564272135	07556	25642 72135	3
.	07254	2400000000	07557	24000 00000	4
.	07255	2235423542	07560	22354 23542	5
.	07256	2111111111	07561	21111 11111	6
.	07257	2000000000	07562	20000 00000	7
.	07260	LOGES 0002300014	07563	00023 00014	UPPER HALF
.	07261	0002600135	07564	00026 00135	SHIFT CONSTANTS
.	07262	0003101343	07565	00031 01343	LOWER HALF
.	07263	0003413426	07566	00034 13426	CHAR RANGE
.	07264	LOGEM ENT B5=17D	07567	12500 00021	
.	07265	JP LOGE1A	07570	61000 07473	
.	07266	STR A=W(SAVE1)	07571	15030 07577	
.	07267	ENT A=59D	07572	11000 00073	
.	07270	SUB A=B5	07573	21005 00000	
.	07271	STR A=W(COUNT)	07574	15030 07600	
.	07272	ENT A=W(SAVE)	07575	11030 07577	
.	07273	JP LOGE1A+3	07576	61000 07476	
.	07274	SAVE RESERVE 1	07577	00000 00000	
.	07275	COUNT RESERVE 1	07600	00000 00000	
.	07276	SIN ENTRY	07601	61000 00000	
.	07277	ENT A=L(B4)	07602	11014 00000	
.	07300	COM A=37767*YMORE	07603	04700 37767	TEST EXPONENT LES 2EXP-10
.	07301	JP \$+5	07604	61000 07611	NO
.	07302	STR A=L(B6)	07605	15016 00000	SET SIN(X) EQ X
.	07303	ENT A=W(B4+1)	07606	11034 00001	
.	07304	STR A=W(B6+1)	07607	15036 00001	
.	07305	EXIT	07610	61010 07601	
.	07306	COM A=40034*YMORE	07611	04700 40034	
.	07307	JP \$*STOP	07612	61400 07612	EXPONENT GEO 2EXP27
.	07310	CL L(SINCOS2+1)	07613	16010 07626	

CARDS	L1 ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	07311	ENT A=W(1+B4)	07614	11034	00001		
.	07312 SINCOS1	STR A=W(SINCOS20)*APOS	07615	15630	07706		ARG IN SINCOS20
.	07313	CP A=ANOT	07616	15540	00000		
.	07314	JP SINCOS7+1*AZERO	07617	60400	07674		
.	07315	ENT Q=40033	07620	10000	40033		
.	07316	SUB Q=L(B41)	07621	27014	00000		
.	07317	STR Q=L(SINCOS2)	07622	14010	07625		
.	07320	ENT Q=A	07623	10070	00000		\$ARG\$ TO Q
.	07321	MUL W(SINCOS10)	07624	22030	07677		\$ARG\$ TIMES 2/PI IN AQ
.	07322 SINCOS2	RSH AQ=0	07625	03000	00000		QTREV IN AQ AT B30
.	07323	ADO A=0	07626	20000	00000		AOD 1 IF COSINE
.	07324	SEL CL=X77774	07627	52040	77774		
.	07325	ENT B7=A	07630	12770	00000		QUADRANT TO B7
.	07326	RSH AQ=1	07631	03000	00001		FRAC IN Q AT B29
.	07327	JP \$+1+B7	07632	61007	07633		
.	07330	JP \$+3	07633	61000	07636		QUADRANT I
.	07331	CP Q=SKIP	07634	14100	00000		QUADRANT II
.	07332	CP Q	07635	14000	00000		QUADRANT III
.	07333	ENT A=W(SINCOS20)*APOS	07636	11630	07706		QUADRANT IV, ARG TO A
.	07334	CP Q	07637	14000	00000		-FRAC IF ARG NEGATIVE
.	07335	STR Q=W(SINCOS20)	07640	14030	07706		STORE X EQ + OR - FRAC AT B29
.	07336	MUL W(SINCOS20)	07641	22030	07706		Y EQ X**2 IN AQ AT B58
.	07337	RSH AQ=29D	07642	03000	00035		Y IN Q AT B29
.	07340	STR Q=W(SINCOS20+11)	07643	14030	07707		
.	07341	ENT B7*3	07644	12700	00003		
.	07342	ENT Q=W(SINCOS11+4)	07645	10030	07705		KSUB9 IN Q AT B32
.	07343	MUL W(SINCOS20+1)	07646	22030	07707		Y TIMES POLY
.	07344	ENT Q=A	07647	10070	00000		TO Q
.	07345	ADD Q=W(SINCOS11+B71)	07650	26037	07701		POLY EQ POLY+KSUBI
.	07346	BJP B7*\$-3	07651	72700	07646		
.	07347	MUL W(SINCOS20)	07652	22030	07706		X*POLY IN AQ AT B57
.	07350	JP SINCOS6*ANEG	07653	60700	07661		
.	07351	CL L(SINCOS6+6)	07654	16010	07667		
.	07352	RPT 320	07655	70000	00040		
.	07353	LSH AQ=1*ANEG	07656	07700	00001		
.	07354	JP SINCOS7	07657	61000	07673		SIN(X) EQ 0
.	07355	JP \$+5	07660	61000	07665		
.	07356 SINCOS6	CL CPL(\$+6)	07661	16050	07667		
.	07357	RPT 320	07662	70000	00040		
.	07360	LSH AQ=1*APOS	07663	07600	00001		
.	07361	JP SINCOS7	07664	61000	07673		SIN(X) EQ 0
.	07362	ENT Q=37743+B7	07665	10007	37743		
.	07363	STR Q=W(B6)	07666	14036	00000		
.	07364	ENT Q=0	07667	10000	00000		PUT PROPER SIGN IN Q
.	07365	LSH AQ=58D	07670	07000	00072		SIN(X) IN A
.	07366	STR A=W(1+B61)	07671	15036	00001		
.	07367	EXIT	07672	61010	07601		
.	07370 SINCOS7	CL A	07673	11000	00000		SIN(X) EQ 0
.	07371	CL W(B6)	07674	16036	00000		
.	07372	CL W(1+B6)	07675	16036	00001		
.	07373	EXIT	07676	61010	07601		
.	07374 SINCOS10	2427630155	07677	24276	30155		2/PI AT B29

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 BELTP PONTON#7/1/65

CARDS	LI ID LABEL	TA STATEMENT	LOC	F	JKB	Y	NOTES
.	07375	1000000000	07700	10000	00000		1.0 AT B27
.	07376 SINCOS11	3110375522	07701	31103	75522		K1 AT B28
.	07377	5325041750	07702	53250	41750		K3 AT B29
.	07400	0506321276	07703	05063	21276		K5 AT B30
.	07401	7731554634	07704	77315	54634		K7 AT B31
.	07402	0002366574	07705	00023	66574		K9 AT B32
.	07403 SINCOS20	0	07706	00000	00000		X HERE AT B29
.	07404	0	07707	00000	00000		Y EQ X**2 AT B29
.	07405 COS	ENTRY	07710	61000	00000		
.	07406	ENT Q=L(COS)	07711	10010	07710		
.	07407	STR Q=L(SIN)	07712	14010	07601		SET EXIT ADDRESS
.	07410	ENT A=L(B4)	07713	11014	00000		
.	07411	COM A=37764*YLESS	07714	04600	37764		TEST EXPONENT GTR 2EXP-13
.	07412	JP SINCOSB	07715	61000	07727		NO, SET COS(X) EQ 1.0
.	07413	COM A=40034*YMORE	07716	04700	40034		TEST EXPONENT TOO LARGE
.	07414	JP \$*STOP	07717	61400	07717		YES
.	07415	ENT A=1	07720	11000	00001		
.	07416	STR A=L(SINCOS2+1)	07721	15010	07626		
.	07417	ENT A=W(1*B4)*APOS	07722	11634	00001		
.	07420	CP A=AZERO	07723	15440	00000		\$ARG\$ IN A
.	07421	JP SINCOS1=ANOT	07724	60500	07615		
.	07422	ENT Q=A	07725	10070	00000		
.	07423	JP SINCOS1	07726	61000	07615		
.	07424 SINCOSB	ENT A=40001	07727	11000	40001		COS(X) EQ 1.0
.	07425	STR A=W(B6)	07730	15036	00000		
.	07426	ENT A=W(SINCOS10+1)	07731	11030	07700		
.	07427	STR A=W(B6+1)	07732	15036	00001		
.	07430	EXIT	07733	61010	07710		
			07734	37777	77777		

END OF LISTING

..... SPURT OUTPUT NO. 211

BELTP		PONTON=7/1/65			
LABEL	LOC	LABEL	LOC	LABEL	LOC
A\$\$\$\$\$1111	07734	A\$\$\$\$\$1112	07030	A\$\$\$\$\$1113	07024
A2	06173	AA	05426	ACOS	07375
ACOS1	07414	ACQAZIM	63071	ACQELEV	63075
ACQUI	63427	ACTUALTIME	63142	ADDFL	07064
ADD	06325	ADSCN	63416	AFRR	07060
AERR1	07020	AERR2	07040	AESCN	63417
ALNGOFFSET	63517	ALP1	04332	ALP10	04430
ALP2	04416	ALP3	04424	ALP4	04425
ALP5	04426	ALP6	04427	ALP7	04431
ALP8	04446	ALP9	04457	ALPERR	04452
ALPERR2	04461	ALPH	05460	ALPH1COS	05610
ALPH1SIN	05576	ALPH2COS	05612	ALPH2SIN	05600
ALPH3COS	05614	ALPH3SIN	05602	ALPH4COS	05616
ALPH4SIN	05604	ALPHA	04325	ALPHAGNEW	04730
ALPHASW	05702	ALPHR	05460	ALPHB1	05767
ALPHCOS	05606	ALPHDIFF	06067	ALPHC	05717
ALPHR	05723	ALPHRCOS	05640	ALPHRSIN	05636
ALPHSIN	05574	ALPTAN	05620	ANGCONV	06126
AQR	06450	ARCOFAZIM	63524	ARCOFDEC	63526
ARCOFELEV	63522	ARCOFRA	63530	ASIN	07171
ASIN1	07213	ASIN2	07255	ASIN3	07261
ASIN4	07340	ASIN5	07347	ASINK	07357
ASINP	07366	ASINQ	07372	ASTRODEC	63106
ASTRORA	63105	ASTRB4	04777	ASTRB5	05000
ASTRB6	05001	ASTRB7	05002	ATAN	06647
ATANI	06655	ATAN2	06667	ATAN3	06710
ATANS	06721	AUPEREQUAT	63341	AZELOTIME	63532
AZELBXSCAN	63500	AZIM	63053	AZIMOFFSET	63512
AZIMOUT	64000	AZIMOVER	63325	AZIMADD	63442
AZIMIN	75000	AZMTHSCAN	63501	BODYSIZE	63462
BONE	06152	B1234X	02011	B1234XYZ	02007
BANGLE	06150	BANGLEX	06153	BCON1	05312
BCON2	05326	BCONVERT	05306	BDAY	05474
BDAY1	06232	BDAYNOW	05476	BEL2PI	06165
BEL2PI1	06140	BELCOS	06240	BELC5	00000
BELDIFF	06236	BELDR	05753	BELDU	01057
BELDV	01011	BELDV84	01064	BELDV85	01065
BELDV86	01066	BELDV87	01067	BELDVERR	01071
BELM	05735	BELPIXX	06175	BELPROD	06242
BELQUOT	06246	BELSTOR1	06250	BELSTOR2	06252
BELSUM	06244	BELTCAN	00002	BELTC2	00644
BELTC3	00430	BELTCB1	00633	BELTCB4	00634
BELTCB5	00635	BELTCB6	00636	BELTCB7	00637
BELTCB7X	00640	BELTCC	00531	BELTCCERR	00515
BELTCERR	00761	BELTCSW	00766	BELCTAB	00770
BELCTABA	00774	BELTEM	06157	BELTEMSW	01000
BELTJUMP	00622	BELTP	00000	BLASTOFF	63146
BRANGE	04463	BRE1	05360	BRE2	05374
BRESTORE	05355	BSELSW	05701	COCON	63414
CON60	06146	CONVERTIME	63135	CORCT	63420
COS	07710	COSORIENT	63065	COSA2	04646

..... SPURT OUTPUT NO. 211

BELTP		PONTON*7/1/65			
LABEL	LOC	LABEL	LOC	LABEL	LOC
COSA3	04647	COSA4	04650	COSA5	04651
COSA6	04652	COSAERR	04640	COSAERR22	04657
COSALF	04556	COSAZEL	63070	COSCHI	05660
COSCHI2	05775	COUNT	07600	CAZIM	63060
CCHICON	00617	CELBODY	63113	CELCOMPGM	63424
CELEV	63061	CELTIME	63133	CHCOR	63422
CHE270	03150	CHI	05773	CHPAR	63431
CRANGE	63057	CRSSOFFSET	63516	CURJULDAY	05514
CURJULDAYF	05516	DOMEGA	05436	DOPPOUT	66000
DOPPADD	63444	DALPHA	01203	DALPHAB4	01246
DALPHAB5	01247	DALPHAB6	01250	DALPHAB7	01251
DALPHAERR	01253	DATOA	01364	DATOALPHA	01454
DATDDEC	01440	DATODY	01430	DATOE	01370
DATOERRA	01470	DATOERRMA	01735	DATOI	01374
DATOK	01444	DATOLONG	01460	DATOLZERD	01450
DATDMD	01424	DATOMESA	01464	DATOMESB	01466
DATORAM	01410	DATORAMDOT	01414	DATOSCHED	01434
DATOTBASE	01420	DATOW	01400	DATOWDOT	01404
DATA01	01265	DATA02	01277	DATA03	01307
DATAD4	01322	DATA05	01325	DATA06	01330
DATA07	01335	DATA08	01340	DATA09	01342
DATA10	01344	DATA11	01354	DATA99	01763
DATAA	01472	DATAALPHA	01566	DATADDEC	01551
DATADY	01531	DATAE	01475	DATAI	01500
DATATN	01255	DATAX	01555	DATALONG	01572
DATALZERO	01561	DATAMO	01524	DATAMESA	01750
DATAMESB	01756	DATANALYZE	63425	DATARAM	01512
DATARAMOOT	01515	DATASAME	01271	DATASCHED	01537
DATASCHEDA	01733	DATATBASE	01520	DATAX	01503
DATAWDOT	01506	DATIA	01577	DATIALPHA	01717
DATIOEC	01675	DATIOY	01665	DATIE	01605
DATII	01613	DATIK	01703	DATILONG	01725
DATILZERO	01711	DATIMO	01657	DATIRAM	01635
DATIRAMDOT	01643	DATISCHEO	01673	DATITBASE	01651
DATIW	01621	DATIWDOT	01627	DAY	63150
DOELT	05751	DEC	63003	DECOFFSET	63515
DECOOT	63010	DECLIN	04661	DECLINSCAN	63505
DECT	05452	DELALPH	05755	DELDELTA	01143
OELDELTA4	01174	DELDELTA5	01175	DELDELTA6	01176
OELOELTAB7	01177	DELOELTAER	01201	DELTA	05452
DELTA1COS	05564	DELTA1SIN	05552	DELTA2COS	05566
DELTA2SIN	05554	DELTA3COS	05570	DELTA3SIN	05556
OELTA4COS	05572	DELTA4SIN	05560	DELTA4TEE	63316
OELTB	05452	DELTA1	05771	DELTA2COS	05562
DELTR	05721	DELTRCOS	05644	DELTR4SIN	05642
DELTA1SIN	05550	DELTA1SIN2	05763	DELTA1SINPOS	05664
DIV	06406	DLLB	05715	DRAM	05442
ORANGE	01073	DRANGE4	01134	DRANGE5	01135
DRANGE6	01136	DRANGE7	01137	DRANGERR	01141
DSECONDS	63141	DU	05747	DUMSECTTG	63154
OV	05745	DVOFL	07072	DYDMP	63421

..... SPURT OUTPUT NO. 211

BELTP		PONTON*7/1/65			
LABEL	LOC	LABEL	LOC	LABEL	LOC
DYPRMO	06177	DYPRYR	06213	EE	05430
EE2	06047	EE2M1	06051	EECOS	05534
EESIN	05536	FFP	06303	ELEV	63054
ELEVOFFSET	63513	ELEVOUT	65000	ELEVADD	63443
FLEVIN	76000	ELVTNSCAN	63502	EQUATOR	63323
ERCON	06171	ERR	07055	ERR10	07107
ERR11	07074	ERR12	07075	ERR13	07077
ERR14	07100	ERR15	07102	ERR16	07103
ERR16A	07105	ERR17	07110	ERR2	07141
ERR20	07112	ERR21	07114	ERR22	07116
ERR23	07120	ERR24	07122	ERR25	07124
ERR26	07126	ERR27	07130	ERR3	07142
ERR30	07152	ERR31	07154	ERR32	07156
ERR33	07160	ERR34	07162	ERR35	07164
ERR4	07144	ERR40	07132	ERR5	07145
ERR6	07147	ERR7	07150	ESTSHIFTED	63143
EXP	06727	EXP1	06737	EXP10	07006
EXP2	06744	EXP3	06747	EXP4	06751
EXP5	06763	EXP6	06772	EXP7	07003
EXPNAME	63350	FACTOR1	06025	FACTOR10	06041
FACTOR11	06043	FACTOR11X	06077	FACTOR12	06045
FACTOR2	06027	FACTOR3	06031	FACTOR4	06033
FACTOR5	06035	FACTOR6	06037	FIRSTELEV	63104
FIRSTTHRU	63153	FIXLONG	03652	FIXLONGI	03610
FIXLAT	02320	FIXLATI	01764	FIXRA	03060
FIXRA1	02751	FIXRATE	02552	FIXRATI	02376
FLATTENING	63337	FLTOFX	06504	FLTOFX1	06516
FLTOFX2	06521	FLTONE	06136	FLTBDAY	05500
FLTDIFF	05512	FLTFOUR	06144	FLTNDAY	05502
FLTPT	06266	FLTSECDIFF	05510	FLTTWO	06142
FLTWO	06142	FP1	06275	FP4	06276
FP5	06277	FP6	06300	FP7	06301
FPSTOP	07053	FRAMECON	06105	FRAMEFLTPT	06107
FRAMESIZE	63101	FREQUENCY	63317	FXINST	06117
FXINST1	06120	FXLGI	03740	FXLGIXT	03644
FXLGXT	03744	FXLTI	02355	FXLTI1	02111
FXLTI2	02275	FXLTIXT	02312	FXLTXT	02370
FXQUAD1	03432	FXQUAD2	03451	FXQUAD3	03355
FXQUAD4	03374	FXRADN	03557	FXRADNX	03571
FXRADNY	03600	FXRAI4	03023	FXRAIXT	03052
FXRAX1	03236	FXRAX14	03406	FXRAX15	03416
FXRAX2	03530	FXRAX36	03331	FXRAX37	03341
FXRAXERR	03607	FXRAXT	03563	FXRAY12	03423
FXRAY34	03346	FXRT1	02612	FXRT12X	02633
FXRT2	02637	FXRT20	02667	FXRT3	02674
FXRT4	02737	FXRT4XX	02724	FXRTIXT	02544
FXRTXT	02743	FXSWITCH	03441	FXSWITCH2	03364
FXTOFL	06474	GOON	03046	GOTLL	02070
GAM1COS	05646	GAMITEMP	06001	GAM2COS	05652
GAM2TEMP	06003	GAM3COS	05654	GAM4COS	05656
GAMCOS	05650	GEOCENLAT	63322	GEODETLAT	63321

..... SPURT OUTPUT NO. 211

BELTP		PONTON*7/1/65			
LABEL	LOC	LABEL	LOC	LABEL	LOC
GETLL	02062	GLR	06161	GM	06167
GMK	06061	GMTMODU24	63145	GMTSHIFTED	63144
GTEMP1	06005	GTEMP2	06007	HOLDNOHOLD	63511
HOURLMINUTE	63137	HOURLREG	63151	HEIGHT	63326
HERE	07203	HFPI	06150	ID10RADIO	66777
ID11RADIO	67776	ID12RADIO	67777	ID13RADIO	70775
ID14RADIO	70776	ID15RADIO	71776	ID16RADIO	71777
ID17RADIO	72776	ID18RADIO	72777	ID19RADIO	73776
ID1CELCOR	63000	ID1ENTPNT	63410	ID1RADCOR	63050
ID1RADIO	63440	ID1RECRD	63210	ID1SYSENT	77576
ID1SYSNAM	77676	ID1SYSPAR	63310	ID1TIME	63130
ID20RADIO	73777	ID21RADIO	74776	ID22RADIO	74777
ID23RADIO	75776	ID24RADIO	75777	ID25RADIO	76775
ID26RADIO	76776	ID2CELCOR	63001	ID2ENTPNT	63411
ID2RADCOR	63051	ID2RADIO	63441	ID2RECRD	63211
ID2SYSENT	77577	ID2SYSNAM	77677	ID2SYSPAR	63311
ID2TIME	63131	ID3RADIO	63776	ID4RADIO	63777
ID5RADIO	64776	ID6RADIO	64777	ID7RADIO	65776
ID8RADIO	65777	ID9RADIO	66776	II	05432
IICOS	05542	IICHE270	03220	IIDECOM	02021
IIDECOM1	02025	IIDELTDIFF	06011	IILESS	03167
IISIN	05540	IISIN2	05670	IISINPOS	05666
IISWITCH	05676	INAZIMADD	63446	INELEVADD	63447
INTER	63413	INTERAZIM	72000	INTERCOM	63426
INTERDOPP	74000	INTERELEV	73000	INTERLCKSW	63460
INTERRANGE	76777	JULDAY064	06125	KK	05454
KKCM	06075	KKNCALC	06055	KMPERNM	63342
KNCAL	06053	KRECI P	06057	KYBRDLLEVEL	63110
LOGE	07420	LOGE1	07454	LOGE1A	07473
LOGE2	07511	LOGE3	07525	LOGEA	07535
LOGEF	07543	LOGEK	07553	LOGEM	07567
LOGER	07531	LOGES	07563	LONG	05462
LONGITUDE	63320	LAMDB	05462	LAMDR	05765
LAT1	04146	LAT11	04274	LAT12	04275
LAT13	04276	LAT14	04277	LAT15	04300
LAT1PI	04305	LAT1PI1	04311	LAT2	04036
LAT21	04127	LAT22	04130	LAT23	04131
LAT24	04132	LAT25	04133	LAT2PI	04140
LATEM	05704	LERR	07134	LL	05707
LL1	05456	LLICOS	05632	LL1LAST	05711
LL1SIN	05624	LL2COS	05634	LL2LAST	05713
LL2SIN	05626	LL4	06254	LLCOS	05630
LLL	05777	LLMINUS	06101	LLSIN	05622
LLSIN2	05672	LSPERAU	63336	LZERO	05456
MOD1	04005	MOD2	04006	MOD2PI	03752
MOD3	04010	MOD4	04014	MOD5	03765
MOD6	04024	MOD81	03777	MOD84	04000
MOD85	04001	MOD86	04002	MOD87	04003
MODNORM	03775	MODNUM	06256	MILAST	05737
M2LAST	05741	MAINSWITCH	63334	MCPFILLER	71000
MCPGM	63412	MEGALAST	05761	MILLSTNADD	63451

..... SPURT OUTPUT NO. 211

BELTP		PONTON*7/1/65			
LABEL	LOC	LABEL	LOC	LABEL	LOC
MINREG	63152	MLOFL	07070	MPL	06374
MSFREQ	63332	MTR	06360	MTR1	06361
NCODE	05703	NEG	06441	VIL	00000
NMBELDR	06063	NMCON	06134	NMPERAU	63340
NN	05743	NSTART	00303	VSTIME	05506
NTIME1	05504	NUMPT	05700	NUMRAN	06163
POLE	63324	POS	06343	POW14	07170
PERIODAZIM	63523	PERIODDEC	63525	PERIODELEV	63521
PERIODRA	63527	PI	06175	PLOTP	63436
PLANP	63434	PP	06065	PREVIUSTM	63461
PRLOG	63423	PTCON	06123	PTS1	05017
PTS11	05221	PTS11X	05217	PTS15	05210
PTS2	05037	PTS3	05107	PTS9X	05252
PTS9XX	05257	PTS9XXX	05267	PTSB1	05276
PTSB2	05277	PTSB3	05300	PTSB4	05301
PTSB5	05302	PTSB6	05303	PTSB7	05304
PTSEL	05004	PTSERR	05275	PTSNORM	05273
PTTEM	06013	PUNCH	06531	QUAD12	03377
QUADL34	03322	ROTATEAEBX	63507	ROTATERADN	63506
ROTATERDBX	63510	RA	63002	RAOFFSET	63514
RADOT	63007	RADARMODE	63312	RADCBXSCAN	63503
RADECOTIME	63531	RADIODEC	63541	RADIOMETER	63102
RADIORA	63540	RADIUS	63006	RADIUSDOT	63011
RAGREENCON	06121	RAM	05727	RAMCOS	05546
RAMCHECK	06103	RAM1270	06073	RAM190	06071
RAMLAST	05757	RAMSIN	05544	RAN1	04535
RAN2	04536	RAN3	04537	RAN4	04540
RAN5	04502	RAN6	04541	RANERR	04546
RANERR24	04554	RANGE	63052	RANGEOUT	70777
RANGEADD	63445	RANGEB	05731	RANGEDOT	63062
RARAMO	03503	RARAM180	03454	RASCTNSCAN	63504
RDTR	63430	RDXXX	63433	RECORDSIZE	63112
RECAZIM	67000	RECELEV	70000	RECFILE	63212
RECRD	63415	RECRDSWTCH	63155	RELEASESW	63156
RR	05731	RZERO	06552	SOMEGA	05434
SAVE	07577	SAZIM	63055	SBOFL	07066
SCELTIME	63134	SCHDSW	05425	SCHICON	00613
SCL	06426	SCL1	06466	SCL2	06467
SDEC	63005	SECONDS	63140	SELEV	63056
SET	06472	SFT	06353	SFT1	06354
SIDERFLTPT	06111	SIDERLAMDR	06113	SIDERTIME	63012
SIN	07601	SINORIENT	63064	SINALF	04317
SINAZEL	63066	SINCOS1	07615	SINCOS10	07677
SINCOS11	07701	SINCOS2	07625	SINCOS20	07706
SINCOS6	07661	SINCOS7	07673	SINCOSR	07727
SINCHI	05662	SIND1	04672	SIND10	04725
SIND2	04705	SIND3	04716	SIND4	04720
SIND5	04721	SIND6	04722	SIND7	04723
SIND8	04724	SIND9	04727	SINDECLIN	04666
SKIP	63331	SOR	06555	SQR1	06626
SQR2	06633	SOR3	06637	SQR4	06643

..... SPURT OUTPUT NO. 211

BELTP		PONTON#7/1/65			
LABEL	LOC	LABEL	LOC	LABEL	LOC
SQRT1	06624	SRA	63004	SRADTIME	63136
SRAM	05440	STARTREAD	07166	SUB	06364
SYNCTIMING	63542	SYSCOMREG1	63452	SYSCOMREG2	63453
SYSCOMREG3	63454	SYSCOMREG4	63455	SYSCOMREG5	63456
SYSCOMREG6	63457	SYSENTRIES	77600	SYSNAMES	77700
SYSTART1	00671	SYSTAT1	63313	SYSTAT2	63314
SYSTATD	63315	TCONV	06130	THFPI	06153
THRHF	06155	TIME	05466	TIME1	05470
TIME1LAST	05520	TIME2LAST	05522	TIMECORR	63107
TIMEDIFF	05524	TIMEMODE	63103	TIMEP	63435
TIMETOHOLD	63520	TIMETEMP	05472	TIMTP	06234
TLAST	05520	TRUERANGE	63063	TRUETIME	63132
TTWPI	06165	TTYSTATUS	63111	TWOSECDOP	63017
TXX	06015	TXX1	06017	TYPE	06527
UNDEARTHSW	05677	VDAY	05450	VELOFLIGHT	63335
VIZDEC1	63014	VIZDEC2	63016	VIZRA1	63013
VIZRA2	63015	VMONTH	05446	VV	05733
VVCOS	05532	VVSIN	05530	VYEAR	05444
WONE	06136	WONETH	06132	WFORD	63432
WFADD	63450	WFFREQ	63333	WS	06533
WS1	06534	WS10	06543	WS11	06544
WS12	06545	WS13	06546	WS14	06547
WS15	06550	WS16	06551	WS2	06535
WS3	06536	WS4	06537	WS5	06540
WS6	06541	WS7	06542	YEARMONTH	63147
YRTRAN	63327	YY	06021	ZOMEGA	05725
ZERO	06463	ZRTRAN	63330	ZZ	06023

END OF LISTING

..... SPURT OUTPUT NO. 212

BELTP		PONTON*7/1/65			
LABEL	LOC	LABEL	LOC	LABEL	LOC
NIL	00000	BELTP	00000	BELC5	00000
BELTC0N	00002	NSTART	00303	BELTC3	00430
BELTCCERR	00515	BELTCC	00531	SCHIC0N	00613
CCHIC0N	00617	BELTJUMP	00622	BELTCB1	00633
BELTCB4	00634	BELTCB5	00635	BELTCB6	00636
BELTCB7	00637	BELTCB7X	00640	BELTC2	00644
SYSTART1	00671	BELTCERR	00761	BELTCSW	00766
BELTCTAB	00770	BELTCTABA	00774	BELTEMSW	01000
BELOV	01011	BELOU	01057	BELOVB4	01064
BELOVB5	01065	BELOVB6	01066	BELOVB7	01067
BELOVERR	01071	DRANGE	01073	DRANGEB4	01134
DRANGEB5	01135	DRANGEB6	01136	DRANGEB7	01137
DRANGERR	01141	DELDELTA	01143	DELDELTAB4	01174
DELDELTAB5	01175	DELDELTAB6	01176	DELDELTAB7	01177
DELDELTAER	01201	DALPHA	01203	DALPHAB4	01246
DALPHAB5	01247	DALPHAB6	01250	DALPHAB7	01251
DALPHAERR	01253	DATAIN	01255	DATA01	01265
DATASAME	01271	DATA02	01277	DATA03	01307
DATA04	01322	DATA05	01325	DATA06	01330
DATA07	01335	DATA08	01340	DATA09	01342
DATA10	01344	DATA11	01354	DATOA	01364
DATOE	01370	DATOI	01374	DATOW	01400
DATOWDOT	01404	DATORAM	01410	DATORAMDOT	01414
DATOTBASE	01420	DATOMO	01424	DATODY	01430
DATOSCHED	01434	DATODEC	01440	DATOK	01444
DATOLZERO	01450	DATOALPHA	01454	DATOLONG	01460
DATOMESA	01464	DATOMESB	01466	DATDERRA	01470
DATAA	01472	DATAE	01475	DATAI	01500
DATAW	01503	DATAWDOT	01506	DATARAM	01512
DATARAMDOT	01515	DATATBASE	01520	DATAMO	01524
DATADY	01531	DATASCHED	01537	DATADEC	01551
DATAK	01555	DATALZERO	01561	DATAALPHA	01566
DATALONG	01572	DATIA	01577	DATIE	01605
DATII	01613	DATIW	01621	DATIWDOT	01627
DATIRAM	01635	DATIRAMDOT	01643	DATITBASE	01651
DATIMO	01657	DATIDY	01665	DATISCHED	01673
DATIDEC	01675	DATIK	01703	DATILZERO	01711
DATIALPHA	01717	DATILONG	01725	DATASCHEDA	01733
DATOERRMA	01735	DATAMESA	01750	DATAMESB	01756
DATA99	01763	FIXLATI	01764	B1234XYZ	02007
B1234X	02011	IIDECOM	02021	IIDECOM1	02025
GETLL	02062	GOTLL	02070	FXLTI1	02111
FXLTI2	02275	FXLTIXT	02312	FIXLAT	02320
FXLTI	02355	FXLTXT	02370	FIXRATI	02376
FXRTIXT	02544	FIXRATE	02552	FXRT1	02612
FXRT12X	02633	FXRT2	02637	FXRT20	02667
FXRT3	02674	FXRT4XX	02724	FXRT4	02737
FXRTXT	02743	FIXRAI	02751	FXRAI4	03023
GOON	03046	FXRAIXT	03052	FIXRA	03060
CHE270	03150	IILESS	03167	IICHE270	03220
FXRAX1	03236	QUADL34	03322	FXRAX36	03331

..... SPURT OUTPUT NO. 212

BELTP		PONTON•7/1/65			
LABEL	LOC	LABEL	LOC	LABEL	LOC
FXRAX37	03341	FXRAY34	03346	FXQUAD3	03355
FXSWITCH2	03364	FXQUAD4	03374	QUADL12	03377
FXRAX14	03406	FXRAX15	03416	FXRAY12	03423
FXQUAD1	03432	FXSWITCH	03441	FXQUAD2	03451
RARAM180	03454	RARAMO	03503	FXRAX2	03530
FXRADN	03557	FXRAXT	03563	FXRADNX	03571
FXRADNY	03600	FXRAXERR	03607	FIXLONGI	03610
FXLGIXT	03644	FIXLONG	03652	FXLG1	03740
FXLGXT	03744	MOD2PI	03752	MOD5	03765
MODNORM	03775	MODB1	03777	MODB4	04000
MODB5	04001	MODB6	04002	MODB7	04003
MOD1	04005	MOD2	04006	MOD3	04010
MOD4	04014	MOD6	04024	LAT2	04036
LAT21	04127	LAT22	04130	LAT23	04131
LAT24	04132	LAT25	04133	LAT2PI	04140
LAT1	04146	LAT11	04274	LAT12	04275
LAT13	04276	LAT14	04277	LAT15	04300
LAT1PI	04305	LAT1PI1	04311	SINALF	04317
ALPHA	04325	ALP1	04332	ALP2	04416
ALP3	04424	ALP4	04425	ALP5	04426
ALP6	04427	ALP10	04430	ALP7	04431
ALPB	04446	ALPERR	04452	ALP9	04457
ALPERR2	04461	BRANGE	04463	RAN5	04502
RAN1	04535	RAN2	04536	RAN3	04537
RAN4	04540	RAN6	04541	RANERR	04546
RANERR24	04554	COSALF	04556	COSAERR	04640
COSA2	04646	COSA3	04647	COSA4	04650
COSA5	04651	COSA6	04652	COSAERR22	04657
DECLIN	04661	SINDECLIN	04666	SIND1	04672
SIND2	04705	SIND3	04716	SIND4	04720
SIND5	04721	SIND6	04722	SIND7	04723
SIND8	04724	SIND10	04725	SIND9	04727
ALPHAGNEW	04730	ASTRB4	04777	ASTRB5	05000
ASTRB6	05001	ASTRB7	05002	PTSEL	05004
PTS1	05017	PTS2	05037	PTS3	05107
PTS15	05210	PTS11X	05217	PTS11	05221
PTS9X	05252	PTS9XX	05257	PTS9XXX	05267
PTSNORM	05273	PTSERR	05275	PTSB1	05276
PTSB2	05277	PTSB3	05300	PTSB4	05301
PTSB5	05302	PTSB6	05303	PTSB7	05304
BCONVERT	05306	BCON1	05312	BCON2	05326
BRESTORE	05355	BRE1	05360	BRE2	05374
SCHDSW	05425	AA	05426	EE	05430
II	05432	SOMEGA	05434	DOMEGA	05436
SRAM	05440	DRAM	05442	VYEAR	05444
VMONTH	05446	VDAY	05450	DECT	05452
DELT	05452	DELT8	05452	KK	05454
LZERO	05456	LLI	05456	ALPHB	05460
ALPH	05460	LAMDB	05462	LONG	05462
TIME	05466	TIME1	05470	TIMETEMP	05472
BDAY	05474	BDAYNOW	05476	FLTBDAY	05500

..... SPURT OUTPUT NO. 212

BELTP		PONTON*7/1/65			
LABEL	LOC	LABEL	LOC	LABEL	LOC
FLTNDAY	05502	NSTIME	05504	NSTIME	05506
FLTSECDIFF	05510	FLTDIFF	05512	CURJULDAY	05514
CURJULDAYF	05516	TLAST	05520	TIME1LAST	05520
TIME2LAST	05522	TIMEDIFF	05524	VVSIN	05530
VVCOS	05532	EECOS	05534	EESIN	05536
IISIN	05540	IICOS	05542	RAMSIN	05544
RAMCOS	05546	DELT SIN	05550	DELT1SIN	05552
DELT2SIN	05554	DELT3SIN	05556	DELT4SIN	05560
DELT COS	05562	DELT1COS	05564	DELT2COS	05566
DELT3COS	05570	DELT4COS	05572	ALPHSIN	05574
ALPH1SIN	05576	ALPH2SIN	05600	ALPH3SIN	05602
ALPH4SIN	05604	ALPHCOS	05606	ALPH1COS	05610
ALPH2COS	05612	ALPH3COS	05614	ALPH4COS	05616
ALPHTAN	05620	LLSIN	05622	LL1SIN	05624
LL2SIN	05626	LLCOS	05630	LL1COS	05632
LL2COS	05634	ALPHRSIN	05636	ALPHRCOS	05640
DELTRSIN	05642	DELTRCOS	05644	GAM1COS	05646
GAMCOS	05650	GAM2COS	05652	GAM3COS	05654
GAM4COS	05656	COSCHI	05660	SINCHI	05662
DELTSINPOS	05664	IISINPOS	05666	IISIN2	05670
LLSIN2	05672	IISWITCH	05676	UNDEARTH SW	05677
NUMPT	05700	BSELSW	05701	ALPHASW	05702
NCODE	05703	LATEM	05704	LL	05707
LL1LAST	05711	LL2LAST	05713	DLLB	05715
ALPHG	05717	DELTR	05721	ALPHR	05723
ZOMEGA	05725	RAM	05727	RR	05731
RANGEB	05731	VV	05733	BELM	05735
MILAST	05737	M2LAST	05741	NN	05743
DV	05745	DU	05747	DDELT	05751
RELDR	05753	DELALPH	05755	RAMLAST	05757
MEGALAST	05761	DELTSIN2	05763	LAMDR	05765
ALPHB1	05767	DELTB1	05771	CHI	05773
COSCHI2	05775	LLL	05777	GAM1TEMP	06001
GAM2TEMP	06003	GTEMP1	06005	GTEMP2	06007
IIDELTDIFF	06011	PTTEM	06013	TXX	06015
TXX1	06017	YY	06021	ZZ	06023
FACTOR1	06025	FACTOR2	06027	FACTOR3	06031
FACTOR4	06033	FACTOR5	06035	FACTOR6	06037
FACTOR10	06041	FACTOR11	06043	FACTOR12	06045
EE2	06047	EE2M1	06051	KNCAL	06053
KKNCALC	06055	KRECI P	06057	GMK	06061
NMBELDR	06063	PP	06065	ALPHDIFF	06067
RAM190	06071	RAMI270	06073	KKCM	06075
FACTOR11X	06077	LLMINUS	06101	RAMCHECK	06103
FRAMECON	06105	FRAMEFLTPT	06107	SIDERFLTPT	06111
SIDERLAMDR	06113	FXINST	06117	FXINST1	06120
RAGREENCON	06121	PTCON	06123	JULDAY064	06125
ANGCONV	06126	TCONV	06130	WONETH	06132
NMCON	06134	WONE	06136	FLTONE	06136
BEL2P11	06140	FLTTWO	06142	FLTWO	06142
FLTFOUR	06144	CON60	06146	BANGLE	06150

..... SPURT OUTPUT NO. 212

BELTP		PONTON#7/1/65			
LABEL	LOC	LABEL	LOC	LABEL	LOC
HFPI	06150	BONE	06152	THFPI	06153
BANGLEX	06153	THRFH	06155	BELTEM	06157
GLR	06161	NUMRAN	06163	TTWPI	06165
BEL2PI	06165	GM	06167	ERCON	06171
A2	06173	PI	06175	BELPIXX	06175
DYPRMO	06177	DYPRYR	06213	BDAY1	06232
TIMTP	06234	BELDIFF	06236	BELCOS	06240
BELPROD	06242	BELSUM	06244	BELQUOT	06246
BELSTOR1	06250	BELSTOR2	06252	LL4	06254
MODNUM	06256	FLTPT	06266	FP1	06275
FP4	06276	FP5	06277	FP6	06300
FP7	06301	EFP	06303	ADD	06325
POS	06343	SFT	06353	SFT1	06354
MTR	06360	MTR1	06361	SUB	06364
MPL	06374	DIV	06406	SCL	06426
NEG	06441	AQR	06450	ZERO	06463
SCL1	06466	SCL2	06467	SET	06472
FXTOFL	06474	FLTAFX	06504	FLTAFX1	06516
FLTAFX2	06521	TYPE	06527	PUNCH	06531
WS	06533	WS1	06534	WS2	06535
WS3	06536	WS4	06537	WS5	06540
WS6	06541	WS7	06542	WS10	06543
WS11	06544	WS12	06545	WS13	06546
WS14	06547	WS15	06550	WS16	06551
RZERO	06552	SQR	06555	SQRT1	06624
SQR1	06626	SQR2	06633	SQR3	06637
SQR4	06643	ATAN	06647	ATAN1	06655
ATAN2	06667	ATAN3	06710	ATANS	06721
EXP	06727	EXP1	06737	EXP2	06744
EXP3	06747	EXP4	06751	EXP5	06763
EXP6	06772	EXP7	07003	EXP10	07006
AERR1	07020	A\$\$\$\$\$1113	07024	A\$\$\$\$\$1112	07030
AERR2	07040	FPSTOP	07053	ERR	07055
AERR	07060	ADOFI	07064	SBOFL	07066
MLOFL	07070	DVOFL	07072	ERR11	07074
ERR12	07075	ERR13	07077	ERR14	07100
ERR15	07102	ERR16	07103	ERR16A	07105
ERR10	07107	ERR17	07110	ERR20	07112
ERR21	07114	ERR22	07116	ERR23	07120
ERR24	07122	ERR25	07124	ERR26	07126
ERR27	07130	ERR40	07132	LERR	07134
ERR2	07141	ERR3	07142	ERR4	07144
ERR5	07145	ERR6	07147	ERR7	07150
ERR30	07152	ERR31	07154	ERR32	07156
ERR33	07160	ERR34	07162	ERR35	07164
STARTREAD	07166	POW14	07170	ASIN	07171
HERE	07203	ASIN1	07213	ASIN2	07255
ASIN3	07261	ASIN4	07340	ASIN5	07347
ASINK	07357	ASINP	07366	ASINQ	07372
ACOS	07375	ACOS1	07414	LOGE	07420
LOGE1	07454	LOGE1A	07473	LOGE2	07511

..... SPURT OUTPUT NO. 212

BELTP		PONTON#771/65			
LABEL	LOC	LABEL	LOC	LABEL	LOC
LOGE3	07525	LOGER	07531	LOGEA	07535
LOGEF	07543	LOGEK	07553	LOGES	07563
LOGEM	07567	SAVE	07577	COUNT	07600
SIN	07601	SINCOS1	07615	SINCOS2	07625
SINCOS6	07661	SINCOS7	07673	SINCOS10	07677
SINCOS11	07701	SINCOS20	07706	COS	07710
SINCOS8	07727	AS\$\$\$\$1111	07734	ID1CEL COR	63000
ID2CEL COR	63001	RA	63002	DEC	63003
SRA	63004	SDEC	63005	RADIUS	63006
RADOT	63007	DECDOT	63010	RADIUSDOT	63011
SIDERTIME	63012	VIZRA1	63013	VIZDEC1	63014
VIZRA2	63015	VIZDEC2	63016	TWOSECDOP	63017
ID1RADCOR	63050	ID2RADCOR	63051	RANGE	63052
AZIM	63053	ELEV	63054	SAZIM	63055
SELEV	63056	CRANGE	63057	CAZIM	63060
CELEV	63061	RANGEDOT	63062	TRUERANGE	63063
SINORIENT	63064	COSORIENT	63065	SINAZEL	63066
COSAZEL	63070	ACQAZIM	63071	ACQELEV	63075
FRAMESIZE	63101	RADIOMETER	63102	TIMEMODE	63103
FIRSTELEV	63104	ASTRORA	63105	ASTRODEC	63106
TIMECORR	63107	KYBRDLEVEL	63110	TTYSTATUS	63111
RECORDSIZE	63112	CELBODY	63113	ID1TIME	63130
ID2TIME	63131	TRUETIME	63132	CELTIME	63133
SCELTIME	63134	CONVERTIME	63135	SRADTIME	63136
HOURLMINUTE	63137	SECONDS	63140	DSECONDS	63141
ACTUALTIME	63142	ESTSHIFTED	63143	GMTSHIFTED	63144
GMTMODU24	63145	BLASTOFF	63146	YEARMONTH	63147
DAY	63150	HOURLREG	63151	MINREG	63152
FIRSTTHRU	63153	DUMSECTTG	63154	RECRDSWTCH	63155
RELEASESW	63156	ID1RECRD	63210	ID2RECRD	63211
RECFILE	63212	ID1SYSPAR	63310	ID2SYSPAR	63311
RADARMODE	63312	SYSTAT1	63313	SYSTAT2	63314
SYSTATD	63315	DELTATEE	63316	FREQUENCY	63317
LONGITUDE	63320	GEODETLAT	63321	GEOCENLAT	63322
EQUATOR	63323	POLE	63324	AZIMOVER	63325
HEIGHT	63326	YRTRAN	63327	ZRTRAN	63330
SKIP	63331	MSFREQ	63332	WFFREQ	63333
MAINSWITCH	63334	VELOFLIGHT	63335	LSPERAU	63336
FLATTENING	63337	NMPERAU	63340	AUPEREQUAT	63341
KMPERNM	63342	EXPNAME	63350	ID1ENTPNT	63410
ID2ENTPNT	63411	MCPGM	63412	INTER	63413
COCON	63414	RECRD	63415	ADSCN	63416
AESCN	63417	CORCT	63420	DYDMP	63421
CHCOR	63422	PLOG	63423	CELCOMPGM	63424
DATANALYZE	63425	INTERCOM	63426	ACQUI	63427
RDMPTR	63430	CHPAR	63431	WFORD	63432
RDXXX	63433	PLANP	63434	TIMEP	63435
PLOTP	63436	ID1RADIO	63440	ID2RADIO	63441
AZIMADD	63442	ELEVADD	63443	DOPPAD	63444
RANGEADD	63445	INAZIMADD	63446	INELEVADD	63447
WFADD	63450	MILLSTNADD	63451	SYSKOMREG1	63452

..... SPURT OUTPUT NO. 212

BELTP		PONTON*7/1/65			
LABEL	LOC	LABEL	LOC	LABEL	LOC
SYSCOMREG2	63453	SYSCOMREG3	63454	SYSCOMREG4	63455
SYSCOMREG5	63456	SYSCOMREG6	63457	INTERLCKSW	63460
PREVIOUSM	63461	BODYSIZE	63462	AZELBXSCAN	63500
AZMTHSCAN	63501	ELVTNSCAN	63502	RADCBXSCAN	63503
RASCTNSCAN	63504	DECLINSCAN	63505	ROTATERAON	63506
ROTATEAEBX	63507	ROTATERDBX	63510	HOLDNOHOLD	63511
AZIMOFFSET	63512	ELEVOFFSET	63513	RAOFFSET	63514
DECOFFSET	63515	CRSSOFFSET	63516	ALNGOFFSET	63517
TIMETOHOLD	63520	PERIODELEV	63521	ARCOFELEV	63522
PERIODAZIM	63523	ARCOFAZIM	63524	PERIODDEC	63525
ARCOFDEC	63526	PERIODRA	63527	ARCOFRA	63530
RADECOTIME	63531	AZELOTIME	63532	RADIORA	63540
RADIODEC	63541	SYNCTIMING	63542	ID3RADIO	63776
ID4RADIO	63777	AZIMOUT	64000	ID5RADIO	64776
ID6RADIO	64777	ELEVOUT	65000	ID7RADIO	65776
ID8RADIO	65777	DOPPOUT	66000	ID9RADIO	66776
ID10RADIO	66777	RECAZIM	67000	ID11RADIO	67776
ID12RADIO	67777	RECELEV	70000	ID13RADIO	70775
ID14RADIO	70776	RANGEOUT	70777	MCPFILLER	71000
ID15RADIO	71776	ID16RADIO	71777	INTERAZIM	72000
ID17RADIO	72776	ID18RADIO	72777	INTERELEV	73000
ID19RADIO	73776	ID20RAOIO	73777	INTERDOPP	74000
ID21RAOIO	74776	ID22RADIO	74777	AZIMIN	75000
ID23RAOIO	75776	ID24RADIO	75777	ELEVIN	76000
ID25RADIO	76775	ID26RADIO	76776	INTERRANGE	76777
ID1SYSENT	77576	ID2SYSENT	77577	SYSENTRIES	77600
ID1SYSNAM	77676	ID2SYSNAM	77677	SYSNAMES	77700

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1st Ind (ESRL)

29 November 1965

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