

FHWA L-LINE PROGRAM

Developed by Chris Conrad

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Loading The Program



- Infrared
 - On The Source Calculator

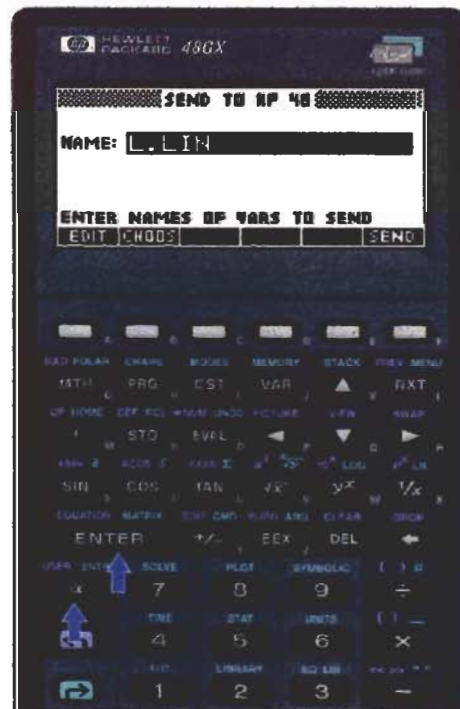


1. Press  then press 



2. Select "Send to HP 48"
press 

3. Press  twice and type
L.LIN as the name and press




– On The Destination Calculator

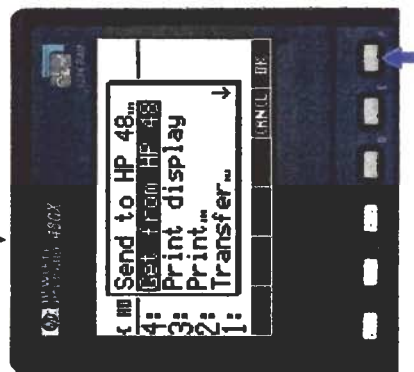
4. Press  then press 

5. Select "Get from HP 48" and press 



6. Line up the arrows at the top of each calculator

7. Source Calculator
Press 

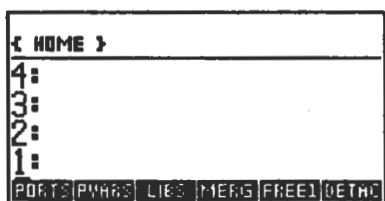


8. Destination Calculator
Press 

• RAM Card

1. With the calculator off.
Insert RAM card into port 1 or 2.

Press **ON**



3. Press **PORTS**



2. Press **LIBRARY** then press

LIBRARY

4. Then select appropriate port (1 or 2).

5. Press **L.LIN**

6. Press **α** twice

7. Type in L.LIN

8. Press **STO**



- **Serial Interface**
– **Set Parameters**

1. Connect HP-48 to the PC with serial interface cord.



2. Press  then Press 

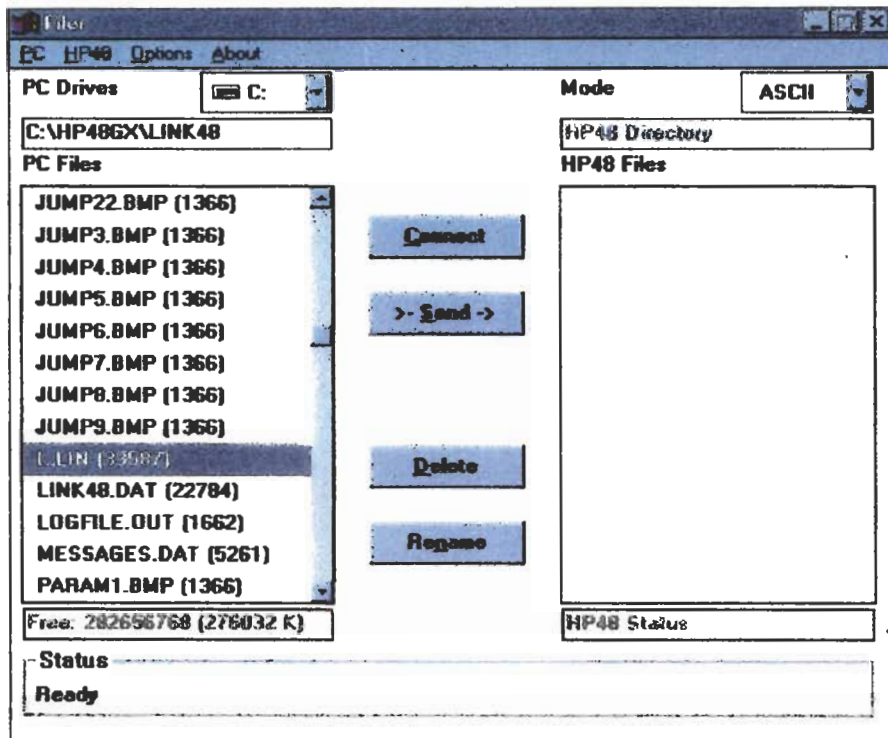


3. Select "Transfer" and press 

4. Set the parameters as shown and press 



5. To put the calculator in server mode press  then press 



- **On the Computer**

6. Open the FILER program.

7. Click on 

8. In the "PC Files" window select L.LIN.

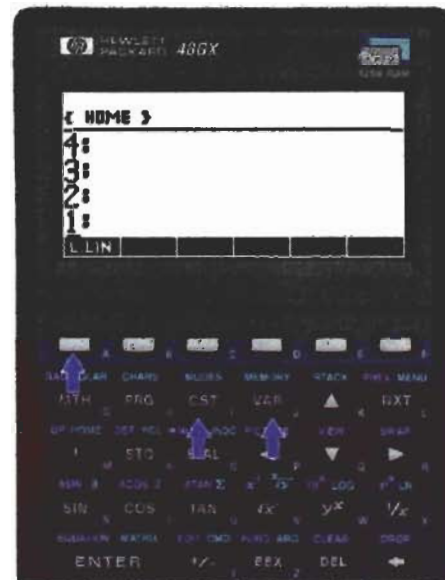
9. Click on 

Starting The Program

1. Press **VAR**

2. Press **L.LIN**

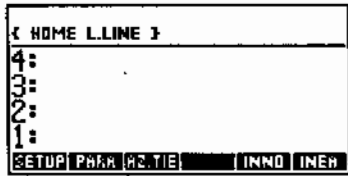
3. Press **CST**



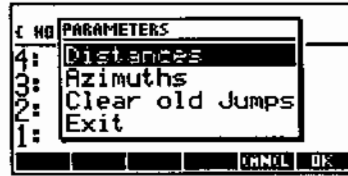
Input - Output Parameters

- **Setting Parameters**

- The program can accept and compute distances in feet or meters.
- The program can accept and compute azimuths from north or south.
- The program can use bearings for input only, directions will be north azimuths.
- Bearings must be entered this way : Quadrant Angle
i.e. SE 65.23321



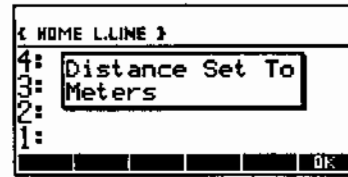
1. Press **PARA**



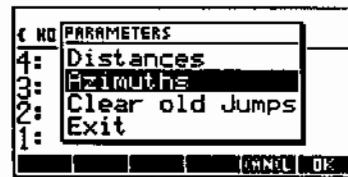
2. Select "Distances" and press **OK**



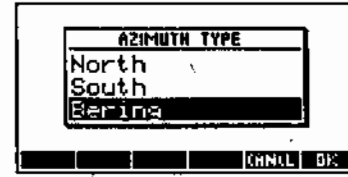
3. Select distance type and press **OK**



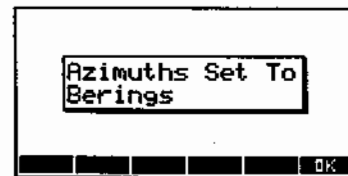
4. Press **OK**



5. Select "Azimuths" and press **OK**



6. Select azimuth type and press **OK**

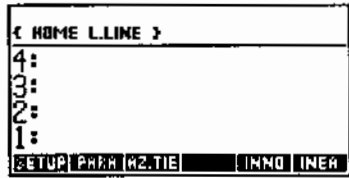


7. Press **OK**



8. Select "Exit" and press **OK**

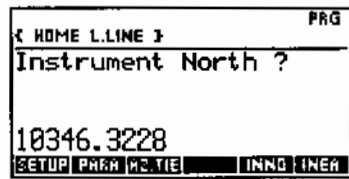
Instrument Coordinates



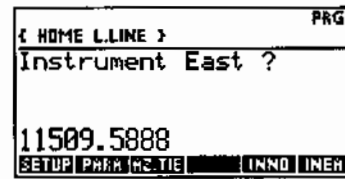
1. Press **SETUP**



2. Press **CP**



3. Input northing and press **ENTER**



4. Input easting and press **ENTER**

Computing A Backsight

```
{ HOME L.LINE }
4:
3:
2:
1:
SETUP PRGM RE.TIE INNO INER
```

1. Press **AZ TIE**

```
{ HOME L.LINE } PRG
Easting ?
11521.9528
SETUP PRGM RE.TIE INNO INER
```

3. Input easting and
press **ENTER**

```
{ HOME L.LINE } PRG
Northing ?
10340.8221
SETUP PRGM RE.TIE INNO INER
```

2. Input northing and
press **ENTER**

```
∠ = 113°59'02.81
DIST = 13.532
NORTH = 10340.8221
EAST = 11521.9528
SETUP PRGM RE.TIE INNO INER
```

Azimuth, distance and
coordinates are displayed

Line Data

- **The calculator can store five different segments of line data at one time**
 - **Tangent**
 - **Spiral - In**
 - **Curve**
 - **Spiral - Out**
 - **Compound Spiral (Middle Spiral)**

• Tangent Data

{ HOME L.LINE }	
4:	
3:	
2:	
1:	
TAN SP-IN CURVE SP-OUT CPSP JUMP	

1. Press **TAN**

{ HOME L.LINE TANGENT }	
4:	
3:	
2:	
1:	
DATA PARA SETUP & TIE JUMP	

2. Press **DATA**

{ HOME L.LINE TANGENT }		PRG
PT Station ?		
0		
DATA PARA SETUP & TIE		JUMP

3. Input beginning tangent station (PT, PST, POT) and press **ENTER**

{ HOME L.LINE TANGENT }		PRG
PT. North Coord. ?		
10284.4430		
DATA PARA SETUP & TIE		JUMP

4. Input the north coordinate and press **ENTER**

{ HOME L.LINE TANGENT }		PRG
PT. East Coord. ?		
11218.8270		
DATA PARA SETUP & TIE		JUMP

5. Input east coordinate and press **ENTER**

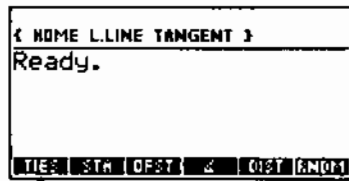
{ HOME L.LINE TANGENT }		PRG
Tangent Azimuth ?		
NE 74.10007561		
DATA PARA SETUP & TIE		JUMP

6. Input the tangent azimuth (AZ) and press **ENTER**

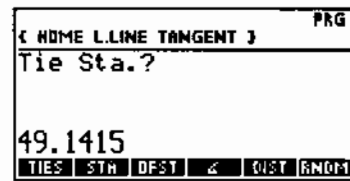
{ HOME L.LINE TANGENT }		PRG
End of Tangent Sta ?		
49.1415		
DATA PARA SETUP & TIE		JUMP

7. Input the station at the end of the tangent (PC, PS, POT) and press **ENTER**

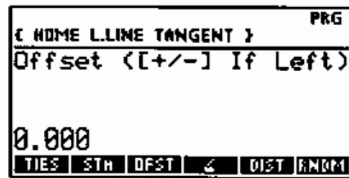
• Tangent Check-In



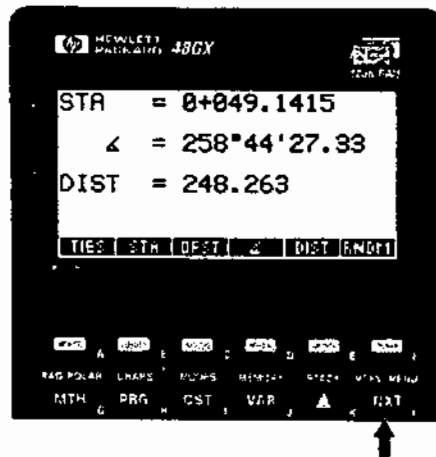
1. Press **TIES**



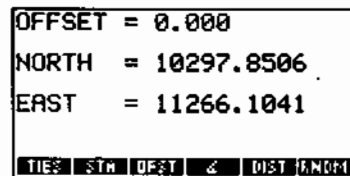
2. Input the end station of the tangent (PS, PC, POT) and press **ENTER**



3. Input the offset and press **ENTER**



4. Station, azimuth and distance are displayed.
Press **NXT** to display offset and coordinates.



5. Check coordinates with the Geopack Line Data.

6. To clear the display press **ENTER**

• Spiral-In Data

{ HOME L.LINE TANGENT }	
4:	
3:	
2:	
1:	248.2627
TIES STA DFST < DIST ANDM	

1. Press **NXT**

{ HOME L.LINE TANGENT }	
4:	
3:	
2:	
1:	
UPDATE SP-IN CURVE SP-OU CPSP EXIT	

2. Press **SP-IN**

{ HOME L.LINE SPIRAL.IN }	
4:	
3:	
2:	
1:	
TIES STA DFST < DIST ANDM	

3. Press **NXT** twice

{ HOME L.LINE SPIRAL.IN }	
4:	
3:	
2:	
1:	
DATA PARA SETUP & TIE JUMP	

4. Press **DATA**

{ HOME L.LINE SPIRAL.IN } PRG	
PS Station ?	
49.1415	
DATA PARA SETUP & TIE JUMP	

5. Input the PS station at the beginning of the spiral and press **ENTER**

{ HOME L.LINE SPIRAL.IN } PRG	
PS North Coordinate ?	
10297.8506	
DATA PARA SETUP & TIE JUMP	

6. Input the north coordinate of the PS and press **ENTER**

{ HOME L.LINE SPIRAL.IN } PRG	
PS East Coordinate ?	
11266.1041	
DATA PARA SETUP & TIE JUMP	

7. Input the east coordinate of the PS and press **ENTER**

{ HOME L.LINE SPIRAL.IN } PRG	
Tangent Azimuth ?	
NE 74.10008	
DATA PARA SETUP & TIE JUMP	

8. Input the azimuth (AZ) from the tangent back and press **ENTER**


```
PRG
{ HOME L.LINE SPIRAL.IN }
Length of Spiral
50.0000
DATA PRG SETUP < TIE JUMP
```

9. Input the length of spiral (LS) and press **ENTER**

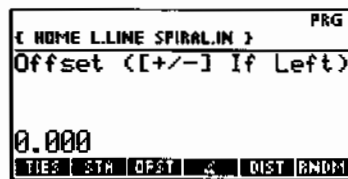
```
PRG
{ HOME L.LINE SPIRAL.IN }
Degree of Curve ?
( - IF left )
16.22128018
DATA PRG SETUP < TIE JUMP
```

10. Input the degree of curve (DC) of the curve ahead and press **ENTER**

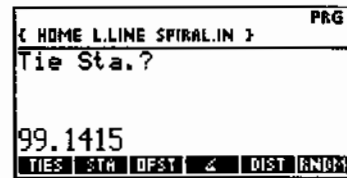
• Spiral Check-In



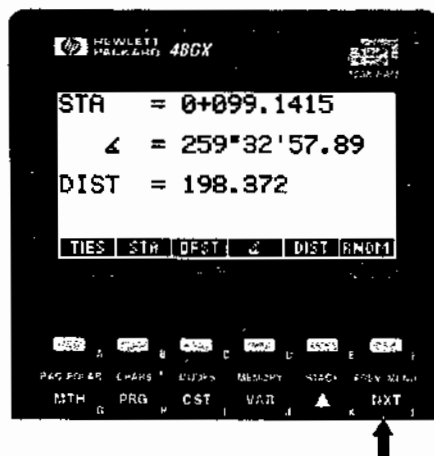
1. Press **TIES**



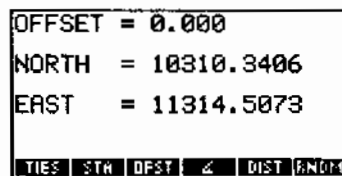
3. Input the offset and press **ENTER**



2. Input the end station of the spiral (PSC) and press **ENTER**



4. Station, azimuth and distance are displayed. Press **NXT** to display offset and coordinates.



5. Check coordinates with the Geopack Line Data.

6. To clear the display press **ENTER**

- **Curve Data**

- **After a spiral you must update the azimuth at the PSC by adding the spiral delta (SD).**
- **If your calculator is set to bearings you must convert it to an azimuth then add the spiral delta and convert it back to a bearing.**

• Adjusting the azimuth

```

< HOME L.LINE SPIRAL.IN >
3:
2:
1: 198.3722
74.10007561
DATE PRGM SETUP TIE JUMP
  
```

1. Type in the tangent azimuth from the tangent back and press **ENTER**

2. Press **TIME** **NXT**

```

< HOME L.LINE SPIRAL.IN >
3:
2: 198.3722
1: 74.1001
4.05332004
DATE DDHVS HMS+ HMS- HMS-
  
```

3. Type in the spiral delta (SD) from the spiral back then press **HMS+**



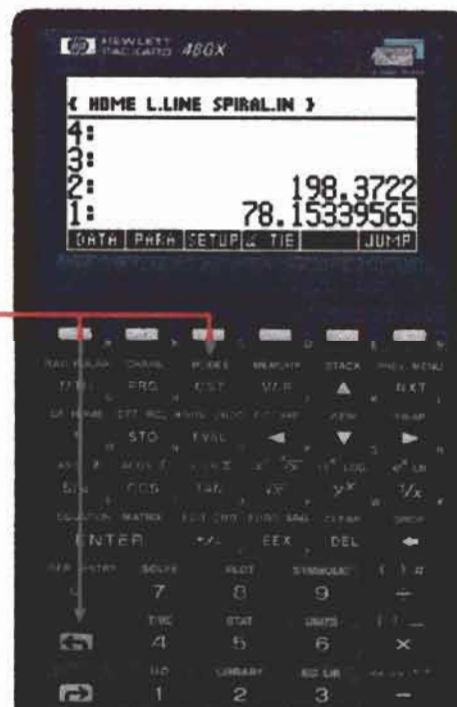
4. To see more digits

press **MODES**

5. Then press **FMT** **STD**

6. Write down the azimuth for later use

7. To return to program menu press **CST**



- A negative curve delta (CD) denotes a left curve. Do not enter (CD) as a negative value.**
- If the curve direction is left the degree of curve must be entered as negative.**

• Curve Data

```

< HOME L.LINE SPIRAL.IN >
4:
3:
2:
1: 198.3722
TIE: STR OFST < CURV (RNDM)
  
```

1. Press **NXT**

```

< HOME L.LINE CURVE >
4:
3:
2:
1: 198.3722
TIE: STR OFST < CURV (RNDM)
  
```

3. Press **NXT** twice

```

< HOME L.LINE SPIRAL.IN >
4:
3:
2:
1: 198.3722
UPDM: TAN CURVE SP-00 CASP EXIT
  
```

2. Press **CURVE**

```

< HOME L.LINE CURVE >
4:
3:
2:
1: 198.3722
DATA: PARA SETUP < TIE JUMP
  
```

4. Press **DATA**

```

< HOME L.LINE CURVE > PRG
PC Station ?
99.1415
DATA: PARA SETUP < TIE JUMP
  
```

5. Input the beginning station of the curve (PC, PSC) and press **ENTER**

```

< HOME L.LINE CURVE > PRG
PC North Coordinate ?
10310.3406
DATA: PARA SETUP < TIE JUMP
  
```

6. Input the north coordinate and press **ENTER**

```

< HOME L.LINE CURVE > PRG
PC East Coordinate ?
11314.5072
DATA: PARA SETUP < TIE JUMP
  
```

7. Input the east coordinate and press **ENTER**

```

< HOME L.LINE CURVE > PRG
Tangent Azimuth ?
NE 78.15339565
DATA: PARA SETUP < TIE JUMP
  
```

8. Input the azimuth (AZ) at the PSC and press **ENTER**

```
PRG
< HOME L.LINE CURVE >
Curve Delta ?
30.38531742
DATA PRK SETUP & TIE JUMP
```

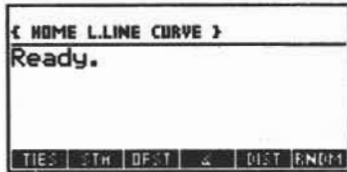
9. Input the curve delta (CD) as a positive and press

ENTER

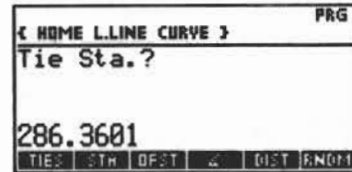
```
PRG
< HOME L.LINE CURVE >
Degree of Curve ?
( - If left )
16.22128018
DATA PRK SETUP & TIE JUMP
```

10. Input the degree of curve (DC) (- left, + right) and press **ENTER**

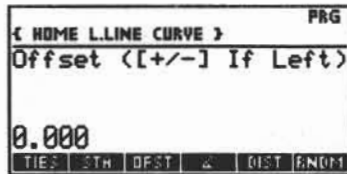
• Curve Check-In



1. Press **TIES**



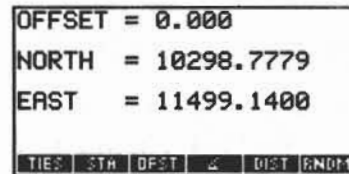
2. Input the end station of the curve (PCS_PT_PCC) and press **ENTER**



3. Input the offset and press **ENTER**



4. Station, azimuth and distance are displayed.
Press **NXT** to display offset and coordinates.



5. Check coordinates with the Geopack Line Data.

6. To clear the display press **ENTER**

• Spiral-Out Data

{ HOME L.LINE CURVE }	
4:	
3:	
2:	
1:	48.6795
TIES	STN DFST < DIST RNDM

1. Press **NXT**

{ HOME L.LINE CURVE }	
4:	
3:	
2:	
1:	48.6795
UPDRT TAN	SP-IN SP-OU CPSP EXIT

2. Press **SP-OU**

{ HOME L.LINE SPIRAL.OUT }	
4:	
3:	
2:	
1:	48.6795
TIES	STN DFST < DIST RNDM

3. Press **NXT** twice

{ HOME L.LINE SPIRAL.OUT }	
4:	
3:	
2:	
1:	48.6795
DATA PRM SETUP & TIE	JUMP

4. Press **DATA**

{ HOME L.LINE SPIRAL.OUT } PRG	
PST Station ?	
336.3601	
DATA	PRM SETUP & TIE JUMP

5. Input the PST station at the end of the spiral and press **ENTER**

{ HOME L.LINE SPIRAL.OUT } PRG	
PST North Coordinate	
10280.3467	
DATA	PRM SETUP & TIE JUMP

6. Input the north coordinate and press **ENTER**

{ HOME L.LINE SPIRAL.OUT } PRG	
PST East Coordinate	
11545.6068	
DATA	PRM SETUP & TIE JUMP

7. Input the east coordinate and press **ENTER**

{ HOME L.LINE SPIRAL.OUT } PRG	
Tangent Azimuth ?	
SE 66.59596688	
DATA	PRM SETUP & TIE JUMP

8. Input the azimuth (AZ) from the tangent ahead and press **ENTER**

```
PRG
< HOME L.LINE SPIRAL.OUT >
Length of Spiral
50
DATA PRGM SETUP < TIE JUMP
```

9. Input the length of spiral (LS) and press **ENTER**

```
PRG
< HOME L.LINE SPIRAL.OUT >
Degree of Curve ?
( - IF left )
16.22128018
DATA PRGM SETUP < TIE JUMP
```

10. Input the degree of curve (DC) of the curve back (left -, right +) and press **ENTER**

• Spiral Check-In

```

{ HOME L.LINE SPIRAL.OUT }
Ready
TIES  STA  DFST  Δ  DIST  RNDM
  
```

1. Press **TIES**

```

{ HOME L.LINE SPIRAL.OUT } PRG
Offset ([+/-] If Left)
0.000
TIES  STA  DFST  Δ  DIST  RNDM
  
```

3. Input the offset and press **ENTER**

```

{ HOME L.LINE SPIRAL.OUT } PRG
Tie Sta.?
286.3601
TIES  STA  DFST  Δ  DIST  RNDM
  
```

2. Input the beginning station of the spiral (PCS) and press **ENTER**



4. Station, azimuth and distance are displayed. Press **NXT** to display offset and coordinates.

```

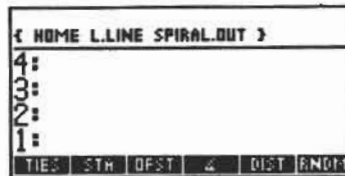
OFFSET = 0.000
NORTH = 10298.7779
EAST = 11499.1401
TIES  STA  DFST  Δ  DIST  RNDM
  
```

5. Check coordinates with the Geopack Line Data.

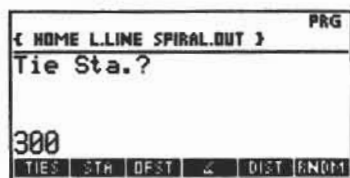
6. To clear the display press **ENTER**

Staking Centerline and Offsets

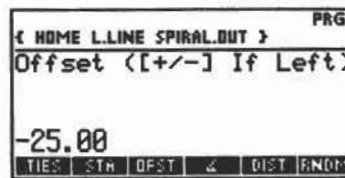
- Tie Stations



1. Press **TIES**



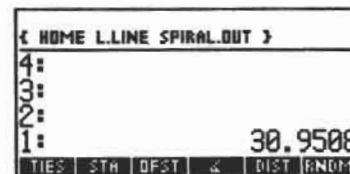
2. Input the station you want to set and press **ENTER**



3. Input the offset (left -, right +) and press **ENTER**



4. Station, azimuth and distance are displayed.



5. Set the azimuth in the instrument. Press **ENTER** to clear the display

Distance to the station is displayed in stack level 1

- Recalling Data

{ HOME L.LINE SPIRAL.OUT }					
4:					
3:					
2:					
1:				300000	
TIES	STW	OFST	◀	DIST	RNDM

↑
Tie Station - press **STA**

{ HOME L.LINE SPIRAL.OUT }					
4:					
3:					
2:					
1:				-25.00	
TIES	STW	OFST	◀	DIST	RNDM

↑
Offset - press **OFST**

{ HOME L.LINE SPIRAL.OUT }					
4:					
3:					
2:					
1:				30.95	
TIES	STW	OFST	◀	DIST	RNDM

↑
Distance - press **DIST**

{ HOME L.LINE SPIRAL.OUT }					
4:					
3:					
2:					
1:				158.3911	
TIES	STW	OFST	◀	DIST	RNDM

↑
Azimuth - press **◀**

• Random Tie Stations

```

{ HOME L.LINE SPIRAL.OUT }
4:
3:
2:
1:
TIES STH DFST ↓ DIST RNDM
    
```

1. Press **RNDM**



```

{ HOME L.LINE SPIRAL.OUT } PRG
Azimuth ?
157.270669
TIES STH DFST ↓ DIST RNDM
    
```

2. Input the azimuth measured to the station and press **ENTER**

```

{ HOME L.LINE SPIRAL.OUT } PRG
Distance ?
66.645
TIES STH DFST ↓ DIST RNDM
    
```

3. Input the distance measured to the station and press **ENTER**

```

HP HEWLETT PACKARD 48GX
STA = 0+325.0002
OFFSET = 0.000
NORTH = 10284.7723
EAST = 11535.1445
TIES STH DFST ↓ DIST RNDM
    
```

Station, Offset, and coordinates are displayed

To clear the display press **ENTER**

Updates

• Beginning Tangent

[HOME L.LINE TANGENT]	
4:	
3:	
2:	
1:	
DATA	PRGM SETUP < TIE JUMP

1. Press **DATA**

[HOME L.LINE TANGENT] PRG	
PT Station ?	
10000	
DATA	PRGM SETUP < TIE JUMP

2. Input beginning tangent station (PT, PST, POT) and press **ENTER**

[HOME L.LINE TANGENT] PRG	
PT. North Coord. ?	
9118.6480	
DATA	PRGM SETUP < TIE JUMP

3. Input the north coordinate and press **ENTER**

[HOME L.LINE TANGENT] PRG	
PT. East Coord. ?	
11117.9480	
DATA	PRGM SETUP < TIE JUMP

4. Input east coordinate and press **ENTER**

[HOME L.LINE TANGENT] PRG	
Tangent Azimuth ?	
NE 72.10263916	
DATA	PRGM SETUP < TIE JUMP

5. Input the tangent azimuth (AZ) and press **ENTER**

[HOME L.LINE TANGENT] PRG	
End of Tangent Sta ?	
10170.3441	
DATA	PRGM SETUP < TIE JUMP

6. Input the station at the end of the tangent (PC, PS, POT) and press **ENTER**

• Tangent Check-In

{ HOME L.LINE TANGENT }					
Ready.					
TIES	STN	OFST	Δ	DIST	RNDM

1. Press **TIES**

{ HOME L.LINE TANGENT } PRG					
Offset ([+/-] If Left)					
0.000					
TIES	STN	OFST	Δ	DIST	RNDM

3. Input the offset and press **ENTER**

{ HOME L.LINE TANGENT } PRG					
Tie Sta.?					
10170.3441					
TIES	STN	OFST	Δ	DIST	RNDM

2. Input the end station of the tangent (PS, PC, POT) and press **ENTER**



4. Station, azimuth and distance are displayed. Press **NXT** to display offset and coordinates.

OFFSET = 0.000					
NORTH = 9170.7950					
EAST = 11280.1140					
TIES	STN	OFST	Δ	DIST	RNDM

5. Check coordinates with the Geopack Line Data.

6. To clear the display press **ENTER**

• Tangent to Spiral

< HOME L.LINE TANGENT >				
4:				
3:				
2:				
1:			1,197.7163	
TIES STR DFST < DIST RNDM				

1. Press **NXT**

< HOME L.LINE TANGENT >				
4:				
3:				
2:				
1:			1,197.7163	
UPDAT SP-IN CURVE SP-OU CPSP EXIT				

2. Press **UPDAT**

Update ?				
NO YES				

3. Press **YES**

Into : Curve				
Spiral				
CURVE SPRL				

4. Press **SPRL**

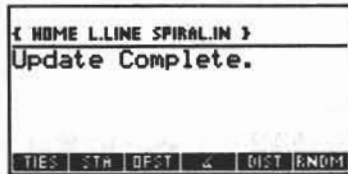
< HOME L.LINE SPIRAL.IN >				PRG
Degree of Curve ?				
(- If left)				
12.43566236				
TIES STR DFST < DIST RNDM				

5. Input degree of curve (DC) of the curve ahead (left -, right +) and press **ENTER**

< HOME L.LINE SPIRAL.IN >				PRG
Length of Spiral ?				
50				
TIES STR DFST < DIST RNDM				

6. Input length of spiral (LS) and press **ENTER**

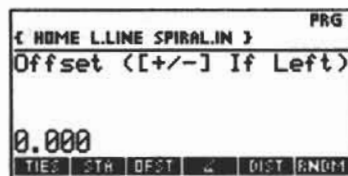
• Spiral Check-In



1. Press **TIES**



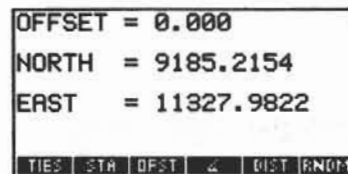
2. Input the station at the end of the spiral (PSC) and press **ENTER**



3. Input the offset and press **ENTER**



4. Station, azimuth and distance are displayed.
Press **NXT** to display offset and coordinates.



5. Check coordinates with the Geopack Line Data.

6. To clear the display press **ENTER**

• Spiral to Curve

```

{ HOME L.LINE SPIRAL.IN }
4:
3:
2:
1: 1,175.2240
TIES STA OFST 4 DIST RNDM
    
```

1. Press **NXT**

```

Update ?
NO YES
    
```

3. Press **YES**

```

{ HOME L.LINE SPIRAL.IN }
4:
3:
2:
1: 1,175.2240
UPDAT TAN CURVE SP-OU CPSP EXIT
    
```

2. Press **UPDAT**

```

{ HOME L.LINE CURVE } PRG
Curve Delta ?
12.17013225
DATA PARA SETUP 4 TIE JUMP
    
```

4. Enter curve delta (CD) and press **ENTER**

• Curve to Curve

```

{ HOME L.LINE CURVE }
Update Complete.
TIES STA OFST 4 DIST RNDM
    
```

1. Press **NXT**

```

Update ?
NO YES
    
```

3. Press **YES**

```

{ HOME L.LINE CURVE }
4:
3:
2:
1:
UPDAT TAN SP-IN SP-OU CPSP ENT
    
```

2. Press **UPDAT**

```

Into : Tangent
      Spiral
      Compound Curve
      Compound Spiral
TNGT SPAL CURVE CPSP
    
```

4. Press **CURVE**

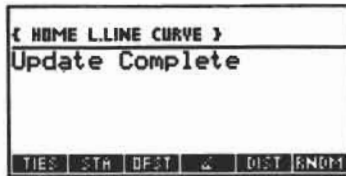
```
PRG
< HOME L.LINE CURVE >
Curve Delta ?
15.54013782
TIES STN OFST < DIST RNDM
```

5. Input curve delta (CD) and press **ENTER**

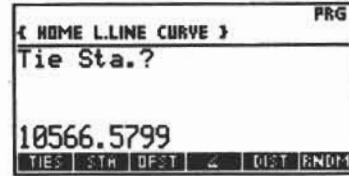
```
PRG
< HOME L.LINE CURVE >
Degree of Curve ?
< - IF left >
6.21585694
TIES STN OFST < DIST RNDM
```

6. Input degree of curve (DC) and press **ENTER**

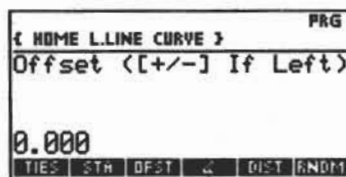
• Curve Check-In



1. Press **TIES**



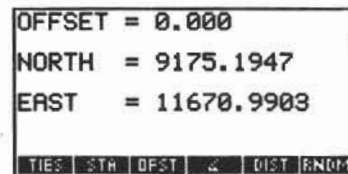
2. Input the end station of the curve (PCS, PT, PCC) and press **ENTER**



3. Input the offset and press **ENTER**



4. Station, azimuth and distance are displayed.
Press **NXT** to display offset and coordinates.



5. Check coordinates with the Geopack Line Data.

6. To clear the display press **ENTER**

• Curve to Spiral

[HOME L.LINE CURVE]	
4:	
3:	
2:	
1:	1,182.1978
TIES	STA DFST < DIST RNDM

1. Press **NXT**

[HOME L.LINE CURVE]	
4:	
3:	
2:	
1:	1,182.1978
UPDAT	TAN SP-IN SP-OU CPSP EXIT

2. Press **UPDAT**

Update ?	
NO	YES

3. Press **YES**

Into : Tangent	
Spiral	
Compound Curve	
Compound Spiral	
TNGT	SPRL
CURVE CPSP	

4. Press **SPRL**

[HOME L.LINE SPIRAL.OUT] PRG	
PST North Coordinate ?	
9158.4595	
DATA	PRGR SETUP < TIE
JUMP	

5. Input the north coordinate of the PST at the end of the spiral and press **ENTER**

[HOME L.LINE SPIRAL.OUT] PRG	
PST East Coordinate ?	
11733.7952	
TIES	STA DFST < DIST RNDM

6. Input the east coordinate of the PST at the end of the spiral and press **ENTER**

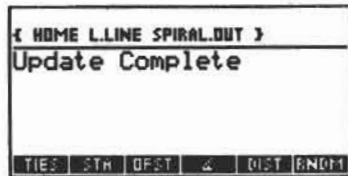
[HOME L.LINE SPIRAL.OUT] PRG	
Length of Spiral ?	
65	
TIES	STA DFST < DIST RNDM

7. Input the length of spiral (LS) and press **ENTER**

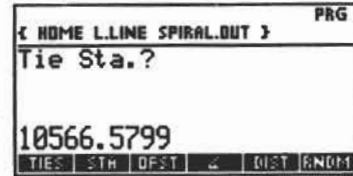
[HOME L.LINE SPIRAL.OUT] PRG	
Tangent Azimuth ?	
SE 74.23234805	
TIES	STA DFST < DIST RNDM

8. Input the azimuth (AZ) of the tangent ahead and press **ENTER**

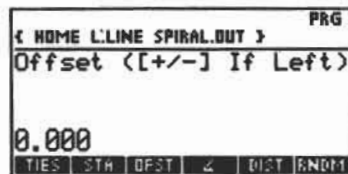
• Spiral Check-In



1. Press **TIES**



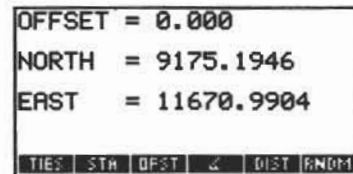
2. Input the beginning station of the spiral (PCS) and press **ENTER**



3. Input the offset and press **ENTER**



4. Station, azimuth and distance are displayed.
Press **NXT** to display offset and coordinates.



5. Check coordinates with the Geopack Line Data.

6. To clear the display press **ENTER**

• Spiral to Tangent

```

{ HOME L.LINE SPIRAL.OUT }
4:
3:
2:
1:          1,182.1978
TIES | STA | OFST |  | DIST | ENDM
  
```

1. Press **NXT**

```

{ HOME L.LINE SPIRAL.OUT }
4:
3:
2:
1:          1,182.1978
UPDAT | TAN | SP.IN | CURVE | CPSP | EXIT
  
```

2. Press **UPDAT**

```

Update ?
NO | YES
  
```

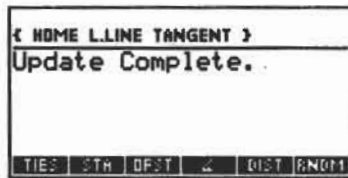
3. Press **YES**

```

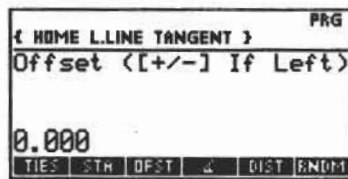
{ HOME L.LINE TANGENT } PRG
PC Station ?
10800.0466
DATA | PARA | SETUP | TIE | JUMP
  
```

4. Input the end station of the tangent and press **ENTER**

• Tangent Check-In



1. Press **TIES**



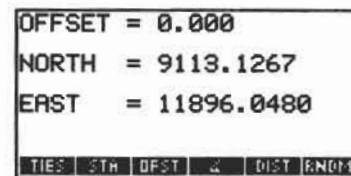
3. Input the offset and press **ENTER**



2. Input the end station of the tangent (PS, PC, POT) and press **ENTER**



4. Station, azimuth and distance are displayed.
Press **NXT** to display offset and coordinates.



5. Check coordinates with the Geopack Line Data.

6. To clear the display press **ENTER**

Jump Hubs

• Creating and Storing Jump Hubs

[HOME L.LINE TANGENT]	
4:	
3:	
2:	
1:	
TIES	STR OFST < DIST RNDM

1. Press **NXT** twice

[HOME L.LINE TANGENT]	
4:	
3:	
2:	
1:	
DATA	PARA SETUP < TIE JUMP

2. Press **JUMP** 

[HOME L.LINE] PRG	
Jump Hub ?	
100	
SETUP	PARA RZ.TIE INNO INER

3. Type in jump hub name then press **ENTER**

[HOME L.LINE] PRG	
Azimuth	
195.26321	
SETUP	PARA RZ.TIE INNO INER

4. Type in azimuth then press **ENTER**

[HOME L.LINE] PRG	
Distance ?	
35.350	
SETUP	PARA RZ.TIE INNO INER

5. Type in distance then press **ENTER**

[HOME L.LINE] PRG	
Elevation ?	
159.350	
SETUP	PARA RZ.TIE INNO INER

6. Type in the elevation of the instrument point then press **ENTER**

[HOME L.LINE] PRG	
Instrument HI ?	
1.596	
SETUP	PARA RZ.TIE INNO INER

7. Type in the instrument HI then press **ENTER**

[HOME L.LINE] PRG	
Elevation Diff. (+/-)?	
-4.216	
SETUP	PARA RZ.TIE INNO INER

8. Type in the elevation difference then press **ENTER**

```
PRG
{ HOME L.LINE }
Jump Hub HI ?
1.389
SETUP PRM HZ.TIE INNO INER
```

9. Type in the jump hub HI then press **ENTER**

```
NORTH = 10312.249
EAST  = 11500.176
ELEV. = 155.341
SETUP PRM HZ.TIE INNO INER
```

11. Press **ENTER** to clear the display.

```
JH - 100
∠ = 195°26'32.1
DIST = 35.35
SETUP PRM HZ.TIE INNO INER
```

10. The azimuth and distance are displayed. Press **NXT** to display the coordinates.

• Using Jump Hubs

```

{ HOME L.LINE TANGENT }
4:
3:
2:
1:
DATA PRG SETUP < TIE JUMP
  
```

1. Press **SETUP**

```

{ HOME L.LINE JHBS } PRG
Jump Hub ?
JH100
  
```

3. Press **JH100** then
press **ENTER**

```

Control Point
Jump Hub
CP JH
  
```

2. Press **JH**

```

{ HOME L.LINE TANGENT }
BS < = 15°26'32.10
DIST = 35.350
ELEV = 155.341
TIES STR OFST < DIST RNDM
  
```

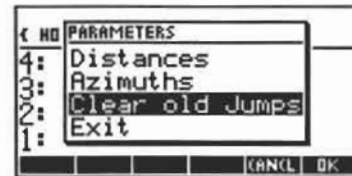
4. Backsight azimuth, distance and elevation are displayed.
Press **ENTER** to clear the display.

- **Deleting Jump Hubs**

**** WARNING : This will clear all stored jump hubs.**



1. Press **PARAM**



2. Select "Clear Old Jumps"
press **ENTER**