025920

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PROGRAM DESCRIPTION I

Program Title SURVEY PAC SUPPLEMENT - POINT STORAGE FOR TRAV. AND INTER.

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Program Description, Equations, Variables

GENERAL DESCRIPTION:

THE SURVEYING APPLICATIONS PAC PROVIDES A USEFUL TOOL FOR COORDINATE GEOMETRY PROBLEMS, HOWEVER IT IS LACKING ONE SIGNIFICANT FEATURE: A MEANS TO STORE AND RETRIEVE COORDINATE PAIRS. THE PURPOSE OF THIS PROGRAM IS TO FURNISH SUCH A CAPABILITY BY PROVIDING REVISED VERSIONS OF THE PROGRAMS TRAV AND INTER WHICH HAVE BEEN REVISED AND INTEGRATED WITH POINT STORAGE, MANIPULATION AND RECALL ROUTINES. ALSO INCLUDED ARE "HOUSEKEEPING" ROUTINES TO LIST SELECTED GROUPS OF POINTS, TO SAVE GROUPS OF POINTS TO MAGNETIC CARDS AND TO LOAD GROUPS

Necessary Accessories SURVEY PAC, 3 MEMORY MODULES (MIN.) OR QUAD MEMORY MODULE (PRINTER, CARD READER OPTIONAL).

Operating Limits and Warnings USER SHOULD BE FAMILIAR WITH THE OPERATING PROCEDURES AND CONVENTIONS OF THE SURVEY PAC.

Reference(s) SURVEYING PAC USERS MANUAL, Rev. B 1/80 OR current version.

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OF POINTS FROM MAGNETIC CARDS TO THE HP41 MEMORY.

PROGRAM FEATURES:

- TRAV ROUTINE PROVIDES SIMILAR CAPABILITIES AS THE SURVEY PAC PROGRAM TRAV WITH ADDED FEATURES THAT INCLUDE POINT STORAGE AND RECALL.
- INTER* ROUTINE PROVIDES SIMILAR CAPABILITIES AS THE SURVEY PAC PROGRAM INTER WITH ADDED FEATURES THAT INCLUDE POINT STORAGE AND RECALL.
- STP ROUTINE PROVIDES THE UTILITY COMMAND TO STORE COORDINATE PAIRS.
- RCP ROUTINE PROVIDES THE UTILITY COMMAND TO RECALL COORDINATE PAIRS.
- LISTP ROUTINE PROVIDES THE UTILITY COMMAND TO LIST GROUPS OF COORDINATE PAIRS (OR, IF A PRINTER IS ATTACHED, THE GROUP OF COORDINATE PAIRS WILL BE PRINTED).
- SAVE ROUTINE PROVIDES THE UTILITY COMMAND TO SAVE GROUPS OF COORDINATE PAIRS TO MAGNETIC CARDS.
- LOAD ROUTINE PROVIDES THE UTILITY COMMAND TO LOAD GROUPS OF COORDINATE PAIRS FROM MAGNETIC CARDS TO THE HP41's MEMORY REGISTERS.

NOTES ON LABEL USAGE

IN INSTANCES WHERE A LABEL IN A USER PROGRAM DUPLICATES A LABEL IN AN APPLICATIONS MODULE, THE USER LABEL TAKES PRIORITY IN THE HP41's OPERATING SYSTEM. THIS BEHAVIOR IS QUITE SIGNIFICANT TO THE PROPER OPERATION OF THIS PROGRAM

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AS IT ALLOWS THE SUBSTITUTION OF A USER ROUTINE FOR THE APPLICATIONS MODULE ROUTINE AND THE EFFECTIVE MASKING OF THE APPLICATIONS MODULE ROUTINE.

FOR INSTANCE, CONSIDER THE BEHAVIOR OF THE PROGRAM TRAV. LINE 18 OF THE APPLICATION PAC VERSION OF TRAV IS THE CLRG COMMAND. WHILE CLEARING OF ALL MEMORY REGISTERS WAS ENTIRELY APPROPRIATE TO THE APPLICATIONS PAC VERSION OF TRAV, IT IS WHOLLY CONTRARY TO OUR PURPOSES WHERE STORAGE OF COORDINATE PAIRS IS DESIRED. HOWEVER, BY GIVING THE USER MEMORY VERSION OF THE PROGRAM THE SAME LABEL AS THE APPLICATIONS PAC PROGRAM, THE APPLICATIONS PAC PROGRAM IS EFFECTIVELY MASKED AND EXECUTION OF TRAV WILL ALWAYS PROVIDE ACCESS TO THE USER MEMORY VERSION OF THE PROGRAM. NOTE THAT THE USER MEMORY VERSION COULD HAVE BEEN GIVEN ANY ARBITRARY NAME AND IT WOULD EXECUTE PROPERLY, HOWEVER AN ACCIDENTAL EXECUTION OF THE PROGRAM LABLE TRAV (APPLICATION PAC) WOULD WIPE-OUT ALL PREVIOUSLY STORED POINTS BY THE CLRG COMMAND ON LINE 18. THE USE OF DUPLICATE LABLES ELIMINATES THIS DISASTROUS POSSIBILITY.

ALSO, NOTE THAT THE SAME PROBLEM DOES NOT EXIST WITH THE INTERSECTION ROUTINE. THE APPLICATION PAC VERSION OF INTER DOES NOT CONTAIN ANY COMMANDS THAT WOULD DISTURB THE STORED COORDINATES, HENCE AN IDENTICAL LABLE WAS NOT USED (THE USER MEMORY VERSION OF THE SURVEY PAC PROGRAM INTER IS GIVEN THE LABLE INTER*).

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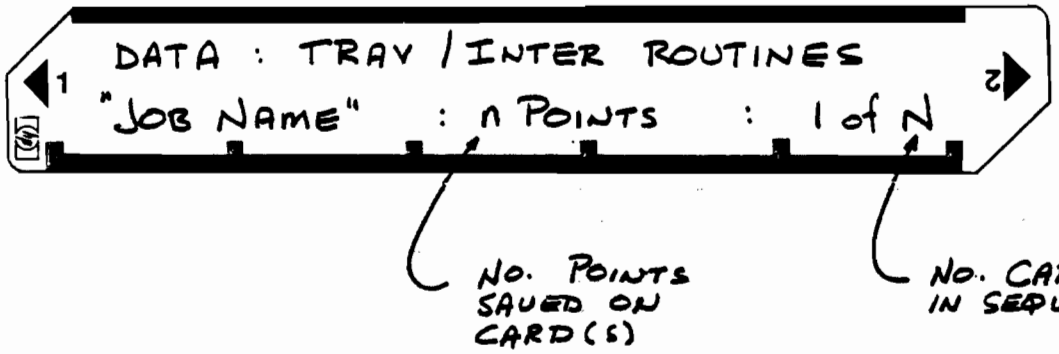
NOTES ON STORAGE OF POINTS ON MAGNETIC CARDS :

1. STORAGE OF A GROUP OF POINTS IS ALWAYS ASSUMED TO BEGIN WITH POINT NO. 1 ; ie. IF 10 IS ENTERED IN RESPONSE TO THE PROMPT "NO. POINTS ?", THE POINT NO.s 1 THROUGH 10 WILL BE STORED TO CARDS

2. WHEN LOADING POINTS INTO THE HP41 FROM CARDS MAKE SURE THERE IS ENOUGH AVAILABLE SPACE.
   MIN. REQ'D. SIZE IS : $15 + 2n$, WHERE n IS THE NUMBER OF POINTS TO BE LOADED.

3. ONCE A GROUP OF POINTS ARE SAVED ON CARDS, THE CARDS SHOULD BE LABLED TO IDENTIFY THE DATA AND TO INDICATE HOW MANY POINTS ARE STORED. THIS LAST ITEM IS IMPORTANT SINCE THE NUMBER OF POINTS IS REQUIRED WHEN READING THE POINTS BACK IN VIA THE ROUTING LOAD. SUGGESTED LABLING OF CARDS IS :



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NOTES ON USER INSTRUCTIONS :

1. THE FOLLOWING ROUTINES FUNCTION IDENTICAL TO THE DESCRIPTION GIVEN IN THE SURVEY PAC MANUAL. THE USER IS REFERED TO THE SURVEY PAC MANUAL FOR FURTHER DETAILS.

   - CLOSURE FOR TRAVERSES
   - CURVED SIDES FOR TRAVERSES
   - COMPASS RULE ADJUSTMENT
   - TRANSIT RULE ADJUSTMENT

2. ALL ANGULAR VALUES ARE INPUT AND OUTPUT IN D.MS FORMAT.

3. ANY CONSISTENT SET OF UNITS IS ACCEPTABLE, HOWEVER IF THE ACRES OPTION IS EXECUTED, VALUES MUST BE IN FEET.

4. IF A PRINTER IS UTILIZED, IT MAY BE SET IN EITHER MAN OR NORM MODES :

   MAN : ONLY RESULTS ARE LISTED
   NORM : INPUT AND RESULTS ARE LISTED.

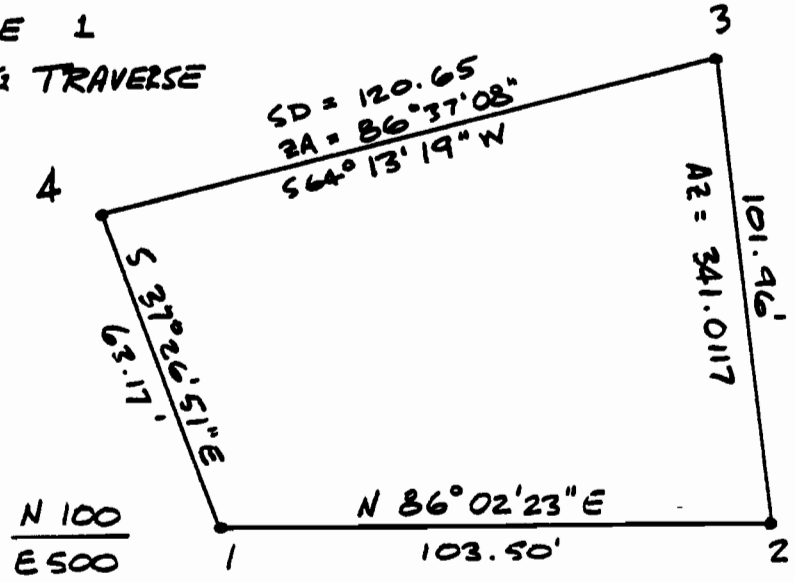
5. IF AN ATTEMPT IS MADE TO STORE A COORDINATE PAIR IN A LOCATION HIGHER THAN THE CURRENT SIZE WILL PERMIT THE PGM. WILL RESPOND WITH "SET SIZE >= nnn" where nnn IS THE REQUIRED SIZE FOR THE ATTEMPTED POINT NUMBER. THE USER SHOULD SET THE SIZE GREATER OR EQUAL TO THE DISPLAYED SIZE AND THEN RE-STORE THE POINT.

PROGRAM DESCRIPTION II

Sample Problem (Sketch if Desired)

EXAMPLE 1

BEARING TRAVERSE



STARTING WITH POINT NO. 1 TRAVERSE THE PARCEL AND COMPUTE THE COORDINATES OF THE OTHER POINTS. DISPLAY BEARINGS.

SOLUTION: (SIZE >= 24)

Display	Input	Function	Comments
	100	ENTER ↑	
100.0000	500	XEQ STP	STORE POINT NO. 1
POINT NO. ?	1	R/S	
500.0000	—	XEQ TRAV	BEGIN TRAVERSE
DSP BRG ?	Y	R/S	
DSP L/D ?	N	R/S	
POINT NO. ?	1	R/S	BEGIN W/ POINT NO. 1
100.0000	86.0223	B	
QD = ?	1	R/S	
N 86.0223 E	103.5	L	
HD = 103.5000	—	R/S *	
N2 = 107.1482	—	R/S *	
E2 = 603.2529	—	R/S *	STORE POINT NO. 2
POINT NO. ?	2	R/S	
603.2529	341.0117	■ B	
N 18.5843 W	101.96	D	
HD = 101.96	—	R/S *	
N3 = 203.5657	—	R/S *	
E3 = 570.0939	—	R/S *	STORE POINT NO. 3
POINT NO. ?	3	R/S	
570.0939	64.1319	B	
QD = ?	3	R/S	
S 64.1319W	120.65	■ D	
Δ = ?	86.3708	R/S	
HD = 120.4400	—	R/S *	
N4 = 151.1880	—	R/S *	
E4 = 461.6395	—	R/S *	STORE POINT NO. 4
POINT NO. ?	4	R/S	
461.6395	37.2651	B	
QD = ?	2	R/S	
S 37.2651 E	63.17	D	
HD = 63.1700	—	R/S *	
N5 = 101.0366	—	R/S *	
E5 = 500.0490	—	R/S *	
POINT NO. ?	—	R/S	— FINISH

* NOT REQ'D. IF PRINTER IS ATTACHED

PROGRAM DESCRIPTION II

Sample Problem (Sketch if Desired) EXAMPLE 1 CONT.

PRINTER LISTING FOR TRAVERSE		PRINTER OUTPUT OF COORDINATE PAIR LIST
N1=100.0000 E1=500.0000	S 64.1319 W HD=120.4400	N1=100.0000 E1=500.0000
N 86.0223 E HD=103.5000	N4=151.1880 E4=461.6395	N2=107.1482 E2=603.2529
N2=107.1482 E2=603.2529	S 37.2651 E HD=63.1700	N3=203.5657 E3=570.0939
N 18.5843 W HD=101.9600	N5=101.0366 E5=500.0490	N4=151.1880 E4=461.6395
N3=203.5657 E3=570.0939		

SOLUTION:

Display	Input	Function	Comments
TO LIST COORDINATE PAIRS:			
		XEQ LISTP	
BEG. PT. NO. ?	1	R/S	} LIMITS OF LIST
END PT. NO. ?	4	R/S	
N1 = 100.0000	—	R/S *	
E1 = 500.0000	—	R/S *	
N2 = 107.1482	—	R/S *	
E2 = 603.2529	—	R/S *	
N3 = 203.5657	—	R/S *	
E3 = 570.0939	—	R/S *	
N4 = 151.1880	—	R/S *	
E4 = 461.6395	—	R/S *	
TO SAVE POINTS TO CARDS:			
		XEQ SAVE	
NO. POINTS ?	4	R/S	
RDY 01 OF 01	—		INSERT ONE CARD TRACK
TO LOAD POINTS FROM CARDS:			
		XEQ LOAD	
NO. POINTS. ?	4	R/S	
CARD	—		INSERT CARD. PROGRAM WILL PROMPT FOR THE REQUIRED NUMBER OF TRACKS.

* NOT REQ'D. IF A PRINTER IS ATTACHED.

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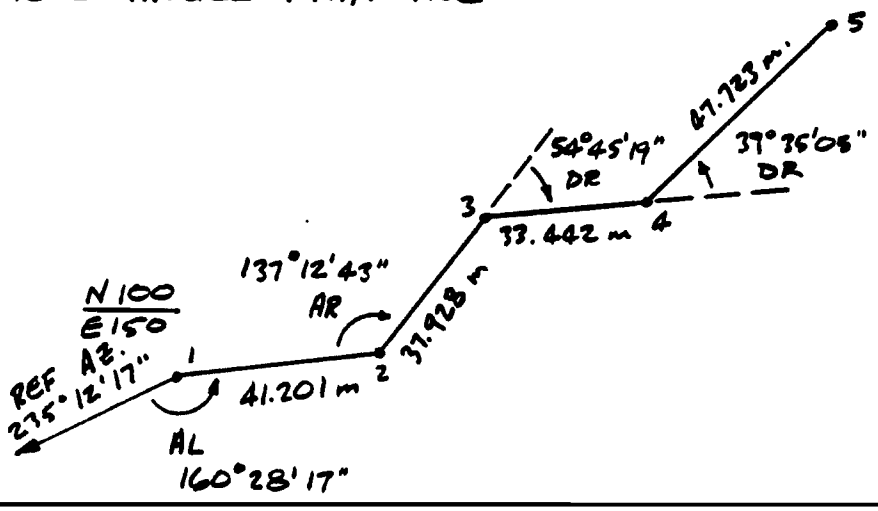
PROGRAM DESCRIPTION II

Sample Problem (Sketch if Desired)

EXAMPLE 2
FIELD ANGLE TRAVERSE



STARTING WITH POINT NO. 1 TRAVERSE THE LINE SHOWN AND COMPUTE THE COORDINATES OF THE OTHER POINTS. DISPLAY AZIMUTHS.

SOLUTION: (SIZE >= 26)

Display	Input	Function	Comments
	100	ENTER ↑	} STORE POINT NO. 1
100.0000	150	XEQ STP	
POINT NO. ?	1	R/S	
150.0000	—	XEQ TRAV	
DSP BRG ?	N	R/S	
DSP L/D ?	N	R/S	
POINT NO. ?	1	R/S	
100.0000	235.1217	H	
AZ = 55.1217	160.2817	CHS C	
AZ = 74.4360	41.201	D	
HD = 41.2010	—	R/S *	
N2 = 110.8487	—	R/S *	} STORE POINT NO. 2
E2 = 189.7470	—	R/S *	
POINT NO. ?	2	R/S	
189.7470	137.1243	C	
AZ = 31.5643	37.928	D	
HD = 37.928	—	R/S *	
N3 = 143.0327	—	R/S *	} STORE POINT NO. 3
E3 = 209.8151	—	R/S *	
POINT NO. ?	3	R/S	
209.8151	54.4519	■ C	
AZ = 86.4202	33.442	D	
HD = 33.442	—	R/S *	
N4 = 144.9574	—	R/S *	} STORE POINT NO. 4
E4 = 243.2017	—	R/S *	
POINT NO. ?	4	R/S	
243.2017	39.3505	CHS ■ C	
AZ = 47.0657	47.723	D	
HD = 47.7230	—	R/S *	
N5 = 177.4338	—	R/S *	} STORE POINT NO. 5
E5 = 278.1698	—	R/S *	
POINT NO. ?	5	R/S	
278.1698			FINISH

PROGRAM DESCRIPTION II

Sample Problem (Sketch if Desired)

EXAMPLE 2 CONT.

PRINTER LISTING FOR TRAVERSE

```
N1=100.0000
E1=150.0000

AZ=55.1217
AZ=74.4360
HD=41.2010

N2=110.8487
E2=189.7470

AZ=31.5643
HD=37.9200

N3=143.0327
E3=209.8151

AZ=86.4202
HD=33.4420

N4=144.9574
E4=243.2017

AZ=47.0657
HD=47.7230

N5=177.4338
E5=278.1698
```

PRINTER OUTPUT OF COORDINATE PAIR LIST

```
N1=100.0000
E1=150.0000

N2=110.8487
E2=189.7470

N3=143.0327
E3=209.8151

N4=144.9574
E4=243.2017

N5=177.4338
E5=278.1698
```

SOLUTION:

Display	Input	Function	Comments
TO LIST COORDINATE PAIRS:			
		XEQ LISTP	
BEG. PT. NO.?	1	R/S	} LIMITS OF LIST
END PT. NO.?	5	R/S	
N1 = 100.0000	—	R/S *	
E1 = 150.0000	—	R/S *	
N2 = 110.8487	—	R/S *	
E2 = 189.7470	—	R/S *	
N3 = 143.0327	—	R/S *	
E3 = 209.8151	—	R/S *	
N4 = 144.9574	—	R/S *	
E4 = 243.2017	—	R/S *	
N5 = 177.4338	—	R/S *	
E5 = 278.1698	—	R/S *	
TO SAVE POINTS TO CARDS:			
		XEQ SAVE	
NO. POINTS?	5	R/S	
RDY 1 OF 1	—	—	INSERT ONE CARD TRACK
TO LOAD POINTS FROM CARDS:			
		XEQ LOAD	
NO. POINTS	5	R/S	
CARD	—	—	INSERT CARD. PGM. WILL PROMPT FOR REQUIRED NO. TRACKS.

* NOT REQUIRED IF A PRINTER IS ATTACHED

PROGRAM DESCRIPTION II

Sample Problem (Sketch if Desired)

EXAMPLE 3
INVERSE

WORK THE FIELD ANGLE TRAVERSE (EXAMPLE 2) AS AN INVERSE PROBLEM. CALCULATE THE BEARING AND DISTANCE OF THE LINE JOINING EACH PAIR OF POINTS. ALSO DISPLAY THE LATITUDE AND DEPARTURE OF EACH LEG.

NOTE : IT IS ASSUMED THAT THE COORDINATES HAVE ALREADY BEEN STORED (WORK EXAMPLE 2 FIRST.)

SOLUTION:

Display	Input	Function	Comments
		XEQ TRAV	
DSP BRG ?	Y	R/S	
DSP L/D ?	Y	R/S	
POINT NO. ?	1	R/S	BEGIN WITH POINT NO. 1
100.0000	—	XEQ RCP	
POINT NO. ?	2	R/S	RECALL POINT NO. 2
189.7470	—	■ A	
N 74.4360 E	—	R/S *	
HD = 41.2010	—	R/S *	
L = 10.8487	—	R/S *	
D = 39.7470	—	R/S *	
N2 = 110.8487	—	R/S *	
E2 = 189.7470	—	XEQ RCP	
POINT NO. ?	3	R/S	RECALL POINT NO. 3
209.8151	—	■ A	
N 31.5643 E	—	R/S *	
HD = 37.9280	—	R/S *	
L = 32.1839	—	R/S *	
D = 20.0680	—	R/S *	
N3 = 143.0327	—	R/S *	
E3 = 209.8151	—	XEQ RCP	
POINT NO. ?	4	R/S	RECALL POINT NO. 4
243.2017	—	■ A	
N 86.4202 E	—	R/S *	
HD = 33.4420	—	R/S *	
L = 1.9247	—	R/S *	
D = 33.3866	—	R/S *	
N4 = 144.9574	—	R/S *	
E4 = 243.2017	—	XEQ RCP	
POINT NO. ?	5	R/S	RECALL POINT NO. 5
278.1698	—	■ A	
N 47.0657 E	—	R/S *	
HD = 47.7230	—	R/S *	
L = 32.4764	—	R/S *	
D = 34.9681	—	R/S *	

* NOT REQ'D IF A PRINTER IS ATTACHED.

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PROGRAM DESCRIPTION II

Sample Problem (Sketch if Desired)

EXAMPLE 3 - CONT.

SOLUTION:

Display	Input	Function	Comments
N5= 177.4338 E5= 278.1698	— —	R/S *	FINISH

PRINTER OUTPUT OF TRAVERSE

```
N1=100.0000
E1=150.0000

N 74.4360 E
HD=41.2010

L=10.8487
D=39.7473

N2=110.8487
E2=189.7470

N 31.5643 E
HD=27.9280

L=32.1839
D=20.0680

N3=143.0327
E3=209.8151

N 86.4200 E
HD=33.4430

L=1.9247
D=33.3866

N4=144.9574
E4=243.3017

N 47.0657 E
HD=47.7230

L=32.4764
D=24.9681

N5=177.4338
E5=278.1698
```

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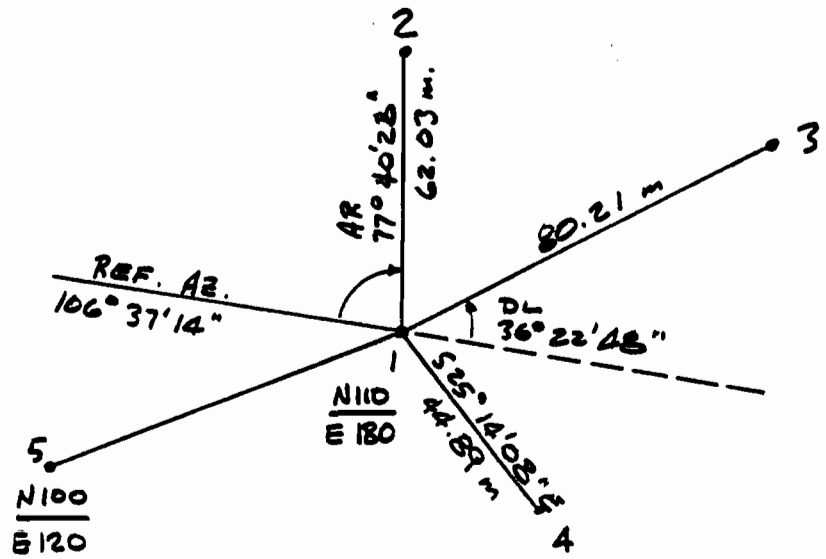
PROGRAM DESCRIPTION II

Sample Problem (Sketch if Desired)

EXAMPLE 4
SIDESHOTS

STARTING FROM POINT NO. 1 CALCULATE THE SIDESHOTS SHOWN, DISPLAYING AZIMUTHS LATITUDES AND DEPARTURES.



SOLUTION: (SIZE >= 26)

Display	Input	Function	Comments
	110	ENTER ↑	
100.0000	180	XEQ STP	STORE POINT NO. 1
POINT NO. ?	1	R/S	
180.0000	100	ENTER ↑	
100.0000	120	XEQ STP	STORE POINT NO. 5
POINT NO. ?	5	R/S	
120.0000	—	XEQ TRAV	BEGIN TRAV. ROUTING
DSP. BRG ?	N	R/S	
DSP L/D ?	Y	R/S	
POINT NO. ?	1	R/S	
110.0000	—	↓	ENTER SIDESHOT MODE
SS	106.3714	■ B	
AZ = 106.3714	77.4028	C	
AZ = 4.1742	62.03	D	
HD = 62.0300	—	R/S *	
L = 61.8558	—	R/S *	
D = 4.6455	—	R/S *	
N2 = 171.8558	—	R/S *	
E2 = 184.6455	—	R/S *	STORE POINT 2
POINT NO. ?	2	R/S	
184.6455	36.2248	CHS ■ C	
AZ = 70.1426	80.21	D	
HD = 80.2100	—	R/S *	
L = 27.1167	—	R/S *	
D = 75.4873	—	R/S *	
N3 = 137.1167	—	R/S *	
E3 = 255.4873	—	R/S *	STORE POINT 3
POINT NO. ?	3	R/S	
255.4873	25.1408	B	
QD = ?	2	R/S	
AZ = 154.4552	44.89	D	
HD = 44.89	—	R/S *	
L = -40.6058	—	R/S *	
D = 19.1384	—	R/S *	

* NOT REQ'D. IF A PRINTER IS ATTACHED.

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PROGRAM DESCRIPTION II

Sample Problem (Sketch if Desired) EXAMPLE 4 CONT.

PRINTER OUTPUT FROM SIDESHOTS :

```
N1=110.0000
E1=180.0000

SS
AZ=106.3714
RZ=4.1742
HD=62.8300

L=61.8558
D=4.6455

N2=171.8558
E2=184.6455

AZ=70.1426
HD=80.2100

L=27.1167
D=75.4973

N3=137.1167
E3=255.4873

AZ=154.4551
HD=44.9900

L=-40.6058
D=19.1384

N4=69.3942
E4=199.1384

AZ=260.3216
HD=60.8276

L=-10.0000
D=-60.0000

N5=100.0000
E5=120.0000
```

SOLUTION:

Display	Input	Function	Comments
N4= 69.3942	—	R/S *	STORE POINT 4
E4= 199.1384	—	R/S *	
POINT NO.?	4	R/S	
199.1384	—	XEQ RCP	RECALL POINT 5
POINT NO.?	5	R/S	
120.0000	—	[redacted] A	
AZ= 260.3216	—	R/S *	
HD= 60.8276	—	R/S *	
L= -10.0000	—	R/S *	
D= -60.0000	—	R/S *	
N5= 100.0000	—	R/S *	
E5= 120.0000	—	I	FINISH SIDESHOTS — EXIT SIDESHOT MODE
TRAV			

* NOT REQ'D. IF A PRINTER IS ATTACHED.

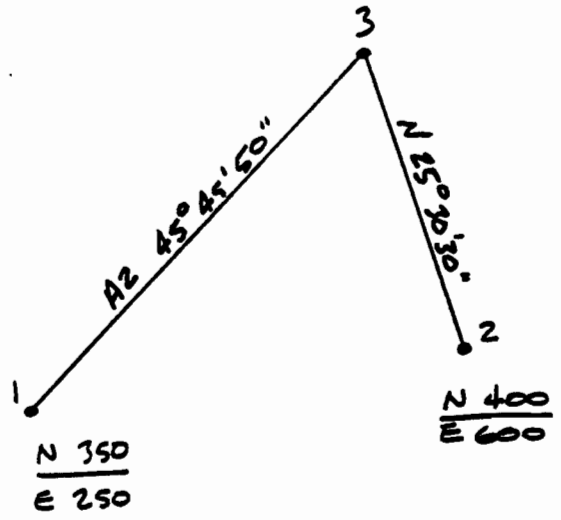
PROGRAM DESCRIPTION II

Sample Problem (Sketch if Desired)

EXAMPLE 5

INTERSECTIONS

CALCULATE THE BEARING - BEARING INTERSECTION.



SOLUTION: (SIZE >= 22)

Display	Input	Function	Comments
	350	ENTER↑	
350.0000	250	XEQ STP	STORE POINT 1
POINT NO.?	1	R/S	
250.0000	400	ENTER↑	
400.0000	600	XEQ STP	STORE POINT 2
POINT NO.?	2	R/S	
600.0000	—	XEQ INTER*	
BB BD DD OFS	—	A	
POINT NO.?	1	R/S	
POINT NO.?	2	R/S	
BRG 1: ?	45.455	R/S	
QD: ?	1	R/S	
BRG 2: ?	25.303	R/S	
QD: ?	4	R/S	
N 45.4550 E	—	R/S †	BRG. pt. 1 → 3
DIST 1 = 356.2783	—	R/S †	DIST. pt. 1 → 3
N 25.3030 W	—	R/S †	BRG pt. 2 → 3
DIST 2 = 219.9897	—	R/S †	DIST pt. 2 → 3
N3 = 598.5457	—	R/S †	
E3 = 505.2631	—	R/S †	STORE POINT 3
POINT NO.?	3	R/S	
505.2631	—	R/S	
N 81.5212 E	—	R/S †	
DIST 1-2 = 353.5534			
			FINISH.

PRINTER OUTPUT :

N 45.4550 E
DIST1=356.2783

N 25.3030 W
DIST2=219.9897

N3=598.5457
E3=505.2631

N 81.5212
DIST1-2=353.5534

† NOT REQ'D. IF A PRINTER IS ATTACHED

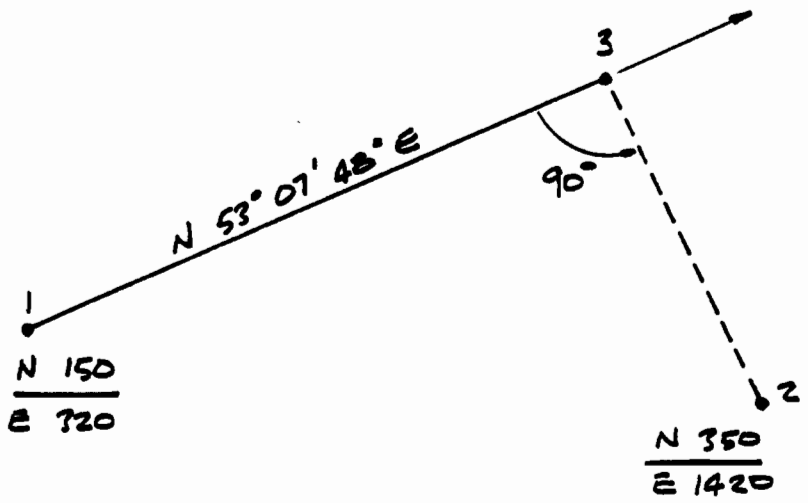
PROGRAM DESCRIPTION II

Sample Problem (Sketch if Desired)

EXAMPLE 6

OFFSETS

SOLVE THE OFFSET PROBLEM SHOWN.



SOLUTION: (SIZE >= 22)

Display	Input	Function	Comments
	150	ENTER ↑	
150.0000	320	XEQ STP	STORE POINT NO. 1
POINT NO.?	1	R/S	
320.0000	350	ENTER ↑	
350.0000	1420	XEQ STP	STORE POINT NO. 2
POINT NO.?	2	R/S	
1420.0000	—	XEQ INTER*	
BB BD DD OFS	—	D	
POINT NO.?	1	R/S	
POINT NO.?	2	R/S	
BRG. 1 = ?	53.0748	R/S	
QD = ?	1	R/S	
N 53.0748 E	—	R/S †	BRG. pt. 1 → 3
DIST 1 = 999.9991	—	R/S †	DIST. pt. 1 → 3
N 36.5212 W	—	R/S †	BRG. pt. 2 → 3
DIST 2 = 500.0018	—	R/S †	DIST. pt. 2 → 3
N3 = 750.0009	—	R/S †	
E3 = 1119.9982	—	R/S †	STORE POINT 3
POINT NO.?	3	R/S	
1,119.9982	—	R/S	BRG. pt. 1 → 2
N 79.4143 E	—	R/S †	DIST. pt. 1 → 2
DIST 1-2 = 1,118.0340			FINISH.

PRINTER OUTPUT:

N 53.0748 E
DIST1=999.999

N 36.5212 W
DIST2=500.00

N3=750.0009
E3=1,119.9982

N 79.4143 E
DIST1-2=1,1[illegible]

† NOT REQ'D. IF A PRINTER IS ATTACHED

SIZE: (HP-41C) SEE p. 35

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
	POINT STORAGE			
1	INPUT NORTH AND	N	ENTER↑	N
	EAST COORDINATE	E	XEQ "STP"	POINT NO.?
2	ASSIGN A POINT NUMBER	n	R/S	E
	POINT RECALL			
1	BEGIN RECALL SUBROUTINE	—	XEQ "RCP"	POINT NO.?
2	ENTER POINT NUMBER.	n	R/S	E
	N - COORDINATE WILL BE IN Y REGISTER & E-COORDINATE WILL BE IN X REGISTER			
	LIST POINT COORDINATES			
1	BEGIN LIST ROUTINE	—	XEQ "LISTP"	BEG. PT. NO.?
2	ENTER POINT NUMBER FOR	n1	R/S	END PT. NO.?
	BEGINNING OF LIST			
3	ENTER POINT NUMBER FOR	n2	R/S	N1 =
	END OF LIST		R/S *	E1 =
			R/S *	N2 =
			R/S *	N2 =
				etc.

* NOT REQUIRED WHEN A PRINTER IS ATTACHED.

USER INSTRUCTIONS

SIZE: (HP-41C) SEE p. 35

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
	SAVE POINTS TO CARDS			
1	BEGIN SAVE ROUTINE	—	XEQ "SAVE"	NO. POINTS ?
2	ENTER NUMBER OF POINTS TO BE SAVED. NUMBERING WILL BEGIN WITH 1 AND PROCEED SEQUENTIALLY THROUGH "n". (ie. "n" SHOULD BE HIGHEST NO. POINT TO BE SAVED.)	n	R/S	RDY 01 OF NN
3	ENTER 'NN' CARDS TO COMPLETE STORAGE OPERATION. NOTE: CARDS SHOULD BE MARKED WITH THE NUMBER OF POINTS STORED (n).	—	—	—
	LOAD POINTS FROM CARDS			
1	BEGIN LOAD ROUTINE	—	XEQ "LOAD"	NO. POINTS ?
2	ENTER NO. POINTS TO BE LOADED	n	R/S	CARD
3	INSERT TRACK 1 OF CARD	—	—	RDY 02 OF NN
4	PROMPT FOR ALL REQ'D TRACKS. INSERT REQUIRED NO. TRACKS.	—	—	etc.

USER INSTRUCTIONS

SIZE: (HP-41C) SEE p. 35

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
	NOTE : IN ORDER TO DEMONSTRATE THIS PROGRAMS SIMILARITIES AND DIFFERENCES WITH THE COUNTERPART APPLICATION MODULE PROGRAMS, THE FORMAT OF THE USER INSTRUCTIONS CLOSELY FOLLOWS THE INSTRUCTIONS GIVEN IN THE SURVEY PAC MANUAL. (SEE REF., p. 1).			
	TRAVERSE			
1	PLACE TRAVERSE OVERLAY ON KEYBOARD AND BEGIN TRAVERSE PROGRAM		XEQ "TRAV"	DSP BRG?
2	CHOOSE BEARING OUTPUTS OR	Y	R/S	DSP L/D?
	AZIMUTH OUTPUTS	N	R/S	DST L/D?
3	CHOOSE TO DISPLAY LATITUDES AND	Y	R/S	POINT NO.?
	DEPARTURES OR NOT TO DISPLAY	N	R/S	POINT NO.?
	LATITUDES AND DEPARTURES			
4	INPUT NUMBER OF THE BEGINNING POINT OF THE TRAVERSE (PREVIOUSLY STORED POINT)	pt. no.	R/S	N1 *
5	FOR BEARING OR AZIMUTH TRAVERSE :			
	INPUT THE BEARING AND QUADRANT	BRG (D.MS)	B	QD = ?
	CODE OR AZIMUTH, THEN GO TO STEP 8.	QD	R/S	Az = (or brg.)
		Az (D.MS)	■ B	Az = (or brg.)
6	FOR FIELD ANGLE TRAVERSE :			
	INPUT REFERENCE AZIMUTH :	REF. Az	H	Az = (or brg.)
	AWAY FROM BEGINNING POINT (BACK	REF. Az	■ B	Az = (or brg.)
	AZIMUTH) OR TOWARD BEGINNING POINT — OPTIONALLY, A REF. BEARING TOWARD THE BEGINNING POINT MAY BE USED IN PLACE			

* N1 AND E1 WILL AUTOMATICALLY BE PRINTED AT THIS POINT WHEN CALCULATOR IS OPERATED WITH A PRINTER.

USER INSTRUCTIONS

SIZE: (HP-41C) SEE p. 35

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
	OF AN AZIMUTH ; FOR THIS CASE			
	GO TO STEP 6a :			
6a	INPUT REFERENCE BEARING (TOWARD	REF. BRG.	B	QD?
	BEGINNING POINT) & QUADRANT CODE	QD	R/S	AZ = (or brg.)
7	INPUT FIELD ANGLE :			
	ANGLE RIGHT ,	AR	C	AZ = (or brg.)
	OR ANGLE LEFT ,	AL	CHS C	AZ = (or brg.)
	OR DEFLECTION RIGHT ,	DR	■ C	AZ = (or brg.)
	OR DEFLECTION LEFT .	DL	CHS ■ C	AZ = (or brg.)
8	INPUT HORIZONTAL DISTANCE	HD	D	HD =
8a	(IF LATITUDES AND DEPARTURES		R/S *	L =
	ARE TO BE DISPLAYED)		R/S *	D =
	DISPLAY COORDINATES OF		R/S *	N# =
	NEXT POINT		R/S *	E# =
8b	ASSIGN A POINT NUMBER TO			POINT NO.?
	THE COMPUTED POINT	n	R/S	E# =
9	REPEAT STEP 5 (OR 7) AND			
	STEP 8 FOR SUCCESSIVE COURSES			
10	FOR A NEW STARTING POINT ,			
	PRESS "A" AND RETURN TO STEP 4 .			
11	FOR SLOPE DISTANCES :			
	BEGIN SLOPE DISTANCE INPUT	SD	■ D	∠ = ?
	ROUTINE AND INPUT SLOPE	VA or ZA		
	DISTANCE AND VERTICAL OR	(D.MS)	R/S	HD =
	ZENITH ANGLE . THEN PRESS		R/S *	N# =
	"R/S" AND GO TO STEP 8a.		R/S *	E# =

* NOT REQUIRED IF A PRINTER IS ATTACHED.

USER INSTRUCTIONS

SIZE: (HP-41C) See p. 35

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
	INVERSE			
1	To Perform Inverse Place Traverse Overlay On Keyboard And Begin Traverse Program		XEQ TRAV	DSP BRG?
2	Choose Bearing Outputs; Or	Y	R/S	DSP L/D?
	Azimuth Outputs	N	R/S	DSP L/D?
3	Choose To Display Latitudes & Departures Or Not To Display Latitudes And Departures.	Y	R/S	POINT NO.?
		N	R/S	POINT NO.?
4	Input Number Of The Beginning Point (Previously Stored Point).	pt. no.	R/S	N1 *
5	Recall Coordinates Of Next Point ...		XEQ RCP	POINT NO.?
		pt. no.	R/S	E
	And Display Azimuth (Or Bearing) And Horizontal Dist.)		■ A	AZ = (or brg.)
			R/S **	HD =
5a	(If Latitudes And Departures Are To Be Displayed.)		R/S **	L =
			R/S **	D =
6	Display Coordinates (This Step Is Not Optional)		R/S **	N# =
			R/S **	E# =
7	Repeat Steps 5 And 6 For Successive Courses.			
8	For A New Starting Point, Press "A" And Go To Step 4		A	POINT NO.?

* N1 And E1 Will Be Automatically Printed At This Point When The Calculator Is Operated With A Printer.

** Not Required If A Printer Is Attached.

SIZE: (HP-41C) SEE p. 35

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
	SIDESHOTS			
1	TO PERFORM SIDESHOTS: PLACE TRAVERSE OVERLAY ON KEYBOARD AND BEGIN TRAVERSE PROGRAM.		XEQ TRAV	DCP BRG. ?
2	CHOOSE BEARING OUTPUTS OR	Y	R/S	DSP L/D ?
	AZIMUTH OUTPUTS	N	R/S	DSP L/D ?
3	CHOOSE TO DISPLAY LATITUDES AND DEPARTURES OR NOT TO DISPLAY	Y	R/S	POINT NO. ?
	LATITUDES AND DEPARTURES	N	R/S	POINT NO. ?
4	INPUT POINT NO. OF BEGINNING	n	R/S	N1 *
5	AFTER COMPLETION OF STEP 4 SET SIDESHOT MODE BY PRESSING J		J	SS
6	FOR BEARING OR AZIMUTH TRAVERSE:			
	INPUT THE BEARING	BRG	B	QD = ?
	AND QUADRANT CODE	QD	R/S	Az = (or brg.)
	OR AZIMUTH, THEN GO TO STEP 8	Az	■ B	Az = (or brg.)
7	FOR FIELD ANGLE TRAVERSE: INPUT REFERENCE AZIMUTH: AWAY (BACK AZIMUTH) FROM BEGINNING POINT, (OR HUB),	REF AZ	H	Az = (or brg.)
	OR TOWARD BEGINNING POINT (OR HUB).	REF AZ	■ B	Az = (or brg.)
	OPTIONALLY, A REFERENCE BEARING TOWARD THE BEGINNING POINT (OR HUB) MAY BE USED			

* N1 & E1 WILL BE AUTOMATICALLY PRINTED AT THIS POINT WHEN THE CALCULATOR IS OPERATED WITH A PRINTER.

USER INSTRUCTIONS

SIZE: (HP-41C) SEE p. 35

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
	IN PLACE OF AN AZIMUTH ; FOR THIS CASE GO TO STEP 7a.			
7a.	INPUT REFERENCE BEARING (TOWARD BEGINNING POINT OR HUB) AND QUADRANT CODE.	REF BRG QD	B R/S	QD = ? Az = (or brg.)
8	INPUT FIELD ANGLE :			
	ANGLE RIGHT ,	AR	C	Az = (or brg.)
	OR ANGLE LEFT ,	AL	CHS C	Az = (or brg.)
	OR DEFLECTION RIGHT,	DR	■ C	Az = (or brg.)
	OR DEFLECTION LEFT .	DL	CHS ■ C	Az = (or brg.)
9	INPUT HORIZONTAL DISTANCE	HD	D	HD =
9a	(IF LATITUDES AND DEPARTURES		R/S *	L =
	ARE TO BE DISPLAYED)		R/S *	D =
	DISPLAY COORDINATES OF		R/S *	N# =
	NEXT POINT		R/S *	E# =
	ASSIGN A POINT NUMBER TO			POINT No. ?
	THE COMPUTED POINT	n	R/S	E# =
10	REPEAT STEP 6 (or 8) FOR SUCCESSIVE SIDESHOTS .			
11	FOR A NEW STARTING POINT, PRESS "A" AND RETURN TO STEP 4 .		A	POINT No. ?
12	FOR SLOPE DISTANCES :			
	BEGIN SLOPE DISTANCE INPUT	SD	■ D	Δ = ?
	ROUTINE AND INPUT SLOPE	VA or ZA	R/S	HD =
	DISTANCE AND VERTICAL OR		R/S *	N# =
	ZENITH ANGLE . THEN PRESS		R/S *	E# =

* NOT REQUIRED IF A PRINTER IS ATTACHED .

SIZE: (HP-41C) SEE p. 35

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
	R/S AND GO TO STEP 9a.			
13	FOR INVERSE SIDESHOTS:			
	RECALL COORDINATES OF NEXT		XEQ RCP	POINT NO.?
	POINT...	pt. no.	R/S	E
	AND CALCULATE AND DISPLAY			
	AZIMUTH (OR BEARING) AND		■ A	AZ= (or brg.)
	HORIZONTAL DISTANCE:		R/S *	HD=
13a	(IF LATITUDES AND DEPARTURES		R/S *	L=
	ARE TO BE DISPLAYED)		R/S *	D=
14	DISPLAY COORDINATES.		R/S *	N#=
			R/S *	E#=
15	GO TO STEP 13 FOR NEXT INVERSE SIDESHOT, STEP 6 OR 7 FOR OTHER SIDESHOTS.			
16	FOR A NEW SET OF SIDESHOTS PRESS "A" AND GO TO STEP 4. (STEP 5 MAY BE OMITTED.)		A	POINT NO.?
17	TO CONVERT FROM SIDESHOTS TO TRAVERSE:			
	USER MAY CONVERT FROM SIDESHOT MODE TO TRAVERSE MODE AT ANY TIME AFTER EXECUTING STEP 4. TO BEGIN NEW TRAVERSE PRESS "I" AND GO TO STEP 10 OF THE TRAVERSE INSTRUCTIONS. TO CONTINUE FORMER TRAVERSE		I	TRAV

* NOT REQUIRED IF A PRINTER IS ATTACHED

USER INSTRUCTIONS

SIZE: (HP-41C) SEE p. 35

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
	PRESS "I" AND CONTINUE.			
18	TO CONVERT FROM TRAVERSE TO SIDESHOTS: USER MAY CONVERT FROM TRAVERSE TO SIDESHOTS AT ANY TIME AFTER COMPLETION OF STEP 4 OR STEP 8 OF THE TRAVERSE INSTRUCTIONS BY PRESSING "J"		J	SS
19	AFTER SIDESHOTS HAVE BEEN MADE USER MAY CONTINUE FORMER TRAVERSE FROM THE LAST OCCUPIED POINT (HUB), BY PRESSING "I".		I	TRAV

USER INSTRUCTIONS

SIZE: (HP-41C) See p. 35

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
	INTERSECTIONS			
1	BEGIN INTERSECTION PROGRAM	—	XEQ INTER*	BB BD DD OFS
2	CHOOSE THE TYPE OF INTERSECTION TO BE CALCULATED :			
	BEARING - BEARING (BB)	—	A	POINT NO. ?
	BEARING - DISTANCE (BD)	—	B	POINT NO. ?
	DISTANCE - DISTANCE (DD)	—	C	POINT NO. ?
	OFFSET FROM POINT TO LINE (OFS)	—	D	POINT NO. ?
3	INPUT POINTS 1 & 2	n 1	R/S	POINT NO.?
		n 2	R/S	
3a	FOR BEARING-BEARING GO TO STEP 4. FOR BEARING-DISTANCE GO TO STEP 5. FOR DISTANCE-DISTANCE GO TO STEP 6. FOR OFFSET GO TO STEP 7.			
4	BEARING-BEARING INTERSECTION :			BRG 1 = ?
	INPUT BEARING AND	BRG 1	R/S	QD = ?
	QUADRANT FROM POINT 1.	QD	R/S	BRG 2 = ?
	INPUT BEARING AND	BRG 2	R/S	QD = ?
	QUADRANT FROM POINT 2.	QD	R/S	
	GO TO STEP 8.			
5	BEARING-DISTANCE INTERSECTION :			BRG 1 = ?
	INPUT BEARING AND	BRG 1	R/S	QD = ?
	QUADRANT FROM POINT 1.	QD	R/S	DIST. 2 = ?
	INPUT DISTANCE FROM POINT 2.	DIST 2	R/S	
	GO TO STEP 8.			

SIZE: (HP-41C) SEE p. 35

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
6	DISTANCE - DISTANCE INTERSECTION:			DIST 1 = ?
	INPUT DISTANCE FROM POINT 1	DIST 1	R/S	DIST 2 = ?
	INPUT DISTANCE FROM POINT 2	DIST 2	R/S	
	GO TO STEP 8.			
7	OFFSET FROM A POINT TO H LINE:			BRG 1 = ?
	INPUT BEARING AND	BRG 1	R/S	QD = ?
	QUADRANT FROM POINT 1.	QD	R/S	
8	RESULTS ARE CALCULATED AND			
	DISPLAYED AS FOLLOWS:			
	BEARING FROM POINT 1			(BEARING 1)
	DISTANCE FROM POINT 1		R/S *	DIST 1 =
	BEARING FROM POINT 2		R/S *	(BEARING 2)
	DISTANCE FROM POINT 2		R/S *	DIST 2 =
	NORTHING OF POINT OF INTERSECTION		R/S *	N3 =
	EASTING OF POINT OF INTERSECTION		R/S *	E3 =
	TO STORE THE COORDINATES OF		R/S *	POINT NO. ?
	THE POINT OF INTERSECTION ENTER NO.	N		
8a.	FOR SECOND SOLUTION (IF IT			
	EXISTS): PRESS R/S. IF A			
	SECOND SOLUTION EXISTS RESULTS			
	ARE OUTPUT AS IN STEP 8. IF			
	SECOND SOLUTION DOES NOT			
	EXIST PROGRAM EXECUTION STOPS.			
9	(OPTIONAL) TO DISPLAY BEARING			
	AND DISTANCE FROM POINT 1 TO		R/S R/S *	(BEARING 1-2)
	POINT 2:		R/S *	DIST 1-2 =

* NOT REQUIRED IF A PRINTER IS ATTACHED.

USER INSTRUCTIONS

SIZE: (HP-41C) See p. 35

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
10	FOR A NEW INTERSECTION, PRESS "E" AND GO TO STEP 2.		E	BB BD DD OFS
	NOTE: IF YOU DESIRE TO INPUT AZIMUTHS RATHER THAN BEARING / QUADRANTS:			BRG = ?
	INPUT AZIMUTH	A2	R/S	QD = ?
	THEN QUADRANT = 1	1	R/S	

PROGRAM LISTING

☐ 67 ☐ 97 ☑ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
01	✦LBL "TRAV"		
02	SF 07		
03	XROM "*IN"		INITIALIZATION FOR TRAV. ROUTINE
04	CF 05		
05	SF 01		
06	SF 00		
07	"DSP BRG"		
08	XROM "*YN"		SET BEARING OR AZIMUTH DISPLAY
09	FC? 10		
10	CF 00		
11	✦LBL 12		
12	"DSP L/D"		
13	XROM "*YN"		DISPLAY OR SUPPRESS LAT. & DEP.
14	FS? 10		
15	SF 03		
16	✦LBL A		
17	FC? 07		
18	GTO A		
19	CF 09		
20	15		
21	ENTER↑		
22	0		
23	✦LBL 11		
24	STO IND Y		
25	DSE Y		
26	GTO 11		
27	SF 02		
28	SF 10		
29	.9		
30	STO 13		
31	ADV		
32	ADV		
33	XEQ "RCP"		LOAD BEGINNING POINT
34	FC? 55		
35	GTO 00		
36	CF 10		
37	XROM "NE"		
38	AVIEW		
39	ADV		
40	✦LBL 00		
41	STO 08		
42	RDN		
43	STO 07		
44	STOP		
45	✦LBL I		ENTRY POINT TO TRAV. FROM SIDESHOT.
46	SF 01		
47	CF 02		
48	"TRAV"		
49	AVIEW		
50	RTN		
51	✦LBL J		BEGIN SIDESHOT ROUTINE
52	CF 01		
53	"SS"		
54	AVIEW		
55	RTN		
56	✦LBL H		
57	SF 05		
58	✦LBL C		
59	FC? 07		
60	GTO c		
61	FC? 07		
62	GTO C		
63	PI		
64	R-D		
65	HMS+		
66	FS?C 05		
67	GTO b		
68	✦LBL c		
69	FC? 07		
70	GTO c		
71	RCL 00		
72	HMS		
73	HMS+		
74	GTO b		
75	✦LBL B		
76	FC? 07		
77	GTO B		
78	SF 10		
79	XROM "*A1"		
80	HMS		
81	✦LBL b		
82	FC? 07		
83	GTO b		
84	HR		
85	1		
86	P-R		
87	✦LBL 08		
88	CF 10		

Note: Refer to HP-41C OWNER'S HANDBOOK AND PROGRAMMING GUIDE for specific information on keystrokes. The Function Index is found at the very back of the Handbook. Refer to Appendix E in 67 or 97 OWNER'S HANDBOOK AND PROGRAMMING GUIDE for exact keystrokes.

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PROGRAM LISTING

☐ 67 ☐ 97 ☑ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
89	R-P		
90	STO 01		
91	X<>Y		
92	X>0?		
93	GTO 07		
94	360		
95	+		
96	◆LBL 07		
97	FS?C 02		
98	STO 00		
99	FS? 01		
100	STO 00		
101	STO 10		
102	FC? 00		
103	GTO 09		
104	XROM "*B		
	1"		
105	AVIEW		
106	RTN		
107	◆LBL 09		
108	HMS		
109	XROM "*A		
	0"		
110	AVIEW		
111	RTN		
112	◆LBL d		
113	"∠=?"		
114	PROMPT		
115	HR		
116	X<>Y		
117	P-R		
118	X<=Y?		
119	X<>Y		
120	◆LBL "TS"		TRAVERSE SUBROUTINE
121	◆LBL D		
122	FC? 07		
123	GTO D		
124	RCL 00		
125	X<>Y		
126	FS? 01		
127	GTO 04		
128	RCL 10		
129	X<>Y		
130	◆LBL 13		
131	◆LBL 04		
132	FS? 01		
133	ST+ 06		
134	STO 01		
135	"HD="		
136	ARCL X		
137	AVIEW		
138	ADV		
139	P-R		
140	FS? 03		
141	XEQ 10		
142	FC? 01		
143	GTO 02		
144	ST+ 02		
145	ENTER↑		
146	ABS		
147	ST+ 15		
148	RDN		
149	X<>Y		
150	ST+ 03		
151	ENTER↑		
152	ABS		
153	ST+ 09		
154	RDN		
155	2		
156	/		
157	RCL 03		
158	-		
159	*		
160	ST+ 04		
161	◆LBL 02		
162	RCL 02		
163	FC? 01		
164	+		
165	RCL 07		
166	+		
167	FC? 01		
168	X<>Y		
169	RCL 03		
170	FC? 01		
171	+		
172	RCL 08		
173	+		
174	ISG 13		
175	FS?C 04		
176	SF 01		
177	XROM "NE		DISPLAY COMPUTED COORDINATES
	"		
178	AVIEW		
179	ADV		
180	FC?C 09		
181	XEQ "STP		STORE THE COMPUTED POINT
	"		
182	RTN		

Note: Refer to HP-41C OWNER'S HANDBOOK AND PROGRAMMING GUIDE for specific information on keystrokes. The Function Index is found at the very back of the Handbook. Refer to Appendix E in 67 or 97 OWNER'S HANDBOOK AND PROGRAMMING GUIDE for exact keystrokes.

PROGRAM LISTING

☐ 67 ☐ 97 ☑ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
183	◆LBL 10		
184	"L="		
185	ARCL X		
186	AVIEW		
187	"D="		
188	ARCL Y		
189	AVIEW		
190	ADV		
191	RTN		
192	◆LBL a		
193	FC? 07		
194	GTO a		
195	SF 09		
196	◆LBL "INVERSE"		
197	RCL 08		
198	-		
199	RCL 03		
200	-		
201	X<>Y		
202	RCL 07		
203	-		
204	RCL 02		
205	-		
206	XEQ 08		
207	RCL 10		
208	RCL 01		
209	XEQ 13		
210	RTN		
211	◆LBL E		BEGIN CLOSURE ROUTINE
212	FC? 07		
213	GTO E		
214	SF 04		
215	"ΣHD="		
216	ARCL 06		
217	AVIEW		
218	RCL 04		
219	ABS		
220	RCL 05		
221	+		
222	XEQ 05		
223	RDN		
224	RCL 13		
225	ENTER↑		
226	CF 01		
227	CLA		
228	"⊢ CORR"		
229	ASTO 13		
230	SF 10		
231	XROM "NE"		
232	"CLOSURE"		
233	R↑		
234	STO 13		
235	RDN		
236	AVIEW		
237	XEQ a		
238	SF 01		
239	STOP		
240	◆LBL e		BEGIN ROUTINE FOR CURVED SIDES (TRAV.)
241	SF 10		
242	XROM "*DL"		
243	CF 10		
244	HR		
245	STO 12		
246	SIN		
247	LASTX		
248	D-R		
249	STO 14		
250	-		
251	"R=?"		
252	PROMPT		
253	STO 11		
254	SIGN		
255	X<>Y		
256	CHS		
257	LASTX		
258	X↑2		
259	*		
260	2		
261	/		
262	*		
263	ST+ 05		
264	"SEG="		
265	ARCL X		
266	AVIEW		
267	RCL 14		
268	RCL 11		
269	*		
270	ABS		
271	ST+ 06		
272	"L="		
273	ARCL X		
274	AVIEW		
275	RCL 12		
276	2		

Note: Refer to "HP-41C OWNER'S HANDBOOK AND PROGRAMMING GUIDE" for specific information on keystrokes. The Function Index is found at the very back of the Handbook. Refer to Appendix E in 67 or 97 "OWNER'S HANDBOOK AND PROGRAMMING GUIDE" for exact keystrokes.

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PROGRAM LISTING

☐ 67 ☐ 97 ☑ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
277	/		
278	TAN		
279	RCL 11		
280	*		
281	ABS		
282	"T="		
283	ARCL X		
284	AVIEW		
285	RCL 12		
286	2		
287	/		
288	SIN		
289	RCL 11		
290	*		
291	2		
292	*		
293	ABS		
294	ST- 06		
295	"C="		
296	ARCL X		
297	AVIEW		
298	STOP		
299	LBL 05		
300	"AREA="		
301	ARCL X		
302	AVIEW		
303	RTN		
304	LBL "INTER*"		BEGIN INTERSECTION ROUTINE
305	CF 07		
306	LBL E		
307	FS? 07		
308	GTO E		
309	XROM "*IN"		
310	SF 10		
311	"BB BD DD OFS"		
312	PROMPT		
313	LBL A		BEARING - BEARING INTER. ROUTINE
314	FS? 07		
315	GTO A		
316	XEQ 10		
317	XROM "*BR"		
318	STO 02		
319	ISG 13		
320	XROM "*BR"		
321	STO 06		
322	GTO a		
323	LBL B		BEARING - DISTANCE INTER ROUTINE
324	FS? 07		
325	GTO B		
326	XEQ 10		
327	XROM "*BR"		
328	STO 02		
329	ISG 13		
330	XROM "*DS"		
331	STO 07		
332	GTO b		
333	LBL C		DISTANCE - DISTANCE INTER ROUTINE.
334	FS? 07		
335	GTO C		
336	XEQ 10		
337	XROM "*DS"		
338	STO 03		
339	ISG 13		
340	XROM "*DS"		
341	STO 07		
342	GTO c		
343	LBL D		OFFSET INTER. ROUTINE
344	FS? 07		
345	GTO D		
346	SF 00		
347	XEQ 10		
348	XROM "*BR"		
349	STO 02		
350	XEQ 00		
351	RCL 02		
352	RCL 10		
353	-		
354	SIN		
355	RCL 11		
356	*		
357	STO 07		
358	LBL b		
359	FS? 07		
360	GTO b		
361	XEQ 00		
362	RCL 07		
363	X↑2		
364	RCL 02		

Note: Refer to HP-41C OWNER'S HANDBOOK AND PROGRAMMING GUIDE for specific information on keystrokes. The Function Index is found at the very back of the Handbook. Refer to Appendix E in 67 or 97 OWNER'S HANDBOOK AND PROGRAMMING GUIDE for exact keystrokes.

PROGRAM LISTING

☐ 67 ☐ 97 ☑ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
365	RCL 10		
366	-		
367	RCL 11		
368	P-R		
369	FS? 00		
370	GTO 05		
371	RDN		
372	X↑2		
373	-		
374	SQRT		
375	R↑		
376	X<>Y		
377	-		
378	STO 12		
379	LASTX		
380	R↑		
381	+		
382	◆LBL 05		
383	STO 03		
384	FS?C 00		
385	GTO 02		
386	XEQ 02		
387	RCL 03		
388	X<> 12		
389	STO 03		
390	GTO 02		
391	◆LBL 10		SUBROUTINE FOR POINT ENTRY (INTERSECTION ROUTINE)
392	SF 10		
393	1.1		
394	STO 13		
395	XEQ "RCP"		
396	STO 01		
397	RDN		
398	STO 00		
399	ISG 13		
400	XEQ "RCP"		
401	STO 05		
402	RDN		
403	STO 04		
404	DSE 13		
405	RTN		
406	◆LBL 00		
407	◆LBL "00"		
408	RCL 05		
409	RCL 01		
410	-		
411	RCL 04		
412	RCL 00		
413	-		
414	XEQ 03		
415	STO 10		
416	X<>Y		
417	STO 11		
418	RTN		
419	◆LBL a		
420	FS? 07		
421	GTO a		
422	XEQ "00"		
423	RCL 06		
424	RCL 10		
425	-		
426	SIN		
427	RCL 11		
428	*		
429	RCL 06		
430	RCL 02		
431	-		
432	SIN		
433	/		
434	STO 03		
435	GTO 02		
436	◆LBL c		
437	FS? 07		
438	GTO c		
439	XEQ "00"		
440	RCL 03		
441	R-P		
442	X↑2		
443	RCL 07		
444	X↑2		
445	-		
446	RCL 11		
447	/		
448	RCL 03		
449	/		
450	2		
451	/		
452	ACOS		
453	RCL 10		
454	X<>Y		
455	-		
456	STO 12		
457	LASTX		
458	RCL 10		
459	+		
460	STO 02		

Note: Refer to HP-41C OWNER'S HANDBOOK AND PROGRAMMING GUIDE for specific information on keystrokes. The Function Index is found at the very back of the Handbook. Refer to Appendix E in 67 or 97 OWNER'S HANDBOOK AND PROGRAMMING GUIDE for exact keystrokes.

PROGRAM LISTING

☐ 67 ☐ 97 ☑ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
461	XEQ 02		
462	RCL 12		
463	X<> 02		
464	STO 12		
465	◆LBL 02		
466	CF 10		
467	1.1		
468	STO 13		
469	RCL 02		
470	RCL 03		
471	P-R		
472	XEQ 03		
473	ISG 13		
474	RCL 02		
475	RCL 03		
476	P-R		
477	RCL 00		
478	+		
479	STO 08		
480	X<>Y		
481	RCL 01		
482	+		
483	STO 09		
484	RCL 05		
485	-		
486	X<>Y		
487	RCL 04		
488	-		
489	XEQ 03		
490	ISG 13		
491	RCL 08		
492	RCL 09		
493	ADV		
494	XROM "NE"		
495	AVIEW		
496	XEQ "STP"		STORE COMPUTED POINT
497	RTN		
498	ADV		
499	RCL 10		
500	XROM "*B1"		
501	AVIEW		
502	"1-2"		
503	ASTO 13		
504	RCL 11		
505	XROM "*DS"		
506	AVIEW		
507	ADV		
508	STOP		
509	◆LBL 03		
510	R-P		
511	STO 14		
512	X<>Y		
513	XEQ 04		
514	FS? 10		
515	RTN		
516	ADV		
517	XROM "*B1"		
518	AVIEW		
519	RCL 14		
520	XROM "*DS"		
521	AVIEW		
522	RTN		
523	◆LBL 04		
524	X>0?		
525	RTN		
526	360		
527	+		
528	RTN		
529	◆LBL "STP"		ROUTINE TO STORE A COORDINATE PAIR
530	0		
531	"POINT NO. ?"		
532	PROMPT		
533	X=0?		
534	RTN		
535	X<>Y		
536	RDN		
537	2		
538	*		
539	15		
540	+		
541	STO T		
542	RDN		
543	SF 25		
544	STO IND Z		
545	FC?C 25		
546	GTO 14		
547	DSE Z		
548	X<>Y		
549	STO IND Z		

Note: Refer to HP 41C OWNER'S HANDBOOK AND PROGRAMMING GUIDE for specific information on keystrokes. The Function Index is found at the very back of the Handbook. Refer to Appendix E in 67 or 97 OWNER'S HANDBOOK AND PROGRAMMING GUIDE for exact keystrokes.

02592C PROGRAM LISTING

☐ 67 ☐ 97 ☑ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
550	X<>Y		
551	RTN		
552	◆LBL 14		
553	X<> Z		PROMPT FOR INSUFFICIENT SIZE
554	1		
555	+		
556	"SET SIZ E>="		
557	FIX 0		
558	ARCL X		
559	FIX 4		
560	PROMPT		
561	GTO "STP "		
562	◆LBL "RCP "		ROUTINE FOR RECALLING A COORDINATE PAIR.
563	"POINT N O. ?"		
564	PROMPT		
565	X<>Y		
566	RDN		
567	2		
568	*		
569	15		
570	+		
571	RCL IND X		
572	DSE Y		
573	RCL IND Y		
574	X<>Y		
575	RTN		
576	◆LBL "SAV E"		ROUTINE TO SAVE A GROUP OF POINTS TO CARDS
577	XEQ 06		
578	WDTAX		
579	STOP		
580	◆LBL "LOA D"		ROUTINE TO LOAD A GROUP OF POINTS FROM CARDS
581	XEQ 06		
582	RDTAX		
583	STOP		
584	◆LBL 06		
585	CF 21		
586	"NO. POI NTS ?"		COMMON SUBROUTINE OF LOAD & SAVE
587	PROMPT		
588	2		
589	*		
590	15		
591	+		
592	1 E3		
593	/		
594	16		
595	+		
596	RTN		
597	◆LBL "LIS TP"		ROUTINE TO LIST A SPECIFIED GROUP OF POINTS.
598	SF 21		
599	"BEG. PT . NO. ?"		
600	PROMPT		
601	"END PT. NO. ?"		
602	PROMPT		
603	1 E3		
604	/		
605	+		
606	STO 13		
607	◆LBL 15		
608	ADV		
609	RCL 13		
610	INT		
611	2		
612	*		
613	15		
614	+		
615	RCL IND X		
616	DSE Y		
617	RCL IND Y		
618	X<>Y		
619	XROM "NE "		
620	AVIEW		
621	ISG 13		
622	GTO 15		
623	END		

00		

Note: Refer to HP-41C OWNER'S HANDBOOK AND PROGRAMMING GUIDE for specific information on keystrokes. The Function Index is found at the very back of the Handbook. Refer to Appendix E in 67 or 97 OWNER'S HANDBOOK AND PROGRAMMING GUIDE for exact keystrokes.

REGISTERS, STATUS, FLAGS, ASSIGNMENTS

DATA REGISTERS

00 01 . . . 14 15	Used by Trav or Inter. Routines (Survey Pac Register Usage)
16 17	Coordinate For Point 1
18 19	Coordinate For Point 2
20 21 . .	etc.

NOTE:

① Required Size = 16 + 2n

Where n = no. points to be stored

STATUS

SIZ	①	TOT. REG.		USER MODE
ENG		FIX 4	SCI	ON ~ OFF
DEG	~	RAD	GRAD	

FLAGS

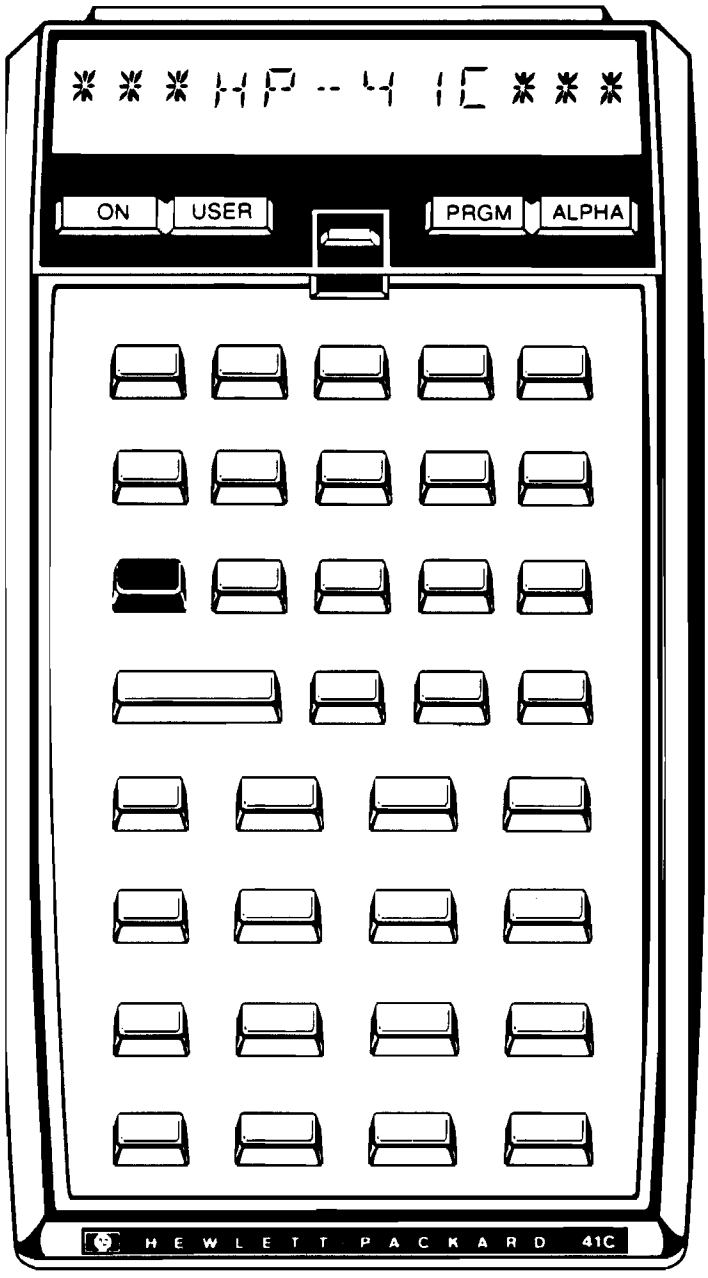
#	INIT S/C	SET INDICATES	CLEAR INDICATES
00 01 02 03 04 05 10 21 22 24 27 29		Used By TRAV OR INTER. ROUTINES. (Survey Pac Flag Usage)	
07	N/A	EXECUTION OF TRAV ROUTINE	EXECUTION OF INTER ROUTINE
09	N/A	SUPPRESS POINT NO. PROMPT	POINT NO. PROMPT ACTIVE

ASSIGNMENTS

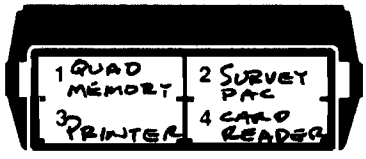
FUNCTION	KEY	FUNCTION	KEY

KEYBOARD CARD LABELING

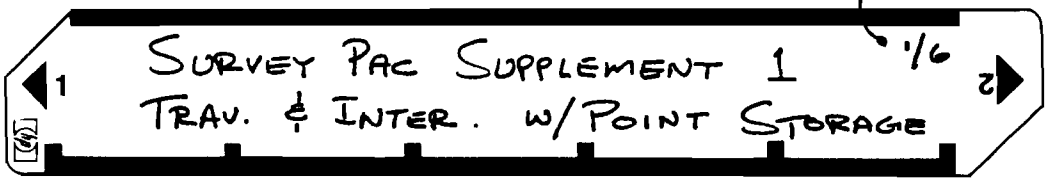
KEYBOARD



SYSTEM CONFIGURATION



CARD



SURVEY PAC SUPPLEMENT–POINT STORAGE FOR TRAV AND INTER
PROGRAM REGISTERS NEEDED: 165

USERS' LIBRARY
PROGRAM NUMBER: 02592C

ROW 1 (1 : 4)

ROW 2 (4 : 7)

ROW 3 (8 : 12)

ROW 4 (12 : 18)

ROW 5 (18 : 25)

ROW 6 (26 : 33)

ROW 7 (33 : 39)

ROW 8 (40 : 48)

ROW 9 (48 : 54)

ROW 10 (55 : 61)

ROW 11 (61 : 68)

ROW 12 (68 : 75)

ROW 13 (75 : 81)

ROW 14 (82 : 90)

ROW 15 (91 : 99)

ROW 16 (99 : 108)

ROW 17 (109 : 116)

ROW 18 (117 : 122)

ROW 19 (123 : 131)

ROW 20 (132 : 138)

ROW 21 (139 : 145)

ROW 22 (146 : 155)

ROW 23 (156 : 166)

ROW 24 (167 : 175)

ROW 25 (176 : 181)

ROW 26 (182 : 188)

ROW 27 (189 : 196)

ROW 28 (196 : 199)

ROW 29 (200 : 209)

ROW 30 (209 : 215)

ROW 31 (215 : 222)

ROW 32 (223 : 228)

ROW 33 (229 : 232)

ROW 34 (232 : 240)

ROW 35 (241 : 250)

ROW 36 (251 : 260)

ROW 37 (261 : 267)

ROW 38 (268 : 276)

ROW 39 (277 : 286)

ROW 40 (287 : 296)

ROW 41 (296 : 302)

ROW 42 (303 : 305)

ROW 43 (306 : 311)

ROW 44 (311 : 313)

ROW 45 (313 : 319)

ROW 46 (319 : 325)

ROW 47 (325 : 332)

ROW 48 (332 : 337)

ROW 49 (337 : 344)

ROW 50 (344 : 350)

ROW 51 (350 : 359)

ROW 52 (360 : 368)

ROW 53 (369 : 379)

ROW 54 (380 : 388)

ROW 55 (388 : 395)

ROW 56 (395 : 400)

ROW 57 (401 : 407)

ROW 58 (408 : 418)

ROW 59 (419 : 424)

ROW 60 (425 : 436)

ROW 61 (436 : 442)

ROW 62 (443 : 455)

ROW 63 (456 : 465)

ROW 64 (466 : 473)

ROW 65 (473 : 485)

ROW 66 (486 : 494)

ROW 67 (495 : 502)

ROW 68 (502 : 510)

ROW 69 (511 : 519)

ROW 70 (520 : 529)

ROW 71 (529 : 531)

ROW 72 (531 : 538)

ROW 73 (539 : 546)

ROW 74 (546 : 555)

ROW 75 (556 : 557)

ROW 76 (558 : 562)

ROW 77 (562 : 563)

ROW 78 (563 : 571)

ROW 79 (572 : 576)

ROW 80 (576 : 580)

ROW 81 (580 : 586)

ROW 82 (586 : 588)

ROW 83 (589 : 597)

ROW 84 (597 : 599)

ROW 85 (599 : 600)

ROW 86 (601 : 601)

ROW 87 (601 : 610)

ROW 88 (611 : 619)

ROW 89 (619 : 623)