PPX Exchange

Vol. 4 Number 4 Copyright 1980 July/August 1980

Contest Winners

Congratulations to the lucky PPX members whose names were drawn from among the 5,000 members who responded to our newsletter survey.

Terry Blake, Elmer Green, Dwight Hughes, Robert Savage, and L. E. Snyder will each receive either a TI digital watch or $100 worth of PPX software.

We would like to thank all of the members who sent survey responses. The information we gained will help us to serve you better.

Hustled

By Robert Wyer

It started off innocently enough. We were well underway on our drive to a close friend's surprise birthday party. To pass the time, my "friend" suggested we place a wager on how many cars' license plates we would have to see before we would see a match of the last two digits. Any of the cars we saw would be considered for a possible match.

Feeling lucky and quickly figuring only 100 possibilities, I said a match would occur in 40 cars. My "friend" said that to make it interesting, he would bet a match would occur in 20 cars. "Like taking candy from a baby," I chuckled! Well, to make a long story boring, I lost at a rate of about 9 out of 10 bets.

When we arrived, me checking my billfold for its now-noticeably emaciated appearance, my "friend" stated that he would give me a chance to win my money back. Of the 50 people at the party, he said I could ask any 25 of the guests and there would be a match of at least one birthday. What I thought was my chance to get even yielded yet another loss. Disgusted (and broke), I retired to the birthday boy's bedroom to lick my wounds.

Aha! A TI-59 and printer were set up on the desk in front of me. Being naturally opportunistic (especially when it comes to getting even), I quickly rejoined the party to search out yet another friend of mine, who was a millwright at the plant at which I worked. My objective was simple. This friend, although some consider him to be a common laborer, has had more than a mere smattering of statistics.

Once we were alone, I explained to him my story and asked if he could aid me with the statistical end of the problem. He agreed, however, only at a nominal 50% find-

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TI-59 APPLICATIONS:

Advertising

By Jeremy D. Sprague

Large computers are used extensively by advertisers, advertising agencies and advertising media to determine the effectiveness of their advertising in terms of potential clients reached versus cost.

We have developed a number of media analysis programs for our TI-59, which we estimate save us about $400 per month in timesharing terminal time—35% of our total.

One of the most widely used media analysis techniques involves the computation of the "reach and frequency" of an advertising schedule. For example, if six advertisements are run, how many people will be exposed to at least one of the advertisements? Among those seeing any part of the schedule, what is the average number of times they will be exposed?

Our program "Advertising Reach/Frequency Analysis" (PPX #048005F) uses the industry-accepted Beta Binomial Distribution Model to make these calculations. In addition to determining the net reach of a given number of advertisement insertions, and the average frequency of exposure, the program also computes the gross impressions (average issue audience multiplied by number of insertions) total cost of the schedule, and cost-per-thousand.

The Beta formula uses, as input, the population (total or demographic) of the geographic area served, and two figures obtained through audience survey research: the average issue audience, and the cumulative net audience to two issues ("cume"). Comparable figures are available for broadcast media.

If audience research statistics are not available, approximations can be made based on industry averages for readers-per-copy and audience turnover rates, with, of course, some loss of precision. The average daily newspaper, for example, has 2.15 readers-per-copy, and a two-issue cume 1.2 times the average issue audience. But few newspapers are average!

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Letters to the Editor

Do you have comments, compliments or (shudder) complaints about PPX-59? We have always welcomed letters from our membership, and starting with this issue we will provide space in each newsletter to share your views on PPX with your fellow members. Approximately 3-5 letters dealing with issues of general interest will be featured in each issue. Letters will be edited to fit the space available.

Dear Sirs:

What publications besides "Byte," "Display," "Chemical Engineering," and "Journal of Chemical Engineering" publish articles related to the TI-59?

My second question is, why are numbers missing from the "E" Addendum? Have they been canceled for newer ones?

And my final question is, why are the newsletters so far behind?

Jose Miguel Gallego Garcia
Tijuana, Mexico

Dear Mr. Garcia:

The only publication we are aware of which regularly publishes material on the TI-59 is "TI PPC Notes," published monthly by the TI Personal Programming Calculator Club. Its editor is well-known PPX member Maurice Swinnen. For information, send a stamped self-addressed envelope to him at: 9213 Lanham Severn Road, Lanham, MD 20801, USA.

Programs which are found to contain serious errors after they have been accepted are removed from the catalog. Also, programs are occasionally assigned a number in the wrong category. Such program numbers are generally not re-assigned.

Ah, the newsletter! I'm afraid our ambitions are to blame on this one. Now that we have switched to a local printer and solidified our change to the new, longer format, we hope to be able to put the newsletter out on schedule once again.

Dear Sir:

The following information may be of interest to federal government users of thermal paper catalog number TP 30250. This paper is available as stock number 7530-01-050-6065.

Charles Heimerdinger
Sheppard Air Force Base, TX

Dear PPX:

The finest issue of PPX arrived last weekend and I was very impressed by it, and the new format and all.

I read the article asking for programs to print up the print code on P. 1, and attached is my version of the idea.

Theodore M. Bones, Jr.
Princeton, WV

COMPLEX LADDER ANALYSIS

PPX members, C. J. McCluskey and R. Travis wrote a TI-59 program for the analysis of complex ladder networks that should be valuable to electronics engineers who design LC filters. Their program was published in the May 10, 1980 issue of Electronic Design magazine. The program allows up to nine branches with one L and one C per branch. The equivalent series resistance of each inductor and the equivalent shunt resistance of each capacitor may be included. There are three output options; 1. Transfer impedance and insertion loss, 2. Input impedance and voltage transfer, 3. Group delay.

The program should be especially useful for calculating the effects of component losses and tolerances on Butterworth, Chebyshev and Cauer (elliptic) filters. In addition, book values for these filters do not always cover the group delay characteristic, which is of importance in filters required to transmit digital signals.

The program has been designed to make data entry easy and relatively foolproof. Branch numbers are used to index the data storage for easy editing. The entries are made in units of λH, pF and Ohms with printed captions which are protected so that the program can be run in fixed decimal format. Other unit combinations are possible.

The program design is such that null entries are not needed. That is to say that if a component does not exist in a branch, it is ignored. This solves the potentially difficult problem to the user of ensuring the connectivity of the ladder containing series and shunt branches of series or parallel connected elements.

Source and load resistances are entered as data and also the start, stop and step frequencies. Thus the program can produce results for single frequencies or an automatically stepped series of frequencies. The running time is about two minutes per frequency for a nine-branch ladder. The program requires the PC-100A printer and the Master Library module (for complex number routines.)

The article is titled "TI-59 calculator analyses complex ladder networks", by C. J. McCluskey and R. Travis of Spilsbury Communications, Vancouver, B.C., Canada. Single copies of the magazine may be available, and article reprints are available for a fee. For details, write to Electronic Design, 50 Essex St., Rochelle Park, NJ 07662.

PPX members who request reprints should be aware of a typographical error in the listing: step 432 should be 47, not 27 as shown.

The PPX Exchange is published bimonthly and is the only newsletter published by Texas Instruments for TI-59 owners. Members are invited to contribute articles and items of general interest to other TI-59 users. Please limit your submissions to four double-spaced typed pages, and forward them to:

PPX
P.O. Box 53
Lubbock, TX 79408
Attn: PPX Exchange Editor

Mystery Series

Eric Tatara of Plymouth, New Hampshire, thinks he might stump, challenge, and confuse some members with the following keystrokes that, when pressed without entering learn mode, will generate the series 1, 1, 2, 3, 5, 8, 13, 21. . . .

With the calculator in power-up state, press 8322481949 x 6.5 = STO 00 0 2nd Op 17 GTO 953 R/S.

Stop by pressing R/S. How did he do this? If you give up, turn this page upside down for the solution.

SOLUTION TO MYSTERY SERIES:

The content of register zero was interpreted as program memory after changing the partition from 6 OP 17 to 0 Op 17. The value stored in register 00, $5.4096132668 \times 10^{10}$ (including guard digits), then appeared in program memory as:

952	00	0
953	01	1
954	85	+
955	65	PAU
956	32	X↑T
957	61	GTO
958	09	09
959	54	54

The TI-59 has 120 registers available in the memory storage area. These registers can be used for program memory or data memory depending upon what partition is set (up to 100 data registers or 960 program steps). Eight program steps can be stored in one register (total of 16 digits) or one data number (also stored as 16 digits: 13 for the value, two for the exponent and one to encode the signs of the value and exponent). The digit that encodes the signs is the units digit of the first code in the block of eight codes. The following table lists the different possibilities:

Number Sign	Exponent Sign	Value of Sign Digit
+	+	0
+	+	1
–	+	2
–	+	3
+	–	4
+	–	5
–	–	6
–	–	7

If the sign digit is an 8 or 9, the display will flash if the number is recalled as data. In the mystery series program, the sign digit appeared at location 952. Since both the number and exponent were positive, the sign digit was zero.

FEDERAL INCOME TAX CALCULATION

By

Otis F. Bryan, Jr.

As inflation drives people into higher income tax brackets, tax considerations become more important in making financial decisions. Thus, it is helpful to have a TI-59 routine that calculates Federal Income Tax given some taxable income without having to carry tables around. A program written for this purpose could use data packing and regression to get more efficient use of memory and time.

Three numbers are needed to calculate income tax: the lower end point of the bracket, the base tax for that bracket, and the tax rate for all income over the end point. For example, one bracket has a lower end point of $24,600, a base tax of $4,505, and a rate of 32% of everything over $24,600.

Without packing, it would take 45 registers to store the data for the 15 brackets used by married couples filing jointly. However, the data for any bracket occupies at most 12 digits—which will fit into the data registers (remember the guard digits). With packing the required memory is cut to 15 registers.

The marginal tax rate occupies the right hand two digits. The base tax takes the next six digits and, if necessary, is preceded by leading zeroes and a decimal point. The lower end point drops the trailing two zeroes and goes to the left of the decimal point. The example above is written as 246.00450532. Table 1 shows the content of the registers for married couples filing jointly.

TABLE 1

1979 FEDERAL INCOME TAX RATES FOR MARRIED, FILING JOINTLY

REGISTER	CONTENTS
1	34.00000014
2	55.00029416
3	76.00063018
4	119.00140421
5	160.00226524
6	202.00327328
7	246.00450532
8	299.00620137
9	352.00816234
10	458.01272049
11	600.01967854
12	856.03350259
13	1094.04754464
14	1624.08146468
15	2154.11750470

Storing the data is simple: enter the decimal part, add the integer part, and store the sum. The right hand two digits will disappear because the display holds only 10 digits, but they are still there. To see this, press INV 2nd Int.

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ADVERTISING

The computational formula used in our program is as follows:

$$C_N = C_{N\text{-}1} + \left(\frac{b + N\text{-}2}{k + N\text{-}1}\,(C_{N\text{-}1} - C_{N\text{-}2})\right)$$

Where: C_1 = Average issue audience

C_2 = Two-issue cumulative audience

N = Number of insertions

And:

$$k = \frac{C_2 - C_1}{2C_1 - C_2 - \frac{(C_1)^2}{p}}$$

$$b = k\left(1 - \frac{C_1}{p}\right)$$

p = population

While this "reach formula" can be executed on a non-programmable calculator, it is an extremely tedious and time-consuming process, and most users of this type of information are not used to working with mathematical formulae.

Since the formula will not work for a single insertion (when $C_{N\text{-}1} = 0$) and since C_1 and C_2 are known from audience research, the formula is bypassed for a one- or two-insertion input. For a schedule of ten insertions, for example, eight passes through the formula are necessary.

Example

Input

population = 250,000 two-issue cume = 129,500

average issue audience = 112,000 insertions = 6

Output

```
        CWDO/RF

          6.      USE
        268.8     GRP
         60.7    %RCH
         4.43     FRQ
       151802.    NET
       672000.    GRO

       250000.    POP

                CWD+O
    SALES DEVELOPMENT
          SERVICES

       151.802
       148.473
   .3948199621
   .2179406191
```

Input for Distribution Program

This program can accomplish literally hours of manual computations in less than a minute. Running time is about ten seconds for the first three insertions, and slightly under four seconds each for subsequent insertions.

Our second program, "Advertising Frequency Distribution," (PPX #048004F) determines the number of individuals who were exposed to one of the scheduled insertions, to two of the six, etcetera. Obviously, no one received the "average frequency" of 4.43 developed in the example above. Using four factors (C_N, $C_{N\text{-}1}$, k and b) output by the first program, this program uses the following formula:

$$R_1^N = N\,(C_N - C_{N\text{-}1})$$

then,

$$R_t^N = \frac{a + t\text{-}1}{b + N\text{-}1} \bullet \frac{N - t + 1}{t} \bullet R_{t\text{-}1}^N$$

when,

$a = k\text{-}b$

t = number of exposures (insertions seen)

Applying this formula to the previous example, we get the output:

```
      CWDO/CUME
       (000)

        20.0
        13.9
        12.6
        13.5
        18.5
        73.3

      151.802

EXPOSED X+ TIMES
       4.     =X

       105.3
```

Exposed Once
Exposed Twice
Exposed 3x
Exposed 4x
Exposed 5x
Exposed 6x

(See "NET" on Table I)

Exposed At Least Four Times out of Six Opportunities

Note the figure under "Exposed X + Times, 4 = X." In this option, X can be set at any number between 1 and N.

Extensions of the basic formula allow reach computations involving several media vehicles in combination, if the degree of "non-randomness" of duplication between the vehicles is known (i.e., the net audience to one insertion in each), although in some cases random duplication can be assumed. "Advertising Multi-R/F" (accepted for the G Addendum) calculates this using output from the initial program.

"Advertising: Iterative Reach" (PPX #048008G) uses a special adaptation of the basic reach formula to calculate the net reach delivered by three, four, five, etc. insertions, stopping when it has reached the desired reach level, which was input.

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ADVERTISING

Another program recently accepted by PPX ("Advertising: C_2 Finder") will take the net reach of any number of insertions and work it back to a two-issue cume for use in other computations. This is especially handy since many audience research reports contain, as published, an average issue audience and a four- or five-issue cume, but not the two-issue figure needed for the Beta formula (these published reports are sales rather than research oriented). This program was made possible by using portions of Richard Humphrey's "Improved Function Approximation" (PPX #398170E).

Two programs which have not yet been submitted to PPX are "Fast Net Reach," for use when a large number of net reaches (and only net reach) must be generated quickly, and "Gross/Net/Frequency," which will compute the third element when the other two are known. The latter program uses the "Label (X). CP INV x=t" routine for number entry routing which was described in the September 1979 "Analyst's Desk".

We still must use large computers for very complex problems, particularly for frequency distributions involving more than one media vehicle, but the cost savings we gain by using our TI-59 programs have permitted much experimentation which we otherwise could not have afforded.

HUSTLED

er's fee for any new victims which I would encounter. After developing a basic recursion formula for the probability of at least one match in a group of observations (given the maximum number of possible different observations), I keyed in the following program:

000	76	LBL	024	53	(	048	01	1
001	11	A	025	43	RCL	049	54	)
002	53	(	026	01	01	050	54	)
003	42	STO	027	65	×	051	44	SUM
004	03	03	028	43	RCL	052	02	02
005	35	1/X	029	00	00	053	42	STO
006	42	STO	030	65	×	054	01	01
007	01	01	031	53	(	055	69	DP
008	42	STO	032	43	RCL	056	20	20
009	02	02	033	03	03	057	43	RCL
010	35	1/X	034	85	+	058	00	00
011	85	+	035	01	1	059	67	EQ
012	01	1	036	75	-	060	23	LNX
013	54	)	037	43	RCL	061	98	ADV
014	32	X:T	038	00	00	062	99	PRT
015	02	2	039	54	)	063	43	RCL
016	99	PRT	040	55	÷	064	02	02
017	42	STO	041	43	RCL	065	99	PRT
018	00	00	042	03	03	066	61	GTO
019	43	RCL	043	55	÷	067	22	INV
020	02	02	044	53	(	068	76	LBL
021	99	PRT	045	43	RCL	069	23	LNX
022	76	LBL	046	00	00	070	92	RTN
023	22	INV	047	75	-			

Editor's Note: To use this program without a printer, substitute R/S for Prt at steps 62 and 65. After entering the maximum number of observations, press A and then press R/S twice (the first time R/S is pressed, the sample size will be displayed and the second time it is pressed, the corresponding odds for a match will be displayed).

By simply entering the maximum possible observations as described above and pressing A, the program prints out the probability of at least one match in a sample size from 2 to the maximum number of possibilities. Entering 100 (the maximum number of two-digit numbers contained on a license plate), the chart that was printed yielded that the odds would swing in my favor at 13 plates! Quickly plugging in 365 (the maximum possible birthdays, not considering leap year), the probability of a match passes 50% at 23 people. I'd been hustled! A smile slowly crept across my face.

On our way home, I asked my buddy about one more chance to get even.

"Why not?" he responded.

I calmly suggested matching three rather than two of the last numeric digits on the license plates. "Say about 40 cars?"

"Why forty?" he said. "Your break point is at 38. Trying to hedge your bet?"

As he smiled, he removed his billfold, and in amongst my "cash" was a piece of PC-100 printer paper. Guess what was on it! The printout of the very odds I had calculated.

The moral to this story is: 1) Never try to hustle a hustler. 2) Always cover your tracks (or at least destroy discarded but useful information like PC-100 paper with your odds on it). 3) And finally, your TI-59 can be used for more things than simply crunching numbers.

Editor's Note:
Due to Bob's recent financial incapacitation, he requested that his free statistics module go to his "friend".

Home Computer Contest

Attention TI-99/4 enthusiasts: Texas Instruments has announced an Author Incentive Program for persons submitting innovative programs written for the 99/4 or other microcomputer.

Top prize in the contest will be $3,000. In addition, there will be five $1,000 prizes and twenty $500 awards.

Programs may be written in any high-level language used on microcomputers, or in assembly language.

Additional information regarding this contest is enclose with your newsletter. Deadline for program submittal is November 15, 1980.

COMPLEX KEYBOARD

By Frank Fujimoto

The program below will simulate a complex calculator with complex arithmetic and functions (including trig). It is written using common label subroutines which correspond with the desired complex operations (e.g. the sin of a complex number is taken by pressing SBR sin). The program allows for eight pending operations and seven memories. The arithemtic section operates exactly like AOS except that each pending operation level can hold up to nine levels of parenthesis. The Master Library is required for execution.

USER INSTRUCTIONS:

1. Partition to 4 Op 17 and enter program. To enter the HIR keystroke (this keystroke was explained in the May/June 1980 issue of the Exchange), press STO 82 STO NN, where NN is the 2-digit code following the HIR command. BST and delete the two STO's.

2. Key in the complex number by first entering the real part, press x⇄t, then the imaginary part, press A. (After A is pressed, the sign of both the real and imaginary parts of the number may be changed by pressing SBR +/-.) **NOTE: All computed and recalled values may be used and processed immediately, however, all keyboard entries must be followed by pressing A.**

3. Operations. The following operations can be performed by pressing SBR X, where X is the operation: x^2, $\sqrt{x}$, 1/x, sin, cos, tan, lnx, log, +/-, (,), +, -, x, ÷, y^x, $\sqrt[x]{y}$ (press SBR INV for this operation), and =. For the inverse of any of these, press B before pressing the operation.

4. Memory Register Functions. Enter the memory register number (0-6) and press SBR, then press one of the following functions: STO, RCL, Exc, SUM, and Prd. For the inverse of these functions precede pressing the function with pressing B.

Example: Solve the following equations for E.

$A = 3 + 7i \qquad B = 4 + 2i \qquad C = -7 + 6i$

$D = \sqrt{(\log A + \sin B) \times A^2}$

$E = e^D \times (c + \frac{1}{B})$

Enter	Press	Display	Comments
	SBR CLR	0.	Initialize
3	x⇄t	0.	Enter A
7	A	3.	
0	SBR STO	3.	Store in R_0
	SBR log	.8817139968	log A
	SBR +	.8817139968	
4	x⇄t	.5063459084	Enter B
2	A	4.	
1	SBR STO	4.	Store in R_1
	SBR sin	-2.847239087	Sin B
	SBR =	-1.96552509	log A + sin B
	SBR X	-1.96552509	
0	SBR RCL	3.	Recall R_0
	SBR x^2	-40.	A^2
	SBR =	156.9227906	$(\log A + \sin B) \times A^2$
	SBR $\sqrt{X}$	12.53092772	D
	B SBR lnx	262857.7333	e^D
	SBR X	262857.7333	
	SBR (	262857.7333	
7	+/- x⇄t	-86632.78568	
6	A	-7.	Enter C
	SBR +	-7.	
1	SBR RCL	4.	Recall R_1
	SBR 1/X	0.2	$\frac{1}{B}$
	SBR =	-1276299.151	real E
	x⇄t	2139963.569	Imaginary E


```
000  82 HIR 016  82 HIR 032  22 INV 048  09  09
001  16  16 017  15  15 033  86 STF 049  32 X:T
002  32 X:T 018  42 STO 034  01  01 050  01   1
003  82 HIR 019  01  01 035  91 R/S 051  00   0
004  15  15 020  82 HIR 036  76 LBL 052  42 STO
005  91 R/S 021  16  16 037  25 CLR 053  00  00
006  76 LBL 022  42 STO 038  00   0 054  25 CLR
007  11   A 023  02  02 039  82 HIR 055  91 R/S
008  82 HIR 024  92 RTN 040  05  05 056  76 LBL
009  06  06 025  76 LBL 041  82 HIR 057  53   (
010  32 X:T 026  12   B 042  06  06 058  43 RCL
011  82 HIR 027  22 INV 043  42 STO 059  06  06
012  05  05 028  87 IFF 044  05  05 060  59 INT
013  81 RST 029  01  01 045  42 STO 061  32 X:T
014  76 LBL 030  00  00 046  06  06 062  09   9
015  10   E' 031  33  33 047  42 STO 063  67  EQ
```

```
064  03  03 080  32 X:T 096  76 LBL 112  45  Y^X
065  73  73 081  44 SUM 097  75   - 113  06   6
066  43 RCL 082  09  09 098  03   3 114  61 GTO
067  05  05 083  22 INV 099  61 GTO 115  82 HIR
068  59 INT 084  44 SUM 100  82 HIR 116  76 LBL
069  32 X:T 085  05  05 101  76 LBL 117  22 INV
070  01   1 086  69  DP 102  65   X 118  07   7
071  67  EQ 087  25  25 103  04   4 119  61 GTO
072  00  00 088  69  DP 104  61 GTO 120  82 HIR
073  88  88 089  26  26 105  82 HIR 121  76 LBL
074  93   . 090  81 RST 106  76 LBL 122  54   )
075  01   1 091  76 LBL 107  55   ÷ 123  01   1
076  49 PRD 092  85   + 108  05   5 124  61 GTO
077  06  06 093  02   2 109  61 GTO 125  82 HIR
078  49 PRD 094  61 GTO 110  82 HIR 126  76 LBL
079  09  09 095  82 HIR 111  76 LBL 127  95   =
```

128	00	0	189	36	PGM	250	76	LBL	311	16	16	372	81	RST	433	32	X:T	494	48	EXC	555	43	RCL
129	86	STF	190	05	05	251	39	COS	312	72	ST*	373	85	+	434	43	RCL	495	03	03	556	09	09
130	00	00	191	14	D	252	10	E'	313	08	08	374	95	=	435	05	05	496	42	STO	557	59	INT
131	76	LBL	192	32	X:T	253	87	IFF	314	81	RST	375	81	RST	436	59	INT	497	01	01	558	22	INV
132	82	HIR	193	11	A	254	01	01	315	76	LBL	376	76	LBL	437	67	EQ	498	43	RCL	559	44	SUM
133	42	STO	194	76	LBL	255	06	06	316	48	EXC	377	49	PRD	438	05	05	499	04	04	560	09	09
134	07	07	195	35	1/X	256	00	00	317	19	D'	378	19	D'	439	40	40	500	48	EXC	561	44	SUM
135	55	÷	196	10	E'	257	36	PGM	318	82	HIR	379	10	E'	440	22	INV	501	02	02	562	05	05
136	02	2	197	36	PGM	258	06	06	319	15	15	380	22	INV	441	44	SUM	502	42	STO	563	01	1
137	95	=	198	05	05	259	13	C	320	63	EX*	381	87	IFF	442	05	05	503	04	04	564	00	0
138	59	INT	199	15	E	260	32	X:T	321	08	08	382	01	01	443	65	×	504	36	PGM	565	49	PRD
139	32	X:T	200	32	X:T	261	11	A	322	82	HIR	383	03	03	444	03	3	505	04	04	566	06	06
140	43	RCL	201	11	A	262	76	LBL	323	05	05	384	88	88	445	85	+	506	15	E	567	49	PRD
141	05	05	202	76	LBL	263	30	TAN	324	69	DP	385	36	PGM	446	04	4	507	92	RTN	568	09	09
142	55	÷	203	23	LNX	264	10	E'	325	28	28	386	05	05	447	07	7	508	43	RCL	569	22	INV
143	02	2	204	10	E'	265	87	IFF	326	82	HIR	387	15	E	448	01	1	509	01	01	570	87	IFF
144	95	=	205	87	IFF	266	01	01	327	16	16	388	73	RC*	449	95	=	510	48	EXC	571	00	00
145	59	INT	206	01	01	267	06	06	328	63	EX*	389	08	08	450	42	STO	511	03	03	572	00	00
146	77	GE	207	05	05	268	05	05	329	08	08	390	42	STO	451	08	08	512	42	STO	573	13	13
147	04	04	208	78	78	269	36	PGM	330	82	HIR	391	03	03	452	71	SBR	513	01	01	574	43	RCL
148	12	12	209	36	PGM	270	06	06	331	06	06	392	69	DP	453	40	IND	514	43	RCL	575	07	07
149	43	RCL	210	05	05	271	14	D	332	81	RST	393	28	28	454	08	08	515	04	04	576	61	GTO
150	00	00	211	16	A'	272	32	X:T	333	76	LBL	394	73	RC*	455	43	RCL	516	48	EXC	577	82	HIR
151	32	X:T	212	32	X:T	273	11	A	334	43	RCL	395	08	08	456	01	01	517	02	02	578	36	PGM
152	02	2	213	11	A	274	76	LBL	335	19	D'	396	42	STO	457	82	HIR	518	42	STO	579	05	05
153	06	6	214	76	LBL	275	94	+/-	336	73	RC*	397	04	04	458	05	05	519	04	04	580	17	B'
154	67	EQ	215	28	LOG	276	01	1	337	08	08	398	36	PGM	459	43	RCL	520	36	PGM	581	32	X:T
155	03	03	216	10	E'	277	94	+/-	338	82	HIR	399	04	04	460	02	02	521	04	04	582	11	A
156	73	RC*	217	87	IFF	278	82	HIR	339	05	05	400	13	C	461	82	HIR	522	14	D	583	01	1
157	93	.	218	01	01	279	45	45	340	69	DP	401	43	RCL	462	06	06	523	92	RTN	584	00	0
158	01	1	219	05	05	280	82	HIR	341	28	28	402	02	02	463	01	1	524	36	PGM	585	23	LNX
159	49	PRD	220	83	83	281	46	46	342	73	RC*	403	72	ST*	464	00	0	525	04	04	586	49	PRD
160	05	05	221	36	PGM	282	81	RST	343	08	08	404	08	08	465	49	PRD	526	12	B	587	01	01
161	43	RCL	222	05	05	283	76	LBL	344	82	HIR	405	69	DP	466	05	05	527	92	RTN	588	49	PRD
162	07	07	223	16	A'	284	19	D'	345	06	06	406	38	38	467	43	RCL	528	36	PGM	589	02	02
163	44	SUM	224	01	1	285	32	X:T	346	81	RST	407	43	RCL	468	07	07	529	04	04	590	36	PGM
164	05	05	225	00	0	286	06	6	347	76	LBL	408	01	01	469	61	GTO	530	17	B'	591	05	05
165	82	HIR	226	23	LNX	287	22	INV	348	44	SUM	409	72	ST*	470	82	HIR	531	92	RTN	592	17	B'
166	15	15	227	35	1/X	288	77	GE	349	19	D'	410	08	08	471	02	2	532	36	PGM	593	32	X:T
167	72	ST*	228	49	PRD	289	03	03	350	82	HIR	411	81	RST	472	44	SUM	533	04	04	594	11	A
168	00	00	229	01	01	290	73	RC*	351	15	15	412	82	HIR	473	00	00	534	13	C	595	36	PGM
169	69	DP	230	49	PRD	291	32	X:T	352	22	INV	413	15	15	474	81	RST	535	92	RTN	596	06	06
170	20	20	231	02	02	292	65	×	353	87	IFF	414	42	STO	475	68	NOP	536	36	PGM	597	17	B'
171	82	HIR	232	43	RCL	293	02	2	354	01	01	415	03	03	476	68	NOP	537	04	04	598	32	X:T
172	16	16	233	01	01	294	85	+	355	03	03	416	82	HIR	477	61	GTO	538	18	C'	599	11	A
173	72	ST*	234	32	X:T	295	02	2	356	58	58	417	16	16	478	05	05	539	92	RTN	600	36	PGM
174	00	00	235	43	RCL	296	06	6	357	22	INV	418	42	STO	479	24	24	540	69	DP	601	06	06
175	69	DP	236	02	02	297	95	=	358	74	SM*	419	04	04	480	61	GTO	541	36	36	602	18	C'
176	20	20	237	11	A	298	42	STO	359	08	08	420	69	DP	481	05	05	542	02	2	603	32	X:T
177	81	RST	238	76	LBL	299	08	08	360	69	DP	421	30	30	482	28	28	543	44	SUM	604	11	A
178	76	LBL	239	38	SIN	300	92	RTN	361	28	28	422	73	RC*	483	61	GTO	544	00	00	605	36	PGM
179	33	X²	240	10	E'	301	76	LBL	362	82	HIR	423	00	00	484	05	05	545	43	RCL	606	06	06
180	10	E'	241	87	IFF	302	42	STO	363	16	16	424	42	STO	485	32	32	546	06	06	607	19	D'
181	36	PGM	242	01	01	303	19	D'	364	22	INV	425	02	02	486	61	GTO	547	59	INT	608	32	X:T
182	05	05	243	05	05	304	82	HIR	365	87	IFF	426	69	DP	487	05	05	548	29	CP	609	11	A
183	13	C	244	95	95	305	15	15	366	01	01	427	30	30	488	36	36	549	22	INV			
184	32	X:T	245	36	PGM	306	72	ST*	367	03	03	428	73	RC*	489	61	GTO	550	67	EQ			
185	11	A	246	06	06	307	08	08	368	70	70	429	00	00	490	05	05	551	05	05			
186	76	LBL	247	12	B	308	69	DP	369	22	INV	430	42	STO	491	08	08	552	69	69			
187	34	FX	248	32	X:T	309	28	28	370	74	SM*	431	01	01	492	43	RCL	553	69	DP			
188	10	E'	249	11	A	310	82	HIR	371	08	08	432	01	1	493	01	01	554	35	35			

MEMBERSHIP RENEWALS

Is your membership about to expire? To ensure that you will miss no newsletters, catalogs, or ordering privileges, check the renewal table to find out if your membership will soon expire.

A renewal card and reminder will be sent to each member in ample time to renew. Return the card to PPX with your check or money order for $18. Be sure to include your membership number on both your card and your check.

Membership Number	Renewal Due:
100001-101982	December 15
908733-909706	September 15
909707-910537	October 15
910538-911277	November 15
911278-912141	December 15
919573-920478	September 15
920479-921076	October 15
921077-921780	November 15
921781-922653	December 15

INCOME TAX

Unpacking is straightforward. With the data in the display, press 2nd Int to get the lower end point in hundreds of dollars. To get the base tax, press INV 2nd Int, multiply by 1 EE 6, press INV EE, then 2nd Int. To get the marginal tax rate, do the same as for the base tax, except replace 2nd Int with INV 2nd Int.

Before the data can be used, one must find the proper bracket. One way is to search upward comparing the end point of the bracket with the taxable income until the right data is found. A faster way is to get a good estimate of the bracket and then do a "local search". This is explained below:

If the tax data is packed into the first 15 registers (1-15), one can get a nice fit by regressing the register number against the end point using a logarithmic curve ($r \approx .97$). The following formula was derived using the Curve Fit programs of the Real Estate Module.

RN = −12.61688508 + 3.61963091 x TI + 1

where:

RN = Estimate of the register number

TI = Taxable Income (hundreds of dollars)

The "+1" biases the estimate upward so that the local search will be down. A regression curve falls on both sides of this data. A downward search requires the curve to be above the data everywhere.

To illustrate, suppose the taxable income is $25,210. Then TI = 252.1 and RN = 8.399. Truncating this (2nd Int) gives the 8th register as a good place to start looking. The correct register is 7 (see Table 1), but the search routine will find this in one iteration rather than seven. The tax, by the way, turns out to be $4,700.20.

While these techniques are general, the program I wrote was custom designed to meet my needs. When the adjusted gross income is entered, the program takes off five exemptions to get the taxable income and calculates the tax. No effort was made to extend this to other rate tables, although that should be straightforward.

The efficiency was good enough to leave plenty of memory for an income averaging program on the same card. Given an adjusted gross income, the program will determine if I should income average, calculate the tax, and print the data to fill out Schedule G. Otherwise, it will calculate the tax in the regular way and display it.

A note on the architecture of memory use: The memory was repartitioned so that 80 registers and 320 instructions could be used. This means that 8 Op 17 has to be executed before the cards can be read. Registers 7-32 are used for income averaging results so that the printed register number corresponds to the line number on Schedule G (the calculator was made for man, not man for the calculator). Data for lines 1-6 from Schedule G are kept with the tax records because they are not needed for any decision. The tax data is stored in consecutive registers beginning with 54. That was convenient at the time and nothing has come along to change it.

Dual Purpose User-Defined Keys

By
Forrest Chambers

Editor's Note: An article on this topic previously appeared ed in the November 1977 issue of the Exchange. Recently, PPX received the following article, which uses a method different from the "flag" method of the earlier article.

Now and again while using one of my collection of PPX programs, I encounter a data entry routine that requires the operator to press SBR x^2, SBR STO, etcetera, after each data entry. This awkward method of subroutine access is usually resorted to because of all the user-defined keys (A-E') have already been used for data entry.

Recently, in writing a program of my own, I ran up against the same brick wall. I needed to be able to easily access 21 different routines from the keyboard. After a little thought, which by no means came easily to me, I decided to try to develop a method for calling subroutines that utilized two user-defined keys (UDK) in succession. At first I tried having each UDK (A-E) set a flag and then testing the flag conditions to determine what location to transfer to. By using five UDKs, I would be able to create 25 different conditions (use of four UDKs would only create 16 conditions, which wasn't quite enough). Three erasers and two pages of code later, I discovered that by the time I tested for all the conditions I would have no room left for the "body" of my program! ("Beneath the Planet of the Flags," in the last issue, showed that a 104-step program is required to test for only eight conditions—Ed.)

And then the light dawned on me—I had been barking up the wrong brick wall. By storing the absolute addresses of each routine in packed form in data registers, I could use the GTO IND command to direct processing to the correct routine. Since each absolute address requires a three-digit code, three addresses could easily be stored per register (four if the guard digits are used). In my program, "Lbl" AA was to be located at program step 200, AB at 231, AC at

continued on page 9

potpourri

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It is important that "PPX" appear because we share P.O. Box 53 with other Texas Instruments departments. "M/S 5820" is an internal address which will also help our mail department to route your correspondence properly.

2. PPX is sorry to announce the departure of operations manager Kevin McGarrigle, who is transferring to Texas Instruments' Dallas office.

USER-DEFINED KEYS

239, AD at 251, and AE at 267. This data was packed in registers 30 and 31 as shown below:

200.231 239	30
251.267	31

Similarly, the routine locations for BA-BE would be stored in registers 32 and 33, and so on for C, D, and E.

Since most of these keyboard-accessible routines were data entry/computation routines, it was necessary to make provision for the contents of the display register to be in the x register when transfer was made to the routine. Temporary use of registers 01 facilitated this function.

Register 00 was used as a location counter and flag 0 was used to signal the first or second keystroke.

The last barrier was that of time. For it would be of no advantage to press AA instead of SBR x^2 if I had to wait to press the second "A". To speed the program, I absolute-addressed (faster than label addressing and the speeding bullet) the routine transfer segment of the program.

To my extreme pleasure, only a mere second's pause was required before pressing the second UDK.

The final result was the 103-step program listed below. To test the routine: (1) enter the program, (2) place R/S at steps 200, 231, 239, 251, and 267, (3) load registers 30 and 31 as shown previously, (4) press A, wait one second, press A again, and (5) enter the Learn mode. The program step counter should be at 201, showing that the transfer was made properly.

000	76	LBL	035	50	50	070	67	EQ
001	11	A	036	65	×	071	00	00
002	32	X↕T	037	02	2	072	98	98
003	01	1	038	85	+	073	73	RC*
004	61	GTO	039	02	2	074	00	00
005	00	00	040	08	8	075	65	×
006	32	32	041	95	=	076	01	1
007	76	LBL	042	42	STO	077	52	EE
008	12	B	043	00	00	078	03	3
009	32	X↕T	044	86	STF	079	95	=
010	02	2	045	00	00	080	22	INV
011	61	GTO	046	32	X↕T	081	59	INT
012	00	00	047	42	STO	082	65	×
013	32	32	048	01	01	083	01	1
014	76	LBL	049	91	R/S	084	52	EE
015	13	C	050	22	INV	085	03	3
016	32	X↕T	051	86	STF	086	95	=
017	03	3	052	00	00	087	42	STO
018	61	GTO	053	32	X↕T	088	00	00
019	00	00	054	03	3	089	43	RCL
020	32	32	055	77	GE	090	01	01
021	76	LBL	056	00	00	091	83	GO*
022	14	D	057	65	65	092	00	00
023	32	X↕T	058	69	DP	093	73	RC*
024	04	4	059	20	20	094	00	00
025	61	GTO	060	32	X↕T	095	61	GTO
026	00	00	061	75	-	096	00	00
027	32	32	062	03	3	097	87	87
028	76	LBL	063	95	=	098	73	RC*
029	15	E	064	32	X↕T	099	00	00
030	32	X↕T	065	01	1	100	61	GTO
031	05	5	066	67	EQ	101	00	00
032	87	IFF	067	00	00	102	80	80
033	00	00	068	93	93			
034	00	00	069	02	2			

from the Analyst's Desk

• PPX member W. Calvin Moore of York, Pennsylvania, sent us two programming ideas which we would like to pass on to you:

1. If the SUM or INV SUM hierarchy commands (HIR code 82) are used, a fraction is multiplied by ten to the power related to the decimal point location before the SUM command is executed. For example, .1 becomes 10, .02 becomes 200. This can be prevented by entering the number in the EE mode. Note the two routines below:

000	76	LBL
001	11	A
002	99	PRT
003	82	HIR
004	38	38
005	99	PRT
006	82	HIR
007	18	18
008	99	PRT
009	98	ADV
010	91	R/S

000	76	LBL
001	11	A
002	52	EE
003	99	PRT
004	82	HIR
005	38	38
006	99	PRT
007	82	HIR
008	18	18
009	99	PRT
010	98	ADV
011	91	R/S

Enter .5, press A. The first routine will incorrectly display 50, but the second will display the correct answer (5×10^{-1}).

2. One possible mistake to avoid is the use of the SBR command in iterative calculations. After five repetitions, the return register is loaded and the interation aborts. Using the GTO command avoids this.

• But alas, there is no CMs Key for the HIR registers. To overcome this paradox, William W. Buechner, of Arlington, Massachusetts, uses the following subroutine that will clear these registers (Because this routine uses OP 00, which clears the alphanumeric print registers, this routine only works when the PC-100A/C is attached:

000	25	CLR
001	69	DP
002	00	00
003	85	+
004	88	DMS
005	65	×
006	88	DMS
007	95	=

Warning—Remember that when you clear the HIR's, you also upset any pending operations.

• Palmer O. Hanson, Jr. of Largo, Florida, has found the EE INV EE sequence does more than truncate the guard digits (See page C-1 of **Personal Programming**). It also changes the calculator state from a "dead entry" to a "live entry" state. To illustrate this effect, turn on the calculator, enter 12 into the display, press x^2 and see 144 displayed. Press key 1 and key 2 and see 12 in the display again. (The display changed from 144 to 12 because the calculator was in a "dead entry" state.) Press x^2 and again see 144 in the display. Now perform the sequence EE INV EE followed by pressing key 1 and key 2. The display will contain 144.12. This shows that the EE INV EE has changed the calculator's state into "live entry".

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Editor's Note: This column presents new PPX programs now available. The abstracts here are from programs that the Analysts thought would be of special interest to members. If you have a need for a specific program, send a note to PPX. If an appropriate program has already been written, we will put the abstract in the next issue of the Exchange. Requests for programs not yet written will be placed in the "Programming Corner" column.

088015F Proration Per Diem
This program calculates the exact portion both buyer and seller are responsible for as of a specific closing or settlement date. It is designed to handle three annually due amounts. Real estate taxes can be entered either as assessment/mill format or total due. Closing date can be reentered to show "what-if" situations and allowances are made for leap years.
Robert G. Premecz, Allentown, PA
476 Steps

108004F Depreciation Schedules - Four Methods
Simultaneously lists one or more of the four methods of depreciation—straight line, double declining balance, sum of years' digits and units of production.
Michael Shanok, Hamden, CA
369 Steps, PC-100A

148010F Checkbook & Savings Account Balances
Maintains checkbook and savings account balances. Calculates and stores accumulated daily interest earned on savings. Posts interest to account.
William A. Donnelly, Louisville, KY
464 Steps, PC-100A, Mod 1

148011F Investment Versus Inflation
Calculates growth of investment and compares value of investment buying power with growth. Allows use of varying inflation rates for length of investment.
Ken Wehrkamp, Dayton, OH
290 Steps

198059F Salary Forecast With Raises
The program calculates annual salaries, by quarters, using the rate of pay—hourly or monthly salary—and the projected month of pay raises. Up to two pay raises per year can be calculated per individual.
Laurence V. Moore, Arvada, CO
469 Steps, PC-100A

208054F Linear Regression Lack-Of-Fit ANOVA
This program tests the lack-of-fit of a linear regression when replicates of the observed (Y)-values are available. The regression mean square and the residual mean square are calculated. The latter is partitioned into a lack-of-fit mean square and a pure error mean square. The linearity of the regression is tested by the ratio: Lack-of-fit mean square/pure error mean square.
Thomas Masurat, Morris Plains, NJ
472 Steps, PC-100A, Mod 10

228041F Duncan's Multiple Range Test
Duncan's multiple range test can be applied to treatment means with unequal subclass numbers. The studentized range values and error mean square are provided by the user. Significant differences are displayed.
Pamela H. Miles, Gainesville, FL
315 Steps

268037F F-Distribution and Inverse
The F-distribution probability function is obtained from a 2F1 hypergeometric series based on the incomplete beta function. The inverse search is based on Newton's method except that the formal expression for the first derivative is used instead of finite differences.
Theodore M. Bones, Princeton, WV
426 Steps

308082F Solution of 2 x 2 Complex Matrix
Solves for the two knowns in a 2 x 2 matrix with elements in the rectangular form. Solution is displayed and printed in rectangular form. Provision for solution of 3x3 determinant is also made.
Jens H. Buche, Mooroolbark, Australia
495 Steps, PC-100, Mod 1

328010F Extended Discrete Fourier Series
This program is similar to program 19 of the Math/Utilities Library. However, data packing and the hierarchy registers are used to increase the number of discrete function values that may be entered to 94 times the number of pseudo-registers per register.
Gregory L. Stark, Hicksville, NY
160 Steps, Mod 10

398189F Integer Space Vectors and Triangles
For any given space vector magnitude R this program calculates all possible unique integer sets of orthogonal components XYZ, and similarly for all integersided right triangles of hypotenuse H=R. For any arbitrary set of integers A, B, C, a separate routine generates an integer space vector set XYZR, determines the GCD of the set components and reduces the set to relatively prime cognates XYZR. Direction angles and their cosines are also calculated.
Wilbur J. Widmer, Storrs, CT
422 Steps

408047F Simulation of 3-Body Problem (Celestial Mechanics)
Traces the trajectories of three celestial bodies, all with non-negligible mass, under the influence of each other's gravitational pulls. An accurate 4th-order Runge-Kutta algorithm is used. The X- and Y- components of their velocities are the twelve state variables that are carried through this program. The user inputs initial conditions for these state variables, and gets the state variable values at the end of each time step. The time step can be varied if desired.
Stephen Gold, Lafayette, LA
371 Steps

418088F Henderson-Hasselbalch Equation
Calculates either PH, PKA, base concentration, or acid concentration from the other three variables. And where

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applicable, hydrogen ion concentration and the acid equilibrium concentration are also calculated from the PH and the PKA respectively.
Ramond C. Copen, Normal, IL
303 Steps, PC-100A

458004F Population Size Estimation
Program uses Volly's stochastic model to estimate population from studies involving the recapture of marked individuals from a given population.
Douglas E. MacLean, Brooklyn, NY
477 Steps, PC-100A, Mod 10

498006F Hurricane Tracker
The program accepts date, time latitude, and longitude information on a hurricane as announced in weather broadcasts; computes its speed, heading and distance travelled, then projects its probable position at a selected time in the future.
H. C. Sanderson, Orlando, FL
479 Steps, Mod 10

508049F Oxyhemoglobin Dissociation Curve
The program provides a hemoglobin dissociation curve from the saturation and partial pressure of oxygen for both venous and arterial blood.
Jeanne M. Buch, Abilene, TX
350 Steps, PC-100A

548007F Scanning DNA for Restriction Enzyme Sites
A DNA sequence (up to 10 bases) recognized as a cleavage site by a particular restriction is entered. This program prints or displays the location of each cleavage site in the DNA. Multiple runs allow the scanning of any size DNA.
Leonard I. Malkin, Troy, MI
122 Steps

598003F Radioimmundassay Curve and Calculations
The program averages counts from radioassays and computes the percent bound and amount of antigen from a programmed standard curve. The standard curve entered into the program as a series of (X, Y) data points. The program prints input and output data if the PC-100A printer is used.
Richard L. Kitchens, Dallas, TX
302 Steps

648084F A.C. Equivalent Circuits Conversions
Provides the user with a set of quick efficient routines of a delta to WYE or WYE to delta network and the conversion of a two element series circuit to its equivalent parallel counterpart and vice-versa. In addition, the program will convert frequency to omega and omega to frequency, convert either a capacitance or inductance to their respective reactances and back, as well as finding the inverse of any complex number.
William H. Beebe, Lilburn, GA
260 Steps

678008F Fusion-Fission Hybrid
This program will calculate overall efficiency with and without blanket multiplication of a fusion-fission hybrid together with the support ratio of the fusion driver and the cost ratio of the system compared to a breeder reactor.
Paraschos Karahalios, Dracut, Mass.
480 Steps, PC-100A

748030F Infrared Target Irradiance Vs. Range Signature
Values of radiant intensity and atmospheric extinction coefficient are entered and irradiance at any range may be calculated. Also, the Beer's Law irradiance-range curve may be found by least squares fit to experimental data. If the minimum detectable irradiance of an infrared search set is known, then target detection ranges can be predicted.
Wayne R. Houston, Ontario, Canada
223 Steps, PC-100A, Mod 1

788037F Interstellar Distances
Calculates the distance between any two stars, given their coordinates (distance, right ascension, and declination) relative to earth. Also calculates and stores distances of up to 8 closest neighbors to any given star, out of a field of up to 44 stars. Star coordinates can be stored on magnetic cards.
Steven Caine, Needham, MA
446 Steps

858003F Multiple Effect Evaporation
Calculates evaporations (lb/hr) and economy (lb H_20/lb steam) when given feed liquor flow (gal/min), feed liquor solid %, product solid %, feed liquor BE (degrees), and steam flow (lb/hr).
Mike Hastings, Fayetteville, AR
77 Steps

908172F Character Set Print-Out
The program prints in table form the complete character set of the TI-59, with associated code, in a form the user may find more desirable than that given on page VI-7 of the Personal Programming Manual. The characters are printed in two columns, each with character on the left and its code on the right.
Craig, W. Green, Happy Valley, Australia
88 Steps, PC-100A

918182F Dungeon Master's Aid
Eliminates the need for endless dice rolling by generating non-player characters for use in Dungeons and Dragons. Race is chosen at random according to the percentages listed in the player guide (TSR Inc.) or can be chosen by user for use as a Random Monster, "Occupation" of character is chosen by user as per the guidelines of the rules.
Michael A. Henry, St. Peters, MO
394 Steps, PC-100A

918198F Las Vegas Blackjack
Follows professional gambling rules and payoffs. Players can split pairs "Double Down" on any two cards and "In-

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surance" is available when the dealer has an ace showing. A portable game, no printer needed.
Lem Matteson, Kansas City, MO
781 Steps

938034F Vortac Navigation With Winds
Given vortac latitude, longitude, and elevation plus magnetic variation, aircraft altitude, range and bearing, program computes aircraft latitude and longitude. Given a second fix, respective fix times, aircraft heading, indicated temperature, and recovery coefficient, program also computes groundspeed, wind direction, and velocity. Program can also determine great circle range and wind bearing between any two known positions.
Paul D. Sperry, Boulder, CO
464 Steps, Mod 06

948020F Great Circle Marine Navigation
Computes the initial bearing along a great circle track given the starting point and destination, and the destination latitude and longitude given the starting point, bearing and distance.
Gary M. Davis, Watford, England
470 Steps, PC-100A, Mod 05

988039F Sailplane Competition - Pentalateral Task
Calculates great circle distance for 5 legs of a closed course pentalateral. Calculates scores for all flights for the task, both finishers and non-finishers. Adjusts scores in case less than 60% complete task or if there are no finishers. Sort and print scores in descending order, labeling each score with contestant's competition ID number.
Robert V. McNeil, Rockwall, TX
793 Steps, PC-100

PROGRAMMING CORNER

Are there programs that you would like to see made available through PPX? Send us a description of your programming needs. PPX is not staffed to do custom programming, but we are offering incentives to those PPX members who write programs to fill Programming Corner requests. See the May/June 1980 "PPX Exchange" for details.

Two PPX members have already taken advantage of this offer. Tom Chambers ("Random Number/Sample Generator," PPX #268039) and Gregory Stark ("Two Constant Weibull Distribution," PPX #268040) have each received a free Solid State Software™ module of their choice.

We will be accepting submissions to fill the following requests until October 31, 1980:

- A program for Slope Stability Analysis by the Swedish Slip Circle Method with provisions for groundwater, horizontal seismic forces, and critical circle coordinates.
- A program to test the fit of entered data to different distributions (normal, exponential, etc.) and determine degree of fit for each.
- A three dimensional Lunarlander Game in which one must pilot his spaceship from orbit to a soft landing at a specified landing site without exhausting his limited fuel supply.

ADDRESS CHANGES

In order to ensure uninterrupted service, please submit address changes to PPX at lease six weeks prior to the effective date of the change. Send your name, membership number, old and new addresses to:

PPX
P.O. Box 53
Lubbock, TX 79408

TI-59 Programming Seminar

A Texas Instruments Programming Seminar may be coming to your area. These seminars will provide beginning and intermediate programming training on the TI-59. Classes consist of two 8-hour days of hands-on training that begin at 8:30 A.M. and last until 4:30 P.M. A luncheon will be served daily. You must provide your own TI-59 and it is highly recommended that you also bring your PC-100 A/C Printer. As a service to our members, we are including the schedule below for dates and locations.

To attend, send your name, mailing address, and telephone number to: TI-59 Seminar; P.O. Box 10508, M/S 5873; Lubbock, Texas, 79408. Also include your check or money order for the tuition fee of $150 per person (purchase orders are not accepted). Those members that want to attend need to respond as quickly as possible as there is a limit of 50 participants per class.

SEMINAR DATES		LOCATION
August	7/8	Dallas, TX
August	28/29	Westbury, Long Island
Sept.	17/18	Philadelphia, PA
Sept.	22/23	Pittsburgh, PA
October	14/15	Costa Mesa, CA
October	20/21	Phoenix, AZ
Nov.	13/14	Detroit, MI
Nov.	17/18	Cleveland, OH
Dec.	4/5	Orlando, FL
Dec.	11/12	Burlingame, CA