PPX EXCHANGE

Vol. 2 Number 6 Copyright 1978 November 1978

Happy Anniversary PPX-59! One year ago, PPX-59 released its first Software Catalog containing over 200 programs. Upon release of the December 1978 Software Addendum, over 1000 programs will be offered. Active membership participation has made this possible. PPX-59 would like to take this opportunity to thank its members for all their time and effort. As an anniversary celebration would not be complete without gifts, PPX-59 would like to present one year complimentary memberships to its first 10 members:

Ralph Catapano
Rene Amon
Gordon W. Stubbs
William D. McCoy
David H. Miller
Michael D. Nobel
Richard W. Stewart
Rolland Darby
James R. Pollock
R.E. Ramsay

PPX-59 looks towards the future and many more anniversary celebrations.

PPX POTPOURRI

1. **PPX-52 Members** — SR-52 Games Libraries will continue to be offered for the unbelievable low price of $14.95 through December 31, 1978.

2. A number of questions regarding the operation and programming of the TI-59 and SR-52 have been received by PPX. Due to limited staffing these questions must be forwarded to Consumer Relations. To avoid this and thus shorten response time, please send these types of questions directly to:

Consumer Relations Department
Texas Instruments Inc.
P.O. Box 53
Lubbock, Texas 79408

Only those questions regarding PPX operations or programs should be sent to PPX.

3. PPX-59 will be releasing an Addendum to the July 1978 Software Catalog at the end of December. Over 500 new programs will be offered to PPX-59 members, bringing the total program offering to over 1000.

4. PPX is currently working on the necessary procedures to ensure smooth PPX-59 Membership Renewals. Information on renewals will be announced in the January issue of the PPX Exchange.

5. Regretfully we are unable to fill PPX-59 orders for Master Libraries. These libraries are part of the calculator package and are not available in replacement form.

6. PPX fills orders by number. We have found that members often write down the wrong program number. By getting into the habit of entering **both the program number and title**, you can insure, in your own mind, that you have ordered correctly.

7. When you send PPX an address change, please include your membership number.

8. For your convenience, PPX now offers three new accessory items — battery packs and two types of adapter/chargers. To order, please write the item(s) on your PPX-59 order form as follows: Rechargeable battery pack (BP-1A) $9.95; 12 volt adapter/charger (DC9105) $12.95; AC adapter/charger 120 Vac (AC9131) $4.95.

GOOD NEWS FOR 52ERS

Although this issue of the PPX Exchange marks the final newsletter for PPX-52 members, all ordering privileges continue. With this issue, we'd like to spread the news of a sale on all single programs offered in past PPX-52 Catalogs and Addendums.

Order 5 or more PPX-52 programs and the cost to you will be $2 per program — that's 1/3 off! (Normal taxes, postage and handling apply.) This offer is good until February 28, 1979. With the holidays just around the corner, give yourself the gift of PPX-52 software.

INCREASE YOUR COMPANY'S PRODUCTIVITY

Last year, Texas Instruments invested over $1 million in a program designed to increase the productivity of its professional people. The productivity program consisted of distributing approximately 8,000 TI-59's and then providing training to ensure effective use of the machines. The results were outstanding. An overall productivity increase of 4 percent was achieved as the TI-59's took up the daily burden of calculations in which professionals are involved. A second major benefit of the program was a 40% reduction in time sharing expense as programs were converted from TI's large central computer system to the TI-59.

Based on the success of this program, Texas Instruments is now offering the Professional Productivity Program (TIPPP) to other corporations.

Through TIPPP, a company can arrange for the necessary training to implement TI-59's into their daily work. TIPPP also offers a wide range of application software and custom Solid State Software™ modules. If your company would like to know more about TIPPP, write to:

Gary Lipscomb
Texas Instruments
P.O. Box 10508 M.S. 5873
Lubbock, Texas 79408

STATISTICAL APPLICATIONS

Upon browsing through the PPX-59 Catalog an astonishing fact is driven home. That is, that statistics is truly a universal tool. For example, Oliver Benson uses statistical calculations in the area of Political Science (see PPX-52 #80001-80013). At the same time, David Patterson is deeply involved in measurements used in Anthropology and Genetics. His work in Anthropology includes:

- "Construction of Demographic Life Tables" (PPX-59 #488001) allows computation of the values of a life table with up to 30 age intervals.
- "Biological State Index" (PPX-52 #480003) measures the portion of a given generation that has a chance to participate fully in the reproduction of the next generation.
- "Mean Measure of Distance" (PPX-52 #480008) is used to assess the biological relationships between populations based upon either multiple discrete traits or metrical measurements.

The SR-52 provides an excellent means for simulation of many genetic allele systems and calculation of the genetic relationships of populations. Among Mr. Patterson's contributions to PPX-52 in Genetics are:

- "Two Allele Gene Frequency Change" (PPX-52 #540005) and "Three Allele Gene Frequency Change" (PPX-52 #540006) automatically calculate the frequency change of the genes and the average fitness in each generation for any number of generations.
- "Genetic Distances I and II" (PPX-52 #540009, 540010) computes the genetic distances between pairs of populations on the basis of allele frequencies of multiple genetic loci.

Although the parameters may vary widely between the Political Scientist and Anthropologist, they have much in common — the tool of statistics.

SR-52/TI-59: THE ART OF DATA PACKING

For programs requiring mass amounts of data storage, e.g. Income Tax Tables, there is a storage technique known as "packing". As a data register in the SR-52 and TI-59 is capable of containing up to 12 digits (13 digits on the first model of the SR-52), it is economical to pack as many digits as possible into each data register.

When the calculator examines the contents of a register, it assumes that all the digits comprise one number unless told differently. If we want to pack sets of digits into a register, we must define the beginning and end of each set as well as the location of the decimal point within each set. For any group (of sets) to be packed both the x and y characteristics of the group must be defined. To do this, we first define **digits to the left of the decimal point in each set as, x and digits to the right of the decimal point in each set as, y.** Next, we determine the x and y characteristics of each set. Then, we select the set (within the group) that has the most digits in the x position and that which has the most in the y position. These values are then used as the total group's x and y characteristics. (Note: if you pack a set whose x and/or y characteristic is smaller than what has been defined, leading and trailing zeroes will automatically be packed to fill the area reserved.)

As an example, let us pack a group of six sets of 2-digit numbers of the form x.y into register 01. The numbers are: .3, 8.0, 1.2, 8.2, 2.2 and 0. According to our definition of x and y, x = 1 and y = 1. In LRN mode, key in:

SR-52

000	46	LBL	
001	11	A	
002	55	÷	
003	01	1	10^x
004	00	0	
005	95	=	
006	42	STO	
007	00	0	
008	00	0	
009	01	1	10^{x+y}
010	00	0	
011	00	0	
012	22	INV	
013	49	PRD	
014	00	0	
015	01	1	
016	43	RCL	
017	00	0	
018	00	0	
019	44	SUM	
020	00	0	
021	01	1	
022	81	HLT	

TI-59

000	76	LBL	
001	11	A	
002	55	÷	
003	01	1	10^x
004	00	0	
005	95	=	
006	42	STO	
007	00	00	
008	01	1	10^{x+y}
009	00	0	
010	00	0	
011	22	INV	
012	49	PRD	
013	01	01	
014	43	RCL	
015	00	00	
016	44	SUM	
017	01	01	
018	91	R/S	

Enter the first number, press A. Repeat this procedure for the next five numbers. To use this packing routine for any group of positive numbers, change the italicized values shown above, to the appropriate x and y characteristics of the group.

Now that we have packed our data, let's try to unpack it in reverse order. In LRN mode, key in:

SR-52

023	46	LBL	
024	12	B	
025	01	1	10^{x+y}
026	00	0	
027	00	0	
028	49	PRD	
029	00	0	
030	01	1	
031	43	RCL	
032	00	0	
033	01	1	
034	22	INV	
035	37	DMS	
036	22	INV	
037	37	DMS	
038	57	FIX	
039	00	0	
040	37	DMS	
041	22	INV	
042	57	FIX	
043	22	INV	
044	44	SUM	
045	00	0	
046	01	1	
047	55	÷	
048	01	1	10^y
049	00	0	
050	95	=	
051	81	HLT	

TI-59

019	76	LBL	
020	12	B	
021	01	1	
022	00	0	10^{x+y}
023	00	0	
024	49	PRD	
025	01	01	
026	43	RCL	
027	01	01	
028	59	INT	
029	22	INV	
030	44	SUM	
031	01	01	
032	55	÷	
033	01	1	10^y
034	00	0	
035	95	=	
036	91	R/S	

Press B, the sixth number will be displayed. Repeat this procedure for the next five numbers. To use this packing routine for any group of positive numbers, change the italicized values shown above, to the appropriate x and y characteristics of the group.

Let's complicate things by assuming that each of our six numbers has a sign associated with it (i.e., some or all of the numbers may be negative). If your data might include negative numbers, you must devise a way of storing the sign with the number.

There are many methods for storing the sign. Probably the easiest to implement is a slight modification of what is referred to as "ten's complement". The ten's complement of a single digit negative number is simply that number plus 10. For example, the ten's complement of -3 is (-3)+ 10=7. However, when we look at the 7 later, we won't know whether it is actually a 7 or a -3. To handle this, we'll revise the technique, and instead of adding 10 we'll add 100 (i.e., ten's complement requires adding 10^{x+1} to all negative number sets where x is the number of digits to the left of the decimal point). Now -3 becomes (-3)+ 100=97. If our original number had been positive, we would have done nothing. We can now look at the digit in the ten's place to determine the sign of the number. If it is not a zero, we subtract 100 to get back to the original number (97 - 100 = -3).

Let's modify our original example so that the six numbers are -.3, 8.0, -1.2, 8.2, -2.2 and 0, and use the ten's complement technique to pack them into register 01. Notice that an additional digit is now required for each number's sign. Therefore, we can only pack four of the six numbers. Let's pack -.3, 8.0, -1.2, and 0. The first number is negative, so we will add 100, getting 99.7, then divide by 100 (we now have .997) and store it in register 01. Before proceeding to the next number, we need to make room for it in register 01 as follows: 1000 INV *Prd 01. (Register 01 now contains .000997). Since the next number is positive we simply divide by 100 and sum it into register 01. Again we must shift the number to the right, so we press 1000 INV *Prd 01. This process is repeated until all four numbers are stored. The packing routine just described is as follows:

SR-52

```
000  46 LBL
001  16  A'
002  80 IF+
003  15   E
004  85   +
005  01   1 }
006  00   0 } 10^(x+1)
007  00   0 }
008  95   =
009  46 LBL
010  15   E
011  55   ÷
012  01   1 }
013  00   0 } 10^(x+1)
014  00   0 }
015  95   =
016  42 STD
017  00   0
018  00   0
019  01   1 }
020  00   0 } 10^(x+y+1)
021  00   0 }
022  00   0 }
023  22 INV
024  49 PRD
025  00   0
026  01   1
027  43 RCL
028  00   0
029  00   0
030  44 SUM
031  00   0
032  01   1
033  81 HLT
```

TI-59

```
000  76 LBL
001  16  A'
002  77  GE
003  15   E
004  85   +
005  01   1 }
006  00   0 } 10^(x+y)
007  00   0 }
008  95   =
009  76 LBL
010  15   E
011  55   ÷
012  01   1 }
013  00   0 } 10^(x+1)
014  00   0 }
015  95   =
016  42 STD
017  00  00
018  01   1 }
019  00   0 } 10^(x+y+1)
020  00   0 }
021  00   0 }
022  22 INV
023  49 PRD
024  01  01
025  43 RCL
026  00  00
027  44 SUM
028  01  01
029  91 R/S
```

Enter the first number, press A'. Repeat this procedure for the next three numbers. To use this packing routine for any group of numbers, change the italicized values shown above, to the appropriate x and y characteristics of the group. (Notice that we cannot see the entire group by simply recalling register 01, as the display can only contain 10 digits at one time.)

The following routine will unpack the numbers in register 01 in reverse order:

SR-52

```
034  46 LBL
035  17  B'
036  01   1
037  18  C'
038  90 IFZ
039  40  X²
040  01   1 }
041  00   0 } 10^(x+1)
042  00   0 }
043  94 +/-
044  85   +
045  46 LBL
046  40  X²
047  02   2   x+y
048  18  C'
049  95   =
050  55   ÷
051  01   1 }
052  00   0 } 10^y
053  95   =
054  81 HLT
055  46 LBL
056  18  C'
057  22 INV
058  28 LOG
059  49 PRD
060  00   0
061  01   1
062  43 RCL
063  00   0
064  01   1
065  22 INV
066  37 DMS
067  22 INV
068  37 DMS
069  57 FIX
070  00   0
071  37 DMS
072  22 INV
073  57 FIX
074  22 INV
075  44 SUM
076  00   0
077  01   1
078  56 RTN
```

TI-59

```
030  76 LBL
031  17  B'
032  01   1
033  18  C'
034  67  EQ
035  33  X²
036  01   1 }
037  00   0 } 10^(x+1)
038  00   0 }
039  94 +/-
040  85   +
041  76 LBL
042  33  X²
043  02   2   x+y
044  18  C'
045  95   =
046  55   ÷
047  01   1 }
048  00   0 } 10^y
049  95   =
050  91 R/S
051  76 LBL
052  18  C'
053  22 INV
054  28 LOG
055  49 PRD
056  01  01
057  43 RCL
058  01  01
059  59 INT
060  22 INV
061  44 SUM
062  01  01
063  92 RTN
```

To unpack the fourth number, press B'. Repeat for the next three numbers. To use this routine for unpacking any group of numbers substitute the italicized values shown above, to the appropriate x and y characteristics of the group.

The routines for packing and unpacking register 01 have been outlined. Now it is up to you to implement them into your own program.

PROGRAMMING SYSTEMS

PPX has received some programs of a length which does not fit the general format of PPX-59. For this reason, they were not offered in the July PPX-59 Software Catalog. However, as we did not want to pass up these excellent programs, we are now offering them as programming systems for $15 each. The programs are as follows:

STAR TREK: This program matches the popular game of Star Trek as it is found on many small computer systems today.

William G. Bryson, Houston, Tx.
6295 steps, PC-100A

COMPLETE PAYROLL SYSTEM (NEW YORK): Handles complete payroll calculations for weekly and quarterly reports. Incorporates tax tables, provisions for sick days, vacation days, etc. With modification, this program may be used in other states.

Merton A. Sigoda, Roslyn Heights, New York
5000 steps, PC-100A

TEXAS INSTRUMENTS PRESENTS

FIVE NEW SPECIALTY PAKETTES

PPX has just completed publishing five new specialty pakettes. These pakettes, along with the nine previously published pakettes, provide an informative well-rounded collection of programs. The new pakettes are:

59 FUN — Everyone will enjoy these entertaining yet challenging games. Programs include such favorites as Space War, Skydiving, and Baseball. Learning games in which the calculator will gain experience after every game, such as Tic-Tac-Toe and Hexpawn, will keep you on your guard.

LAB CHEMISTRY — If you are involved with lab chemistry, this pakette is for you. Among the problems solved are elemental composition, psychrometric calculations, general thermodynamics, and least squares activation energy.

3 D GRAPHICS — A must for draftsmen and illustrators. With programs such as isometric projection, oblique projection, and axonometric projection, you can accurately redraw your object to a new viewing angle. Provides translation of original points to new coordinate points.

MATHEMATICS — This collection of programs was put together with the math student in mind. Programs dealing with functions and derivatives, numerical integration, and quadratic and cubic equations will aid anyone involved with calculus and algebra.

FLUID DYNAMICS — Aids the engineer in solving fluid dynamic problems including equivalent pipe length, pressure drop, and heat transfer coefficients. Valve sizes and flow rates are also calculated. Programs cover flow of both compressible and noncompressible fluid.

SOURCEBOOK FOR PROGRAMMABLE CALCULATORS

Attention College Students: PPX-59 is now offering a textbook "Sourcebook For Programmable Calculators", designed to guide you in using your TI-58/TI-59 programmable calculator in your college studies. The approach taken in this book is towards solving specific applications as opposed to teaching the functions of the calculator. Chapters in the book include: Basic Number Theory, College Algebra and Trigonometry, Calculus and Linear Algebra, Statistics, Statistical Inference and Experiment Design, Music Theory, Business and Operations Research, Economics, Biology, Biomedical Engineering, Electrical and Systems Engineering, Physics and Astronomy. Each chapter contains a selection of application situations, along with a brief look at the theory and background information necessary to lead you to a program solution. Related examples are outlined for you to explore on your own. Programs in the book provide "bite-size" segments which can be used within your own applications programs.

For convenience, the material is cross-referenced to the Personal Programming manual and the Master Library manual.

To order your copy, enter "Sourcebook" on your PPX-59 order form and include $12.95 plus tax and $1.00 postage and handling.

THE MATH/UTILITIES LIBRARY

If you write your own programs, this library is for you! The majority of the programs in this library are designed to be used either on their own or as subroutines in your programs. Applications range from utility programs such as printer formatting and large scale plotting to advanced mathematical routines. The following is a list of the programs contained in the library.

PROMPTER — Prints standard prompting messages and prompts magnetic card entry.

ALPHA MESSAGES — Use your calculator and PC-100A to write and store messages.

PRINTER FORMATTING — Simulates format statements used by high-level computer languages.

SUPER PLOTTER — Plot up to ten functions simultaneously. Using multiple printer strips, a graph of any size and precision may be plotted.

SORTING — Quickly orders a list of up to 99 elements using an advanced technique known as the shell sort.

DATA ARRAYS — Stores a matrix of data in the calculator.

DATA PACKING — Effectively increases the number of available data registers by packing data.

PRIME FACTORS — Determines all prime factors of an integer.

HYPERBOLIC FUNCTIONS — Calculates the hyperbolic sine, cosine, and tangent and their inverses.

GAMMA FACTORIAL — Evaluates the gamma function and determines factorials for positive integers.

RANDOM NUMBERS — Generates sequences of uniformly or randomly distributed random numbers.

NORMAL DISTRIBUTION — Solves for areas under the standard normal distribution curve.

INTERPOLATION — Fits an (n-1) order polynomial to n input data points and computes f(x) predicted by this polynomial using Aitken's method.

ROOTS OF FUNCTION — Finds real roots of a function using Newton's method.

MINIMAX — Determines the maxima and minima of a function.

ROMBERG INTEGRATION — Approximates the integral of a function to a stated necessary limit over a given interval.

DIFFERENTIAL EQUATIONS — Solves first and second order differential equations.

DISCRETE FOURIER SERIES — Fourier sine and cosine coefficients are computed for discrete values of a periodic function.

CALCULATOR STATUS — Detects and stores calculator status (fix mode, partitioning, etc.) in data memory where it can be recorded on magnetic cards.

VARIABLE ARITHMETIC — Designed to be used as a keyboard calculating aid by storing, recalling, or computing the variables A-E.

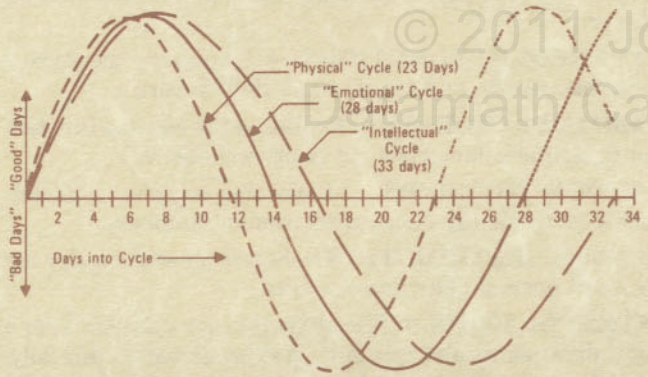
SR-52 BIORHYTHM PATTERNS

Many believe, that our physical, emotional, and intellectual "peaks and valleys" follow a cyclic pattern which begins at birth and continues through life. This phenomenon is known as your biorhythm. Because these peaks and valleys are cyclic, biorhythm tracing is an excellent application for the SR-52 calculator. This program is offered solely for its entertainment value in determining an individual's position on each of these cyclic curves on any given date. In addition, the degree of relative match between any two sets of curves (i.e., two individuals) is calculated.

PPX wishes to thank J. E. Eller for his excellent revision of the Texas Instruments' program.

DESCRIPTION:

The periods assumed for each of the cyclic patterns in biorhythm studies are: Physical — 23 days; Emotional — 28 days; Intellectual — 33 days. These cyclic patterns are presented graphically in the diagram below:



BIORHYTHM "CYCLES"

As shown in the diagram, "good" days are when the curve is above the horizontal lines; days below the line are "bad" days. Crossover days are "critical" days. Because these curves are continuous, any given day will fall somewhere within one of the repeating cycles. The amplitude of each cycle may be expressed as a value between -1 and 1 where -1 is the low point, 0 is the critical point, and 1 is the high point on the curve. Using this program you can determine your position in the biorhythm cycles on any given day simply by entering your birthdate and the date in question.

The relative match of one person's "ups and downs" to another's is called biorhythm compatibility. The composite match of the three cycles is computed by the program. The compatibility rating (a percentage value) is normally evaluated in the following way:

50% is average
below 35% indicates potential for strong variances
above 65% indicates potential for blissful relations

USER INSTRUCTIONS:

1. Enter program.
2. Set mode switch to R (radians).
3. Enter birthdate, press A. (Dates are entered in the form MM.DDYYYY, where MM is the month number, DD is the day and YYYY is the year.
4. Enter analysis date/birthdate (see examples below) and press RUN.
   If used with the PC-100(A), the following results will be printed in succession:
   a. Analysis date
   b. Number of days between birthdate and analysis date
   c. Days into physical cycle
   d. "Rise (+1) or Fall (-1)" status of the physical cycle curve
   e. Amplitude of physical cycle curve
   f. Days into emotional cycle
   g. "Rise (+1) or Fall (-1)" status of the emotional curve
   h. Amplitude of emotional curve
   i. Days into intellectual cycle
   j. "Rise (+1) or Fall (-1)" status of the intellectual curve
   k. Amplitude of intellectual curve
   l. Compatibility factor (scale of 0 to 100)
   If used without the PC-100(A), each of the listed values will be displayed by pressing RUN.
5. For new dates, return to step 3.

EXAMPLE: (Set mode switch to R)

I. The compatibility for individuals born on July 27, 1925 and June 18, 1927 is determined.

Enter	Press	Display	Comments
7.271925	A	7.271925	Birthdate #1
6.181927	RUN	6.181927*	Birthdate #2
		74.	% compatibility

* Without a printer, press RUN for each result. The next ten outputs (printer or display) are to be ignored. The eleventh output represents the % compatibility.

II. The age in days and the positions of each of the three curves on June 14, 1978, for an individual born on June 18, 1927, is determined.

Enter	Press	Display	Comments
6.181927	A	6.181927	Birthdate
6.141978	RUN	6.141978+	Analysis date
		18624.	Age in days
		18.	Physical: days into cycle
		1.	rising curve
		-0.98	amplitude
		5.	Emotional: days into cycle
		1.	rising curve
		0.90	amplitude
		13.	Intellectual: days into cycle
		-1.	falling curve
		0.62	amplitude

\+ Without a printer, press RUN for each result. With a printer, the last (eleventh) result should be ignored.

BIORHYTHM LISTING*

000	99	PAP	056	57	FIX	112	00	0	168	43	RCL
001	58	DSZ	057	02	2	113	75	-	169	00	0
002	68	8'	058	98	PRT	114	16	A'	170	04	4
003	43	RCL	059	43	RCL	115	42	STO	171	75	-
004	00	0	060	00	0	116	00	0	172	01	1
005	08	8	061	07	7	117	03	3	173	95	=
006	57	FIX	062	18	C'	118	95	=	174	55	÷
007	00	0	063	75	-	119	65	×	175	04	4
008	98	PRT	064	93	.	120	04	4	176	95	=
009	99	PAP	065	05	5	121	42	STO	177	16	A'
010	99	PAP	066	95	=	122	00	0	178	85	+
011	99	PAP	067	40	X²	123	00	0	179	43	RCL
012	99	PAP	068	30	ΓX	124	22	INV	180	00	0
013	81	HLT	069	65	×	125	28	LOG	181	03	3
014	46	LBL	070	06	6	126	65	×	182	85	+
015	68	8'	071	07	7	127	42	STO	183	43	RCL
016	05	5	072	95	=	128	00	0	184	00	0
017	44	SUM	073	44	SUM	129	04	4	185	02	2
018	00	0	074	00	0	130	03	3	186	65	×
019	06	6	075	08	8	131	06	6	187	03	3
020	43	RCL	076	86	RST	132	05	5	188	01	1
021	00	0	077	46	LBL	133	95	=	189	95	=
022	01	1	078	16	A'	134	44	SUM	190	56	RTN
023	18	C'	079	53	(	135	00	0	191	46	LBL
024	75	-	080	24	CE	136	03	3	192	11	A
025	16	A'	081	75	-	137	43	RCL	193	47	CMS
026	95	=	082	93	.	138	00	0	194	42	STO
027	18	C'	083	05	5	139	02	2	195	00	0
028	20	1/X	084	54	)	140	75	-	196	01	1
029	65	×	085	57	FIX	141	03	3	197	17	B'
030	98	PRT	086	00	0	142	95	=	198	94	+/-
031	42	STO	087	52	EE	143	22	INV	199	48	EXC
032	00	0	088	22	INV	144	80	IF+	200	00	0
033	07	7	089	52	EE	145	67	7'	201	01	1
034	02	2	090	56	RTN	146	43	RCL	202	22	INV
035	65	×	091	46	LBL	147	00	0	203	57	FIX
036	59	π	092	18	C'	148	02	2	204	81	HLT
037	18	C'	093	55	÷	149	65	×	205	17	B'
038	95	=	094	43	RCL	150	93	.	206	44	SUM
039	42	STO	095	00	0	151	04	4	207	00	0
040	00	0	096	06	6	152	85	+	208	01	1
041	05	5	097	56	RTN	153	02	2	209	43	RCL
042	33	COS	098	46	LBL	154	93	.	210	00	0
043	80	IF+	099	17	B'	155	03	3	211	01	1
044	69	9'	100	57	FIX	156	95	=	212	99	PAP
045	00	0	101	06	6	157	16	A'	213	98	PRT
046	75	-	102	98	PRT	158	94	+/-	214	01	1
047	46	LBL	103	75	-	159	44	SUM	215	44	SUM
048	69	9'	104	16	A'	160	00	0	216	00	0
049	01	1	105	42	STO	161	03	3	217	01	1
050	95	=	106	00	0	162	01	1	218	01	1
051	98	PRT	107	02	2	163	44	SUM	219	08	8
052	43	RCL	108	95	=	164	00	0	220	42	STO
053	00	0	109	65	×	165	04	4	221	00	0
054	05	5	110	01	1	166	46	LBL	222	06	6
055	32	SIN	111	00	0	167	67	7'	223	86	RST

*If the program is to be used without a printer, change the Prt instructions to HLT at locations 030,051,058,213. In addition, delete Prt instruction at location 102.

FROM THE ANALYST'S DESK

• Armed with his trusty SR-52/PC-100, Mr. M. Patton Echols, Jr., Arlington, Va., participated in the Virginian Republican Party Convention this summer. As the votes were cast for the nomination of a Senate candidate, he busily compiled the results on a blow by blow basis. Immediately after the last vote was cast, he printed the decision of the voters. By the sixth ballot, the senate runners discovered that vote tabulation on the SR-52 was usually ahead of the "chair" by ten to fifteen minutes. This changed the runners' traffic patterns as they realized that 'a few steps on the SR-52' can save 'many steps of man-kind.'

• Will the author of "Bass Booster", submitted the end of August, please come forward? As your program submission does not have the "Submittal Agreement" filled out, PPX does not know who put in all that hard work.

• The program "Arithmetic Tutor (TI-59)" featured in the July PPX Exchange did not avoid division by zero. Please make the following insertions to the program to take care of this omission:

Insert at location 099:
Insert at location 105:
Insert at location 325:

099	71	SBR
100	29	CP
105	71	SBR
106	29	CP
325	76	LBL
326	29	CP
327	22	INV
328	87	IFF
329	03	03
330	03	03
331	35	35
332	29	CP
333	67	EQ
334	48	EXC
335	92	RTN
336	76	LBL
337	48	EXC
338	71	SBR
339	88	DMS
340	71	SBR
341	29	CP
342	92	RTN

• PPX has received several questions about keying in TI-59 programs from PC-100A tape listings. In general, the user should key in what is indicated on the tape. **See page VI-6 of your Personal Programming manual** for a complete list of PC-100A tape instructions and their equivalent key strokes. The following are exceptions to the rule:

The instructions *Fix, *st flg, *if flg, and *Dsz should be keyed in with a single digit number (0-9) which is stored in one program location. When printed, a 'silent' zero is present in the PC-100A listing. For example, if *Fix 2 is keyed into the TI-59 (with printer) the printed output will include a '**silent**' zero which was not keyed in.

```
000  58  FIX
001  02  02
```

The absolute address following the instructions *x=t, *x≥t, GTO, SBR, and *Dsz n (where n is the register) occupies two program locations. As an absolute address can be up to 3 digits long, the hundreds digit goes into the first location and the tens and ones digits share the second location. For example, pressing GTO 058 results in the following printout:

```
000  61  GTO
001  00  00
002  58  58
```

The PPX Exchange is published every other month and is the only newsletter published by Texas Instruments for TI-59 owners. You are invited to submit items you feel are of general interest to other TI-59 users. Inputs should be limited to 3 double-spaced typed pages. Please forward your newsletter inputs and any questions to:

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