PPX EXCHANGE

Vol. 3 Number 3 Copyright 1979 May 1979

PPX POTPOURRI

1. Regretfully we are unable to fill orders for Programming **Systems** on the "3 Introductory **Programs**" order form. The intent of this "3 Introductory" offer is to familiarize our members with the format of the programs available through our catalog. Therefore, please use your introductory program order form to request **only individual programs.**

2. **PPX Redesigns Submission Forms.** Recent program submitters have seen some changes in the PPX-59 Submission Form.

- Submittal Agreement
  a. Space has been added for your **membership number.** By filling in this information you will be assured prompt delivery of your acceptance materials upon program checkout.
  b. This agreement has been rewritten to clarify the fact that the submitter retains his or her copyright on the program(s) and grants Texas Instruments an unrestricted license under the copyright.
- User Instructions
  a. Additional space has been provided for listing the data registers used in your program.
  b. Space for the description of user defined keys has been extended.
- General
  An extra Listing page is now provided for those submitters who require additional space to document program steps.

PPX has made these changes for your convenience as we believe they will be of help to you in documenting your program(s).

3. **Undeliverable As Addressed . . .** We are receiving a lot of mail with "Undeliverable as Addressed" stamped on it. This problem is particularly evident after large mailings of the PPX Exchange and Addendums. Please notify PPX **as soon as possible** of any address change. The **PPX-59 order form has a label** on the back which you can use to notify us of your change of address. Good service starts with a correct address; therefore, it is important that we **always** have your current address.

4. What is the difference between the PC-100C and the PC-100A? This is a question that has been asked over and over again.

- PC-100C is designed to be used with the TI-58 or TI-59 **only.**
- PC-100A can be used with the SR-56, SR-52, TI-58, or TI-59.
- PC-100C can be turned off and the calculator connected to it will still operate. PC-100A does not have this capability.

If you see "PC-100A Required" on programs listed in the PPX Exchange or in the PPX-59 Catalog, these programs will work on either machine. Oh, for the curious, the PC-100B is the European version of the PC-100C.

5. The PPX-59 Catalog is now overflowing with more than 1100 programs. Answering questions regarding the usage of these programs represents a tremendous task. For this reason, we ask that our members **not send questions of a general nature to PPX** (e.g., calculator repair/usage, individual programming problems, and questions on TI Libraries). Our original PPX-59 policy of answering only those questions pertaining to PPX (memberships, orders, PPX program usage, etc.) will be followed in the future. Please send all other questions directly to:

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

6. Master Library for the TI-58/59. Regretfully PPX is unable to fill orders for the Master Library. A Master Library is provided with each TI-58 and TI-59 purchased. If you need to purchase this library, you may do so through **Accessory Sales,** Texas Instruments, Inc., P. O. Box 53, Lubbock, Tx. 79408.

7. Have cobwebs covered your mailbox while waiting for receipt of your PPX order? Has Spot had two litters of pups since you placed your last order? For those of you who have answered affirmatively to these questions, we would like to take this opportunity to reply.

- Forecasting the demand for each of the 1100 programs we offer is an arduous task. If we are out of stock on a certain item, PPX attempts to **obtain** that item instead of sending you only a partial order. (We realize that there are tradeoffs in doing this and are seriously looking into the problem.) Each new Addendum published brings with it new programs for which we must again forecast demand. This **is** becoming easier to do and we **are** gaining ground in this area.
- **Very often** there is a **two week time lag** between the time your **order** is **mailed** and when **PPX receives it.** This problem also occurs when a filled order is returned to you.

MEMBERSHIP RENEWALS

Is your membership about to expire? To ensure continued receipt of Addendums, newsletters, and ordering privileges, make certain that this is not the case.

Below is printed the renewal table for members whose one year memberships will soon expire. To find your renewal date, check your membership number against the table shown below. Your membership number corresponds with your original membership date.

Membership number	Must be postmarked by
59907526-59908257	June 15
59908258-59908923	July 15
59908924-59910093	August 15
59910094-59910894	September 15

Members with numbers greater than those listed above will be informed of their renewal dates in a future issue of the PPX Exchange.

A renewal subscription card and reminder will be sent to each member in ample time to renew. The subscription card must be returned with a check or money order for $15. Be sure to include your membership number on both your subscription card and check.

INDIRECTLY SPEAKING OF OLD MACDONALD

Editor's Note: One of the most often asked questions is, "When and how can I use indirect addressing?". As it appears that many members are having difficulty grasping the concept of indirect addressing, we would like to offer a simplified explanation of this subject. We ***purposely*** *chose an example which would not be easily forgotten.*

The indirect instruction greatly extends the programming capabilities of your TI-59. Page V-68 of your Personal Programming Manual lists those indirect instructions available on your TI-59. One of the most commonly used indirect instructions is **Indirect Recall**. (Key sequence: RCL Ind nn, where nn is a register number. The corresponding keycode is 73.) The basic concept is simple. You go to data register nn, **not to find the information** you need, **but** to find a **pointer to where the information is stored.** By using indirect recall, you can recall large amounts of stored data with a minimum number of keystrokes.

Since everyone is familiar with the song "Old MacDonald", we would like to relay a story we heard about how the not so familiar instruction, indirect recall, helped Old MacDonald. Old MacDonald had five cows on his farm which he planned to sell at the market. The cows' weights were 500, 520, 530, 550, and 600 pounds, respectively. They were to be sold for 25¢ per pound. How much money would Old MacDonald receive for his cows?

Manual Solution:

500 x .25 = $125.00
520 x .25 = 130.00
530 x .25 = 132.50
550 x .25 = 137.50
600 x .25 = 150.00
$675.00

Since Old MacDonald owned a TI-59, he decided to write a program to do this calculation for him. His first program attempt looked like this:

000	43	RCL	010	02	02	020	65	×	030	93	.	040	02	2
001	01	01	011	65	×	021	93	.	031	02	2	041	05	5
002	65	×	012	93	.	022	02	2	032	05	5	042	95	=
003	93	.	013	02	2	023	05	5	033	95	=	043	44	SUM
004	02	2	014	05	5	024	95	=	034	44	SUM	044	06	06
005	05	5	015	95	=	025	44	SUM	035	06	06	045	43	RCL
006	95	=	016	44	SUM	026	06	06	036	43	RCL	046	06	06
007	42	STO	017	06	06	027	43	RCL	037	05	05	047	91	R/S
008	06	06	018	43	RCL	028	04	04	038	65	×			
009	43	RCL	019	03	03	029	65	×	039	93	.			

He entered the above in LRN mode and manually stored the weight of each of his cows in registers 1-5. Out of LRN mode, he pressed RST then R/S to calculate the total amount of money he would receive (i.e., $675).

A fellow farmer, who also owned a TI-59, saw Old MacDonald's programming effort. He explained to Old MacDonald that if he had used the indirect recall instruction, program steps would have been saved. Realizing that the basic formula he was using was

Weight of cow x .25 =

(with the weight of each cow being the only changing variable), Old MacDonald decided to redesign his program using indirect addressing. Again, he stored the weight of each cow in registers 1-5 and keyed in the following listing (in LRN mode):

000	76	LBL	008	02	2
001	11	A	009	05	5
002	69	OP	010	95	=
003	20	20	011	44	SUM
004	73	RC*	012	06	06
005	00	00	013	43	RCL
006	65	×	014	06	06
007	93	.	015	91	R/S

Out of LRN mode, he stored a zero in register 00 (to initialize the pointer value) and in register 06, and **pressed A five times** for each of his five cows. A running total value of the cows was displayed each time.

By way of explanation — RCL Ind 00 (at locations 004 and 005) recalled the contents of the register which had been pointed to by the value in register 00. This pointer value was incremented by 1 (at locations 002-003) each time the Op 20 command was encountered. Therefore, the first time A was pressed, the calculator recalled the weight of the first cow from register 01 (as register 00's pointer value was 1). On the second pass, the weight of the second cow was recalled from register 02 (as at this point Op 20 had incremented register 00 to a pointer value of 2). Each time a weight was recalled, it was automatically multiplied by .25 and summed into register 06 (at locations 006-012), which held the running total.

Thrilled with his results, Old MacDonald immediately began working on extending his program to automatically store the weights of his cows using the indirect store instruction. (Indirect store uses the same concept as indirect recall.) His solution was as follows:

016	76	LBL
017	12	B
018	69	OP
019	20	20
020	72	ST*
021	00	00
022	91	R/S

Out of LRN mode, he stored a zero in register 00 and entered each of the cows weights and pressed B. So ends the saga of Old MacDonald . . .

CUSTOM FITTED SOFTWARE

As you are aware, software support is offered to TI-59 owners in the form of individual PPX-59 programs, Pakettes, and Solid State Software™ Libraries. However, did you know that Texas Instruments also manufactures customized modules? Now **Texas Instruments is manufacturing** Solid State Software modules for applications **developed by private business, industry, and government.** Applications ranging from Securities Options Analysis to Heating and Air Conditioning calculations have already been custom fitted onto TI-58/59 modules.

A custom module offers 5000 program steps or up to 99 individual programs (i.e., the same size as a TI-58/59 Library Module). As a module cannot be accidently erased or scratched, it is more advantageous than individual TI-59 magnetic cards. All programs are directly accessible to keyboard/program commands and are 100% compatible with all TI-58/59 calculators.

Once manufactured, the modules become the exclusive property of the organization developing the module. To safeguard against unauthorized access, modules can be protected against being downloaded by users. All programming for the module is done by the developer while Texas Instruments provides the manufacturing processes.

Typical costs are $12000 for **250 modules (minimum quantity** that may be ordered) and $25000 for 1000 modules. Other quantities available are 500, 2000, and 5000 at varying prices. The more units manufactured, the lower the unit cost to the developer.

For more information regarding custom modules, please write or call: Jan Van der Veer or Sid Arora, Programmable Calculators, Texas Instruments, Inc., P. O. Box 10508, M/S 5873, Lubbock, Texas 79408. (806) 741-3240 or 741-2495.

Now for a description of the custom modules already manufactured. (The descriptions and prices quoted are presented as forwarded to PPX-59 ***by the module developer.)*** *If you find a module for which you would like more information, contact the developer mentioned in the announcement. Please* ***do not*** *write to PPX as we are simply presenting this information but do* ***not*** *carry the modules. As new custom modules become available, we will announce them in future issues of the PPX Exchange.*

Commercial Cooling Load Program

Mechanical engineers dealing with the heating/air conditioning specialty — Scot•Ware™ announces the first Commercial Cooling Load Program on a Solid State Software™ module.

Using the ASHRAE 1977 procedures, this innovative program calculates the building envelope load, internal loads, ventilation air loads, grand total heat, apparatus dew point, supply air volume and temperature, by-pass air, air condition entering and leaving the air handling equipment, and coil face area. In addition, the quantities required to conform to energy conservation standard ASHRAE 90-75, the OTTV actual and allowed, and the U_o for the walls and roof are calculated. User-defined default values are supplied for almost all inputs.

This customized module for the TI-59/PC-100A is available for $495. For further information, contact: R.S. McClintock, P. O. Box 430734, Miami, Florida 33143.

Options Analyst System

Whether you are a market maker on the exchange floor, a professional broker, money manager or trader, or a sophisticated private investor, the Options Analyst™ System will help you make those tough options trading decisions.

You can calculate put and call prices, implied option volatility, option leverage, hedge ratios, option price movement 'on the fly', over/under valuation and much more. With a PC-100A/C printer, the Options Analyst System lets you generate profit/loss projections for option purchases, spreads, combinations, covered/ratio/naked writing — 19 different strategies in all. All calculations are based on industry-accepted mathematical models. As part of the Options Analyst™ System, the developer, Datalab, publishes a newsletter that supplies Options Market derived volatilities for each time series (short/intermediate/long term), so that your calculations remain accurate and up to date.

The Options Analyst™ System (for present owners of either a TI-58 or TI-59) is available as a Mini-System for $225. For more information, write to: Datalab, Inc., 3624 Science Center, Philadelphia, PA 19104.

Tax Management Programs

The passage of the 1976 Tax Reform Act made computing estate taxes much more complex. As the cost of using mainframe computers to deal with these new computational complexities is high, the Tax Management Tax Inc. Module is ideal for estate planning work.

The module was written to handle federal estate, gift, and income tax computations. It also computes the New York estate tax. Programs included in this module are:

- Estate tax computation (federal, maximum credit, and New York)
- Federal gift tax computation
- Estate tax maximum and optimum marital deduction computation for community and non-community property estates
- Interrelated marital and/or charitable deductions — tax computation
- Method to construct your own tax computation program to simplify computing your own local taxes.
- Stock and bond portfolio load, list and value programs
- 1979 federal income tax computation for joint, married filing separately, unmarried, head of household, estates and trusts, and corporations.

This module for the TI-58 or TI-59 will be available in September for $295. Printer is optional but highly recommended. Tax computation programs may be called as subroutines by your own program. For more information, contact: H. A. Conway, Kelley Drye & Warren, 350 Park Avenue, N.Y., N.Y. 10022.

FROM THE ANALYST'S DESK

- Mr. Pat Eaton, Scarborough, Canada, has discovered **another way** of calling subroutines from TI Solid State Software™ Modules. **In addition to calling label addresses, direct addresses may be used.** For example, the key sequence Pgm mm SBR nnn can be used, where mm is the library program number and nnn is the library program location (address) from which you wish to begin execution. The advantage of using direct addresses is that any group of steps

Economical Order Quantity

INVENTORY CONTROL — EOQ

This program can be used to establish inventory control and the economical order quantity (EOQ) of individual items. The EOQ can be determined with or without inputting all the price breaks. Inputs may be altered by entering only the variables that are to be changed. This allows the user to experiment using a "what-if" approach to find the optimum EOQ.

PPX wishes to thank Gerry L. Pearson, for his excellent program.

The equations that are used by this program are as follows:

$EOQ = \sqrt{\frac{2FS}{CP}}$

$N = \frac{S}{EOQ}$

$A = B + \frac{EOQ}{2}$

$D = \frac{(B + EOQ)N}{W}$

$O = D \times L - G$

$R = F \times N + V \times S$

$K = C \times P \times A$

$T = R + K$

Where:

EOQ = order size at which ordering costs plus inventory carrying costs are at a minimum
F = fixed cost per order (e.g., postage, handling, clerical costs)
S = annual sales (in units)
C = carrying cost of inventory as decimal fraction of inventory value
P = purchase price per unit
N = number of orders placed per year
A = average inventory on hand
B = buffer (safety) stock
D = average daily usage
W = number of working days per year
O = order point (inventory level at which new order should be placed)
L = order lead time in days
G = goods in transit (already ordered but not received)
R = total annual cost of placing and receiving orders
V = variable (per unit) ordering costs
T = total annual inventory and carrying costs
K = total annual inventory carrying costs

000	76	LBL	047	02	2	094	15	15	141	02	2	188	68	NOP	235	04	4	282	01	01	329	03	3	376	30	30
001	11	A	048	01	1	095	03	3	142	65	×	189	42	STO	236	01	1	283	95	=	330	03	3	377	25	CLR
002	42	STO	049	02	2	096	07	7	143	43	RCL	190	10	10	237	03	3	284	32	X:T	331	05	5	378	61	GTO
003	01	01	050	04	4	097	03	3	144	03	03	191	32	X:T	238	06	6	285	02	2	332	01	1	379	03	03
004	32	X:T	051	04	4	098	05	5	145	65	×	192	98	ADV	239	01	1	286	42	STO	333	05	5	380	58	58
005	25	CLR	052	04	4	099	01	1	146	43	RCL	193	03	3	240	07	7	287	15	15	334	69	OP	381	02	2
006	42	STO	053	61	GTO	100	03	3	147	01	01	194	01	1	241	98	ADV	288	01	1	335	04	04	382	44	SUM
007	15	15	054	99	PRT	101	03	3	148	55	÷	195	71	SBR	242	71	SBR	289	05	5	336	58	FIX	383	00	00
008	03	3	055	76	LBL	102	01	1	149	43	RCL	196	99	PRT	243	99	PRT	290	03	3	337	02	02	384	61	GTO
009	06	6	056	17	B'	103	61	GTO	150	04	04	197	92	RTN	244	92	RTN	291	02	2	338	73	RC*	385	03	03
010	76	LBL	057	42	STO	104	99	PRT	151	55	÷	198	43	RCL	245	43	RCL	292	03	3	339	00	00	386	69	69
011	99	PRT	058	04	04	105	76	LBL	152	43	RCL	199	07	07	246	12	12	293	06	6	340	69	OP	387	76	LBL
012	58	FIX	059	32	X:T	106	14	D	153	02	02	200	85	+	247	65	×	294	03	3	341	06	06	388	25	CLR
013	09	09	060	02	2	107	42	STO	154	95	=	201	43	RCL	248	43	RCL	295	07	7	342	69	OP	389	47	CMS
014	69	OP	061	42	STO	108	07	07	155	34	√X	202	09	09	249	08	08	296	98	ADV	343	20	20	390	29	CP
015	04	04	062	15	15	109	32	X:T	156	76	LBL	203	55	÷	250	75	-	297	71	SBR	344	92	RTN	391	69	OP
016	32	X:T	063	01	1	110	25	CLR	157	71	SBR	204	02	2	251	43	RCL	298	99	PRT	345	86	STF	392	00	00
017	58	FIX	064	05	5	111	42	STO	158	42	STO	205	95	=	252	06	06	299	92	RTN	346	00	00	393	22	INV
018	40	IND	065	01	1	112	15	15	159	09	09	206	42	STO	253	95	=	300	61	GTO	347	25	CLR	394	86	STF
019	15	15	066	03	3	113	01	1	160	87	IFF	207	11	11	254	32	X:T	301	15	E	348	35	1/X	395	00	00
020	69	OP	067	03	3	114	04	4	161	00	00	208	32	X:T	255	03	3	302	76	LBL	349	72	ST*	396	02	2
021	06	06	068	05	5	115	04	4	162	01	01	209	01	1	256	02	2	303	10	E'	350	00	00	397	06	6
022	92	RTN	069	61	GTO	116	01	1	163	80	80	210	03	3	257	03	3	304	98	ADV	351	01	1	398	00	0
023	76	LBL	070	99	PRT	117	02	2	164	22	INV	211	04	4	258	03	3	305	58	FIX	352	06	6	399	42	STO
024	16	A'	071	76	LBL	118	01	1	165	86	STF	212	02	2	259	98	ADV	306	09	09	353	42	STO	400	14	14
025	42	STO	072	13	C	119	61	GTO	166	00	00	213	02	2	260	71	SBR	307	72	ST*	354	00	00	401	01	1
026	02	02	073	42	STO	120	99	PRT	167	32	X:T	214	02	2	261	99	PRT	308	00	00	355	25	CLR	402	05	5
027	32	X:T	074	05	05	121	76	LBL	168	25	CLR	215	98	ADV	262	92	RTN	309	03	3	356	42	STO	403	42	STO
028	02	2	075	32	X:T	122	19	D'	169	42	STO	216	71	SBR	263	43	RCL	310	04	4	357	09	09	404	00	00
029	42	STO	076	02	2	123	42	STO	170	15	15	217	99	PRT	264	04	04	311	03	3	358	73	RC*	405	25	CLR
030	15	15	077	42	STO	124	08	08	171	01	1	218	92	RTN	265	65	×	312	07	7	359	00	00	406	58	FIX
031	03	3	078	15	15	125	32	X:T	172	07	7	219	43	RCL	266	43	RCL	313	03	3	360	42	STO	407	09	09
032	03	3	079	04	4	126	25	CLR	173	03	3	220	07	07	267	02	02	314	07	7	361	02	02	408	98	ADV
033	03	3	080	02	2	127	42	STO	174	02	2	221	85	+	268	65	×	315	04	4	362	69	OP	409	92	RTN
034	05	5	081	01	1	128	15	15	175	03	3	222	43	RCL	269	43	RCL	316	05	5	363	20	20	410	76	LBL
035	01	1	082	03	3	129	02	2	176	04	4	223	09	09	270	11	11	317	69	OP	364	15	E	411	42	STO
036	05	5	083	03	3	130	07	7	177	98	ADV	224	95	=	271	85	+	318	04	04	365	67	EQ	412	42	STO
037	61	GTO	084	05	5	131	01	1	178	71	SBR	225	65	×	272	43	RCL	319	73	RC*	366	01	01	413	14	14
038	99	PRT	085	61	GTO	132	07	7	179	99	PRT	226	43	RCL	273	03	03	320	00	00	367	64	64	414	92	RTN
039	76	LBL	086	99	PRT	133	01	1	180	92	RTN	227	10	10	274	65	×	321	69	OP	368	32	X:T			
040	12	B	087	76	LBL	134	03	3	181	43	RCL	228	55	÷	275	43	RCL	322	06	06	369	73	RC*			
041	42	STO	088	18	C'	135	01	1	182	01	01	229	43	RCL	276	10	10	323	69	OP	370	00	00			
042	03	03	089	42	STO	136	06	6	183	55	÷	230	14	14	277	85	+	324	20	20	371	22	INV			
043	32	X:T	090	06	06	137	61	GTO	184	43	RCL	231	95	=	278	43	RCL	325	92	RTN	372	77	GE			
044	02	2	091	32	X:T	138	99	PRT	185	09	09	232	42	STO	279	05	05	326	72	ST*	373	03	03			
045	42	STO	092	25	CLR	139	76	LBL	186	95	=	233	12	12	280	65	×	327	00	00	374	81	81			
046	15	15	093	42	STO	140	15	E	187	68	NOP	234	32	X:T	281	43	RCL	328	03	3	375	69	OP			

USER INSTRUCTIONS:

1. Enter program.
2. To initialize, press SBR CLR.
3. Enter working days/yr if other than 260 (program's default value), press SBR STO.
4. Enter annual sales (in units), press A.
5. Enter purchase price per unit, press A'.
6. Enter fixed cost per order, press B.
7. Enter inventory carrying cost as a decimal fraction of inventory value, press B'.
8. Enter variable (per unit) ordering costs, press C.
9. Enter goods in transit (in units), press C'.
10. Enter buffer (safety) stock (in units), press D.
11. Enter order lead time (in days), press D'.
12. Compute economical order quantity, press E.
13. Press R/S to obtain each of the following results:
    - number of orders placed per year
    - average inventory on hand
    - average daily usage
    - order point (inventory level at which new order should be placed)
    - total annual inventory and carrying costs
14. If you wish to base calculations on a pre-selected order quantity, enter the quantity and press SBR SBR. Go to step 13.

EOQ with Price Breaks: Use steps 15 and 16 after steps 1-11 have been executed (step 15 need not follow immediately after step 11, it can follow step 13).

15. Enter each price break by first entering the quantity, press E', then the price for that quantity, press R/S. Start with the lowest quantity and work upward. A maximum of 22 price breaks may be entered. To change price breaks, program must be restarted at step 2.
16. Compute the EOQ by pressing R/S. Go to step 13 to continue computations.

Note: All inputs and results will be printed and labeled if using a printer.

EXAMPLE:

A company wishes to compute an item's economical order quantity (EOQ), number of orders placed per year, average inventory and daily usage, order point, and total annual inventory and carrying costs. Calculate this information in four parts using:

(a) a buffer stock of 2000 and an 8 day order lead time;
(b) a buffer stock of 1000 and an 8 day order lead time;
(c) a buffer stock of 1000 and a 6 day order lead time;
(d) a buffer stock of 1000 and a 6 day order lead time, using price breaks.

Given:	Annual Sales	250,000
	Purchase Price	10.00
	Fixed Order Cost	8.30
	Carrying Costs	.23
	Variable order cost	.08
	Goods in Transit	5000

Price Breaks:

QUANTITY	UNIT PRICE
0	10.00
100	9.94
250	9.86
500	9.72
1000	9.60
2500	9.51
5000	9.46

	Enter	Press	Output	Comments
		SBR CLR	0.	Initialize
	312	SBR STO	312.	312 working days
	250000	A	250000.	Annual sales
	10	A'	10.00	Purchase price
	8.3	B	8.30	Fixed order cost
	.23	B'	0.23	Carrying costs
	.08	C	0.08	Variable order cost
	5000	C'	5000.	Goods in transit
(a)	2000	D	2000.	Buffer stock
	8	D'	8.	Order lead time
		E	1343.	EOQ
		R/S	186.	# orders placed/yr.
		R/S	2672.	Average inventory
		R/S	1994.	Average daily usage
		R/S	10955.	Order point
		R/S	27689.50	Total annual inventory and carrying costs
(b)	1000	D	1000.	Change in buffer stock
		E	1343.	Recompute EOQ (no change)
		R/S	186.	(no change)
		R/S	1672.	(decreased)
		R/S	1398.	(decreased)
		R/S	6182.	(greatly decreased)
		R/S	25389.50	(decreased)
(c)	6	D'	6.	Change in order lead time
		E	1343.	(no change)
		R/S	186.	(no change)
		R/S	1672.	(no change)
		R/S	1398.	(no change)
		R/S	3387.	(greatly reduced)
		R/S	25389.50	(no change)
(d)	0	E'	0.	Quantity
	10	R/S	10.00	Price
	100	E'	100.	
	9.94	R/S	9.94	
	250	E'	250.	
	9.86	R/S	9.86	
	500	E'	500.	
	9.72	R/S	9.72	
	1000	E'	1000.	
	9.6	R/S	9.60	
	2500	E'	2500.	
	9.51	R/S	9.51	
	5000	E'	5000.	
	9.46	R/S	9.46	
		R/S	1371.	Better price means higher EOQ
		R/S	182.	(decreased)
		R/S	1685.	(increased)
		R/S	1386.	(decreased)
		R/S	3315.	(decreased)
		R/S	25235.08	(decreased)

may be directly accessed without beginning at a label. There is one golden rule to remember: Your selected group of steps must end with an 'INV SBR'. This method provides added flexibility when using Solid State Software.

• Attention PC-100A and PC-100C owners: To insure optimum print clarity, the printhead should be cleaned before installing each new roll of thermal paper. PPX member Mr. R. Roger Breton of Whittier, California, has written a routine that allows the printhead to be **completely** cleaned using a head cleaning card. (Head cleaning cards are included with each new package of TP-30250 thermal paper.) To use, enter the following keystrokes into the calculator program memory:

000	69	DP	018	69	DP	036	02	2	054	03	3
001	01	01	019	05	05	037	04	4	055	02	2
002	69	DP	020	69	DP	038	71	SBR	056	03	3
003	02	02	021	05	05	039	00	00	057	02	2
004	69	DP	022	69	DP	040	00	00	058	03	3
005	03	03	023	05	05	041	07	7	059	02	2
006	69	DP	024	92	RTN	042	04	4	060	03	3
007	04	04	025	76	LBL	043	07	7	061	02	2
008	69	DP	026	11	A	044	04	4	062	03	3
009	05	05	027	98	ADV	045	07	7	063	02	2
010	69	DP	028	02	2	046	04	4	064	71	SBR
011	05	05	029	04	4	047	07	7	065	00	00
012	69	DP	030	02	2	048	04	4	066	00	00
013	05	05	031	04	4	049	07	7	067	98	ADV
014	69	DP	032	02	2	050	04	4	068	98	ADV
015	05	05	033	04	4	051	71	SBR	069	98	ADV
016	69	DP	034	02	2	052	00	00	070	92	RTN
017	05	05	035	04	4	053	00	00			

After keying in the listing, insert the head cleaning card in place of the normal printing paper. Execute the program by pressing A.

• If you've ever needed to perform **factorials greater than 69!** (the upper limit of program 16 in the Master Library), PPX and a fellow member now come to your aid with **two different methods.**

Mr. Stan Chapman, Kent, England, sent PPX a method which **increases** the range of factorials, permutations, and combinations in **ML-16 to 120!** Following step 2 of the User Instructions in ML-16, store a 1×10^{-99} in register 4. Continue with the instructions provided with ML-16. After the calculation has been performed, the result must be multiplied by 1×10^{99} manually (the TI-59 display would overflow). For example, compute 100!. Press Pgm 16, enter 100 and press A, store a 1×10^{-99} (using EE key) in register 4, and then press C. The displayed result is 9.3326215×10^{58}. This number when multiplied by 1×10^{99} will give the value of 100!: $(9.3326215 \times 10^{58}) \times (1 \times 10^{99}) = 9.3326215 \times 10^{157}$.

PPX offers the following program which calculates the value of n!, where n can be **any positive integer** or zero. This routine **does not** require the use of the Master Library. Enter the following keystrokes (in LRN mode):

000	76	LBL	017	00	00
001	11	A	018	00	00
002	42	STO	019	11	11
003	00	00	020	43	RCL
004	32	X:T	021	01	01
005	00	0	022	22	INV
006	42	STO	023	59	INT
007	01	01	024	22	INV
008	67	EQ	025	28	LOG
009	00	00	026	59	INT
010	20	20	027	32	X:T
011	43	RCL	028	43	RCL
012	00	00	029	01	01
013	28	LOG	030	59	INT
014	44	SUM	031	99	PRT
015	01	01	032	32	X:T
016	97	DSZ	033	92	RTN

After exiting LRN mode, enter n and press A. The answer is retrieved in two parts. The mantissa of n! is displayed and the characteristic is obtained by pressing x⇄t. If a printer is used, both values are printed. Try calculating 100! again. After the program is keyed in, enter 100 and press A. The result 9.332621492 will be displayed and upon pressing x⇄t the characteristic 157 will be displayed.

• Our members are always looking for new discoveries as exploration of the TI-59 continues. We received an interesting letter informing PPX that the TI-59 has negative flags. This discovery, if correct, would have meant that the TI-59 has nineteen flags instead of ten. But alas . . . after testing the idea, we found that **there are still only ten flags.** Try the sequence: 1 +/- STO 00 Stflg Ind 00 Ifflg 0 123. Enter LRN mode and note that the program pointer is at location 123 proving that flag **0** is set instead of flag **-1.**

• PPX would like to thank all program submitters for their continuing support. Fully realizing the great amount of work that goes into originating and documenting programs, we would like to outline some **simple** but **important** points to ensure your finished program reaches the user in its best form.

1. If submitting a PC-100(A/C) printout as your program listing, **completely** secure your printout to the submission form. Simply **gluing or taping** the top and **bottom edges** of the printout is **undesirable** as it can tear very easily during duplication. (This has been a continuing problem.) If you choose to adhere the printout with tape, **do not** tape over any of the printing as that printing will quickly fade. If you use glue, PPX member Jay P. Unwin suggests Carter's Stix-A-Lot® Glue Stick. It is easy to use and costs less than tape or spray adhesive.
2. To avoid damaging magnetic cards, submit them in a small envelope or plastic bag. **Do not tape or paper clip cards to the submission forms.** Be sure to label all magnetic cards with program title, partition, and card side number.
3. Mail your program submission(s) in a large envelope. **Submissions** which are folded and placed into **small envelopes** are very difficult to handle and can be **damaged by automatic letter openers.**
4. If you use HIR (hierarchy) or Dsz nn (where nn is greater than 9) in your program, be sure to document how to enter these instructions into program memory as they cannot be keyed in directly. **Do not assume** that all members are as familiar with these instructions as you are.
5. Do not forget to document register contents that must be stored before program execution (i.e., constants and alphanumeric codes).

Most importantly, remember that **fellow members** who order your program are not as familiar with it as you are and they do not have your magnetic cards. Therefore, thoroughly document your program so that it stands by itself when viewed by a user.

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:

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