PPX EXCHANGE

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Texas Instruments' newly released Printer Utility Pakette has met with tremendous success. As a result, PPX is receiving suggestions and requests for printer dependent (e.g., graphs) and non-dependent (e.g., sorts) utility routines. We are glad to see an interest in these types of programs as they help the user gain more from his TI-59. The ability to fulfill these needs, however, remains with you, the PPX-59 member.

For this reason, we are **putting out a call to all PPX-59 members for utility subroutines/programs** (both printer dependent and non-dependent). All submitted programs will be checked out and used as PPX-59 program submissions (i.e. checked for sample problem, user instructions, and listing). Authors of accepted utility programs will receive the pakette of their choice (instead of 1 complimentary program) and replacement magnetic cards. All inputs should be postmarked by April 30.

In addition, we are interested in your **ideas** for utility programs. It's difficult for PPX to guess what types of programs **you** would like to see. Let us know your needs so that we may be instrumental in trying to fulfill them.

PPX POTPOURRI

1. Continuous demands on our SR-52 Library Inventories have exhausted our supply of Statistics and Finance Libraries. However, the programs within these Libraries remain available on an individual basis. These programs are listed in the TI Library Cross Reference Section of your Catalog. The following SR-52 Libraries are still available: Electrical Engineering, Aviation, Navigation, Surveying, and Games.

2. A valuable new TI-59 learning tool is now available through PPX-59. The **TI Programmable 59 Workbook** reinforces those subjects covered in the TI-59 Personal Programming manual by offering sample problems and corresponding exercises. Specific references to the Personal Programming manual are given for each exercise. This workbook is written on an **elementary** level. It may be ordered by entering **"TI-59 Workbook"** on your PPX-59 order form and enclosing $4.95, plus tax and handling.

3. When ordering programs or accessories, please send a check or money order. We regret that we are **unable to accept purchase orders.**

4. It is gratifying to see that so many of our members are renewing their PPX-52 memberships. We are glad that we are able to satisfy your software needs. For those members whose memberships are about to expire, the renewal rate table is reprinted to aid you in your decision about renewal. Check your membership number against the table for a complete picture of your renewal status. **Clarification is needed on one point: the renewal rate only applies to your PPX-52 membership. If as a PPX-52 member you would like to also join PPX-59, a $15 fee is required.** This fee covers the costs of catalogs, member's guides, order forms, etc.

Membership Number	Renewal Rate	Must Be Postmarked By	Benefits Received
100001-102780	$8	February 5	2 Addendums, 5 Newsletters
102781-103780	$4	February 15	1 Addendum, 5 Newsletters
103781-105453	$4	March 15	1 Addendum, 4 Newsletters
105454-107112	$4	April 15	1 Addendum, 4 Newsletters
107113-108094	$4	May 15	1 Addendum, 3 Newsletters
108095-108778	$4	June 15	1 Addendum, 3 Newsletters

5. **Attention users and programmers of micro and mini-computers:** Texas Instruments has developed a specialty pakette for you. The Programmer's Aid Pakette contains six full length programs for use with the TI-59 and PC-100A. These include:

- "EBCDIC Code Converter" — see abstract for PPX-59 #638003
- "ASCII Code Converter" — see abstract for PPX-59 #638004
- "ASCII and EBCDIC Encoder" — Takes alphanumerics by the memo pad form of entering data (see PPX-59 #908016) and prints out the alphanumerics and their associated ASCII or EBCDIC code in either decimal, octal, binary, or hexadecimal.
- "TI Programmer Simulator" — Emulates most functions available on the TI Programmer calculator including:
  - Hexadecimal, Octal and Decimal Modes
  - Conversions between bases
  - Ten digit octal and five digit hexadecimal capabilities
  - Logical operations: And, Or, Xor, Shift, One's Complement,
  - Arithmetic operations: Add, Subtract, Multiply, Integer Division (3 bases), Two's Complement
- "TMS 9900 Disassembler" — Hexadecimal absolute machine code for the Texas Instrument TMS 9900 microprocessor is entered. The assembly language mnemonics are printed.
- "INTEL 8080 Disassembler" — Hexadecimal absolute machine code for the INTEL 8080 microprocessor is entered. The assembly language mnemonics are printed.

6. There appears to be a misunderstanding concerning the intended use of the "3 Introductory Programs" order form. This order form cannot be used as a credit towards a Pakette (or any other supplies). The purpose of the order form is to introduce each new member to the **individual** programs available through PPX-59. Do not order other items on this form. Such orders will be returned to the sender for inclusion of taxes and handling charges.

REMARKABLE NEW POCKET CALCULATOR PLANNING SYSTEMS FOR POLICE MANAGEMENT

Nelson B. Heller

For more than a decade the nation's largest police departments have experimented with sophisticated computer-based resource allocation planning systems. Worthwhile

results have been achieved, but the required expertise and related data processing and set-up costs put these systems out of reach of all but a few police departments. Now, related police resource allocation planning tools based on the TI Programmable 59 are being developed by The Institute for Public Program Analysis (TIPPA).

TIPPA is developing two powerful planning systems which incorporate the use of the TI-59. These systems, PATROL/PLAN and SCHEDULE PLAN, will capture much of the power and speed of the larger computer-based systems at only a fraction of the cost. Prototypes of these systems have been used in training seminars for police executives and planners at Northwestern University's Traffic Institute and at TIPPA.

PATROL/PLAN is being developed under a Law Enforcement Assistance Administration (LEAA) funded research project. It permits a police department to determine how many patrol cars are needed, and when and where they should be located. The user is provided with a variety of outputs including average service times per call and per dispatch, average travel time, average number of patrol cars available to accept dispatch assignments, and average preventive (free) patrol frequency. Also provided is an estimate of the least number of patrol cars needed to keep the fraction of time when all cars are simultaneously busy below a user-specified value.

The second TIPPA System, SCHEDULE/PLAN (being prepared separately from the LEAA project), takes the confusion and guesswork out of planning around the clock duty schedules. This system takes into consideration that every officer should have two consecutive days off each week if working 8-hour shifts, or three consecutive days off if working 10-hour shifts. (This system can be used by other extended-hours services such as fire, paramedic, or vehicle maintenance services.)

TIPPA plans to make additional TI-59 based police and local government planning programs available in the near future. Expected areas of application are workload forecasting, traffic accident reconstruction, crime trend analysis, and deployment of directed police patrol teams.

Others using programmable pocket calculator systems in police planning are invited to submit a description of their current or projected applications. These applications will be considered for inclusion in the LEAA-sponsored police planning software package. Further information on TIPPA's planning systems may be obtained by writing to Dr. Nelson Heller, Executive Director, The Institute for Public Program Analysis, 230 S. Bemiston Avenue, Suite 914, St. Louis, Missouri, 63105.

A WALK THROUGH TI-59 HARDWARE

This article is intended as a brief item of interest for those PPX-59 members with a curiosity about how the TI-59 operates. It is ***not*** *written as an official design specification and should not be construed as such. It is a rapid walk through the workings of the TI-59.*

Although many owners of the TI-59 do not realize it, they possess a tool containing the equivalent of approximately 100,000 Metal-Oxide-Semiconductor (MOS) Transistors. Because the average user lacks the technical background to comprehend the hardware of the TI-59, the following discussion is presented in the hopes that it will further each user's understanding of his TI-59.

All TI-59 hardware is associated with two major functions; Support Functions and Logic Functions (with many subsections included within each):

A. Support Functions
   1. Switching Regulator Power Supply
   2. Clock
   3. Light Emitting Diode (LED) Display with Drivers
   4. Keyboard
   5. Magnetic Card Read/Write Assembly
   6. Read Amplifier
   7. Motor Control Circuit

B. Logic Functions
   1. Scanning Read Only Memory (SCOM)
   2. Read Only Memory (ROM)
   3. Arithmetic Logic Unit (ALU)
   4. Multi-Register Memory
   5. Magnetic Input/Output (Mag I/O) Interface Processor
   6. Constant Read Only Memory (CROM)

The Support Functions provide the MOS Logic with the necessary inputs and outputs for communication with the user. Additionally, they supply the essential power and timing signals required for the operation of the TI-59.

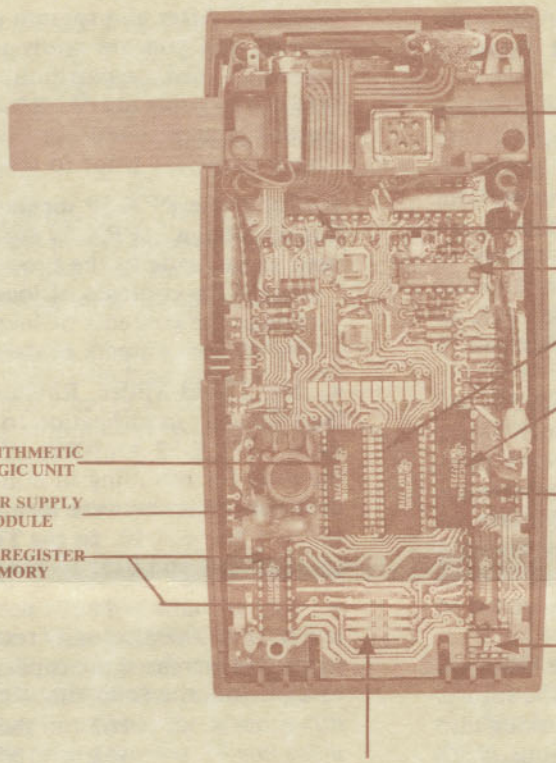
A1. **The Switching Regulator Power Supply** is used to convert the low battery voltage to the higher voltage required by the MOS. The nickel cadmium battery pack provides a relatively constant output voltage of 3.75 volts to the power supply. The power supply then produces two outputs of approximately 10 volts and 16 volts that are distributed to every MOS device as well as the Clock and Read Amplifier.

A2. **The Clock** is the source of the timing signals distributed to all of the logic functions. These signals synchronize the distribution and execution of all logic functions. Additionally, by monitoring the activity occuring in the logic functions, the Clock slows the system down during inactive periods thus increasing battery life.

A3. **A 7-Segment Group of Light Emitting Diodes** form each character in the display. (There are twelve 7-Segment Characters across the display.) Depending on the segments illuminated in each 7-Segment Character, a digit or minus sign is displayed. (For example, all seven segments are illuminated when an 8 appears in the display.) The segment information is provided by the Arithmetic Logic Unit (ALU) and the digit information is provided by the Scanning Read Only Memory (SCOM). By working together, the ALU and SCOM illuminate the character by a process called multiplexing. Because the display voltage differs from the ALU and SCOM voltage, a pair of digit driver integrated circuits provide the level translation.

A4. **The Keyboard (not labeled in the picture)** enables the entry of numbers and functions into the TI-59. This device consists of an x-y matrix of switch contacts attached to a plastic board. The horizontal lines (i.e., x-axis) consist of sequentially addressed digit signals which are used to drive the display digit drivers. The vertical lines (i.e., y-axis) consist of key select lines. When a key is depressed, a digit signal is connected to a key select line. The Arithmetic Logic Unit senses the particular digit signal and decodes the key entry.

A5. **The Magnetic Card Read/Write Assembly** sets the TI-59 apart from most programmable calculators in that it provides a means of permanent program or data storage. A four track magnetic head, similar to that used in tape recorders, is used to read and write data on a card. The head is mounted within a transport housing. The transport housing is molded from a glass filled plastic with very precise tolerances, in some cases to within one thousandth of



an inch. The housing contains a small motor, gearbox, and drive wheel which are used to drive the magnetic card across the read/write head.

A6. **The Read Amplifier** increases the low amplitude magnetic head read signal to allow the Magnetic Input/Output Interface Processor (logical function) to recognize it. The four channel integrated circuit Amplifier provides a signal that is about five hundred times larger in amplitude than the signal originating from the read head.

A7. **The Motor Control Circuit (not labeled in the picture)** maintains the card speed to within a window of 2.1 and 2.5 inches per second. The circuit supplies a constant voltage to the motor under various loads, thus maintaining a uniform card speed as the card passes through the mechanism. This circuit is adjustable so that the card speed will match the requirements of the individual mechanism installed in each calculator. This circuit is made up of discrete components located throughout the calculator.

All necessary computations, manipulations, and data storage are accomplished in the logic functions of the calculator. Ten MOS devices comprise the six distinct logic functions.

B1. **Two Scanning Read Only Memory [SCOM]**, each containing 2.5K words of Read Only Memory (ROM) and 64 words of Random Access Memory (RAM), compose one logic function. The ROM stores most of the TI-59 algorithms. The RAM stores pending operations, t register, key push register, etc. In addition to containing ROM and RAM (memory), the SCOM contains the digit select circuitry with 16 digit time outputs for display multiplexing and key selection.

B2. **The Read Only Memory [ROM]** is programmed with the algorithm overflow from the two SCOM chips. In effect, it is a 1K work extension of the total ROM available in the calculator.

B3. **The Arithmetic Logic Unit [ALU]** is the most complex of the logic functions. The primary task of the ALU is to perform the required mathematical operations using instructions supplied by the SCOM or ROM. Additionally, the ALU provides the direct segment drive to the seven segment display and interprets the keyboard entries appearing on its key select lines.

B4. **Four Multi-Register Memories**, each containing 1920 bits of information, retain the program storage and data memory. Each Multi-Register Memory has thirty shift registers capable of storing a 16 digit number of 4 binary bits. To increase the flexibility of the TI-59, each shift register is capable of storing data or program steps (dependent upon the setting of the partition).

B5. **The Magnetic Input/Output [Mag I/O] Interface Processor** is responsible for data transfer to and from a magnetic card. This device directly controls the magnetic head during write operations and interprets information from the head during read operations. The Mag I/O Interface Processor also corrects and verifies the read information from the mag head and controls the read/write timing (using Clock signals) and motor start function.

B6. **The Constant Read Only Memory [CROM] Chip**, otherwise known as the Solid State Software™ Module, performs the final logic function. This is a ROM that is programmed with software applicable to a specific discipline and capable of being easily removed and replaced. Up to 5,000 program steps (or the equivalent of 40,000 bits of data) can be stored in this compact module.

This ends our walk through the workings of the TI-59. We hope you found it interesting!

SR-52* — LEARNING NIMB

LEARNING NIMB

This program is an experiment in artificial intelligence. The SR-52 is programmed with the basic rules for one version of the game NIMB. With each successive game, the machine accumulates "experience" on the basis of both its own and its opponent's moves and successes. Repeated playing carries the SR-52 from the novice state to the expert level.

The rules for the form of NIMB that is used are as follows: There is a stack of N objects (up to 19). The SR-52 and the user take turns in choosing up to 3 objects (1, 2, or 3) from the stack. The player who takes the last object loses.

Each possible move is weighted by the SR-52 on the basis of past experience. The higher the weight, the higher the probability is of the calculator choosing that move. The probability is determined by the range in which a random number falls. A random number seed between 0 and 1 is initially stored in register 97 by the user. It is not necessary to store a new seed number as long as the calculator remains powered up.

For an interesting variation to the game, change step 049 from 02 to 00. Now, the calculator will only keep track of **its** moves.

If interrupted play occurs, the user may want to store the calculator's experience between games. A Data Transfer Program is included.

PPX wishes to thank the author of "Learning NIMB", Joshua M. Friedman, for his excellent program.

INSTRUCTIONS

To Play a Game of NIMB

1. Enter Main Program.
2. Choose a number between 0 and 1 and store it in register 97. (This is the random number seed.)
3. Press D to initialize program; 0. is displayed.
4. Enter total number of objects in stack, between 0 and 19 (if different than what is displayed), and press RUN.
5. If the player is to move first, press A. If the calculator is to move first, press B.
6. If A has been pressed, enter the number of objects you wish to take and press RUN. The number in the display is the result of both your move and the calculator's countermove. Repeat this step until the game is over.
7. If B has been pressed, the number in the display is the result of the calculator's move. Enter the number of objects you wish to take and press RUN. The number in the display is the result of both your move and the calculator's countermove. Repeat this step until the game is over.
8. The game is over when:
   a. the total number of objects is displayed (player wins).
   b. 3.141592654 (flashing) is displayed (calculator wins).
9. If the calculator won, press E and then go to step #4. If the player won, go to step #4.

To Store the Calculator's Experience

1. Enter Data Transfer Program.
2. Press B; total number of objects is displayed.
3. Press CLR INV *read, INV *read and insert Data Transfer card.

To Recall the Calculator's Past Experience

1. Read in Data Transfer Program card.
2. Press D; total number of objects is displayed.
3. Enter Main program and start the game.

EXAMPLE: Play two games of NIMB using .777779 as the seed number.

Enter	Press	Display	Comments
.777779	STO 97	.777779	Store seed number
	D	0.	Initialize
8	RUN	8.	# of objects in stack
	B	7.	SR-52 moves first—takes 1, 7 left
2	RUN	4.	Player takes 2, the SR-52 takes 1, 4 left
3	RUN	8.	Player takes 3 and wins!
9	RUN	9.	Change total # in stack to 9
	A	9.	Player wishes to move first
3	RUN	5.	Player takes 3, SR-52 takes 1, 5 left
1	RUN	1.	Player takes 1, SR-52 takes 3, 1 left
1	RUN	3.141592654	"PIE IN YOUR FACE!"

LEARNING NIMB — MAIN PROGRAM

000	46	LBL	036	85	+	072	08	8	108	22	INV	144	36	IND	180	22	INV
001	14	D	037	01	1	073	42	STO	109	80	IF+	145	43	RCL	181	80	IF+
002	47	CMS	038	54	)	074	00	0	110	97	LST	146	00	0	182	58	DSZ
003	46	LBL	039	94	+/-	075	00	0	111	43	RCL	147	00	0	183	22	INV
004	15	E	040	44	SUM	076	43	RCL	112	00	0	148	22	INV	184	90	IFZ
005	25	CLR	041	09	9	077	09	9	113	00	0	149	23	LNX	185	87	1'
006	43	RCL	042	08	8	078	07	7	114	90	IFZ	150	85	+	186	01	1
007	09	9	043	43	RCL	079	22	INV	115	69	9'	151	56	RTN	187	94	+/-
008	09	9	044	09	9	080	38	D/R	116	93	.	152	46	LBL	188	49	PRD
009	81	HLT	045	08	8	081	75	-	117	01	1	153	69	9'	189	01	1
010	42	STO	046	90	IFZ	082	18	C'	118	36	IND	154	43	RCL	190	09	9
011	09	9	047	69	9'	083	85	+	119	44	SUM	155	09	9	191	46	LBL
012	08	8	048	93	.	084	93	.	120	00	0	156	09	9	192	87	1'
013	42	STO	049	02	2	085	05	5	121	00	0	157	42	STO	193	43	RCL
014	09	9	050	36	IND	086	54	)	122	43	RCL	158	00	0	194	01	1
015	09	9	051	44	SUM	087	42	STO	123	00	0	159	00	0	195	09	9
016	46	LBL	052	09	9	088	09	9	124	00	0	160	46	LBL	196	60	IFF
017	11	A	053	08	8	089	07	7	125	42	STO	161	41	GTO	197	01	1
018	22	INV	054	46	LBL	090	65	×	126	09	9	162	01	1	198	88	2'
019	50	STF	055	12	B	091	43	RCL	127	08	8	163	42	STO	199	94	+/-
020	01	1	056	50	STF	092	01	1	128	41	GTO	164	01	1	200	46	LBL
021	43	RCL	057	01	1	093	09	9	129	11	A	165	09	9	201	88	2'
022	09	9	058	43	RCL	094	54	)	130	46	LBL	166	36	IND	202	36	IND
023	08	8	059	09	9	095	94	+/-	131	18	C'	167	43	RCL	203	44	SUM
024	81	HLT	060	08	8	096	46	LBL	132	57	FIX	168	00	0	204	00	0
025	75	-	061	42	STO	097	97	LST	133	00	0	169	00	0	205	00	0
026	04	4	062	00	0	098	58	DSZ	134	52	EE	170	75	-	206	46	LBL
027	54	)	063	00	0	099	00	0	135	22	INV	171	18	C'	207	58	DSZ
028	80	IF+	064	10	E'	100	85	+	136	52	EE	172	36	IND	208	58	DSZ
029	11	A	065	10	E'	101	36	IND	137	22	INV	173	42	STO	209	41	GTO
030	85	+	066	10	E'	102	43	RCL	138	57	FIX	174	00	0	210	60	IFF
031	03	3	067	42	STO	103	00	0	139	56	RTN	175	00	0	211	01	1
032	54	)	068	01	1	104	00	0	140	46	LBL	176	75	-	212	15	E
033	22	INV	069	09	9	105	22	INV	141	10	E'	177	93	.	213	59	⇧
034	80	IF+	070	43	RCL	106	23	LNX	142	58	DSZ	178	01	1	214	13	C
035	11	A	071	09	9	107	54	)	143	00	0	179	54	)	215	81	HLT

DATA TRANSFER

000	46	LBL	036	46	LBL
001	14	D	037	12	B
002	01	1	038	01	1
003	08	8	039	08	8
004	42	STO	040	42	STO
005	00	0	041	00	0
006	00	0	042	00	0
007	46	LBL	043	46	LBL
008	19	D'	044	17	B'
009	43	RCL	045	43	RCL
010	00	0	046	00	0
011	00	0	047	00	0
012	85	+	048	85	+
013	07	7	049	07	7
014	09	9	050	09	9
015	54	)	051	54	)
016	42	STO	052	42	STO
017	01	1	053	01	1
018	09	9	054	09	9
019	36	IND	055	36	IND
020	43	RCL	056	43	RCL
021	01	1	057	00	0
022	09	9	058	00	0
023	36	IND	059	36	IND
024	42	STO	060	42	STO
025	00	0	061	01	1
026	00	0	062	09	9
027	58	DSZ	063	58	DSZ
028	19	D'	064	17	B'
029	43	RCL	065	43	RCL
030	07	7	066	09	9
031	09	9	067	09	9
032	42	STO	068	42	STO
033	09	9	069	07	7
034	09	9	070	09	9
035	81	HLT	071	81	HLT

Listing produced with a TI-59/PC-100A using the program "SR-52 Program Listing" (PPX-59 #908010).

**The TI-59 version of this program can be ordered by entering 918009 on your PPX-59 order blank.*

CALCULATOR DOCTOR

This column is intended to answer frequently occurring questions relating to either SR-52 or TI-59 operation and programming. These questions are obtained from TI's Consumer Relations Department. If you are having difficulty with your calculator, contact TI's Consumer Relations Department for assistance.

QUESTION: After my TI-59 has been OFF for a long period of time, it will not always power up showing a zero in the display. I must turn it off and then turn it back ON. Is this an indication of a problem with the calculator?

ANSWER: No. Although most TI-59's will power-up clear every time, I have seen some which would not. However, they have been fully operational in all other respects. If every power-up results in a non-clear condition, you should send the unit in for repair.

QUESTION: My program will only work the first six times that I run it. Why?

ANSWER: An overloaded subroutine return register may be the source of your problem since only six subroutine return levels are available. Most people don't realize that each time *D.MS, *P→R, or any of the statistical functions are used, a level of the subroutine return register is filled. If you use one of these functions, the seventh run will result in an overflow of the return register. If you use a RST prior to executing the program (provided you don't have any flags), you will eliminate this problem by clearing the subroutine return register.

THE INTRODUCTION OF PROGRAMMABLES IN BUSINESS SCHOOLS

Julius S. Aronofsky, Robert J. Frame, Elbert B. Greynolds
Southern Methodist University, Dallas, Texas

Since programmable calculators were first introduced, Southern Methodist University (SMU) has followed their development closely, continually considering and testing their possible uses in various aspects of its business school curriculum. This reports our experiences to date.

Earlier Experience with the SR-52

In the March 1977 issue of the PPX Exchange, we reported the introduction of the SR-52 programmable calculator into a core course in our Executive MBA program (EMBA). This action was taken to provide an answer to two important questions:

1) Could a programmable provide the computing power necessary for common analysis techniques used in the EMBA course? and

2) Could we teach elementary programming concepts using a programmable calculator?

The answer to both questions was an unqualified yes. Our experience with the EMBA program has shown that programmables can be effectively used to satisfy several student objectives:

- To learn the fundamentals of programming.
- To eliminate complex manual calculations or the need for large-scale computers in analytical courses.
- To develop and use programs for special job-related applications.
- To make an easy transition to BASIC or FORTRAN and to recognize when larger computer systems are more effective.

Expansion with the TI-59

Satisfied that the above objectives were being fulfilled, programmable calculator usage was extended into other programs. These programs include:

- EMBA Program Expansion — In the Fall 1977 semester, a new group of EMBA students were introduced to the TI-59 in the required core course called Management Science and Computers (MSC). The first group of EMBA students continue to use programmables in other courses in their curriculum.
- Full-Time MBA Program — In the Fall 1977 semester, programmables were introduced in the MSC core course for full-time MBA students. In the four sections of this course offered, the students were given the option of learning programming by using programmables (which they had to furnish) or by using time share terminals with the BASIC language. One of the four sections chose to buy their own programmables.
- Undergraduate Program — An elective undergraduate course is now underway (Spring 1978) with the emphasis on financial applications of programmables.
- Non-Credit Course — A seminar sponsored by the Costa Institute of Real Estate Finance is also in progress. This seminar is designed for real estate investors, brokers, lenders, appraisers, and counselors. It's primary objective is to develop the capability to utilize a programmable and it's library programs to perform a broad range of financial and real estate analysis.

Development of Text Materials

Based on our early experiences using programmables in courses and seminars, we concluded that our progress was being hampered by the lack of suitable text materials for classroom use and self-study. To overcome this obstacle, we undertook the writing of a self-instructional book: PROGRAMMABLE CALCULATORS: Business Applications, Aronofsky, Frame, and Greynolds, McGraw-Hill, 1978. The book is designed to be used as:

1) A self-study manual for the manager, analyst, or student of business;
2) A textbook for an introductory-level programming course;
3) A supplementary text in such fields as statistics, accounting, finance, real estate, etc.

Although excellent software support is available from Texas Instruments, it tends towards the specific calculator and its features rather than general concepts and programming applications. By concentrating only on business applications, we were able to explain business-related function keys and calculating techniques in depth. The text stresses simple, straightforward programming techniques rather than "fancy" or "tricky" methods. Although it is written for the TI-58/59, an extensive Appendix shows the same in-text examples worked out for other programmables of the TI family (where applicable): the SR-52, 56, 60, TI-57, and the MBA.

Summary

Programmable calculators have a significant role to play in business schools. However, for programmables to be properly implemented into the educational system, it is important that proper text and related classroom materials be made available to students. We have developed such materials to ensure that SMU business students acquire the expertise that is currently enjoyed by the business community. Universities and colleges everywhere should plan similar programs to prepare their graduates for today's business world.

THE SR-52 AND THE MARKET
Darrell Deuel

What's the DOW? How's the Market? These are questions constantly asked in today's fast paced financial world.

The stock market is primarily a numbers game. The way the numbers interact is very important. The speed with which decisions must be made has left the nonprogrammable calculator user in a dither because a calculator without programmability is only good for basic mathematical calculations. A programmable calculator has the ability to give the investor an almost instantaneous look at statistics and the ability to do projections and "what iffing" (i.e. all variables do not have to be reentered if one variable is changed).

As a stockbroker, I constantly use the SR-52 and PC-100A as a decision making tool. I get a much larger overlay of information rapidly, which helps me reach timely decisions. For example, writing options is a conservative way of increasing income. Finding which option offers the most income, used to take me five minutes when figuring in all the variables. By writing a custom program to meet my needs, I can now execute the same formulae in about 30 seconds.

When a person buys a stock he'll look at some historical facts and mentally calculate what will happen in the future. Statistical projections are an effective tool for looking into the future, but they are time-consuming and tedious. With my specialized program, "Linear Regression with Standard Deviation of Y" (PPX-52 #200040), I can do a linear regression and get a standard deviation on a large number of variables as fast as I can punch in the variables. It used to take me at least 15 minutes with a nonprogrammable calculator!

The use of statistical model building is catching on. The nation's largest brokerage houses are starting econometric programs for their clients. In the years to come, it will probably become universal throughout the industry. Many people aren't waiting! The door is open now for the individual to do his own analytical projections without having to resort to expensive computers. By building a good SR-52 statistical library, an investor can reap financial rewards.

Others using the SR-52 in the market and associated areas of business are welcome to contact me to compare notes. Please direct all correspondence to:

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FROM THE ANALYST'S DESK

• If you find that your program's length exceeds the space provided on the PPX-59 Listing Sheets, **please put the remaining steps on white bond paper.**

• The professional category Anthropology has been opened by Mr. David K. Patterson Jr. of Ontario, Canada with the acceptance of his seven programs. These programs, ranging from "Penrose's Size and Shape" (PPX-52 #480002) to the "Robinson Index for Archaeological Deposits" (PPX-52 #480004), can be found in the D Addendum to the PPX-52 Software Catalog.

• Having to manually repartition the TI-59 before reading a magnetic card can be somewhat of a nuisance. The way to get around this is to let the program repartition itself. Write the program in whatever partition you desire and include an initialization routine (before step 480) that will repartition the memory storage area into the ratio that you desire (i.e. N *Op 17 where N is the desired number of registers). After all program and data constants have been entered and you are ready to write the program onto a magnetic card, repartition to the power-up partition (479.59) by going out of LRN mode and keying in 6 *Op 17. Record your magnetic card(s). Now, repartitioning is no longer necessary prior to reading cards.

• For those PPX-59 members who have "Zener Power Supply Design" (PPX-59 #658006), the following changes need to be made to the program listing:
change the contents of location 044 to 0
change the contents of location 149 to 18
change the contents of data register 64 to 4617311735.

• Mr. David Miller, Randolph, Massachusetts, suggests the following modification to the program "Base Conversions" (PPX-52 #369020, PPX-59 #368002) to eliminate the need for rounding in non-decimal bases. **In the SR-52 program**, insert between location 019 and 020: INV *if pos *9' + 1 EE +/- 10. **In the TI-59 program**, insert between location 014 and 015: INV x ≥ t *Op + 1 EE +/- 10.

• Mr. William Wilson's use of "Means and Moments" (PPX-52 #299003) usually resulted in an overflow of register 06. He increased the capacity with a log transformation by changing the following steps:

167	INS	INV
168	INS	lnx
162		÷
115	del	STO
115	del	0
115	del	6
028		lnx
029	INS	x
034	del	*PROD
034		SUM

• Have you ever been in the middle of a manual calculation with your TI-59 or SR-52, had a momentary interruption at the point where you were entering INV and/or 2nd, and couldn't remember whether or not you had already keyed them? At this point, if you guess and continue on, you may ruin your calculation. There is a way out of this predicament. To nullify the INV and/or 2nd key, simply press the BST/*Del key on the TI-59 and the HLT/*rset key on the SR-52. (This will not effect any key if 2nd or INV has not been pressed.) Then, re-enter the INV and/or 2nd key and continue on. This solution applies **only in the calculate mode** where these keys have no effect.

• After you have put the effort into recording your program, be sure that it is not in vain. **Do not lay your card near anything that is possibly magnetized (e.g. scissors).** This will nullify your efforts.

The PPX Exchange is published every other month and is the only newsletter published by Texas Instruments for SR-52 and TI-59 owners. You are invited to submit items you feel are of general interest to other SR-52 or 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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