

# Programmable TI59 Specialty Packages Securities



TEXAS INSTRUMENTS  
INCORPORATED



Copy Right 1978, Texas Instruments, Inc.

© 2010 Joerg Woerner  
Datamath Calculator Museum

**IMPORTANT**

TEXAS INSTRUMENTS MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, REGARDING THESE PROGRAM MATERIALS AND MAKES SUCH MATERIALS AVAILABLE TO THE BUYER SOLELY ON AN "AS-IS" BASIS WITH ALL FAULTS.

IN NO EVENT SHALL TEXAS INSTRUMENTS AND/OR THE CONTRIBUTOR BE LIABLE TO ANYONE FOR SPECIAL, COLLATERAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE PURCHASE OR USE OF THESE MATERIALS AND THE SOLE AND EXCLUSIVE LIABILITY TO TEXAS INSTRUMENTS AND/OR THE CONTRIBUTOR, REGARDLESS OF THE FORM OF ACTION, SHALL NOT EXCEED THE PURCHASE PRICE OF THESE MATERIALS.

## THE TI-59 PAKETTE STORY

Since the early days of handheld programmable calculators, Texas Instruments (TI) has been deeply involved in supplying not only calculators with exceptional power but also programs (software) to match. Many experts were put to work within their special fields of endeavor to design quality Software Libraries for TI calculator users. Among the Libraries produced by TI for the TI-59 are:

- Statistics
- Real Estate and Investment
- Surveying
- Navigation
- Aviation
- Leisure

Fully recognizing TI-59 users may require programs other than those included in TI-59 Libraries, a second program source was developed. This source, the Professional Program Exchange, gathers, compiles and redistributes programs **written by TI-59 users** who defined their own specific program needs and filled these needs by writing programs. These programs, now in Pakettes, add a new dimension to the software made available to TI-59 user. Combining some of the best TI originated programs with the most popular programs found in the Professional Program Exchange, Program Pakettes offer a true software value. Current TI Pakette offerings include:

- Securities
- Statistical Testing
- Civil Engineering
- Electronic Engineering
- Blackbody
- Oil/Gas/Energy
- Printer Utility
- Astrology
- Programmer's Aid



## THE TI-59 PAKETTE STORY

Since the early days of handheld programmable calculators, Texas Instruments (TI) has been deeply involved in supplying not only calculators with exceptional power but also programs (software) to match. Many experts were put to work within their special fields of endeavor to design quality Software Libraries for TI calculator users. Among the Libraries produced by TI for the TI-59 are:

### Table of Contents

UNIVERSAL RATE OF RETURN	188003A
CALL OPTION RATIO WRITING	188004A
CALL OPTION SPREADING	188009A
SCREEN STOCKS — QUALITY AND QUANTITY	188010A
VALUE OF CALL OPTION	188011A
INTERNAL RATE OF RETURN	188914A
FORECASTING: AUTOMATIC CURVE CHOICE	208902A

© 2010 Joerg Woerner  
Datamath Calculator Museum

- Programmer's Aid
- Astrology
- Printer Utility
- Oil/Gas/Energy
- Blackbody
- Electronic Engineering
- Civil Engineering
- Statistical Testing
- Securities





# TEXAS INSTRUMENTS

INCORPORATED

## SECURITIES PAKETTE ERRATA

Please make the following changes to your Pakette Documentation to insure correct program execution.

Program #208902 FORECASTING: AUTOMATIC CURVE CHOICE

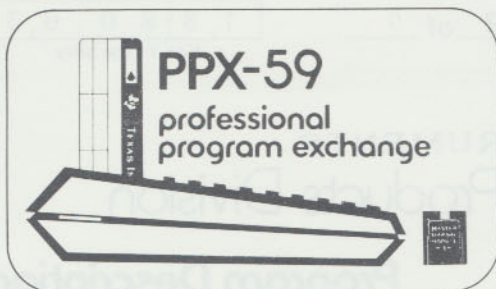
Page 4 of 8, step 5 should read:

1=Linear; 2=Power; 3=Exponential; 4=Logarithmic

Pages 6, 7, and 8 of 8, program steps 285, 286, 422, 458, and 521 should read:

285	68	Nop
286	68	Nop
422	36	36
458	38	38
521	54	54

© 2000 Jerg Woerner  
Datamath Calculator Museum



# TEXAS INSTRUMENTS Calculator Products Division

## Submission Abstract

Program Title	UNIVERSAL RATE OF RETURN	Rev.
---------------	--------------------------	------

### Abstract of Program

Calculates the unknown interest rate (internal rate of return) for a wide variety of investment situations. Among the situations which may be analyzed are ordinary annuities, sinking funds, uneven cash flows, yield-to-maturity on bonds, annuities with balloon payments, step-rate loans, grouped variable cash flows, installment loans, etc.

The program also permits the present value of a series of even or uneven cash flows to be calculated for any interest rate.

Original SR-52 program written by Dix Fulton of Seattle, Washington

### User Benefits:

Allows use of a single program for a variety of situations previously requiring separate programs. Computes interest to 10 significant digits.

Category Name	Required Progs.	Prog. Steps	Card Sides	PC-100A Needed <input type="checkbox"/>
Gen. Finance		323	2	Library Module ID <input type="checkbox"/>

### Submittal Agreement

All of the information forwarded herewith is contributed to Texas Instruments on a nonconfidential, nonobligatory basis; no relationship, confidential or otherwise, express or implied, is established with Texas Instruments by this contribution. Texas Instruments may use, copyright, distribute, publish, reproduce or sell this information in any way it chooses, without compensation to me. To my knowledge, this data is not copyrighted, and contribution of this information to Texas Instruments by me does not breach any obligation to any other person or organization relating to proprietary or confidential information.

Signature \_\_\_\_\_ Date \_\_\_\_\_  
Name Texas Instruments Tel. No. \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

### Submission Checklist

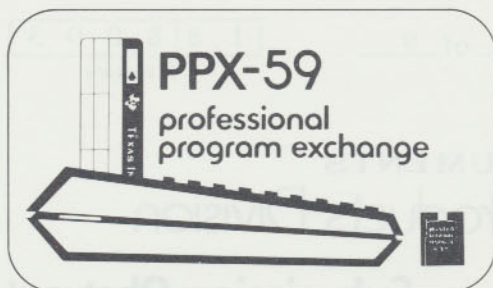
- ☒ Recorded Magnetic Cards
- ☒ Submission Abstract
- ☒ Program Description
- ☒ User Instructions
- ☒ Sample Problem
- ☒ Listing
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_

### IMPORTANT

TEXAS INSTRUMENTS MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, REGARDING THESE PROGRAM MATERIALS AND MAKES SUCH MATERIALS AVAILABLE TO THE BUYER SOLELY ON AN "AS-IS" BASIS WITH ALL FAULTS.

IN NO EVENT SHALL TEXAS INSTRUMENTS AND/OR THE CONTRIBUTOR BE LIABLE TO ANYONE FOR SPECIAL, COLLATERAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE PURCHASE OR USE OF THESE MATERIALS AND THE SOLE AND EXCLUSIVE LIABILITY TO TEXAS INSTRUMENTS AND/OR THE CONTRIBUTOR, REGARDLESS OF THE FORM OF ACTION, SHALL NOT EXCEED THE PURCHASE PRICE OF THESE MATERIALS.





# TEXAS INSTRUMENTS Calculator Products Division

## Program Description

Program Title:

UNIVERSAL RATE OF RETURN

Rev.

Method, Equations, Sketches, Limitations, References, Error Recovery:

This program accepts an initial investment and a series of up to nine groups of cash flows associated with the investment. The program calculates the interest rate which makes the sum of the present values of all cash flows equal to the investment.

There are no practical limits on the number of identical cash flows in any group, or on the magnitude or sign of the flows for each group or the initial investment. Cash flows must occur at periodic intervals, but limited variations in time scheduling may be modelled by the judicious use of zero cash flows, (eg., flows of \$1000 in two successive years followed by flows of \$500 in four successive six-month periods may be modelled as six-month cash flows of \$0, \$1000, \$0 \$1000, \$500, \$500, \$500, \$500).

The equation which relates investment, cash flow, time, and rate of return is:

$$\text{Investment} = \sum_{j=1}^q (\text{Cashflow}_j \cdot (1 - 1/(1 + \text{ROR})^{n_j}) / \text{ROR} / (1 + \text{ROR})^{\sum_{k=1}^j n_{k-1}})$$

where Investment = Initial investment

Cashflow<sub>j</sub> = Amount of each cash flow in j<sup>th</sup> group

n<sub>j</sub> = Number of equal cash flows in j<sup>th</sup> group

n<sub>k-1</sub> = Number of equal cash flows in k-1<sup>th</sup> group  
(if k=1, n<sub>k-1</sub>=0)

ROR = Rate of return or interest rate

The program solves this equation iteratively using Newton's method, for the rate of return. Alternatively, the equation may be solved directly for the investment (present value of cash flows), if the rate of return is given.

If no frequency is entered for a given cash flow amount, a single payment of that amount is assumed by default. After entry of the ninth cash flow amount, the calculation of the rate of return is initiated automatically. A schedule of fewer than 9 groups, however, requires the explicit initiation by the user of the rate of return calculation.





# User Instructions

Program Title			
UNIVERSAL RATE OF RETURN			
Invest	n	Cashflo	ROR → PV

Partition (OP 17)	399	69	Varies	t Register	<input checked="" type="checkbox"/>
Angular Mode (if applicable)			SBR Levels	Absolute Addresses	<input checked="" type="checkbox"/>
Library Module ID			1	Disturbs Pending Operations	<input checked="" type="checkbox"/>

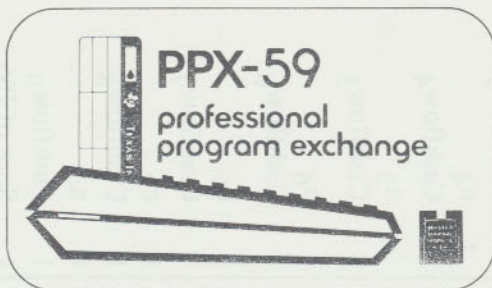
LABELS (Op 08)											
INV	INX	CE	CLR	SUM	Y*	X <sup>2</sup>	EE	1/X	STO	RCL	Σ
SBR	-	RST	+	R/S	•	•	+/−	=	CLR	INV	log
Tan	Pgm	P→R	sin	cos	CM5	CM5	tan	Prd	1/x	Eng	Int
EE	Pause	Σ=1	Σ+	Σ	Grad	St ilg	EE	Pause	Σ=1	Σ+	Σ
EE	Pause	Σ=1	Σ+	Σ	Grad	St ilg	EE	Pause	Σ=1	Σ+	Σ
EE	Pause	Σ=1	Σ+	Σ	Grad	St ilg	EE	Pause	Σ=1	Σ+	Σ
EE	Pause	Σ=1	Σ+	Σ	Grad	St ilg	EE	Pause	Σ=1	Σ+	Σ
EE	Pause	Σ=1	Σ+	Σ	Grad	St ilg	EE	Pause	Σ=1	Σ+	Σ
EE	Pause	Σ=1	Σ+	Σ	Grad	St ilg	EE	Pause	Σ=1	Σ+	Σ
EE	Pause	Σ=1	Σ+	Σ	Grad	St ilg	EE	Pause	Σ=1	Σ+	Σ
EE	Pause	Σ=1	Σ+	Σ	Grad	St ilg	EE	Pause	Σ=1	Σ+	Σ
EE	Pause	Σ=1	Σ+	Σ	Grad	St ilg	EE	Pause	Σ=1	Σ+	Σ

USER DEFINED KEYS	
A	Cashflow <sub>0</sub>
B	n <sub>j</sub>
C	Cashflow <sub>j</sub>
D	rate of return
E	rate of ret. → PV
A'	input loop
B'	sum pf PV <sub>j</sub>
C'	increment j
D'	.000001
E'	PV <sub>j</sub>

FLAGS	B SBR	PRINT	1	FIX	2	3	4	5	6	7	8	9

STEP	PROCEDURE	ENTER	PRESS	OUTPUT/MODE (see legend below)	DATA REGISTERS (INV LIST)
1	Specify initial investment or cash flow	Cashflow <sub>0</sub>	A	Cashflow <sub>0</sub> *	0 dsz
2	Enter number of occurrences of next cash flow (defaults to 1 if not entered)	n <sub>j</sub>	B	n.* j	1 n <sub>1</sub>
3	Enter amount of cash flow	Cashflow <sub>j</sub>	C	Cashflow <sub>j</sub> *	2 Cashflow <sub>1</sub>
4	Repeat steps 2 and 3 up to eight more times				3 n <sub>2</sub>
5	Calculate rate of return based on compounding according to the time interval between individual cash flows. (This step is initiated manually unless 9 groups have been entered under steps 2-4)		D	Rate of rt.* (%)	4 Cashflow <sub>2</sub>
6	Calculate investment (different from that entered in step 1) corresponding to any interest rate and the previously entered cash flows	interest rate (%)	E	present value of all cash flows no. 1-9*	5 n <sub>3</sub>
					6 Cashflow <sub>3</sub>
					7 n <sub>4</sub>
					8 Cashflow <sub>4</sub>
					9 n <sub>5</sub>
					1 Cashflow <sub>5</sub>
					1 n <sub>6</sub>
					1 Cashflow <sub>6</sub>
					1 n <sub>7</sub>
					1 Cashflow <sub>7</sub>
					1 n <sub>8</sub>
					1 Cashflow <sub>8</sub>
					1 n <sub>9</sub>
					1 Cashflow <sub>9</sub>
					1 Sum of PV <sub>j</sub>

Modes: (n) \*—Printed only (n)—Displayed Briefly (Pause)  
n\*—Printed and displayed

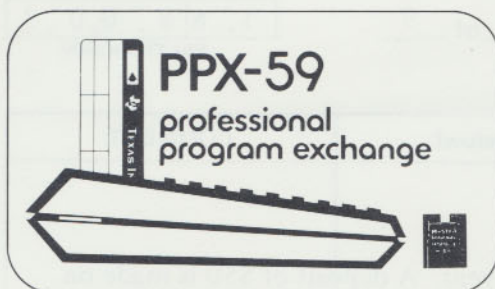


# TEXAS INSTRUMENTS Calculator Products Division

Continued From: ☐ Program Description ☒ User Instructions ☐ Stmt. of Example

Program Title: UNIVERSAL RATE OF RETURN		Rev.
STEP	PROCEDURE	Data Registers
7	Additional cash flows (up to 9 total) may be added to the schedule after step 5 or step 6 by returning to step 2 or 3	20 No. of periods 21 Cash flow <sub>0</sub> 22 1 + ROR

© 2010 Joerg Woerner  
Datamath Calculator Museum



# TEXAS INSTRUMENTS Calculator Products Division

## Sample Problem

### Statement of Example

Calculate the Annual Percentage Rate on a step-rate, 30-year mortgage with the following terms:

Loan amount = \$30,000

Up front 2% loan fee = \$600

Monthly payments for the

first two years = 24 @ \$209.77

Monthly payments for the

second two years = 24 @ \$224.83

Monthly payments for the

third two years = 24 @ \$239.60

Monthly payments for the remaining 24 years = 288 @ \$254.13

Solution time: less than 2 minutes

☐ See Continuation Sheet

ENTER	PRESS	OUTPUT/MODE (see legend below)	COMMENT
30000	$\bar{\cdot}$	30000.	enter initial investment
600	= A	29,400.00 Init*	
24	B	24. Per*	Enter cash flow for 2 years
209.77	C	209.77 CFLO*	
24	B	24. PER*	Enter cash flow for 2nd two years
224.83	C	224.83 CFLO*	
24	B	24. PER*	Enter cash flow for 3rd two years
239.60	C	239.60 CFLO*	
288	B	288. PER*	Enter cash flow for remaining 24 years
254.13	C	254.13 CFLO*	
	D x	.7637571238 ROR*	monthly % rate
12	=	9.165085486	annual % rate
9.25	$\div$	9.25	
12	=E	29170.59 PV*	Amt of loan which could be paid off by the schedule payments if int = 9.25% (neglecting 2% fee)

Modes: (n)\*—Printed only (n)—Displayed Briefly (Pause)  
n\*—Printed and displayed

☐ Over



ENTER	PRESS	OUTPUT/MODE (see legend below)	COMMENT
<p>2) A Savings account contains \$2000 at the beginning of the year. A deposit of \$50 is made on the first day of Jan, Feb, Mar, Apr, May, July and Aug. In addition, a deposit of \$70 is made on June 1 and a deposit of \$100 is made on Sept. 1. By the end of the year, the balance has grown to \$2639.</p> <p>What is the annual interest rate being paid on the account, assuming that the interest is paid and compounded monthly?</p>			
0	A	0.00 INIT*	Initialize
2000	+	2000.00	
50	=C	(1. PER)*	Jan.
4	B	2050.00 CFLO*	
50	C	4. PER*	Feb-May
		50.00 CFLO*	
70	C	(1. PER)*	June
2	B	70.00 CFLO*	
50	C	2. PER*	July-Aug
		50.00 CFLO*	
100	C	(1. PER)*	Sept.
		100.00 CFLO*	
3	B	3. PER*	Oct-Dec
0	C	0.00 CFLO*	
2639	+/- C	(1. PER)*	Withdraw balance
		- 2639.00 CFLO*	
	D x	0.416665223 ROR*	Monthly rate
12	=	4.99998268	Annual int. rate
<p>Modes: (n)* —Printed only (n)—Displayed Briefly ( Pause )</p> <p>n* — Printed and displayed</p>			

## Page 7 of 9

For TI use only

MERGED CODES

62	Pgm	Ind	72	STO	Ind	83	GTO	Ind
63	Exc	Ind	73	RCL	Ind	84	Op	Ind
64	Prd	Ind	74	SUM	Ind	92	INV	SBR



# PPX-59 Professional Program Exchange

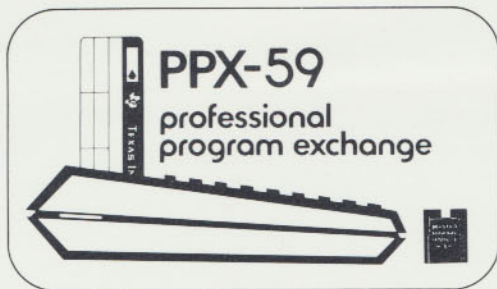
Page 8 of 9

1 8 8 0 0 3

For TI use only

LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
162	02	02		216	02	02		272	32	X↗T	
163	92	RTN		217	18	C*		273	22	INV	
164	76	LBL		218	98	ADV		274	58	FIX	
165	12	B		219	85	+		275	43	RCL	
166	42	STD		220	53	(		276	62	62	
167	20	20		221	01	1		277	69	DP	
168	86	STF		222	07	7		278	04	04	
169	00	00		223	75	-		279	32	X↗T	
170	75	-		224	43	RCL		280	24	CE	
171	59	INT		225	00	00		281	69	DP	
172	95	=		226	54	)		282	06	06	
173	29	CP		227	29	CP		283	61	GTD	
174	67	EQ		228	77	GE		284	16	A*	
175	01	01		229	16	A*		285	76	LBL	
176	82	82		230	25	CLR		286	15	E	
177	29	CP		231	76	LBL		287	55	÷	
178	32	X↗T		232	14	D		288	01	1	
179	23	LNK		233	17	B*		289	00	0	
180	32	X↗T		234	55	÷		290	00	0	
181	91	R/S		235	53	(		291	85	+	
182	22	INV		236	24	CE		292	01	1	
183	58	FIX		237	75	-		293	95	=	
184	43	RCL		238	19	D*		294	48	EXC	
185	60	60		239	44	SUM		295	22	22	
186	69	DP		240	22	22		296	85	+	
187	04	04		241	17	B*		297	17	B*	
188	43	RCL		242	54	)		298	48	EXC	
189	20	20		243	65	×		299	22	22	
190	18	C*		244	19	D*		300	00	0	
191	91	R/S		245	22	INV		301	95	=	
192	76	LBL		246	44	SUM		302	48	EXC	
193	13	C		247	22	22		303	22	22	
194	22	INV		248	95	=		304	85	+	
195	58	FIX		249	44	SUM		305	43	RCL	
196	32	X↗T		250	22	22		306	21	21	
197	87	IFF		251	58	FIX		307	95	=	
198	00	00		252	08	08		308	32	X↗T	
199	02	02		253	52	EE		309	22	INV	
200	10	10		254	22	INV		310	58	FIX	
201	43	RCL		255	52	EE		311	43	RCL	
202	60	60		256	58	FIX		312	63	63	
203	69	DP		257	02	02		313	69	DP	
204	04	04		258	29	CP		314	04	04	
205	86	STF		259	22	INV		315	32	X↗T	
206	01	01		260	67	EQ		316	58	FIX	
207	61	GTD		261	14	D		317	02	02	
208	02	02		262	43	RCL		318	69	DP	
209	14	14		263	22	22		319	06	06	
210	43	RCL		264	75	-		320	85	+	
211	61	61		265	01	1		321	61	GTD	
212	69	DP		266	95	=		322	16	A*	
213	04	04		267	65	×		MERGED CODES 62 Pgm Ind 72 STO Ind 83 GTD Ind 63 Exc Ind 73 RCL Ind 84 DP Ind 64 Prd Ind 74 SUM Ind 92 INV SBR			
214	32	X↗T		268	01	1					
215	86	STF		269	00	0					
				270	00	0					
				271	85	+					





# TEXAS INSTRUMENTS Calculator Products Division

Continued From: ☐ Program Description ☐ User Instructions ☐ Stmt. of Example

Program Title:

UNIVERSAL RATE OF RETURN

Rev.

Out of learn, key in the following codes and store in corresponding registers. Be sure to be in 399/69 partition.

Code for ALPH

Reg

331735.

60

15212732.

61

353235.

62

3342.

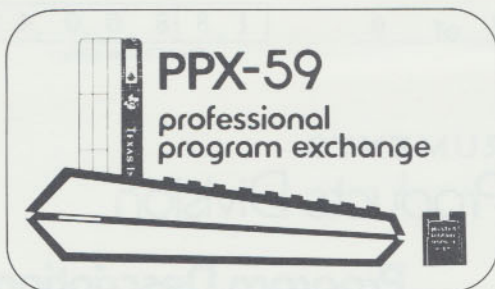
63

24312437.

64

© 2010 Joerg Woerner  
Datamath Calculator Museum



Page 1 of 9

1 8 8 0 0 4

For TI use only

TEXAS INSTRUMENTS  
Calculator Products Division

## Submission Abstract

Program Title CALL OPTION RATIO WRITING	Rev.
--	------

## Abstract of Program

Ratio writing involves the sale of more than one call option with a high exercise price for each call option with a lower exercise price that is purchased. Given the exercise prices and premiums for the two types of options, the price of the underlying stock, the number of options bought and the number sold, the program calculates the upside and downside breakeven points for the underlying stock, the percent move in the stock to reach upside break-even, the net debit/credit upon initiating the position, the maintenance requirement, the maximum net profit and the maximum percent return on the investment.

Original SR-52 Program written by Walden C. Rhines of Lubbock, Texas

## User Benefits:

Time savings and decreased probability of error in performing an investment analysis.

Category Name <u>Securities</u>	Required Progs. _____	Prog. Steps <u>315</u>	Card Sides <u>2</u>	PC-100A Needed <input type="checkbox"/> Library Module ID _____
------------------------------------	--------------------------	---------------------------	------------------------	---

## Submittal Agreement

All of the information forwarded herewith is contributed to Texas Instruments on a nonconfidential, nonobligatory basis; no relationship, confidential or otherwise, express or implied, is established with Texas Instruments by this contribution. Texas Instruments may use, copyright, distribute, publish, reproduce or sell this information in any way it chooses, without compensation to me. To my knowledge, this data is not copyrighted, and contribution of this information to Texas Instruments by me does not breach any obligation to any other person or organization relating to proprietary or confidential information.

Signature \_\_\_\_\_ Date \_\_\_\_\_  
Name Texas Instruments Tel. No. \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

## Submission Checklist

- ☒ Recorded Magnetic Cards
- ☒ Submission Abstract
- ☒ Program Description
- ☒ User Instructions
- ☒ Sample Problem
- ☒ Listing

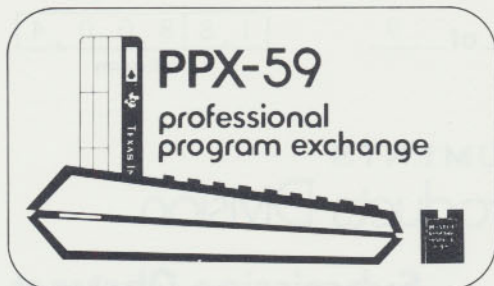
☐ \_\_\_\_\_  
☐ \_\_\_\_\_

## IMPORTANT

TEXAS INSTRUMENTS MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, REGARDING THESE PROGRAM MATERIALS AND MAKES SUCH MATERIALS AVAILABLE TO THE BUYER SOLELY ON AN "AS-IS" BASIS WITH ALL FAULTS.

IN NO EVENT SHALL TEXAS INSTRUMENTS AND/OR THE CONTRIBUTOR BE LIABLE TO ANYONE FOR SPECIAL, COLLATERAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE PURCHASE OR USE OF THESE MATERIALS AND THE SOLE AND EXCLUSIVE LIABILITY TO TEXAS INSTRUMENTS AND/OR THE CONTRIBUTOR, REGARDLESS OF THE FORM OF ACTION, SHALL NOT EXCEED THE PURCHASE PRICE OF THESE MATERIALS.

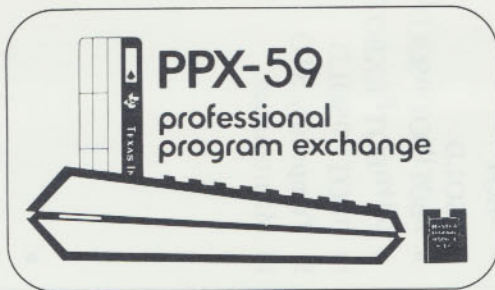




# TEXAS INSTRUMENTS Calculator Products Division

## Program Description

Program Title:	CALL OPTION RATIO WRITING	Rev.
Method, Equations, Sketches, Limitations, References, Error Recovery:		
<p>Upside break-even (u) is the stock price, above which the ratio-write will result in a loss at expiration of the options. It can be calculated from</p> $u = \frac{n_{BOT} (P_{EXBOT} + P_{BOT}) - n_{SOLD} (P_{SOLD} + P_{EXSOLD})}{n_{BOT} - n_{SOLD}}$ <p>where</p> <p> <math>n_{BOT}</math> = Number of options purchased  <math>n_{SOLD}</math> = Number of options sold  <math>P_{BOT}</math> = Price (premium) of the option purchased  <math>P_{SOLD}</math> = Price (Premium) of the option sold  <math>P_{EXBOT}</math> = Exercise price of the option purchased  <math>P_{EXSOLD}</math> = Exercise price of the option sold </p> <p>%u = Percentage increase in the stock price required to reach the upside break-even point</p> $\%u = 100 \left( \frac{u - P_{Stk}}{P_{Stk}} \right) \text{ where } P_{Stk} = \text{current price of the underlying stock}$ <p>Downside break-even (L) is the stock price, below which the ratio-write will result in a loss at expiration of the options. If the ratio-write is entered with a net credit to the writer's account, then there is no downside breakeven point since there is a net gain regardless of how low the stock price falls. In this case, the program calculates L = 0.00. Otherwise,</p> $L = \frac{n_{BOT} (P_{EXBOT} + P_{BOT}) - n_{SOLD} P_{SOLD}}{n_{BOT}}$		
<input type="checkbox"/> See Continuation Sheet		



# TEXAS INSTRUMENTS Calculator Products Division

Continued From: ☒ Program Description ☐ User Instructions ☐ Stmt. of Example

Program Title:	CALL OPTION RATIO WRITING	Rev.
<p>Net dr/cr = the net debit or credit to the writer's account upon establishing the position. A positive number for this calculation indicates a credit to the writer's account.</p> $= n_{\text{SOLD}} P_{\text{SOLD}} - n_{\text{BOT}} P_{\text{BOT}}$ <p>Maintenance = maintenance requirement for the options sold that are effectively 'naked' (uncovered)</p> $= (100) (n_{\text{SOLD}} - n_{\text{BOT}}) (1.3 P_{\text{Stk}} - P_{\text{EXSOLD}}) \text{ or } \$250, \text{ whichever is greater.}$ <p>Maximum net profit = <math>\left[ (n_{\text{BOT}}) (P_{\text{EXSOLD}} - P_{\text{EXBOT}} - P_{\text{BOT}}) + n_{\text{SOLD}} P_{\text{SOLD}} \right] (100)</math></p> <p>Maximum percent return on investment = <math>\frac{\text{Maximum net profit}}{n_{\text{BOT}} P_{\text{BOT}} - n_{\text{SOLD}} P_{\text{SOLD}} + \frac{\text{Maintenance}}{100}}</math></p> <p><b>LIMITATIONS</b></p> <ol style="list-style-type: none"> <li>1. If the user enters a greater number of options bought (A') then sold (B') the situation is not a "ratio-write" and calculated answers will be meaningless.</li> <li>2. Although the formula for maintenance requirements is widely used, there are different formulas at many brokerage firms. The \$250 minimum maintenance requirement also varies but can be easily altered in the program by changing steps 256-258.</li> </ol> <p>*TI Note - changed number must be exactly 3 digits because of direct (absolute) addressing used at 262-263.</p>		





## User Instructions

Program Title		CALL OPTION RATIO WRITING	
nBOT	nSOLD	Upsd Bkn % to U. Bkn	Net cr/dr Maint
PStk	PBOT	P EXBOT	P EXSOLD

Partition (OP 17)		Parenthesis Levels	
319	79	1	t Register
Angular Mode (if applicable)		SBR Levels	Absolute Addresses
Library Module ID			Disturbs Pending Operations

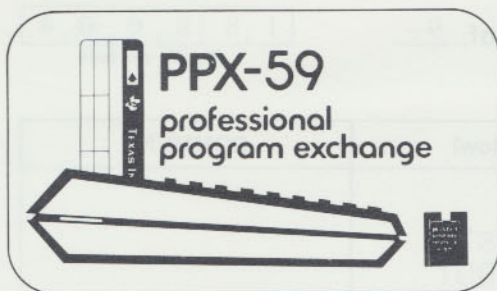
LABELS (Op 08)											
INV	INX	CE	CLR	X:1	X:2						
√	1/x	STO	RCL	SUM	Y*						
EE	(	)	→	GTO	X						
SBR	-	RST	+	R/S	•						
+/-	=	CLR	INV	log	CP						
tan	Pgm	P-R	sin	cos	CMs						
Exc	Pid	EXI	Eng	Fix	Int						
Org	Pause	X=1	Map	Op	Rad						
LBL	X=1	X+	X-	Grad	Sting						
HLg	DMS	π	Test	Write	Dsr						
Adv	PI	✓									

USER DEFINED KEYS	
A	PStk
B	PBOT
C	PEXBOT
D	PSOLD
E	PEXSOLD
A'	nBOT
B'	nSOLD
C	Upside bknv; % to up-
D	sd: bknv; lower bknv.
E	Net dr/cr; maintenance
	Max. Prof. % Return

FLAGS	0	1	2	3	4	5	6	7	8	9
-------	---	---	---	---	---	---	---	---	---	---

STEP	PROCEDURE	ENTER	PRESS	OUTPUT/MODE (see legend below)	DATA REGISTERS (INV LST)
1	Enter program				0 Pointer-Alpha
2	Enter current price of underlying stock	PStk	A	PStk*	1 PStk
3	Enter price (premium) of option bought	PBOT	B	PBOT*	2 PBOT
4	Enter exercise price of option bought	PEXBOT	C	PEXBOT*	3 PEXBOT
5	Enter price (premium) of option sold	PSOLD	D	PSOLD*	4 PSOLD
6	Enter exercise price of option sold	PEXSOLD	E	PEXSOLD*	5 PEXSOLD
7	Enter number of options bought	nBOT	*A'	nBOT*	6 nBOT
8	Enter number of options sold	nSOLD	*B'	nSOLD*	7 nSOLD
9	Steps 2 through 7 may be performed in any order. Changes may be made to one or more of these inputs without affecting stored values for the others.				8 nBOT <sup>P</sup> BOT-nSOLD <sup>P</sup> SOLD
10	Calculate upside bknv point		*C'	Upsd. Bknv.*	9 08+nBOT <sup>P</sup> PEXBOT
11	Calculate % move in stock to upside bknv. point		R/S	% to upsd. bknv.*	10 nBOT - nSOLD
12	Calculate lower bknv point		R/S	Lower bknv.*	11 Temporary STO
13	Calculate net dr/cr to account		*D'	Net dr/cr*	12 Maintenance
14	Calculate maintenance requirement		R/S	Maintenance*	
15	Calculate maximum profit		*E'	Max profit*	
	Calculate maximum % return on investment (including maintenance)		R/S	Max % return*	

NOTE: Calculations 9, 12 and 14 must be performed in sequential order, each time an input is changed. Also, step 13 must be calculated before step 15.



# TEXAS INSTRUMENTS Calculator Products Division

## Sample Problem

### Statement of Example

On September 3, 1976, closing prices for Texas Instruments and its options were as follows:

Stock price	=	\$111-1/2
January 110's	=	8-1/4
January 120's	=	4-5/8

The following calculation evaluates a "ratio-write" involving the sale of 4 January 120 call options and the purchase of 2 January 110 call options. The position is profitable if TXN closes on January 14, 1976 at any price between zero and \$131. Maximum profit is \$2200 and percent return is 45.93%. Maintenance requirement is \$4990 and a loss on the transaction would be sustained only if the stock increased more than 17.49% from its current price of \$111-1/2.

☐ See Continuation Sheet

ENTER	PRESS	OUTPUT/MODE (see legend below)	COMMENT
111.5	A	111.50 P <sub>Stk</sub> *	P <sub>Stk</sub>
8.25	B	8.25 P <sub>BOT</sub> *	P <sub>BOT</sub>
110.	C	110.00 X <sub>BOT</sub> *	P <sub>EXBOT</sub>
4.625	D	4.63 SOLD*	P <sub>SOLD</sub>
120.	E	120.00 X <sub>SOLD</sub> *	P <sub>EXSOLD</sub>
2.	*A'	2.00 N <sub>BOT</sub> *	n <sub>BOT</sub>
4.	*B'	4.00 N <sub>SOLD</sub> *	n <sub>SOLD</sub>
	*C'	131.00 UBEP*	Upside bkv <sub>n</sub> point (\$)
	Run	17.49 MOVE*	% move to upside bkv <sub>n</sub> (%)
	Run	0.00 LBEP*	Lower bkv <sub>n</sub> point (\$)
	*D'	200.00 CR*	Net cr to account (\$)
	Run	4990.00 MAIN*	Maint. requirement (\$)
	*E'	2200.00 PFT*	Maximum profit (\$)
	Run	45.93 % ROI*	% return on total investment (%)

Modes: (n)\*—Printed only (n)—Displayed Briefly (Pause)  
n\*—Printed and displayed



PPX-59 Professional Program  
Exchange  
Sample Problem (cont'd)

Page 6 of 9

1	8	8	0	0	4
---	---	---	---	---	---

For TI use only

ENTER	PRESS	OUTPUT/MODE (see legend below)	COMMENT
		111.50 PSTK	
		8.25 PBDT	
		110.00 XBDT	
		4.63 SOLD	
		120.00 XSLD	
		2.00 NBDT	
		4.00 NSLD	
		131.00 UBEP	
		17.49 MOVE	
		0.00 LBEP	
		200.00 CR	
		4990.00 MAIN	
		2200.00 PFT	
		45.93 %ROI	
<p>© 2010 Joerg Woerner Datamath Calculator Museum</p>			
<p>Modes: (n)* —Printed only (n)—Displayed Briefly ( Pause ) n*—Printed and displayed</p>			



# PPX-59 Professional Program Exchange

Page 7 of 9

1 8 8 0 0 4

For TI use only

LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
000	22	INV		054	43	RCL		109	99	PRT	
001	58	FIX		055	02	02		110	91	R/S	
002	22	INV		056	71	SBR		111	76	LBL	
003	57	ENG		057	99	PRT		112	17	B*	
004	25	CLR		058	91	R/S		113	42	STD	
005	08	8		059	76	LBL		114	07	07	
006	69	DP		060	13	C		115	06	6	
007	17	17		061	42	STD		116	06	6	
008	25	CLR		062	03	03		117	42	STD	
009	91	R/S		063	06	6		118	00	00	
010	76	LBL		064	02	2		119	43	RCL	
011	99	PRT		065	42	STD		120	07	07	
012	32	X:T		066	00	00		121	71	SBR	
013	22	INV		067	43	RCL		122	99	PRT	
014	58	FIX		068	03	03		123	91	R/S	
015	73	RC*		069	71	SBR		124	76	LBL	
016	00	00		070	99	PRT		125	18	C*	
017	69	DP		071	91	R/S		126	06	6	
018	04	04		072	76	LBL		127	07	7	
019	32	X:T		073	14	D		128	42	STD	
020	58	FIX		074	42	STD		129	00	00	
021	02	02		075	04	04		130	43	RCL	
022	69	DP		076	06	6		131	06	06	
023	06	06		077	03	03		132	65	X	
024	92	RTN		078	42	STD		133	43	RCL	
025	76	LBL		079	00	00		134	02	02	
026	44	SUM		080	43	RCL		135	75	-	
027	65	X		081	04	04		136	43	RCL	
028	01	1		082	71	SBR		137	07	07	
029	00	0		083	99	PRT		138	65	X	
030	00	0		084	91	R/S		139	43	RCL	
031	95	=		085	76	LBL		140	04	04	
032	92	RTN		086	15	E		141	95	=	
033	76	LBL		087	42	STD		142	42	STD	
034	11	A		088	05	05		143	08	08	
035	42	STD		089	06	6		144	85	+	
036	01	01		090	04	4		145	43	RCL	
037	06	6		091	42	STD		146	06	06	
038	00	0		092	00	00		147	65	X	
039	42	STD		093	43	RCL		148	43	RCL	
040	00	00		094	05	05		149	03	03	
041	43	RCL		095	71	SBR		150	95	=	
042	01	01		096	99	PRT		151	42	STD	
043	71	SBR		097	91	R/S		152	09	09	
044	99	PRT		098	76	LBL		153	75	-	
045	91	R/S		099	16	A*		154	43	RCL	
046	76	LBL		100	42	STD		155	07	07	
047	12	B		101	06	06		156	65	X	
048	42	STD		102	06	6		157	43	RCL	
049	02	02		103	05	5		158	05	05	
050	06	6		104	42	STD		159	95	=	
051	01	1		105	00	00		160	55	÷	
052	42	STD		106	43	RCL		CODES			
053	00	00		107	06	06		63	Exc	Ind	
				108	71	SBR		64	Pro	Ind	
								73	RCL	Ind	
								74	SUM	Ind	
								83	GTO	Ind	
								84	Op	Ind	
								92	INV	SBR	



# PPX-59 Professional Program Exchange

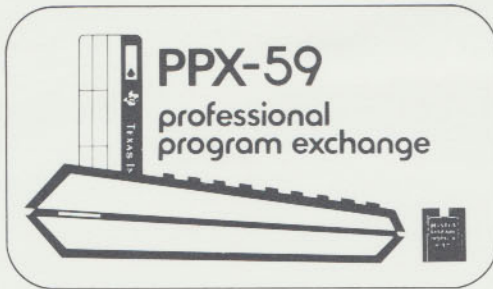
Page 8 of 9

1 8 8 0 0 4  
For TI use only

LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
161	53	(		216	76	LBL		271	71	SBR	
162	43	RCL		217	19	D*		272	99	PRT	
163	06	06		218	07	7		273	91	R/S	
164	75	-		219	00	0		274	76	LBL	
165	43	RCL		220	42	STD		275	10	E*	
166	07	07		221	00	00		276	07	7	
167	54	)		222	43	RCL		277	02	2	
168	42	STD		223	08	08		278	42	STD	
169	10	10		224	94	+/-		279	00	00	
170	95	=		225	71	SBR		280	43	RCL	
171	71	SBR		226	44	SUM		281	06	06	
172	99	PRT		227	71	SBR		282	65	x	
173	91	R/S		228	99	PRT		283	43	RCL	
174	32	X!T		229	91	R/S		284	05	05	
175	06	6		230	07	7		285	75	-	
176	08	8		231	01	1		286	43	RCL	
177	42	STD		232	42	STD		287	09	09	
178	00	00		233	00	00		288	95	=	
179	32	X!T		234	43	RCL		289	71	SBR	
180	55	÷		235	10	10		290	44	SUM	
181	43	RCL		236	65	x		291	71	SBR	
182	01	01		237	53	(		292	99	PRT	
183	75	-		238	43	RCL		293	91	R/S	
184	01	1		239	05	05		294	32	X!T	
185	95	=		240	75	-		295	07	7	
186	71	SBR		241	01	1		296	03	3	
187	44	SUM		242	93	.		297	42	STD	
188	71	SBR		243	03	3		298	00	00	
189	99	PRT		244	65	x		299	32	X!T	
190	91	R/S		245	43	RCL		300	55	÷	
191	06	6		246	01	01		301	53	(	
192	09	9		247	54	)		302	43	RCL	
193	42	STD		248	71	SBR		303	12	12	
194	00	00		249	44	SUM		304	85	+	
195	43	RCL		250	42	STD		305	43	RCL	
196	08	08		251	11	11		306	08	08	
197	94	+/-		252	85	+		307	71	SBR	
198	29	CP		253	43	RCL		308	44	SUM	
199	22	INV		254	10	10		309	54	)	
200	77	GE		255	65	x		310	71	SBR	
201	02	02		256	02	2		311	44	SUM	
202	07	07		257	05	5		312	71	SBR	
203	25	CLR		258	00	0		313	99	PRT	
204	71	SBR		259	95	=		314	91	R/S	
205	99	PRT		260	29	CP					
206	91	R/S		261	77	GE					
207	43	RCL		262	02	02					
208	09	09		263	66	66					
209	55	÷		264	94	+/-					
210	43	RCL		265	85	+					
211	06	06		266	43	RCL					
212	95	=		267	11	11					
213	71	SBR		268	95	=					
214	99	PRT		269	42	STD					
215	91	R/S		270	12	12					

## MERGED CODES

62	Pgm	Ind	72	STD	Ind	83	GTO	Ind
63	Exc	Ind	73	RCL	Ind	84	Op	Ind
64	Prd	Ind	74	SUM	Ind	92	INV	SBR



# TEXAS INSTRUMENTS Calculator Products Division

Continued From: ☐ Program Description ☐ User Instructions ☐ Stmt. of Example

Program Title:	Rev.
----------------	------

CALL OPTION RATIO WRITING

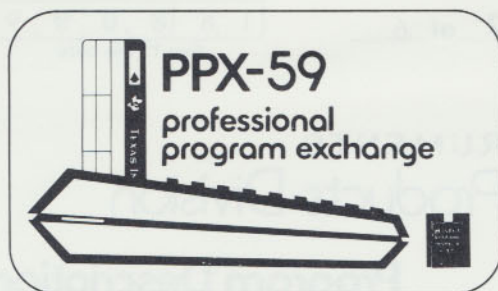
Out of learn mode, key in the following alphanumeric codes and store in corresponding register.  
Be sure partition is 319179.

33363726.	60
33143237.	61
44143237.	62
36322716.	63
44362716.	64
31143237.	65
31362716.	66
41141733.	67
30324217.	68
27141733.	69
153500.	70
30132431.	71
332137.	72
61353224.	73

© 2010 Joerg Woerner  
Datamath Calculator Museum





TEXAS INSTRUMENTS  
Calculator Products Division

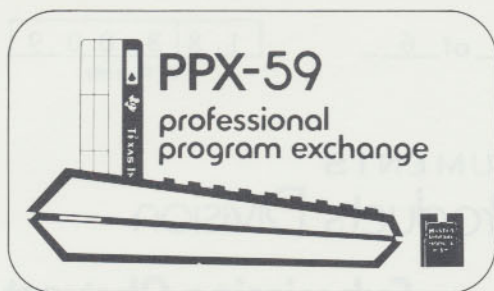
## Submission Abstract

Program Title CALL OPTION SPREADING				Rev.
Abstract of Program Calculations of: 1) risk, 2) maximum profit, 3) risk/reward ratio, 4) break-even point and 5) percent move in underlying stock needed to reach break-even point, are performed for either bullish or bearish vertical call option spreads.				
Original SR-52 Program by Walden C. Rhines of Lubbock, Texas.				
User Benefits: Significant time savings and convenience for investors and analysts.				
Category Name 18	Required Progs.	Prog. Steps 261	Card Sides 2	PC-100A Needed <input type="checkbox"/> Library Module ID <input type="checkbox"/>
Submittal Agreement All of the information forwarded herewith is contributed to Texas Instruments on a nonconfidential, nonobligatory basis; no relationship, confidential or otherwise, express or implied, is established with Texas Instruments by this contribution. Texas Instruments may use, copyright, distribute, publish, reproduce or sell this information in any way it chooses, without compensation to me. To my knowledge, this data is not copyrighted, and contribution of this information to Texas Instruments by me does not breach any obligation to any other person or organization relating to proprietary or confidential information.				Submission Checklist <input checked="" type="checkbox"/> Recorded Magnetic Cards <input checked="" type="checkbox"/> Submission Abstract <input checked="" type="checkbox"/> Program Description <input checked="" type="checkbox"/> User Instructions <input checked="" type="checkbox"/> Sample Problem <input checked="" type="checkbox"/> Listing <input type="checkbox"/> <input type="checkbox"/>
Signature _____ Date _____ Name Texas Instruments Tel. No. _____ Address _____ City _____ State _____ Zip _____				

## IMPORTANT

TEXAS INSTRUMENTS MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, REGARDING THESE PROGRAM MATERIALS AND MAKES SUCH MATERIALS AVAILABLE TO THE BUYER SOLELY ON AN "AS-IS" BASIS WITH ALL FAULTS.

IN NO EVENT SHALL TEXAS INSTRUMENTS AND/OR THE CONTRIBUTOR BE LIABLE TO ANYONE FOR SPECIAL, COLLATERAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE PURCHASE OR USE OF THESE MATERIALS AND THE SOLE AND EXCLUSIVE LIABILITY TO TEXAS INSTRUMENTS AND/OR THE CONTRIBUTOR, REGARDLESS OF THE FORM OF ACTION, SHALL NOT EXCEED THE PURCHASE PRICE OF THESE MATERIALS.



# TEXAS INSTRUMENTS Calculator Products Division

## Program Description

Program Title:	CALL OPTION SPREADING		Rev.																												
Method, Equations, Sketches, Limitations, References, Error Recovery:																															
<p>This program analyzes a bullish or bearish vertical call option spread by assuming that all premiums (market prices of call options) will equal the intrinsic values of the options at some time before expiration. Data required for the program is readily available in the daily option listings of newspapers and includes the following:</p> <p> <math>P_{STK}</math> = Price of underlying stock  <math>P_{BOT}</math> = Price of the call option purchased  <math>P_{EXBOT}</math> = Exercise price of the call option purchased  <math>P_{SOLD}</math> = Price of the call option sold  <math>P_{EXSOLD}</math> = Exercise price of the call option sold </p> <p>Calculations are based upon the following equations:</p> <table border="1"> <thead> <tr> <th></th> <th><u>CALCULATIONS</u></th> <th><u>BULLISH SPREAD</u></th> <th><u>BEARISH SPREAD</u></th> </tr> </thead> <tbody> <tr> <td>R=Risk=Maximum potential loss</td> <td></td> <td><math>P_{BOT} - P_{SOLD}</math></td> <td><math>P_{EXSOLD} - P_{EXBOT}</math></td> </tr> <tr> <td>MP=Maximum profit</td> <td></td> <td><math>P_{EXSOLD} - P_{EXBOT} - R</math></td> <td><math>P_{SOLD} - P_{BOT}</math></td> </tr> <tr> <td>RRW=Risk to reward ratio</td> <td></td> <td><math>R/MP</math></td> <td><math>R/MP</math></td> </tr> <tr> <td>BVN=Break-even point</td> <td></td> <td><math>R + P_{EXBOT}</math></td> <td><math>MP + P_{EXSOLD}</math></td> </tr> <tr> <td>=Price of underlying stock for which there is no gain or loss on the spread</td> <td></td> <td></td> <td></td> </tr> <tr> <td>PCTBVN=Percent move in underlying stock to reach break-even point</td> <td></td> <td><math>\frac{BVN - P_{STK}}{P_{STK}}</math></td> <td><math>\frac{P_{STK} - BVN}{P_{STK}}</math></td> </tr> </tbody> </table> <p>Despite the sequential nature of some of the calculations, any of the six quantities may be calculated independently of the others. In each case, the program first checks the input data to determine whether the spread is bullish or bearish and then applies the appropriate equation. Flag 0 is set if the spread is bearish.</p> <p>Print instructions are included for both the input data and each calculated result. All results are displayed and printed in FIX 2 format.</p> <p>Use of the program is restricted to <u>spreads</u>, i.e. the number of options sold equals the number of options bought. For calculations involving unequal numbers of options bought and sold, see program entitled "Call Option Ratio Writing".</p>					<u>CALCULATIONS</u>	<u>BULLISH SPREAD</u>	<u>BEARISH SPREAD</u>	R=Risk=Maximum potential loss		$P_{BOT} - P_{SOLD}$	$P_{EXSOLD} - P_{EXBOT}$	MP=Maximum profit		$P_{EXSOLD} - P_{EXBOT} - R$	$P_{SOLD} - P_{BOT}$	RRW=Risk to reward ratio		$R/MP$	$R/MP$	BVN=Break-even point		$R + P_{EXBOT}$	$MP + P_{EXSOLD}$	=Price of underlying stock for which there is no gain or loss on the spread				PCTBVN=Percent move in underlying stock to reach break-even point		$\frac{BVN - P_{STK}}{P_{STK}}$	$\frac{P_{STK} - BVN}{P_{STK}}$
	<u>CALCULATIONS</u>	<u>BULLISH SPREAD</u>	<u>BEARISH SPREAD</u>																												
R=Risk=Maximum potential loss		$P_{BOT} - P_{SOLD}$	$P_{EXSOLD} - P_{EXBOT}$																												
MP=Maximum profit		$P_{EXSOLD} - P_{EXBOT} - R$	$P_{SOLD} - P_{BOT}$																												
RRW=Risk to reward ratio		$R/MP$	$R/MP$																												
BVN=Break-even point		$R + P_{EXBOT}$	$MP + P_{EXSOLD}$																												
=Price of underlying stock for which there is no gain or loss on the spread																															
PCTBVN=Percent move in underlying stock to reach break-even point		$\frac{BVN - P_{STK}}{P_{STK}}$	$\frac{P_{STK} - BVN}{P_{STK}}$																												
<input type="checkbox"/> See Continuation Sheet																															



PPX-59

professional  
program exchange

## User Instructions

Program Title					CALL OPTION SPREADING				
Risk	Mas Prof	RSK/Rwd	Brkun	% Stk Mkt					
PSTK	PBOT	PEXBOT	PSOLD	PEXSOLD					

Partition (OP 17)	Parenthesis Levels	t Register	<input checked="" type="checkbox"/>
399	69		
Angular Mode (if applicable)	SBR Levels	Absolute Addresses	<input checked="" type="checkbox"/>
Library Module ID		Disturbs Pending Operations	<input checked="" type="checkbox"/>

LABELS (Op 08)									
INV	Inx	CE	CLR	x <sup>2</sup>	STO	SUM	Y*		
EE	1/x		RCL	✓	GTO	X			
SBR	(	RST	+	R/S					
+/-	=	CLR	INV	log	CP				
tan	Pgm	P-R	sin	cos	CMs				
Exc	Ptd	LxL	Eng	fix	Int				
Reg	Pause	x=1	Map	Op	Rad				
LI	x=1	x*		Grad	St Ang				
RIIlg	0 MS	PI	Test	Write					
Mr									

USER DEFINED KEYS	
A	PSTK
B	PBOT
C	PEXBOT
D	PSOLD
E	PEXSOLD
A'	Risk
B'	Mas. Profit
C'	Risk/reward
D'	Break-even point
E'	% move to BVN pn

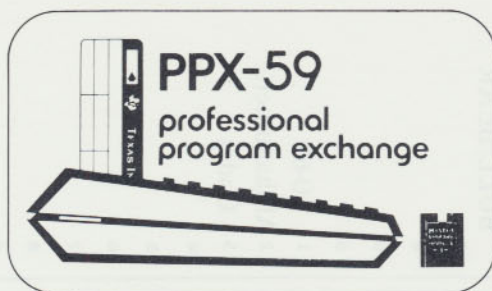
FLAGS	If beep <sup>0</sup>	1	2	3	4	5	6	7	8	9
-------	----------------------	---	---	---	---	---	---	---	---	---

STEP	PROCEDURE	ENTER	PRESS	OUTPUT/MODE (see legend below)
1	Enter Program			
2	Enter underlying stock price (PSTK)	PSTK	A	PSTK*
3	Enter price of option purchased (PBOT)	PBOT	B	PBOT*
4	Enter exercise price of option purchased (PEXBOT)	PEXBOT	C	PEXBOT*
5	Enter price of option sold (PSOLD)	PSOLD	D	PSOLD*
6	Enter exercise price of option sold (PEXSOLD)	PEXSOLD	E	PEXSOLD*
7	Calculate Risk		*A'	Risk*
8	Calculate maximum profit		*B'	Max. Profit*
9	Calculate risk/reward		*C'	Risk/Reward*
10	Calculate break-even point		*D'	Break-Even Pt*
11	Calculate % move in stock to break-even point		*E'	% Move in stock to break even*
Steps 2 thru 5 and 7-11 performed in any order				

DATA REGISTERS (INV 100)	
0	Pointer to Alpha Reg.
1	PSTK
2	PBOT
3	PEXBOT
4	PSOLD
5	PEXSOLD
6	BULL/BEAR
7	
8	
9	
0	
1	60-69
2	Alphanumeric
3	Codes
4	
5	
6	
7	
8	
9	

Modes: (n) \* —Printed only (n) —Displayed Briefly (Pause)  
 n\* —Printed and displayed

See Continuation Sheet



# TEXAS INSTRUMENTS Calculator Products Division

## Sample Problem

### Statement of Example

Based upon closing prices on September 8, 1976, a bull spread between the Texas Instrument Oct 110 and Oct 120 call options is analyzed. Input variables would be as follows:

$$P_{STK} = 112-1/2 = \$112.50 \quad P_{BOT} = 5-1/2 = \$5.50 \quad P_{EXBOT} = 110 = \$110.00$$

$$P_{SOLD} = 1-1/8 = \$1.25 \quad P_{EXSOLD} = 120 = \$120.00$$

Calculation of risk, maximum profit, risk to reward ratio, break-even point and percent move in underlying stock to reach break-even is obtained by pressing the appropriate A', B', C', D' or E' key respectively.

☐ See Continuation Sheet

ENTER	PRESS	OUTPUT/MODE (see legend below)		COMMENT
112.5	A	112.50	STK*	Stock Price
5.5	B	5.50	BOT*	Price of op. bot.
110	C	110.00	XBOT*	Ex. price of op bot.
1.125	D	1.13	SOLD*	Price of op.sold
120	E	120.00	XSOLD*	Ex. price of op.sold
	*A'	4.38	RISK*	Risk
	*B'	5.63	MAXP*	Max profit
	*C'	0.78	R/R*	Risk/Reward
	*D'	114.38	BEP*	Break-even
	*E'	1.67	MOVE*	% move in stock to break-even point

Modes: (n)\*—Printed only (n)—Displayed Briefly ( Pause )  
n\*—Printed and displayed

☐ Over



# PPX-59 Professional Program Exchange

Page 5 of 6

1,888,009

For TI use only

LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
000	22	INV		056	00	00		111	42	STD	
001	58	FIX		057	43	RCL		112	00	00	
002	22	INV		058	04	04		113	71	SBR	
003	57	ENG		059	71	SBR		114	44	SUM	
004	25	CLR		060	99	PRT		115	87	IFF	
005	07	7		061	91	R/S		116	00	00	
006	69	DP		062	76	LBL		117	01	01	
007	17	17		063	15	E		118	22	22	
008	25	CLR		064	42	STD		119	71	SBR	
009	91	R/S		065	05	05		120	99	PRT	
010	76	LBL		066	06	6		121	91	R/S	
011	11	A		067	04	4		122	85	+	
012	42	STD		068	42	STD		123	43	RCL	
013	01	01		069	00	00		124	03	03	
014	06	6		070	43	RCL		125	75	-	
015	00	0		071	05	05		126	43	RCL	
016	42	STD		072	71	SBR		127	05	05	
017	00	00		073	99	PRT		128	95	=	
018	43	RCL		074	91	R/S		129	71	SBR	
019	01	01		075	76	LBL		130	99	PRT	
020	71	SBR		076	44	SUM		131	91	R/S	
021	99	PRT		077	43	RCL		132	76	LBL	
022	91	R/S		078	02	02		133	17	B*	
023	76	LBL		079	75	-		134	06	6	
024	12	B		080	43	RCL		135	06	6	
025	42	STD		081	04	04		136	42	STD	
026	02	02		082	95	=		137	00	00	
027	06	6		083	42	STD		138	71	SBR	
028	01	1		084	06	06		139	44	SUM	
029	42	STD		085	29	CP		140	87	IFF	
030	00	00		086	77	GE		141	00	00	
031	43	RCL		087	00	00		142	01	01	
032	02	02		088	91	91		143	56	56	
033	71	SBR		089	86	STF		144	43	RCL	
034	99	PRT		090	00	00		145	05	05	
035	91	R/S		091	92	RTN		146	75	-	
036	76	LBL		092	76	LBL		147	43	RCL	
037	13	C		093	99	PRT		148	03	03	
038	42	STD		094	32	X/T		149	75	-	
039	03	03		095	22	INV		150	43	RCL	
040	06	6		096	58	FIX		151	06	06	
041	02	2		097	73	RC*		152	95	=	
042	42	STD		098	00	00		153	71	SBR	
043	00	00		099	69	DP		154	99	PRT	
044	43	RCL		100	04	04		155	91	R/S	
045	03	03		101	32	X/T		156	43	RCL	
046	71	SBR		102	58	FIX		157	06	06	
047	99	PRT		103	02	02		158	94	+/-	
048	91	R/S		104	69	DP		159	71	SBR	
049	76	LBL		105	06	06		160	99	PRT	
050	14	D		106	92	RTN		161	91	R/S	
051	42	STD		107	76	LBL					
052	04	04		108	16	A*					
053	06	6		109	06	6					
054	03	3		110	05	5					
055	42	STD									

## MERGED CODES

62	Pgm	Ind	72	STD	Ind	83	GTO	Ind
63	Exc	Ind	73	RCL	Ind	84	Op	Ind
64	Prd	Ind	74	SUM	Ind	92	INV	SBR



# PPX-59 Professional Program Exchange

Page 6 of 6

1 8 8 0 0 9  
For TI use only

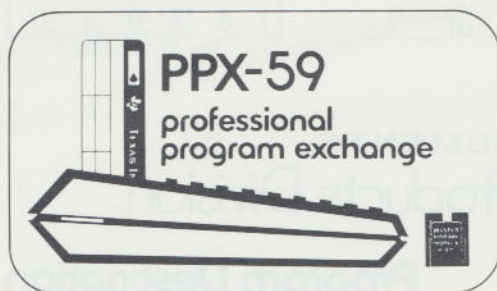
LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
162	76	LBL		217	91	R/S					
163	18	C*		218	76	LBL					
164	06	6		219	10	E*					
165	07	7		220	06	6					
166	42	STD		221	09	9					
167	00	00		222	42	STD					
168	71	SBR		223	00	00					
169	44	SUM		224	71	SBR					
170	55	+		225	44	SUM					
171	53	(		226	87	IFF					
172	43	RCL		227	00	00					
173	05	05		228	02	02					
174	75	-		229	43	43					
175	43	RCL		230	85	+					
176	03	03		231	43	RCL					
177	54	)		232	03	03					
178	95	=		233	95	=					
179	35	1/X		234	55	÷					
180	75	-		235	43	RCL					
181	01	1		236	01	01					
182	95	=		237	75	-					
183	87	IFF		238	01	1					
184	00	00		239	95	=					
185	01	01		240	61	GTO					
186	88	88		241	02	02					
187	35	1/X		242	53	53					
188	71	SBR		243	75	-					
189	99	PRT		244	43	RCL					
190	91	R/S		245	05	05					
191	76	LBL		246	95	=					
192	19	D*		247	55	÷					
193	06	6		248	43	RCL					
194	08	8		249	01	01					
195	42	STD		250	85	+					
196	00	00		251	01	1					
197	71	SBR		252	95	=					
198	44	SUM		253	65	×					
199	87	IFF		254	01	1					
200	00	00		255	00	0					
201	02	02		256	00	0					
202	10	10		257	95	=					
203	85	+		258	71	SBR					
204	43	RCL		259	99	PRT					
205	03	03		260	91	R/S					
206	95	=									
207	71	SBR									
208	99	PRT									
209	91	R/S									
210	94	+/-									
211	85	+									
212	43	RCL									
213	05	05									
214	95	=									
215	71	SBR									
216	99	PRT									

OUT OF LEARN MODE, KEY  
IN THE FOLLOWING ALPHA-  
NUMERIC CODES AND STORE  
IN CORR. REGISTER. BE  
SURE TO BE IN  
399/69 PARTITION.

363726.	60
143237.	61
44143237.	62
36322716.	63
44362716.	64
35243626.	65
30134433.	66
356335.	67
141733.	68
30324217.	69

## MERGED CODES

62	Pgm	Ind	72	STO	Ind	83	GTO	Ind
63	Exc	Ind	73	RCL	Ind	84	Op	Ind
64	Prd	Ind	74	SUM	Ind	92	INV	SBR



# TEXAS INSTRUMENTS Calculator Products Division

## Submission Abstract

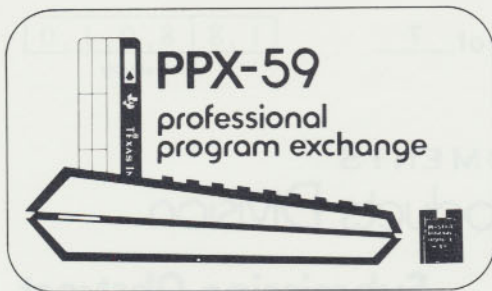
Program Title SCREEN STOCKS - QUALITY AND QUANTITY				Rev.	
Abstract of Program  This program is designed to test each stock in any given list of stocks for five minimum measures of quality and quantity. These measures are: current assets > 2 x current liabilities. Current assets > long term debt, mean earnings last 3 years > 1.33 x mean earnings first 3 years (of a 10 year period), price < 15 x mean earnings last 3 years. Price < 1.5 x book value per share of common stock.  Original SR-52 Program by Richard F.C. Hayden of Pasadena, California.					
User Benefits: Time saving in repetitive scanning of each stock in a long list.					
Category Name	Required Progs.	Prog. Steps 187	Card Sides 2	PC-100A Needed <input type="checkbox"/> Library Module ID <input type="checkbox"/>	
Submittal Agreement  All of the information forwarded herewith is contributed to Texas Instruments on a nonconfidential, nonobligatory basis; no relationship, confidential or otherwise, express or implied, is established with Texas Instruments by this contribution. Texas Instruments may use, copyright, distribute, publish, reproduce or sell this information in any way it chooses, without compensation to me. To my knowledge, this data is not copyrighted, and contribution of this information to Texas Instruments by me does not breach any obligation to any other person or organization relating to proprietary or confidential information.  Signature _____ Date _____ Name Texas Instruments Tel. No. _____ Address _____ City _____ State _____ Zip _____				Submission Checklist  <input checked="" type="checkbox"/> Recorded Magnetic Cards <input checked="" type="checkbox"/> Submission Abstract <input checked="" type="checkbox"/> Program Description <input checked="" type="checkbox"/> User Instructions <input checked="" type="checkbox"/> Sample Problem <input checked="" type="checkbox"/> Listing <input type="checkbox"/> _____ <input type="checkbox"/> _____	

### IMPORTANT

TEXAS INSTRUMENTS MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, REGARDING THESE PROGRAM MATERIALS AND MAKES SUCH MATERIALS AVAILABLE TO THE BUYER SOLELY ON AN "AS-IS" BASIS WITH ALL FAULTS.

IN NO EVENT SHALL TEXAS INSTRUMENTS AND/OR THE CONTRIBUTOR BE LIABLE TO ANYONE FOR SPECIAL, COLLATERAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE PURCHASE OR USE OF THESE MATERIALS AND THE SOLE AND EXCLUSIVE LIABILITY TO TEXAS INSTRUMENTS AND/OR THE CONTRIBUTOR, REGARDLESS OF THE FORM OF ACTION, SHALL NOT EXCEED THE PURCHASE PRICE OF THESE MATERIALS.





# TEXAS INSTRUMENTS Calculator Products Division

## Program Description

Program Title:

SCREEN STOCKS - QUALITY AND QUANTITY

Rev.

Method, Equations, Sketches, Limitations, References, Error Recovery:

This program gives an orderly procedure for making each of five calculations designed to identify those stocks which meet certain minimum standards and thus justify further analysis and consideration.

A user can of course use a different cut-off value for any of the measures

$E_1$  = Earnings for 1st year in 10 year period.  $E_{10}$  = Earnings for last year in period

Earnings Growth =  $(E_8 + E_9 + E_{10}) / (E_1 + E_2 + E_3)$

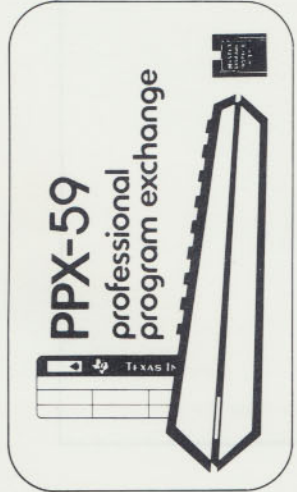
Price/Earning =  $P / (E_8 + E_9 + E_{10})$

3

An additional calculation is the price at which  $P/E=15$ . This is useful for quick scanning, at a later date, of the stocks which were rejected solely because of price, to see if price changes have made them worth further analysis.

The programmer has used the data from the Value Line statistical service but the same data can be obtained directly or by calculation from any of the statistical services.





User Instructions

Program Title Screen Stocks - Quality & Quantity

Enter Yr 1	Enter Price	Initial
------------	-------------	---------

Partition (OP 17) 319 79 Parenthesis Levels ☒ t Register

Angular Mode (if applicable) SBR Levels ☐ Absolute Addresses

Library Module ID Disturbs Pending Operations ☒

LABELS (Op 08)

INV	INX	CE	CLR	Σt	Σ²
√	1/x	STO	RCL	SUM	Y*
EE	(	)	÷	GTO	X
SBR	-	RST	+	R/S	•
+/-	=	CLR	INV	log	CP
tan	Pgm	P→R	sin	cos	CMs
tan	Prd	1/x	Eng	Fit	Int
deg	Pause	Σ=1	Mod	Op	Rad
1/x	Σ=1	Σ+	Σ-	Grad	St/lig
iflig	DMS	π	1/x	Write	Dist
4th	Prt				

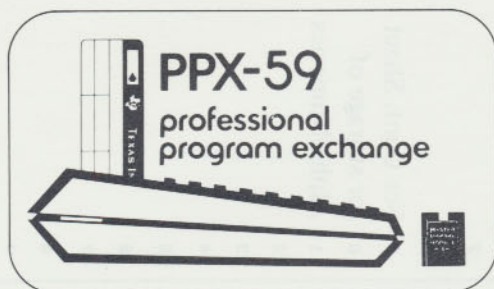
USER DEFINED KEYS

A	Enter 1st Year
B	Enter Price
C	
D	
E	Print Subroutine
A'	
B'	
C'	
D'	
E'	Initialization

FLAGS	0	1	2	3	4	5	6	7	8	9
-------	---	---	---	---	---	---	---	---	---	---

STEP	PROCEDURE	ENTER	PRESS	OUTPUT/MODE (see legend below)	DATA REGISTERS (INV) (DCL)
1	Initialize				0 Ptr to Alpha Numer.
2	Enter earnings/Share year 1	E/S	E' R/S or A	(Screen Stocks)* 0	1
	Enter earnings/Share year 2	E/S	R/S	E/S* (Yr 1)*	2 Current Assets
	Enter earnings/Share year 3	E/S	R/S	E/S* (Yr 2)*	3 Σ Earn/Sh 1st 3 yrs
	Enter earnings/Share year 8	E/S	R/S	E/S* (Yr 3)*	4 Σ Earn/Sh last 3 yrs
	Enter earnings/Share year 9	E/S	R/S	E/S* (Yr 8)*	5 Price
	Enter earnings/Share year 10	E/S	R/S	E/S* (Yr 9)*	6
3	Calculate earnings growth			(E/S)* (Yr 10)*	7
4	Calculate PE = 15			EG* (EARN)*	8
	Enter Price	P	R/S or B	PE = 15 (PE15)*	9 See Cont. Sheet
	Calculate P/E (Current)			(P)* (PRIC)*	0 for storage of
5	Enter Book Value/Share	Bk/Sh	R/S	P/E Current* (PE)*	1 Alpha-Numerics
	Calculate Price/Book			(Bk/Sh)* (B/BK)*	2
6	Enter Current Assets	CA	R/S	P/Bk* (ASST)*	3
7	Enter Current Liabilities	CL	R/S	CA* (LIAB)*	4
	Calculate Curr Assets/Curr Liab.			(CL)* CA/CL*	5
8	Enter Long-term Debt	L.T. Debt	R/S	(L.T. Debt)* (DEBT)*	6
	Calculate Curr Assets/L.T. Debt			CA/L.T.D. (A/D)*	7
					8
					9

Modes: (n) • -Printed only (n) -Displayed Briefly (Pause)  
n • -Printed and displayed



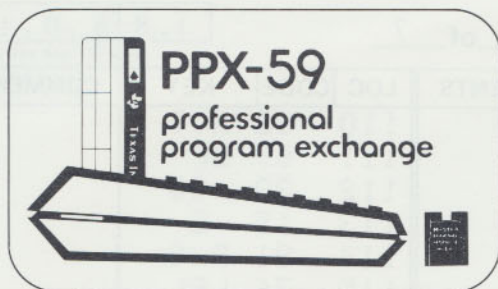
# TEXAS INSTRUMENTS Calculator Products Division

Continued From: ☐ Program Description ☒ User Instructions ☐ Stmt. of Example

Program Title:	SCREEN STOCKS - QUALITY & QUANTITY	Rev.
<p>Alphanumeric Values</p> <p>361535. 60</p> <p>1717310036. 61</p> <p>3732152636. 62</p> <p>45350002. 63</p> <p>45350003. 64</p> <p>45350004. 65</p> <p>45350011. 66</p> <p>45350012. 67</p> <p>45350201. 68</p> <p>17133531. 69</p> <p>33170206. 70</p> <p>33352415. 71</p> <p>3317. 72</p> <p>14633623. 73</p> <p>33631426. 74</p> <p>13363637. 75</p> <p>27241314. 76</p> <p>136327. 77</p> <p>16171437. 78</p> <p>136316. 79</p> <p>Store the values into their corresponding register. Be sure partition is 319.79.</p>		

© 2010 Joeri Woerner  
Datamath Calculator Museum





# TEXAS INSTRUMENTS Calculator Products Division

## Sample Problem

### Statement of Example

Using Data from the June 18, 1976 Edition of Value Line (pg. 1685) for J. C. Penney

Price 51

Book Value /Share (1975) 26.94

Current Assets 1939.7

Current Liabilities 1071.8

Long-term Debt 368.1

(in \$ millions)

Earnings/Share 1966 = 1.59, 1967 = 1.80, 1968 = 2.12,  
1973 = 3.19, 1974 = 2.12, 1975 = 3.16

☐ See Continuation Sheet

ENTER	PRESS	OUTPUT/MODE (see legend below)		COMMENT
	E'	(SCREEN STOCKS)*		Initialize
		0		
1.59	R/S	1.59*	Year 1	Enter Yr 1 (1966)
1.80	R/S	1.80*	Year 2	Enter Yr 2 (1967)
2.12	R/S	2.12*	Year 3	Enter Yr 3 (1968)
3.19	R/S	3.19*	Year 8	Enter Yr 8 (1973)
2.12	R/S	2.12*	Year 9	Enter Yr 9 (1974)
3.16	R/S	(3.16)*	Year 10	Enter Yr 10 (1975)
		1.54*	EARN	Calculate Earning Grwth
	R/S	42.35*	PE15	Price Earning = 15
51	R/S	(51.00)*	PRIC	Enter Price
		18.06*	PE	Calculate Current Price
				Earning
26.94	R/S	(26.94)*	B/SH	Enter Book Value/Shr
		1.89*	P/BK	Calculate Price/BK
1939.7	R/S	1939.70*	ASST	Enter Current Assets
1071.8	R/S	1071.80	LIAB	Enter Current Liabilities
		1.81*	A/L	Calculate Current Assets
				/Current Liabilities
368.1	R/S	(368.10)*	DEBT	Enter Long-term Debt
		5.27*	A/D	Calculate Current Assets
				/Long Term Debt

Modes: (n)\* —Printed only (n)—Displayed Briefly (Pause)  
n\* —Printed and displayed

☐ Over

# PPX-59 Professional Program Exchange

Page 6 of 7

1,8 8,0,1,0  
For TI use only

LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
000	76	LBL		055	42	STD		110	32	X!T	
001	15	E		056	00	00		111	69	DP	
002	22	INV		057	15	E		112	20	20	
003	58	FIX		058	91	R/S		113	15	E	
004	73	RC*		059	44	SUM		114	91	R/S	
005	00	00		060	03	03		115	76	LBL	
006	69	DP		061	32	X!T		116	12	B	
007	04	04		062	69	DP		117	32	X!T	
008	32	X!T		063	20	20		118	07	7	
009	58	FIX		064	15	E		119	01	1	
010	02	02		065	91	R/S		120	42	STD	
011	69	DP		066	44	SUM		121	00	00	
012	06	06		067	03	03		122	15	E	
013	92	RTN		068	32	X!T		123	42	STD	
014	76	LBL		069	69	DP		124	05	05	
015	10	E*		070	20	20		125	55	÷	
016	22	INV		071	15	E		126	53	(	
017	58	FIX		072	91	R/S		127	43	RCL	
018	22	INV		073	44	SUM		128	04	04	
019	57	ENG		074	04	04		129	55	÷	
020	25	CLR		075	32	X!T		130	03	3	
021	06	6		076	69	DP		131	54	)	
022	69	DP		077	20	20		132	95	=	
023	17	17		078	15	E		133	32	X!T	
024	47	CMS		079	91	R/S		134	69	DP	
025	08	8		080	44	SUM		135	20	20	
026	69	DP		081	04	04		136	15	E	
027	17	17		082	32	X!T		137	91	R/S	
028	98	ADV		083	69	DP		138	32	X!T	
029	69	DP		084	20	20		139	69	DP	
030	00	00		085	15	E		140	20	20	
031	43	RCL		086	91	R/S		141	15	E	
032	60	60		087	44	SUM		142	35	1/X	
033	69	DP		088	04	04		143	65	x	
034	01	01		089	32	X!T		144	43	RCL	
035	43	RCL		090	69	DP		145	05	05	
036	61	61		091	20	20		146	95	=	
037	69	DP		092	15	E		147	32	X!T	
038	02	02		093	43	RCL		148	69	DP	
039	43	RCL		094	04	04		149	20	20	
040	62	62		095	55	÷		150	15	E	
041	69	DP		096	43	RCL		151	91	R/S	
042	03	03		097	03	03		152	42	STD	
043	69	DP		098	95	=		153	02	02	
044	05	05		099	32	X!T		154	32	X!T	
045	25	CLR		100	69	DP		155	69	DP	
046	98	ADV		101	20	20		156	20	20	
047	91	R/S		102	15	E		157	15	E	
048	76	LBL		103	91	R/S		158	91	R/S	
049	11	A		104	98	ADV		159	32	X!T	
050	44	SUM		105	43	RCL		160	69	DP	
051	03	03		106	04	04		MERGED CODES 62 Pgm Ind 72 STO Ind 83 GTO Ind 63 Exc Ind 73 RCL Ind 84 Op Ind 64 Pld Ind 74 SUM Ind 92 INV SBR			
052	32	X!T		107	65	x					
053	06	6		108	05	5					
054	03	3		109	95	=					



# PPX-59 Professional Program Exchange

Page 7 of 7

1 8 8 0 1 0

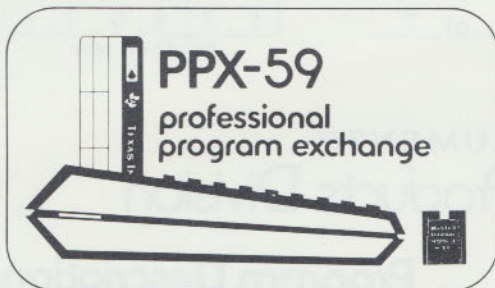
For TI use only

LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
161	20	20									
162	15	E									
163	35	1/X									
164	65	X									
165	43	RCL									
166	02	02									
167	95	=									
168	32	X!T									
169	69	DP									
170	20	20									
171	15	E									
172	91	R/S									
173	32	X!T									
174	69	DP									
175	20	20									
176	15	E									
177	35	1/X									
178	65	X									
179	43	RCL									
180	02	02									
181	95	=									
182	32	X!T									
183	69	DP									
184	20	20									
185	15	E									
186	91	R/S									
								MERGED CODES 62 Pgm Ind 72 STO Ind 83 GTO Ind 63 Exc Ind 73 RCL Ind 84 Op Ind 64 Prd Ind 74 SUM Ind 92 INV SBR			

© 2010 Joerg Woerner  
Datamath Calculator Museum







# TEXAS INSTRUMENTS Calculator Products Division

## Submission Abstract

Program Title VALUE OF CALL OPTION	Rev.
---------------------------------------	------

### Abstract of Program

Calculates the model value of a call option based on the Black-Scholes Formula.

Original SR-52 Program written by Walden C. Rhines of Lubbock, Texas

### User Benefits:

Allows trading decisions based on fast calculations of a widely recognized model.

Category Name	Required Progs.	Prog. Steps 314	Card Sides 2	PC-100A Needed <input type="checkbox"/> Library Module ID <input type="checkbox"/>
---------------	-----------------	-----------------	--------------	---

### Submittal Agreement

All of the information forwarded herewith is contributed to Texas Instruments on a nonconfidential, nonobligatory basis; no relationship, confidential or otherwise, express or implied, is established with Texas Instruments by this contribution. Texas Instruments may use, copyright, distribute, publish, reproduce or sell this information in any way it chooses, without compensation to me. To my knowledge, this data is not copyrighted, and contribution of this information to Texas Instruments by me does not breach any obligation to any other person or organization relating to proprietary or confidential information.

Signature \_\_\_\_\_ Date \_\_\_\_\_  
Name Texas Instruments Tel. No. \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

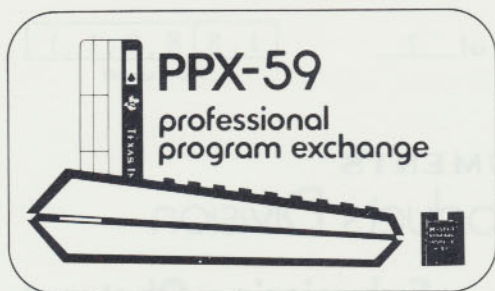
### Submission Checklist

- ☒ Recorded Magnetic Cards
- ☒ Submission Abstract
- ☒ Program Description
- ☒ User Instructions
- ☒ Sample Problem
- ☐ Listing
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_

### IMPORTANT

TEXAS INSTRUMENTS MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, REGARDING THESE PROGRAM MATERIALS AND MAKES SUCH MATERIALS AVAILABLE TO THE BUYER SOLELY ON AN "AS-IS" BASIS WITH ALL FAULTS.

IN NO EVENT SHALL TEXAS INSTRUMENTS AND/OR THE CONTRIBUTOR BE LIABLE TO ANYONE FOR SPECIAL, COLLATERAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE PURCHASE OR USE OF THESE MATERIALS AND THE SOLE AND EXCLUSIVE LIABILITY TO TEXAS INSTRUMENTS AND/OR THE CONTRIBUTOR, REGARDLESS OF THE FORM OF ACTION, SHALL NOT EXCEED THE PURCHASE PRICE OF THESE MATERIALS.



# TEXAS INSTRUMENTS Calculator Products Division

## Program Description

Program Title:	Rev.
VALUE OF CALL OPTION	
Method, Equations, Sketches, Limitations, References, Error Recovery:	
<p>BLACK-SCHOLES FORMULA <sup>1</sup></p> $w(x,t) = xN(d_1) - ce^{-r(\Delta t)}N(d_2)$ $d_1 = \frac{\ln(\frac{x}{c}) + (r + \frac{1}{2}\sigma^2)(\Delta t)}{\sigma\sqrt{\Delta t}}, \quad d_2 = \frac{\ln(\frac{x}{c}) + (r - \frac{1}{2}\sigma^2)(\Delta t)}{\sigma\sqrt{\Delta t}}$ <p>Where <math>x</math> = stock price  <math>c</math> = exercise price  <math>\Delta t</math> = time until expiration of option  <math>\sigma^2</math> = variance rate of return on stock  <math>N(d)</math> = cumulative normal density function  <math>w(x, t)</math> = value of option at time <math>t</math></p> $w_1(x, t) = N(d_1) = \frac{\partial w(x,t)}{\partial x} = \text{Hedge ratio}$ <p>= the change in option premium with respect to changes in the stock price</p> <p>Normal density function is calculated using the following approximation:</p> <p>For <math>d \geq 0</math>, <math>N(d) = 1 - Z(d)(a_1 k + a_2 X^2 + a_3 X^3) + \text{Error}</math></p> $\text{Where } k = \frac{1}{1 + pd}, \quad Z(d) = \frac{1}{\sqrt{2\pi}} e^{-d^2/2}$ $p = 0.33267, \quad a_1 = 0.4361836 \approx 0.4362$ $a_2 = -0.1201676 \approx -0.1202$ $a_3 = 0.9372980 \approx 0.9373$ <p>For <math>d &lt; 0</math>, <math>N(d) = Z(d)(a_1 k + a_2 k^2 + a_3 k^3) + \text{error}</math></p> <p>(In the program, Division by <math>2\pi</math> is combined into the constant values of the <math>a</math>'s) dividends are included in the calculation by subtracting their present value from the stock price.</p> <p><sup>1</sup>F. Black &amp; M. Scholes, <u>Journal of Political Economy</u>, May/June, 1973, pp. 637-654.</p>	
<input type="checkbox"/> See Continuation Sheet	





# User Instructions

Program Title			
Int	Div		Hedge
Pstk	Pex	Δ t	Vol

VALUE OF CALL OPTION	
Partition (OP 17)	Parenthesis Levels
3 1 9 . 7 9	1
Angular Mode (if applicable)	SBR Levels
	1
Library Module ID	

t Register	<input checked="" type="checkbox"/>
Absolute Addresses	<input checked="" type="checkbox"/>
Disturbs Pending Operations	<input checked="" type="checkbox"/>

LABELS (Op 08)	
INV	CE
√	STO
EE	( )
SBR	RST
+/-	=
tan	P-B
Exc	Pd
Deg	Pause
Lbl	Σ+/-
Illeg	0 MS
Mr	Pr

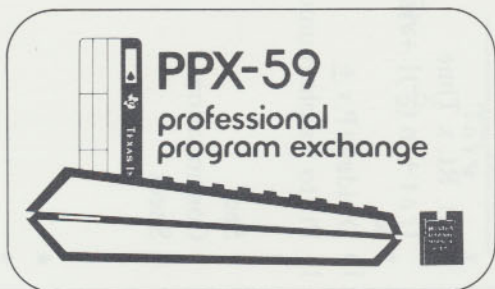
USER DEFINED KEYS	
A	Stock Price
B	Exercise Price
C	Time (Days)
D	Volatility
E	Option Value
A'	Interest Rate
B'	Dividends
C'	
D'	
E'	Hedge Ratio

FLAGS	d < 0	1	2	3	4	5	6	7	8	9

STEP	PROCEDURE	ENTER	PRESS	OUTPUT/MODE (see legend below)
1	Initialize		SBR CLR	(Value of Call Option)*
2	Enter Stock Price	Stock Price	A	Stock Price *
3	Enter Option Exercise Price	Exer. Price	B	Exercise Price *
4	Enter Days until expiration	Days	C	(Days)* years to expiration
5	Enter Volatility	Volatility	D	Volatility *
6	Enter prime interest rate	Int. Rate %	2nd A	Int. Rate * Fraction *
7	Enter Dividend for 1 share	Dividend	2nd B	(Dividend)* 1 + interest
8	Enter days until dividend	Days	R/S	(Days)* -P.V. *
9	Calculate Option Value		E	Option Value *
10	Calculate Hedge Ratio (Steps 9 & 10 may be performed in any order)		2nd E	Hedge Ratio *

Steps 2-6 may be entered or changed in any order. Use of dividend is optional, but if it must be reentered any time the stock is changed.

DATA REGISTERS (INV)	
0	Vol x Time
1	Stock Price
2	Exercise Price
3	Time (years)
4	Volatility
5	Interest Rate
6	$\ln(\frac{C}{C'}) + (r + \frac{1}{2} \sigma^2) \Delta t$
7	$\frac{\sigma \sqrt{\Delta t}}{r + \frac{1}{2} \sigma^2}$
8	Int. Rt. x Time
9	$[r \Delta t + \ln(\frac{C}{C'})] \div \sigma \sqrt{\Delta t}$
10	Dividend P.v. ±
11	Ptr to alphanumerics
2	
3	See
4	Continuation
5	Sheet
6	
7	
8	
9	

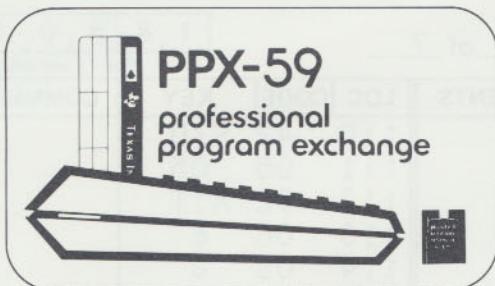


# TEXAS INSTRUMENTS Calculator Products Division

Continued From: ☐ Program Description ☒ User Instructions ☐ Stmt. of Example

Program Title:	Rev.																														
VALUE OF CALL OPTION																															
<p>Store the following alphanumeric codes into the corresponding register. Be sure partition is 319.79.</p> <table> <thead> <tr> <th>Alphanumeric</th> <th>Reg.</th> </tr> </thead> <tbody> <tr> <td>4213274117.</td> <td>60</td> </tr> <tr> <td>32210015.</td> <td>61</td> </tr> <tr> <td>1327270032.</td> <td>62</td> </tr> <tr> <td>3337243231.</td> <td>63</td> </tr> <tr> <td>33363726.</td> <td>64</td> </tr> <tr> <td>33201744.</td> <td>65</td> </tr> <tr> <td>7537.</td> <td>66</td> </tr> <tr> <td>423227.</td> <td>67</td> </tr> <tr> <td>243137.</td> <td>68</td> </tr> <tr> <td>162442.</td> <td>69</td> </tr> <tr> <td>16134536.</td> <td>70</td> </tr> <tr> <td>203342.</td> <td>71</td> </tr> <tr> <td>23171622.</td> <td>72</td> </tr> <tr> <td>42132741.</td> <td>73</td> </tr> </tbody> </table>		Alphanumeric	Reg.	4213274117.	60	32210015.	61	1327270032.	62	3337243231.	63	33363726.	64	33201744.	65	7537.	66	423227.	67	243137.	68	162442.	69	16134536.	70	203342.	71	23171622.	72	42132741.	73
Alphanumeric	Reg.																														
4213274117.	60																														
32210015.	61																														
1327270032.	62																														
3337243231.	63																														
33363726.	64																														
33201744.	65																														
7537.	66																														
423227.	67																														
243137.	68																														
162442.	69																														
16134536.	70																														
203342.	71																														
23171622.	72																														
42132741.	73																														





# TEXAS INSTRUMENTS Calculator Products Division

## Sample Problem

### Statement of Example

On July 31, 1976, "Z Co." stock is selling for \$104 3/8 per share. A dividend of \$0.75 will be paid on Sept. 30, 1976. What is the value of the "Z Co." Oct. 110 option (expires on Oct. 21, 1976)? What is the hedge ratio?

$$P_{stk} = 104.375$$

$$P_{exer} = 110.$$

$$\Delta t = 82 \text{ days}$$

$$*Vol = 0.275 \text{ (from Merrill Lynch)}$$

$$INT = 0.06 \text{ (6\% rate on 90 day prime commercial paper)}$$

$$DIV = 0.75, 61 \text{ days away}$$

\*if volatility data is not available, trial & error may be used to determine this variable from existing option prices.

☐ See Continuation Sheet

ENTER	PRESS	OUTPUT/MODE (see legend below)		COMMENT
	SBR CLR	(Value of Call Option)*	0	Initialize
104.375	A	104.38*	(P stk)*	Enter Pstk
110	B	110.00*	(P-ex)*	Enter Pex
82.	C	(82.)* .224657325	(Δt)*	Enter Δt
.275	D	0.28*	(Vol)*	Enter Volatility
6	A'	0.06*	(Int)*	Enter Int. Rate
.75	B'	(0.75)* 1.06	(Div)*	Enter Dividend
61	R/S	(61.)* -0.74*	(Days)*	Enter Days til Divid.
	E	3.40*	(Valu)*	Calculate Value (\$)
	E'	0.39*	(Hedg)*	Calculate Hedge Ratio
To determine value of Oct. 100:				
100	B	100.00		Enter Pex
	E	8.11		Calculate Value
*Note: Trial and error methods of determining volatility should be used only when relative values of different options on the same stock are of interest.				
Modes: (n)*—Printed only (n)—Displayed Briefly (Pause) n*—Printed and displayed				

☐ Over

# PPX-59 Professional Program Exchange

Page 6 of 7

1 8 8 0 1 1

For TI use only

LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
000	76	LBL		055	06	6		110	42	STD	
001	18	C*		056	04	4		111	05	05	
002	22	INV		057	42	STD		112	32	X:T	
003	58	FIX		058	11	11		113	06	6	
004	73	RC*		059	18	C*		114	08	8	
005	11	11		060	91	R/S		115	42	STD	
006	69	DP		061	76	LBL		116	11	11	
007	04	04		062	12	B		117	18	C*	
008	32	X:T		063	42	STD		118	91	R/S	
009	58	FIX		064	02	02		119	76	LBL	
010	02	02		065	32	X:T		120	17	B*	
011	69	DP		066	06	6		121	32	X:T	
012	06	06		067	05	5		122	06	6	
013	92	RTN		068	42	STD		123	09	9	
014	76	LBL		069	11	11		124	42	STD	
015	25	CLR		070	18	C*		125	11	11	
016	22	INV		071	91	R/S		126	18	C*	
017	58	FIX		072	76	LBL		127	55	÷	
018	22	INV		073	13	C		128	53	(	
019	57	ENG		074	32	X:T		129	01	1	
020	25	CLR		075	22	INV		130	85	+	
021	29	CP		076	58	FIX		131	43	RCL	
022	06	6		077	43	RCL		132	05	05	
023	69	DP		078	66	66		133	54	)	
024	17	17		079	69	DP		134	45	YX	
025	47	CMS		080	04	04		135	53	(	
026	08	8		081	32	X:T		136	91	R/S	
027	69	DP		082	69	DP		137	32	X:T	
028	17	17		083	06	06		138	22	INV	
029	43	RCL		084	55	÷		139	58	FIX	
030	60	60		085	03	3		140	43	RCL	
031	69	DP		086	06	6		141	70	70	
032	01	01		087	05	5		142	69	DP	
033	43	RCL		088	95	=		143	04	04	
034	61	61		089	42	STD		144	32	X:T	
035	69	DP		090	03	03		145	69	DP	
036	02	02		091	91	R/S		146	06	06	
037	43	RCL		092	76	LBL		147	55	÷	
038	62	62		093	14	D		148	03	3	
039	69	DP		094	42	STD		149	06	6	
040	03	03		095	04	04		150	05	5	
041	43	RCL		096	32	X:T		151	54	)	
042	63	63		097	06	6		152	95	=	
043	69	DP		098	07	7		153	94	+/-	
044	04	04		099	42	STD		154	44	SUM	
045	69	DP		100	11	11		155	01	01	
046	05	05		101	18	C*		156	42	STD	
047	25	CLR		102	91	R/S		157	10	10	
048	98	ADV		103	76	LBL		158	32	X:T	
049	91	R/S		104	16	A*		159	07	7	
050	76	LBL		105	55	÷		160	01	1	
051	11	A		106	01	1					
052	42	STD		107	00	0					
053	01	01		108	00	0					
054	32	X:T		109	95	=					

## MERGED CODES

62	Pgm	Ind	72	STD	Ind	83	GTO	Ind
63	Exc	Ind	73	RCL	Ind	84	Op	Ind
64	Pro	Ind	74	SUM	Ind	92	INV	SBR



# PPX-59 Professional Program Exchange

Page 7 of 7

1, 8 8, 0, 1, 1

For TI use only

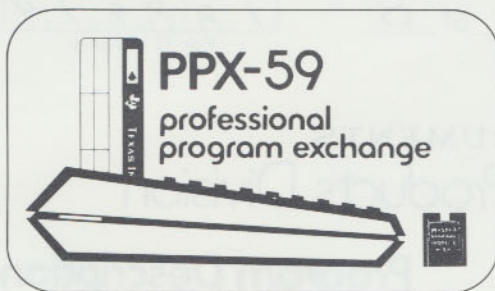
LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
161	42	STD		216	42	STD		271	65	X	
162	11	11		217	07	07		272	93	.	
163	18	C*		218	53	(		273	00	0	
164	91	R/S		219	43	RCL		274	04	4	
165	76	LBL		220	01	01		275	08	8	
166	10	E*		221	55	÷		276	94	+/-	
167	19	D*		222	43	RCL		277	85	+	
168	32	X↓T		223	02	02		278	43	RCL	
169	07	7		224	54	)		279	09	09	
170	02	2		225	23	LNK		280	33	X²	
171	42	STD		226	95	=		281	65	X	
172	11	11		227	55	÷		282	93	.	
173	18	C*		228	53	(		283	03	3	
174	91	R/S		229	43	RCL		284	07	7	
175	76	LBL		230	04	04		285	03	3	
176	15	E		231	65	X		286	09	9	
177	19	D*		232	43	RCL		287	85	+	
178	48	EXC		233	03	03		288	93	.	
179	08	08		234	34	FX		289	01	1	
180	75	-		235	54	)		290	07	7	
181	71	SBR		236	42	STD		291	04	4	
182	35	1/X		237	00	00		292	95	=	
183	65	X		238	95	=		293	55	÷	
184	43	RCL		239	42	STD		294	43	RCL	
185	02	02		240	08	08		295	06	06	
186	55	÷		241	85	+		296	33	X²	
187	43	RCL		242	76	LBL		297	22	INV	
188	07	07		243	35	1/X		298	23	LNK	
189	22	INV		244	43	RCL		299	34	FX	
190	23	LNK		245	00	00		300	95	=	
191	94	+/-		246	55	÷		301	87	IFF	
192	85	+		247	02	2		302	00	00	
193	43	RCL		248	95	=		303	33	X²	
194	08	08		249	77	GE		304	94	+/-	
195	65	X		250	02	02		305	85	+	
196	43	RCL		251	55	55		306	01	1	
197	01	01		252	94	+/-		307	95	=	
198	95	=		253	86	STF		308	76	LBL	
199	32	X↓T		254	00	00		309	33	X²	
200	07	7		255	42	STD		310	22	INV	
201	03	3		256	06	06		311	86	STF	
202	42	STD		257	65	X		312	00	00	
203	11	11		258	93	.		313	92	RTN	
204	18	C*		259	03	3					
205	91	R/S		260	03	3					
206	76	LBL		261	02	2					
207	19	D*		262	07	7					
208	00	0		263	85	+					
209	32	X↓T		264	01	1					
210	43	RCL		265	95	=					
211	05	05		266	35	1/X					
212	65	X		267	65	X					
213	43	RCL		268	53	(					
214	03	03		269	42	STD					
215	85	+		270	09	09					

## MERGED CODES

62	Pgm	Ind	72	STD	Ind	83	GTO	Ind
63	Exc	Ind	73	RCL	Ind	84	Op	Ind
64	Prd	Ind	74	SUM	Ind	92	INV	SBR






Page 1 of 8

1	8	8	9	1	4
---	---	---	---	---	---

For TI use only

# TEXAS INSTRUMENTS Calculator Products Division

## Submission Abstract

Program Title	INTERNAL RATE OF RETURN	Rev.
---------------	-------------------------	------

### Abstract of Program

This program can be utilized to measure the yield from a wide variety of investments. It is capable of using any initial investment, and will accommodate up to 80 positive or negative cash flows, when used with the TI Programmable 59. Up to 40 cash flows can be handled with the TI Programmable 58.

### User Benefits:

© 2010 Joerg Woerner  
Datamath Calculator Museum

Category Name	Required Progs.	Prog. Steps <u>264</u>	Card Sides <u>1</u>	PC-100A Needed <input type="checkbox"/> Library Module ID <input type="checkbox"/>
---------------	-----------------	------------------------	---------------------	---

### Submittal Agreement

All of the information forwarded herewith is contributed to Texas Instruments on a nonconfidential, nonobligatory basis; no relationship, confidential or otherwise, express or implied, is established with Texas Instruments by this contribution. Texas Instruments may use, copyright, distribute, publish, reproduce or sell this information in any way it chooses, without compensation to me. To my knowledge, this data is not copyrighted, and contribution of this information to Texas Instruments by me does not breach any obligation to any other person or organization relating to proprietary or confidential information.

Signature \_\_\_\_\_ Date \_\_\_\_\_  
Name TEXAS INSTRUMENTS Tel. No. \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

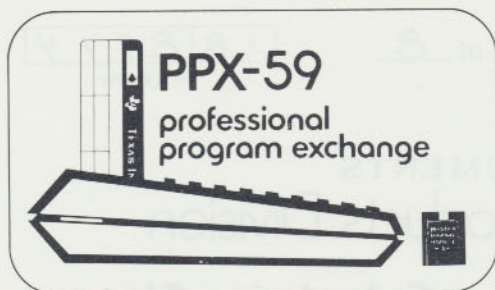
### Submission Checklist

- ☐ Recorded Magnetic Cards
- ☐ Submission Abstract
- ☐ Program Description
- ☐ User Instructions
- ☐ Sample Problem
- ☐ Listing
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_

### IMPORTANT

TEXAS INSTRUMENTS MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, REGARDING THESE PROGRAM MATERIALS AND MAKES SUCH MATERIALS AVAILABLE TO THE BUYER SOLELY ON AN "AS-IS" BASIS WITH ALL FAULTS.

IN NO EVENT SHALL TEXAS INSTRUMENTS AND/OR THE CONTRIBUTOR BE LIABLE TO ANYONE FOR SPECIAL, COLLATERAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE PURCHASE OR USE OF THESE MATERIALS AND THE SOLE AND EXCLUSIVE LIABILITY TO TEXAS INSTRUMENTS AND/OR THE CONTRIBUTOR, REGARDLESS OF THE FORM OF ACTION, SHALL NOT EXCEED THE PURCHASE PRICE OF THESE MATERIALS.



# TEXAS INSTRUMENTS Calculator Products Division

## Program Description

Program Title:	Rev.
----------------	------

### Method, Equations, Sketches, Limitations, References, Error Recovery:

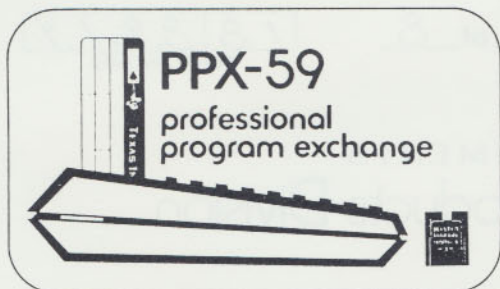
Internal rate of return, which is a form of discounted cash flow analysis, is one of the most widely used measures of return in real estate investments. Essentially, the internal rate of return is compound interest in reverse, it discounts the cash flows arising from an investment at the interest rate at which they exactly equal the present value of the initial investment. The internal rate of return measure may be applied to both before-tax and after-tax cash flows, depending upon the information available to, and the interests of, the analyst.

The major assumptions of internal rate of return are as follows:

- (1) the "time value" of money: because it works like compound interest in reverse, the technique is based on the assumption that "money now is better than money later"; future income streams are discounted more, as they are in all present value calculations due to the opportunity costs which arise from the fact that investments are passed by because the income necessary to make them is not yet available
- (2) the initial investment is the initial cash outlay, not the total cost of the investment; in leveraged investments, which are practically all investments in real estate, only a portion of the price is covered through the initial payment; the remainder is covered by financing
- (3) the income stream resulting from the investment can be reinvested at the calculated IRR
- (4) negative cash flows are discounted at the same rate as positive cash flows

When utilizing IRR to compare alternative investments, the investments should be of similar capital outlays, duration, and risk. The IRR will provide a single measure for each which can be useful for comparing investments, but risk and other nonfinancial considerations must be taken into account, independent of the technique.





# TEXAS INSTRUMENTS Calculator Products Division

**Example 1:** E.S. West III, noted land speculator, purchased a parcel of 20 acres at \$5,000 an acre. He paid \$10,000 down and obtained a \$90,000 mortgage at 8.5% interest for 25 years. Five years later, he sold the entire parcel for \$170,000. If his annual taxes were \$1,700, what was his IRR on the investment?

initial investment = \$10,000

annual debt service on the mortgage =  $\$725 \times 12 = \$8700$

taxes + annual debt service = cash flow = \$10,400

balance on the mortgage at the time of sale = \$83,542.36

YEAR	CASH FLOW
1	-\$10,400
2	-\$10,400
3	-\$10,400
4	-\$10,400
5	$\$170,000 - \$10,400 - \$83,542.36 = \$76,057.64$

Internal Rate of Return = 13.2955

What if he had sold the land for \$200,000?

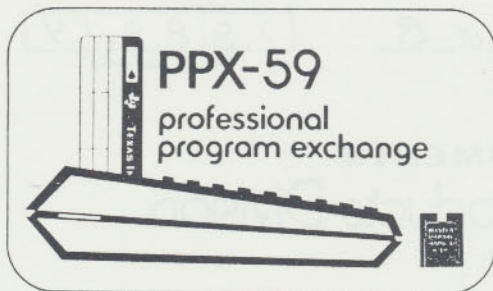
YEAR	CASH FLOW
1	-\$10,400
2	-\$10,400
3	-\$10,400
4	-\$10,400
5	$\$200,000 - \$10,400 - \$83,542.36 = \$106,057.64$

Internal Rate of Return = 25.2030

STEP	OPERATION	ENTER	PRESS	DISPLAY
1	Select program		[2nd] [E']	0.
2	Initialize			
3	Enter cash flows in order:			
	1st cash flow	10400†	[+/-] [A]	1.00
	2nd cash flow	10400†	[+/-] [A]	2.00
	3rd cash flow	10400†	[+/-] [A]	3.00
	4th cash flow	10400†	[+/-] [A]	4.00
	5th cash flow	76057.64†	[A]	5.00
4	Enter initial investment	10000	[B]	10000.00†*
5	Compute internal rate of return		[C]	13.2955†
6	Enter new reversion	5	[2nd] [A']	5.
		106057.64	[2nd] [C']	106057.64
7	Compute internal rate of return		[E]	25.2030†

†These values are printed if the PC-100A is connected.

\*Number of cash flows is also printed.



# TEXAS INSTRUMENTS Calculator Products Division

**Example 2:** A developer purchased a parcel of land and constructed an apartment complex. His down payment was \$500,000. If his after-tax cash flows, including reversion, were as follows, what was his after-tax IRR?

YEAR	AFTER-TAX CASH FLOW
1	-\$ 95,775
2	-\$ 177,450
3	\$ 30,760
4	\$ 109,615
5	\$ 139,975
6	\$ 140,225
7	\$ 122,720
8	\$ 177,647
9	\$ 109,922
10	\$ 105,771
11	\$ 104,629
12	\$1,108,450

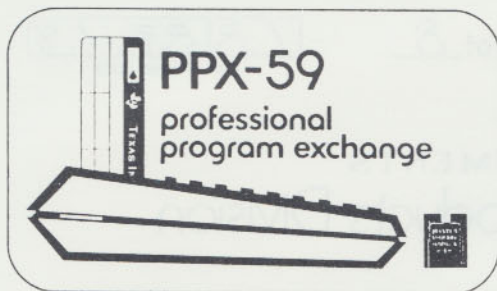
Internal Rate of Return = 12.5682

STEP	OPERATION	ENTER	PRESS	DISPLAY
1	Select program			
2	Initialize		[2nd] [E']	0.
3	Enter cash flows in order:			
	1st cash flow	95775†	[+/-] [A]	1.00
	2nd cash flow	177450†	[+/-] [A]	2.00
	3rd cash flow	30760†	[A]	3.00
	4th cash flow	109615†	[A]	4.00
	5th cash flow	139975†	[A]	5.00
	6th cash flow	140225†	[A]	6.00
	7th cash flow	122720†	[A]	7.00
	8th cash flow	177647†	[A]	8.00
	9th cash flow	109922†	[A]	9.00
	10th cash flow	105771†	[A]	10.00
	11th cash flow	104629†	[A]	11.00
	12th cash flow	1108450†	[A]	12.00
4	Enter initial investment	500000	[B]	500000.00†*
			[C]	12.5682†

†These values are printed if PC-100A is connected.

\*Number of cash flows is also printed.





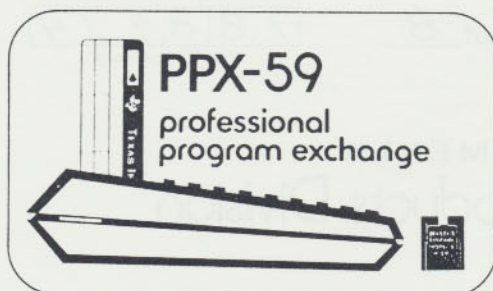
# TEXAS INSTRUMENTS Calculator Products Division

**Example 3:** What was Humphrey Mumford's after-tax IRR on Valle Magnifico Apartments?  
(See Program RE-13, "Cash Flow Analysis", example 1.)

Internal Rate of Return = 10.1416

STEP	OPERATION	ENTER	PRESS	DISPLAY
1	Select program			
2	Initialize		[2nd] [E']	0.
3	Enter cash flows in order:			
	1st cash flow	2043.45†	[+/-] [A]	1.00
	2nd cash flow	8254.20†	[A]	2.00
	3rd cash flow	8230.83†	[A]	3.00
	4th cash flow	8227.99†	[A]	4.00
	5th cash flow	3883.02†	[A]	5.00
	6th cash flow	2368.35†	[A]	6.00
	7th cash flow	2290.15†	[A]	7.00
	8th cash flow	550.48†	[A]	8.00
	9th cash flow	2736.89†	[+/-] [A]	9.00
	10th cash flow	2723.23†	[+/-] [A]	10.00
	11th cash flow	2722.39†	[+/-] [A]	11.00
	12th cash flow	179390.03†	[A]	12.00
4	Enter initial investment	75000	[B]	75000.00†
5	Compute IRR		[C]	10.1416†

†These values are printed if the PC-100A is connected.



# TEXAS INSTRUMENTS Calculator Products Division

Solid State Software				TI ©1977	
INTERNAL RATE OF RETURN				RE-12	
# CF Delete	New CF Entry	New CF		INIT	
CF Entry	Investment	→ IRR		→ Rev IRR	

## USER INSTRUCTIONS

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select program			
2	Initialize		[2nd] [E']	0.
3	Enter the following in order: 1 Cash flows 2 Investment Cash flow (enter each cash flow) Investment	CF† PV CF# New CF	[A] [B] [2nd] [A'] [2nd] [B']	CF# PV† CF# New CF
4	To change a cash flow before the calculation has been made. This step can be repeated as many times as necessary			
5	Solve for internal rate of return		[C]	IRR†
6	To change a cash flow after the calculation has been made. This step may be repeated as many times as necessary.	CF# New CF	[2nd] [A'] [2nd] [C']	CF# New CF
7	After change, calculate IRR		[E]	IRR†**
8	To increase the capability of the program from 40 to 80 (10 to 40) cash flows*	10 (6)	[2nd] [Op] 17	159.99 (0.59)
9	Upon completion of calculations, return to original mode, before proceeding to next program*	6 (3)	[2nd] [Op] 17	479.59 (239.29)

**NOTES:** † These values are printed if the PC-100A is connected.  
\* Numbers in parenthesis are for TI Programmable 58. Be sure to press [2nd] [Fix] 9 before repartitioning.  
\*\* Relatively long calculating time for the step.

### Register Contents

R <sub>00</sub>	R <sub>05</sub> $\Sigma CF_n \times n$	R <sub>10</sub> Used	R <sub>15</sub>	R <sub>20</sub> Cash flows
R <sub>01</sub> Counter	R <sub>06</sub> Used	R <sub>11</sub> Used	R <sub>16</sub>	R <sub>21</sub>
R <sub>02</sub> N	R <sub>07</sub> Used	R <sub>12</sub> Used	R <sub>17</sub>	R <sub>22</sub>
R <sub>03</sub> PV	R <sub>08</sub> Used	R <sub>13</sub>	R <sub>18</sub>	R <sub>23</sub>
R <sub>04</sub> $\Sigma CF_n$	R <sub>09</sub> Used	R <sub>14</sub>	R <sub>19</sub>	R <sub>24</sub>



# PPX-59 Professional Program Exchange

Page 7 of 8

1,889,14

For TI use only

LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
000	76	LBL		055	65	X		110	02	2	
001	13	C		056	73	RC*		111	54	)	
002	58	FIX		057	12	12		112	65	X	
003	08	08		058	65	X		113	43	RCL	
004	43	RCL		059	44	SUM		114	04	04	
005	04	04		060	04	04		115	33	X²	
006	42	STD		061	43	RCL		116	85	+	
007	06	06		062	07	07		117	43	RCL	
008	43	RCL		063	65	X		118	04	04	
009	03	03		064	44	SUM		119	54	)	
010	94	+/-		065	05	05		120	44	SUM	
011	44	SUM		066	43	RCL		121	06	06	
012	06	06		067	07	07		122	53	(	
013	43	RCL		068	65	X		123	33	X²	
014	05	05		069	44	SUM		124	34	FX	
015	22	INV		070	08	08		125	75	-	
016	49	PRD		071	43	RCL		126	06	6	
017	06	06		072	07	07		127	94	+/-	
018	76	LBL		073	54	)		128	22	INV	
019	15	E		074	44	SUM		129	28	LOG	
020	43	RCL		075	09	09		130	54	)	
021	01	01		076	97	DSZ		131	29	CP	
022	42	STD		077	07	07		132	77	GE	
023	12	12		078	00	00		133	15	E	
024	43	RCL		079	40	40		134	53	(	
025	02	02		080	53	(		135	53	(	
026	42	STD		081	53	(		136	43	RCL	
027	07	07		082	53	(		137	06	06	
028	43	RCL		083	43	RCL		138	22	INV	
029	03	03		084	05	05		139	23	LNK	
030	94	+/-		085	35	1/X		140	75	-	
031	42	STD		086	49	PRD		141	01	1	
032	04	04		087	04	04		142	54	)	
033	00	0		088	49	PRD		143	65	X	
034	42	STD		089	08	08		144	01	1	
035	05	05		090	65	X		145	00	0	
036	42	STD		091	43	RCL		146	00	0	
037	08	08		092	09	09		147	54	)	
038	42	STD		093	55	÷		148	58	FIX	
039	09	09		094	06	6		149	04	04	
040	01	1		095	75	-		150	99	PRT	
041	22	INV		096	43	RCL		151	92	RTH	
042	44	SUM		097	08	08		152	76	LBL	
043	12	12		098	33	X²		153	16	A*	
044	53	(		099	55	÷		154	58	FIX	
045	53	(		100	02	2		155	02	02	
046	43	RCL		101	54	)		156	42	STD	
047	06	06		102	65	X		157	10	10	
048	94	+/-		103	43	RCL		158	42	STD	
049	65	X		104	04	04		159	11	11	
050	43	RCL		105	94	+/-		160	92	RTH	
051	07	07		106	85	+		MERGED CODES 62 Pgm Ind 72 STO Ind 83 GTO Ind 63 Exc Ind 73 RCL Ind 84 Op Ind 64 Prd Ind 74 SUM Ind 92 INV SBR			
052	54	)		107	43	RCL					
053	22	INV		108	08	08					
054	23	LNK		109	55	÷					

# PPX-59 Professional Program Exchange

Page 8 of 8

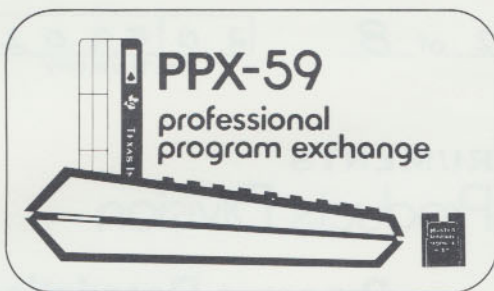
1,889,19  
For TI use only

LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
161	76	LBL		216	02	02					
162	18	C*		217	00	0					
163	32	XIT		218	42	STD					
164	01	1		219	04	04					
165	09	9		220	42	STD					
166	44	SUM		221	05	05					
167	10	10		222	92	RTN					
168	32	XIT		223	76	LBL					
169	72	ST*		224	12	B					
170	10	10		225	32	XIT					
171	92	RTN		226	69	DP					
172	76	LBL		227	32	32					
173	17	B*		228	43	RCL					
174	32	XIT		229	02	02					
175	01	1		230	58	FIX					
176	09	9		231	09	09					
177	44	SUM		232	98	ADV					
178	10	10		233	99	PRT					
179	53	(		234	32	XIT					
180	73	RC*		235	42	STD					
181	10	10		236	03	03					
182	22	INV		237	58	FIX					
183	44	SUM		238	02	02					
184	04	04		239	99	PRT					
185	65	X		240	92	RTN					
186	43	RCL		241	76	LBL					
187	11	11		242	11	A					
188	54	)		243	53						
189	22	INV		244	72	ST*					
190	44	SUM		245	01	01					
191	05	05		246	58	FIX					
192	53	(		247	02	02					
193	32	XIT		248	99	PRT					
194	44	SUM		249	44	SUM					
195	04	04		250	04	04					
196	72	ST*		251	65	X					
197	10	10		252	43	RCL					
198	65	X		253	02	02					
199	43	RCL		254	54	)					
200	11	11		255	44	SUM					
201	54	)		256	05	05					
202	44	SUM		257	69	DP					
203	05	05		258	21	21					
204	92	RTN		259	43	RCL					
205	76	LBL		260	02	02					
206	10	E*		261	69	DP					
207	58	FIX		262	22	22					
208	09	09		263	92	RTN					
209	98	ADV									
210	02	2									
211	00	0									
212	42	STD									
213	01	01									
214	01	1									
215	42	STD									

## MERGED CODES

62	Pgm	Ind	72	STO	Ind	83	GTO	Ind
63	Exc	Ind	73	RCL	Ind	84	Op	Ind
64	Prg	Ind	74	SUM	Ind	92	INV	SBR





# TEXAS INSTRUMENTS Calculator Products Division

## Submission Abstract

Program Title	FORECASTING: AUTOMATIC CURVE CHOICE	Rev.
---------------	-------------------------------------	------

### Abstract of Program

This program, like program RE-10, "Curve Fits", also computes the linear regression, exponential curve, power curve, and logarithmic curve solutions to the relationship between two variables. However, this program calculates the coefficients of determination for each of the four solutions and *automatically* selects the model which yields the highest coefficient of determination: the model which "best fits" the available data. Thus, the program provides the user with the model which is most appropriate for the available values. Nonetheless, although the user automatically obtains the best model, it may be the case that none of the four is particularly accurate in yielding predictions. So, it is a good idea to check the coefficient of determination for the model and to determine how well the model "predicts" the known values of the dependent variable.

### User Benefits:

Category Name	Required Progs.	Prog. Steps	Card Sides	PC-100A Needed <input type="checkbox"/>	Library <input type="checkbox"/>	Module ID <input type="checkbox"/>
		606	3			

### Submittal Agreement

All of the information forwarded herewith is contributed to Texas Instruments on a nonconfidential, nonobligatory basis; no relationship, confidential or otherwise, express or implied, is established with Texas Instruments by this contribution. Texas Instruments may use, copyright, distribute, publish, reproduce or sell this information in any way it chooses, without compensation to me. To my knowledge, this data is not copyrighted, and contribution of this information to Texas Instruments by me does not breach any obligation to any other person or organization relating to proprietary or confidential information.

Signature TEXAS INSTRUMENTS Date \_\_\_\_\_  
 Name \_\_\_\_\_ Tel. No. \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

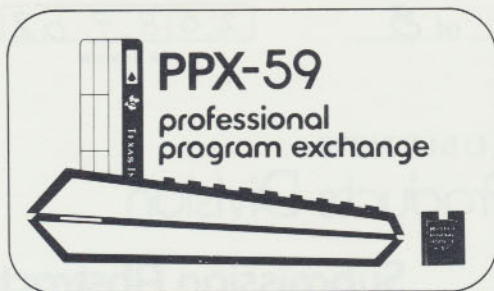
### Submission Checklist

- ☐ Recorded Magnetic Cards
- ☐ Submission Abstract
- ☐ Program Description
- ☐ User Instructions
- ☐ Sample Problem
- ☐ Listing
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_

### IMPORTANT

TEXAS INSTRUMENTS MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, REGARDING THESE PROGRAM MATERIALS AND MAKES SUCH MATERIALS AVAILABLE TO THE BUYER SOLELY ON AN "AS-IS" BASIS WITH ALL FAULTS.

IN NO EVENT SHALL TEXAS INSTRUMENTS AND/OR THE CONTRIBUTOR BE LIABLE TO ANYONE FOR SPECIAL, COLLATERAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE PURCHASE OR USE OF THESE MATERIALS AND THE SOLE AND EXCLUSIVE LIABILITY TO TEXAS INSTRUMENTS AND/OR THE CONTRIBUTOR, REGARDLESS OF THE FORM OF ACTION, SHALL NOT EXCEED THE PURCHASE PRICE OF THESE MATERIALS.

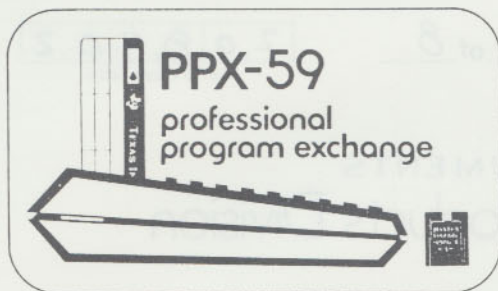


# TEXAS INSTRUMENTS Calculator Products Division

## Program Description

Program Title:	Rev.
<p>Method, Equations, Sketches, Limitations, References, Error Recovery:</p> <p>The linear regression model assumes that there is relationship between the independent variable (the variable you are using as the basis for predicting) and the dependent variable (the variable whose values you are trying to predict). It assumes that there is a relationship such that an increase or decrease of one unit in the value of the independent variable is accompanied by an increase or decrease of some relatively constant number of units in the dependent variable. It may be 5 units, .5 units, or 5000000 units, so long as it is roughly the same for each unit change in the independent variable.</p> <p>In the exponential curve model, the dependent variable changes in a manner similar to compound interest. That is, for each unit change in the independent variable, there is a proportional increase in the value of the dependent variable. Here, each unit change in the value of the independent variable is accompanied by, for example, a 5% or -5% or 20% change in the value of the dependent variable.</p> <p>The power curve assumes a relationship between the proportionate changes in <i>both</i> the independent and dependent variables. That is, each percentage increase or decrease (in the sense of compound interest) in the value of the independent variable is accompanied by a relatively stable percentage change in the dependent variable.</p> <p>Finally, the logarithmic curve assumes that each proportional change in the independent variable is accompanied by a relatively stable unit change in the value of the dependent. That is, for example, each time the independent variable increases by 5%, the dependent variable decreases by 2000 units.</p>	
<input type="checkbox"/> See Continuation Sheet	



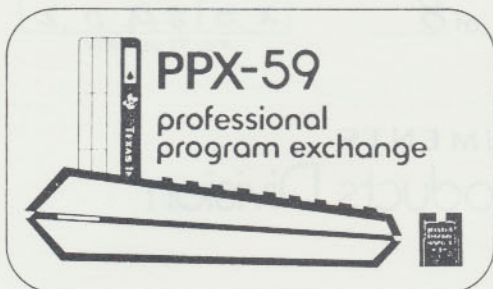


# TEXAS INSTRUMENTS Calculator Products Division

**Example :** You are interested in estimating the sale price of home you are listing. You have gathered information on a set of homes in the same neighborhood which are comparable to your listing, and you want to use this information to estimate the sale price of your house. You update the sale prices of the other homes, and then use the square footage of these houses as the basis of your estimated price. If your listing has an area of 1875 square feet, what do you estimate for its sale price?

		Square Footage	Updated Sale Price	
		1700	\$41000	
		1925	\$45500	
		1850	\$44000	
		1765	\$42300	
		1900	\$45000	
		1975	\$46500	
		1875	\$44500	
STEP	OPERATION	ENTER	PRESS	DISPLAY
1	Select program			
2	Initialize		[2nd] [E']	0.
3	Enter:			
	square footage (x)	1700	[A]	1700.†
	sale price (y)	41000†	[B]	1.
	square footage	1925	[A]	1925.†
	sale price	45500†	[B]	2.
	square footage	1850	[A]	1850.†
	sale price	44000†	[B]	3.
	square footage	1765	[A]	1765.†
	sale price	42300†	[B]	4.
	square footage	1900	[A]	1900.†
	sale price	45000†	[B]	5.
	square footage	1975	[A]	1975.†
	sale price	46500†	[B]	6.
5	Determine best model		[C]	1.†
6	Compute $r^2$		[2nd] [A']	1.†
8	Analyze data fit	1700	[2nd] [C']	41000.†
		1925	[2nd] [C']	45500.†
		1850	[2nd] [C']	44000.†
		1765	[2nd] [C']	42300.†
		1900	[2nd] [C']	45000.†
		1975	[2nd] [C']	46500.†
8	Project sale price	1875	[2nd] [C']	44500.†

† These values are printed if the PC-100A is connected.



# TEXAS INSTRUMENTS Calculator Products Division

Solid State Software TI ©1977				
FORECASTING — AUTO CURVE CHOICE				RE-11
→ r <sup>2</sup>	y → x'	x → y'	Delete x	INIT
x Entry	y Entry	→ "best fit"	→ a (Intcpt)	→ b (Slope)

## USER INSTRUCTIONS

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select program			
2	Initialize		[2nd] [ E' ]	0.
3	Enter x Enter y Repeat Step for all data pairs	x y†	[ A ] [ B ]	x† No. of pairs
4	Delete data x y		[2nd] [ D' ] [ R/S ]	x† y†
5	Determine best fit		[ C ]	1 = Linear† 2 = Exponential† 3 = Logarithmic† 4 = Power†
6	Calculate the coefficient of determination		[2nd] [ A' ]	r <sup>2</sup> †
7	Calculate coefficients		[ D ] [ E ]	a (intercept)† b (slope)†
8	Compute estimated value for: x' given y y' given x	y x	[2nd] [ B' ] [2nd] [ C' ]	x'† y'†

NOTE: † These values are printed if the PC-100A is connected.

### Register Contents

R <sub>00</sub>	R <sub>05</sub> $\Sigma x^2$	R <sub>10</sub> $\Sigma (\ln y)^2$	R <sub>15</sub> b	R <sub>20</sub> *
R <sub>01</sub> $\Sigma y$	R <sub>06</sub> $\Sigma xy$	R <sub>11</sub> $\Sigma \ln x \ln y$	R <sub>16</sub> a	R <sub>21</sub>
R <sub>02</sub> $\Sigma y^2$	R <sub>07</sub> $\Sigma \ln x$	R <sub>12</sub> $\Sigma x \ln y$	R <sub>17</sub> Used	R <sub>22</sub>
R <sub>03</sub> n	R <sub>08</sub> $\Sigma (\ln x)^2$	R <sub>13</sub> $\Sigma y \ln x$	R <sub>18</sub> Used	R <sub>23</sub>
R <sub>04</sub> $\Sigma x$	R <sub>09</sub> $\Sigma \ln y$	R <sub>14</sub> Used	R <sub>19</sub> Used	R <sub>24</sub>

\*Registers 20 through 29 are used.



# PPX-59 Professional Program Exchange

Page 5 of 8

208902

For TI use only

LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
000	76	LBL		055	18	18		110	44	SUM	
001	11	A		056	54	)		111	08	08	
002	86	STF		057	44	SUM		112	43	RCL	
003	04	04		058	11	11		113	16	16	
004	29	CP		059	43	RCL		114	92	RTN	
005	67	EQ		060	16	16		115	42	STD	
006	48	EXC		061	49	PRD		116	17	17	
007	22	INV		062	18	18		117	68	NOP	
008	77	GE		063	43	RCL		118	68	NOP	
009	48	EXC		064	18	18		119	71	SBR	
010	68	NOP		065	87	IFF		120	37	P/R	
011	71	SBR		066	04	04		121	23	LNK	
012	43	RCL		067	00	00		122	42	STD	
013	23	LNK		068	70	70		123	18	18	
014	42	STD		069	94	+/-		124	94	+/-	
015	19	19		070	44	SUM		125	44	SUM	
016	44	SUM		071	12	12		126	09	09	
017	07	07		072	43	RCL		127	33	X²	
018	33	X²		073	17	17		128	94	+/-	
019	44	SUM		074	49	PRD		129	22	INV	
020	08	08		075	19	19		130	86	STF	
021	43	RCL		076	43	RCL		131	04	04	
022	16	16		077	19	19		132	71	SBR	
023	92	RTN		078	44	SUM		133	00	00	
024	76	LBL		079	13	13		134	48	48	
025	48	EXC		080	43	RCL		135	43	RCL	
026	00	0		081	03	03		136	17	17	
027	35	1/X		082	92	RTN		137	92	RTN	
028	92	RTN		083	76	LBL		138	76	LBL	
029	76	LBL		084	44	SUM		139	13	C	
030	12	B		085	42	STD		140	01	1	
031	67	EQ		086	29	29		141	42	STD	
032	48	EXC		087	68	NOP		142	29	29	
033	22	INV		088	68	NOP		143	68	NOP	
034	77	GE		089	71	SBR		144	68	NOP	
035	48	EXC		090	98	ADV		145	71	SBR	
036	68	NOP		091	43	RCL		146	98	ADV	
037	68	NOP		092	26	26		147	69	DP	
038	71	SBR		093	32	X!T		148	13	13	
039	24	CE		094	92	RTN		149	33	X²	
040	43	RCL		095	76	LBL		150	42	STD	
041	17	17		096	19	D*		151	26	26	
042	23	LNK		097	86	STF		152	32	X!T	
043	42	STD		098	01	01		153	22	INV	
044	18	18		099	68	NOP		154	86	STF	
045	44	SUM		100	71	SBR		155	01	01	
046	09	09		101	42	STD		156	43	RCL	
047	33	X²		102	23	LNK		157	01	01	
048	44	SUM		103	94	+/-		158	42	STD	
049	10	10		104	42	STD		159	21	21	
050	53	(		105	19	19		160	43	RCL	
051	43	RCL		106	44	SUM		<div>MERGED CODES</div> <div> 62 Pgm Ind 72 STO Ind 83 GTO Ind  63 Exc Ind 73 RCL Ind 84 Op Ind  64 Prd Ind 74 SUM Ind 92 INV SBR </div>			
052	19	19		107	07	07					
053	65	x		108	33	X²					
054	43	RCL		109	94	+/-					

# PPX-59 Professional Program Exchange

Page 6 of 8

208902

For TI use only

LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
161	02	02		216	33	X <sup>2</sup>		271	92	RTN	
162	42	STD		217	22	INV		272	76	LBL	
163	22	22		218	77	GE		273	15	E	
164	43	RCL		219	02	02		274	43	RCL	
165	06	06		220	26	26		275	15	15	
166	42	STD		221	42	STD		276	99	PRT	
167	23	23		222	26	26		277	92	RTN	
168	43	RCL		223	02	2		278	76	LBL	
169	04	04		224	71	SBR		279	16	A*	
170	42	STD		225	44	SUM		280	43	RCL	
171	24	24		226	22	INV		281	26	26	
172	43	RCL		227	86	STF		282	99	PRT	
173	05	05		228	02	02		283	92	RTN	
174	42	STD		229	86	STF		284	68	NOP	
175	25	25		230	03	03		285	36	PGM	
176	43	RCL		231	43	RCL		286	68	68	
177	09	09		232	21	21		287	68	NOP	
178	42	STD		233	42	STD		288	68	NOP	
179	01	01		234	01	01		289	68	NOP	
180	43	RCL		235	43	RCL		290	42	STD	
181	10	10		236	22	22		291	27	27	
182	42	STD		237	42	STD		292	43	RCL	
183	02	02		238	02	02		293	29	29	
184	43	RCL		239	43	RCL		294	32	X/T	
185	12	12		240	13	13		295	04	4	
186	42	STD		241	42	STD		296	67	EQ	
187	06	06		242	06	06		297	03	03	
188	69	DP		243	69	DP		298	26	26	
189	13	13		244	13	13		299	01	1	
190	33	X <sup>2</sup>		245	33	X <sup>2</sup>		300	67	EQ	
191	22	INV		246	22	INV		301	03	03	
192	77	GE		247	77	GE		302	08	08	
193	02	02		248	02	02		303	02	2	
194	00	00		249	59	59		304	67	EQ	
195	42	STD		250	42	STD		305	03	03	
196	26	26		251	26	26		306	23	23	
197	03	3		252	04	4		307	92	RTN	
198	71	SBR		253	42	STD		308	43	RCL	
199	44	SUM		254	29	29		309	24	24	
200	86	STF		255	68	NOP		310	42	STD	
201	02	02		256	68	NOP		311	04	04	
202	43	RCL		257	71	SBR		312	43	RCL	
203	07	07		258	98	ADV		313	25	25	
204	42	STD		259	22	INV		314	42	STD	
205	04	04		260	86	STF		315	05	05	
206	43	RCL		261	03	03		316	43	RCL	
207	08	08		262	43	RCL		317	23	23	
208	42	STD		263	29	29		318	42	STD	
209	05	05		264	99	PRT		319	06	06	
210	43	RCL		265	92	RTN		320	86	STF	
211	11	11		266	76	LBL		321	01	01	
212	42	STD		267	14	D		MERGED CODES 62 Pgm Ind 72 STO Ind 83 GTO Ind 63 Exc Ind 73 RCL Ind 84 Op Ind 64 Prd Ind 74 SUM Ind 92 INV SBR			
213	06	06		268	43	RCL					
214	69	DP		269	16	16					
215	13	13		270	99	PRT					



# PPX-59 Professional Program Exchange

Page 7 of 8

208902

For TI use only

LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
322	92	RTN		377	44	SUM		432	04	04	
323	86	STF		378	01	01		433	35	35	
324	02	02		379	33	X <sup>2</sup>		434	92	RTN	
325	92	RTN		380	44	SUM		435	05	5	
326	86	STF		381	02	02		436	42	STD	
327	03	03		382	43	RCL		437	16	16	
328	92	RTN		383	15	15		438	42	STD	
329	76	LBL		384	49	PRD		439	14	14	
330	17	B*		385	14	14		440	94	+/-	
331	71	SBR		386	43	RCL		441	44	SUM	
332	02	02		387	14	14		442	04	04	
333	90	90		388	44	SUM		443	33	X <sup>2</sup>	
334	43	RCL		389	06	06		444	94	+/-	
335	27	27		390	43	RCL		445	44	SUM	
336	68	NDP		391	17	17		446	05	05	
337	71	SBR		392	99	PRT		447	69	DP	
338	22	INV		393	43	RCL		448	33	33	
339	92	RTN		394	03	03		449	43	RCL	
340	76	LBL		395	92	RTN		450	16	16	
341	18	C*		396	76	LBL		451	99	PRT	
342	71	SBR		397	98	ADV		452	92	RTN	
343	02	02		398	69	DP		453	42	STD	
344	90	90		399	12	12		454	16	16	
345	43	RCL		400	32	X <sup>1/2</sup>		455	23	LNK	
346	27	27		401	42	STD		456	71	SBR	
347	68	NDP		402	15	15		457	04	04	
348	71	SBR		403	32	X <sup>1/2</sup>		458	37	37	
349	23	LNK		404	87	IFF		459	92	RTN	
350	92	RTN		405	01	01		460	76	LBL	
351	00	0		406	04	04		461	37	P/R	
352	76	LBL		407	14	14		462	42	STD	
353	43	RCL		408	87	IFF		463	15	15	
354	86	STF		409	03	03		464	94	+/-	
355	01	01		410	04	04		465	44	SUM	
356	42	STD		411	14	14		466	01	01	
357	16	16		412	22	INV		467	33	X <sup>2</sup>	
358	42	STD		413	23	LNK		468	94	+/-	
359	14	14		414	42	STD		469	44	SUM	
360	44	SUM		415	16	16		470	02	02	
361	04	04		416	92	RTN		471	53	(	
362	33	X <sup>2</sup>		417	76	LBL		472	43	RCL	
363	44	SUM		418	42	STD		473	15	15	
364	05	05		419	87	IFF		474	65	x	
365	69	DP		420	01	01		475	43	RCL	
366	23	23		421	04	04		476	14	14	
367	43	RCL		422	35	35		477	54	)	
368	16	16		423	87	IFF		478	94	+/-	
369	99	PRT		424	02	02		479	44	SUM	
370	92	RTN		425	04	04		480	06	06	
371	76	LBL		426	53	53		481	43	RCL	
372	24	CE		427	87	IFF		482	17	17	
373	42	STD		428	03	03		MERGED CODES 62 Pgm Ind 72 STO Ind 83 GTO Ind 63 Exc Ind 73 RCL Ind 84 Op Ind 64 Prd Ind 74 SUM Ind 92 INV SBR			
374	17	17		429	04	04					
375	42	STD		430	53	53					
376	15	15		431	71	SBR					

# PPX-59 Professional Program Exchange

Page 8 of 8

208902

For TI use only

LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
483	99	PRT		538	99	PRT		593	53	(	
484	92	RTN		539	92	RTN		594	24	CE	
485	00	0		540	53	(		595	45	YX	
486	00	0		541	53	(		596	43	RCL	
487	00	0		542	24	CE		597	15	15	
488	76	LBL		543	55	÷		598	61	GTO	
489	10	E*		544	43	RCL		599	05	05	
490	98	ADV		545	16	16		600	87	87	
491	22	INV		546	54	)		601	23	LNK	
492	86	STF		547	45	YX		602	69	DP	
493	01	01		548	43	RCL		603	14	14	
494	22	INV		549	15	15		604	99	PRT	
495	86	STF		550	35	1/X		605	92	RTN	
496	02	02		551	54	)					
497	22	INV		552	99	PRT					
498	86	STF		553	92	RTN					
499	03	03		554	69	DP					
500	01	1		555	15	15					
501	03	3		556	99	PRT					
502	42	STO		557	92	RTN					
503	01	01		558	69	DP					
504	00	0		559	15	15					
505	72	ST*		560	22	INV					
506	01	01		561	23	LNK					
507	97	DSZ		562	99	PRT					
508	01	01		563	92	RTN					
509	05	05		564	76	LBL					
510	05	05		565	23	LNK					
511	92	RTN		566	87	IFF					
512	76	LBL		567	01	01					
513	22	INV		568	06	06					
514	87	IFF		569	02	02					
515	02	02		570	87	IFF					
516	05	05		571	03	03					
517	40	40		572	06	06					
518	87	IFF		573	01	01					
519	01	01		574	87	IFF					
520	05	05		575	02	02					
521	53	53		576	05	05					
522	87	IFF		577	93	93					
523	03	03		578	53	(					
524	05	05		579	53	(					
525	58	58		580	24	CE					
526	53	(		581	65	x					
527	53	(		582	43	RCL					
528	24	CE		583	15	15					
529	55	÷		584	54	)					
530	43	RCL		585	22	INV					
531	16	16		586	23	LNK					
532	54	)		587	65	x					
533	23	LNK		588	43	RCL					
534	55	÷		589	16	16					
535	43	RCL		590	54	)					
536	15	15		591	99	PRT					
537	54	)		592	92	RTN					

## MERGED CODES

62	Pgm	Ind	72	STO	Ind	83	GTO	Ind
63	Exc	Ind	73	RCL	Ind	84	Op	Ind
64	Prd	Ind	74	SUM	Ind	92	INV	SBR





## **SECURITIES PAKETTE CONTENTS:**

Universal Rate of Return  
Call Option Ratio Writing  
Call Option Spreading  
Screen Stocks—Quality and Quantity  
Value of Call Option  
Internal Rate of Return  
Forecasting: Automatic Curve Choice

© 2010 Joerg Woerner

*\*PREPROGRAMMED MAGNETIC CARDS ARE NOT INCLUDED.  
(The program Code Lists must be keyed into blank magnetic cards.)*

**TEXAS INSTRUMENTS**  
INCORPORATED  
DALLAS, TEXAS