

User's Guide
632C LoanProtector®
Royal Bank of Canada



www.promsoft.com/rbc

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Key Template

The eight function keys on the face of the calculator are used to run various programs that are identified by the template to be placed on the calculator.

Loans	TDS	Mort	Backup
BuyBack	ReD	IntB/D	Setup
PROM 632C			Royal Bank

Prêts	T/D	Hyp	Préc
PRR	Réaff	D/Dint	Prog
PROM 632C			Banque Royale

Rework Last Routine - [ReD] Function Key

To review the entries and computed results of the most recently executed routine, push the [ReD] function key. You can either change the value at any prompt, or push [ENTER] to keep the same value. The calculator "remembers" the last routine you used and will automatically start that routine again without clearing any of the entered data.

BackUp Routine - [BackUp] Function Key

Pushing the [BackUp] key will display the previous prompt and will show the current value. Continuing to push the key will back up another prompt, and so forth, until the first prompt in a routine is reached. Any entry can be changed by entering a new value and pushing [ENTER]. To go forward without changing the displayed values, make no entry and push [ENTER].

Once a routine has been completed, you can still use the [BackUp] key to reenter the routine. For example, if you have already computed and disclosed a loan, pushing the [BackUp] key will return you to the last prompt in the loan routine.

LoanProtector Routines - [Loans] Function Key

This routine computes a monthly payment, the available proceeds, or amortization term required with a known payment and proceeds. It also runs the Royal Credit Line Routine.

<u>Prompt</u>	<u>User Response</u>
	Push the [Loans] function key to start this routine.
LOAN/RCL 1/2?_	Enter "1" to run this routine.
PM/PR/AM 1/2/3?_	Enter "1" for a payment proposal, "2" for a proceeds proposal, or "3" for a term proposal.
PRCDS 0?_	(Appears for a payment or term proposal.) Enter the proceeds.
PMT 0?_	(Appears for a proceeds or term proposal.) Enter the monthly payment.
AMORT 0?_	(Appears for a payment or proceeds proposal.) Enter the amortization term in months.
INT RATE xx.xxx%?_	If the interest rate percentage shown is correct, push [ENTER], otherwise, enter the correct interest rate.
START mmddyy?_	If the Start Date ¹ shown is correct, push [ENTER], otherwise enter the correct starting date (use the format <i>mmddyy</i> , e.g., March 9, 2001 as 30901).
IAD ?_	(Response is optional.) To use an Interest Adjustment Date, enter it in the format <i>mmddyy</i> ¹ , otherwise, just push [ENTER]. The Interest Adjustment Date must be between the Start Date and the First Due Date.
FIRST ?_	(Response is optional and if no entry is made, the First Due Date is one month from the "IAD" date, if entered, otherwise one month from the Start Date.) Enter the First Due Date in the format <i>mmddyy</i> . ¹

¹ Always enter the last two digits of the year, e.g., for the date January 15, 2000, enter the digits "011500". See Year 2000 Compliant on page 11.

INS 70?_

If the two-digit insurance code shown is correct, push [ENTER], otherwise enter the desired code from the following table:

- 0 - Not present (co-borrower only)
- 3 - Ineligible for insurance
- 4 - Declined insurance
- 6 - Life only
- 7 - Life & disability

The first number represents the borrower, the second the co-borrower, e.g., for life and disability on both the borrower and co-borrower, enter a code of "77". See LoanProtector Insurance Codes on page 6.

DOB ?_

(Appears only in a payment proposal if the proceeds exceed \$50,000.00 and insurance was selected.²) Enter the date of birth of the older insured borrower in the format *mmdyy*¹ or the borrower's age in years (but not more than 100).

The item computed (payment, proceeds, or amortization term) will be displayed.

PMT	xxxx.xx
AMORT	xxx
PRCDS	xxxxx.xx

Computed payment, amortization or loan proceeds.

Press [ENTER] to view the following items (which appear for Payment Proposals):

xxxxxxx	\$xxx.xx
COI	\$xx.xx/\$1000
ADJ AMT	xxxxx.xx

Life rate and monthly disability cost.
Cost of insurance per \$1000 of loan.
Interest adjustment amount.

If no credit insurance was requested, the program will prompt for the interest term.

TERM xxx?_

Enter the interest term.

INT CG	\$xxxxx.xx
PR BAL	\$xxxxxx.xx
T INT	\$xxxxxx.xx

Interest term costs.
Principal at review.
Total interest costs.

² If this prompt appears, a date of birth must be entered. See Required Date Entries on page 6.

LoanProtector Insurance Codes

The insurance code is *always* a two-digit number with the first digit representing the borrower's status and the second digit the co-borrower's. If there is no co-borrower, the second digit should be a "0". For no insurance, enter a code of "40".

<u>Borrower (1st digit)</u>	<u>Co-borrower (2nd digit)</u>
3 - Ineligible for insurance	0 - No co-borrower
4 - Declined insurance	3 - Ineligible for insurance
6 - Life only	4 - Declined insurance
7 - Life & disability	6 - Life only
	7 - Life & disability

Required Date Entries

If insurance is selected for a payment proposal and the proceeds exceed \$50,000.00, the borrower's date of birth is required.

Response to the Interest Adjustment Date prompt is optional, and if no entry is made, the loan will be computed without an Interest Adjustment Date.

Response to the First Due Date prompt is optional, and if no entry is made, the loan is computed assuming 1 month between the First Due Date and the Interest Adjustment Date, if entered, or the Start Date. "1 month" means the same day of the following month; if that day does not exist, then the last day of the following month is assumed.

For proceeds and amortization proposals, computations are done assuming no Interest Adjustment Date and one month to the First Due Date. Only the estimated available proceeds or amortization term is disclosed; it is necessary to compute the loan again using the payment proposal to obtain an exact payment and insurance cost.

Royal Credit Line Routine - [Loans] Function Key

This routine computes the life rate, disability amount, and cost of insurance for the entered credit line limit.

Prompt

User Response

	Push the [Loans] function key to start this routine.
LOAN/RCL 1/2?_	Enter "2" to run this routine.
RCL LIM 0?_	Enter the amount of the credit line limit.
INS 70?_	If the two-digit insurance code shown is correct, push [ENTER], otherwise enter the desired code from the following table: 0 - Not present (co-borrower only) 3 - Ineligible for insurance 4 - Declined insurance 6 - Life only 7 - Life & disability The first number represents the borrower, the second the co-borrower, e.g., for life and disability on both the borrower and co-borrower, enter a code of "77". See LoanProtector Insurance Codes on page 6.
AGE 0?_	(Appears only if the amount entered at the "RCL LIM?" prompt exceeds \$50,000.) Enter the age ³ of the insured (if joint insurance, enter the age of the older insured). The age must be between 18 and the maximum allowed age.

xxxxxxx	\$xxx.xx
COI	\$xx.xxx/1000

Life rate and max monthly disability cost.
Cost of insurance per \$1000 per month

³ Entry of the age is required if the credit limit amount entered exceeds \$50,000.

BuyBack Routine - [BuyBack] Function Key

This routine computes the monthly payment for a BuyBack Loan with a predetermined residual value.

<u>Prompt</u>	<u>User Response</u>
	Push the [BuyBack] function key to start this routine.
PRCDS 0?_	Enter the proceeds.
RESID 0?_	Enter the residual value.
OPTION TERM 0?_	Enter the term to the option in months.
INT RATE xx.xxx%?_	If the interest rate percentage shown is correct, push [ENTER], otherwise, enter the correct interest rate.
START mmddyy?_	If the Start Date ⁴ shown is correct, push [ENTER], otherwise enter the correct starting date (use the format <i>mmddyy</i> , e.g., March 9, 1999 as 30999).
IAD ?_	(Response is optional.) To use an Interest Adjustment Date, enter it in the format <i>mmddyy</i> , otherwise, just push [ENTER]. The Interest Adjustment Date must be between the Start Date and the First Due Date.
FIRST ?_	(Response is optional and if no entry is made, the First Due Date is one month from the "IAD" date, if entered, otherwise one month from the Start Date.) Enter the First Due Date in the format <i>mmddyy</i> .
INS 70?_	If the two-digit insurance code shown is correct, push [ENTER], otherwise enter the desired code from the following table: 0 - Not present (co-borrower only) 3 - Ineligible for insurance 4 - Declined insurance 6 - Life only 7 - Life & disability

⁴ Always enter the last two digits of the year, e.g., for the date January 15, 2000, enter the digits "011500". See Year 2000 Compliant on page 11.

The first number represents the borrower, the second the co-borrower, e.g., for life and disability on both the borrower and co-borrower, enter a code of "77". See LoanProtector Insurance Codes on page 6.

DOB ?_

(Appears only if the proceeds exceed \$50,000.00 and insurance was selected.⁵) Enter the date of birth of the older insured borrower in the format *mmddyy* or the age in years (but not more than 100).

The computed monthly payment will appear.

PMT	xxxxxx.xx
xxxxxxx	\$xxx.xx
COI	\$xx.xx/\$1000
ADJ AMT	xxxxx.xx

Computed monthly payment.
Life rate and monthly disability cost.
Cost of insurance per \$1000.
Interest adjustment amount.

If no credit insurance was requested, the program will continue and ask for the interest term.

TERM xxx?_

Enter the interest term.

INT CG	\$xxxxxx.xx
PR BAL	\$xxxxxx.xx
T INT	\$xxxxxx.xx
BB AMORT	xxx

Interest term costs.
Principal at review.
Total interest costs.
Calculated BuyBack amortization.

It is possible to enter a residual value that is greater than the proceeds, and if it exceeds the proceeds significantly, the computed monthly payment will become negative. Although this is mathematically correct, it is not a logical loan.

It is also possible to enter a residual value that is equal to the proceeds in which case the monthly payment becomes approximately an "interest only" payment.

⁵ If this prompt appears, a date of birth must be entered. See Required Date Entries on page 6.

Total Debt Service Routine - [TDS] Function Key

The Total Debt Service (TDS) routine will compute either the monthly amount of debt a borrower can assume or the TDS % that exists with specified debt service.

<u>Prompt</u>	<u>User Response</u>
	Push the [TDS] function key to start this routine.
GR INC 0?_	Enter the annual gross income.
PMT 0?_	Enter the existing monthly payment.
TAX/YR 0?_	Enter the annual property tax amount.
UTIL 0?_	Enter the monthly amount of utilities or other monthly costs.
OTHER 0?_	Enter any other existing monthly debt service amounts.
TDS xx%?_	If the displayed TDS percentage is correct, push [ENTER], otherwise, enter the desired TDS percentage.
	To compute the TDS percentage, enter a 0.

TDS	xx.xx%	Computed TDS percentage or maximum additional monthly debt
TDS PMT	xxxxx.xx	

If the payment amount appears with a leading "-" sign, the borrower has already exceeded the maximum total debt service by the amount shown.

LOAN/MTG (1/2)?_	(Appears only if the TDS PMT was computed and is greater than 0.) Enter 1 to compute the available proceeds of an installment loan, or 2 to compute the available proceeds of a mortgage.
------------------	---

For computations, all items are adjusted to a monthly cost. The maximum additional monthly debt service is the monthly gross income times the TDS % less the other monthly items.

Finding the Disability Premium in a LoanProtector Payment - #1

In situations where the customer desires to make a specified monthly payment and the loan officer wishes to tell the customer what portion of the payment is for the disability premium, this subprogram can be used.

<u>Prompt</u>	<u>User Response</u>
SECUR?_	Push the [Setup] Key and enter "1" to run this routine.
PMT?_	Enter the total payment amount.
# INSURED 1?_	Enter a "1" for single disability or a "2" for joint disability.

xxxxx.xx + xx.xx

The net principal-&-interest payment and the monthly disability premium.

Year 2000 Compliant

All calculators produced or updated after April 1997 (Version L52 or later) are Year 2000 Compliant and will correctly calculate dates for the Year 2000 and beyond. Dates are entered in a 'mmdyy' format using 6 digits, with the last two digits reserved for the year. The span of dates that can be entered is from January 1st, 1980 through December 31st, 2079. Thus an entry of "010100" represents January 1st, 2000, and an entry of 123149 represents December 31st, 2049.

If your calculator is earlier than version L52, it should be updated before the year 2000 in order for it to be able to properly calculate dates. All calculators returned for maintenance are automatically updated at no extra charge.

Mortgage Routines - [Mort] Function Key

This routine computes the monthly payment or available proceeds of fixed or variable rate mortgages.

<u>Prompt</u>	<u>User Response</u>
MORT/C/F 1/2/3?_	Enter "1" to compute a mortgage, "2" to compute a CMHC mortgage, or "3" to compute the Equivalent Future Rate.
PM/PR/AM 1/2/3?_	Enter "1" to compute the payment, "2" the proceeds, or "3" the amortization term.

Computing the payment

PRCDS 0?_	Enter the mortgage proceeds.
AMORT TERM 0?_	Enter the amortization term in months.

The following four prompts appear only if the Ontario Effective Cost of Borrowing Option is enabled. (See Setup Routine.) If enabled, enter the amounts for the items shown regardless of whether they are paid in cash or deducted from the principal amount of the mortgage. See the Ontario regulation for more information.

COMM?_	Enter any commission amount paid to obtain the mortgage.
BONUS?_	Enter any bonus amount paid to obtain the mortgage.
LEGAL?_	Enter any legal or title fees paid to obtain the mortgage.
OTHER?_	Enter any other fees paid to obtain the mortgage.
INT RATE xx.xxx%?_	Enter the interest rate as a percentage.
FIXD/VAR 1/2 1?_	To compute a fixed rate mortgage (semi-annual compounding), enter "1"; to compute a variable rate mortgage (payment-period compounding), enter "2". (Default is fixed rate.)

PMT FREQ 12?_ If the payment frequency⁶ shown is correct, push [ENTER], otherwise enter the correct frequency

ACCEL 0/1/2 0?_ (Appears only if the payment frequency is 24, 26, or 52.) Enter a 1 for an "option" mortgage, or a 2 for an "accelerated" mortgage.⁷ Default is 0 for a conventional mortgage, i.e., one that will amortize over the entered amortization term.

LIFE 1?_ If the life insurance code shown is correct, push [ENTER], otherwise enter the appropriate code from the following table:

0	No insurance
1	Borrower only
2	Co-borrower only
3	Both borrower and co-borrower

DIS 1?_ If the disability insurance code shown is correct, push [ENTER], otherwise enter the appropriate code from the table above.

A borrower must request life insurance in order to be eligible for disability insurance.

AGE PRI-BOR?_ Enter the age of the primary borrower⁸.

AGE CO-BOR?_ Enter the age of the coborrower.

⁶ Allowed frequencies are 12, 24, 26 and 52 corresponding to monthly, semi-monthly, biweekly and weekly payments.

⁷ The amortization period of "accelerated" mortgages is reduced significantly because the borrower effectively makes one extra monthly payment per year, e.g., for an accelerated biweekly mortgage, the biweekly payment is 1/2 the conventional monthly payment and the borrower makes 26 each year. "Option" mortgages have a slightly shorter amortization period than a conventional mortgage.

⁸ If the AGE PRI-BOR prompt appears, entry of the age is required. The age must be between 18 and 72 years of age. Furthermore, the age plus the amortization period in years cannot exceed 72. For example, a 62-year-old cannot purchase insurance on a mortgage with an amortization longer than 10 years.

PMT-XX	XXXXXX.XX
LIFE X.XX	XXX.XX
DIS^ X.XX	XXX.XX
BENEFIT	\$XXXX.XX
AMORT	XXX

Payment (incl. insurance) and frequency.
 Life rate and premium per payment.
 Disability rate and premium per payment.
 Disability benefit.⁹

Actual amortization (if accelerated)¹⁰

TERM 0?_

Enter the interest term in months.¹¹

DAYS TO IAD 0?_

Enter the interest adjustment period in days. Enter a 0 for no interest adjustment amount.

IAD	XXXX.XX
PRCDS	XXXXXX.XX
2X XX.XX%	XX.XX%
PMT	XXXX.XX
PR BAL	XXXXXX.XX
INT CG	XXXXXX.XX
NETADV	XXXXXX.XX
ECB	XX.XX%
IC SAV	XXXXXX.XX

Interest adjustment amount.

Proceeds.

Equivalent semi-annual rate & interest rate.

Principal-&-interest payment.

End-of-term principal balance.

Interest term costs.

Ontario "Net advance".

Ontario Effective Cost of Borrowing.

Interest savings (for accelerated mortgages).¹²

⁹ If the "^" symbol appears on the line showing the disability rate and premium, the disability benefit has been limited to the amount shown because of insurance policy underwriting limits.

¹⁰ For "option" or "accelerated" mortgages, the actual amortization is recalculated.

¹¹ The interest term is always entered in months and it must be equivalent to a whole number of payments. In the case of biweekly payments (26 per year), the interest term must be a multiple of 6 months (there being exactly 13 biweekly payments every 6 months). In the case of weekly payments, it must be a multiple of 3 months (there being exactly 13 weekly payments every 3 months).

¹² The interest savings are the difference between the total interest costs for a conventional mortgage and the accelerated one. The amortization period of the accelerated mortgage is shorter because the borrower is effectively making additional payments. See footnote 7 on page 13.

Computing the amortization

PRCDS 0?_ Enter the mortgage proceeds.

PMT 0?_ Enter the periodic payment amount.

INT RATE xx.xxx%?_ Enter the interest rate as a percentage.

FIXD/VAR 1/2 1?_ To compute a fixed rate mortgage (semi-annual compounding), enter "1"; to compute a variable rate mortgage (payment-period compounding), enter "2".

PMT FREQ 12?_ If the payment frequency shown is correct, push [ENTER], otherwise enter the correct frequency.¹³

PPMT/YR 0?_ Enter the additional annual principal, if any.¹⁴

PMT INC % 0?_ Enter the annual percentage increase¹⁵ in the periodic payment, if any.

AMORT	xxx
INT CG	xxxxxx.xx
xxx PMTS	

Calculated amortization term in months.
Total interest charges.
Actual number of payments.

¹³ Default is 12 for monthly payments. Allowed payment frequencies are 12, 24, 26, & 52 corresponding to monthly, semi-monthly, biweekly, and weekly payments.

¹⁴ If no entry is made at the "PPMT/YR" prompt, the amortization period is computed using the entered parameters. If an entry is made, the program considers the amount entered to be an additional principal payment made at the end of each year. This payment is in addition to the regular payment that falls at the end of the year.

If the amortization period is an exact multiple of 12 months, indicating the loan will amortize in some whole number of years, the final principal prepayment will usually be less than the entered prepayment amount (it will vary from \$0.00 to the full amount). The computed interest charge reflects this partial payment.

It is possible to compute the final principal payment in the following manner: Add the interest charge to the mortgage amount. From this subtract the sum of the regular payments (# of payments times payment amount) and one less than the whole number of years times the annual principal payment (# of years - 1 times annual principal payment). The balance is the final annual principal payment.

¹⁵ If no entry is made at the "PMT INC %" prompt, the amortization period is computed using the entered payment. If an entry is made, the program increases the periodic payment at the end of each year by the percentage entered. For example, if the entered payment is \$600.00 and a 10 percent increase is entered, the payment will increase to \$660.00 for the second year, to \$726.00 for the third, to \$798.60 for the fourth, and so on, until the mortgage amortizes.

Computing the proceeds

PMT 0?_ Enter the monthly payment amount.

AMORT TERM 0?_ Enter the amortization term in months.

INT RATE xx.xxx%?_ Enter the interest rate as a percentage.

FIXD/VAR 1/2 1?_ To compute a fixed rate mortgage (semi-annual compounding), enter "1"; to compute a variable rate mortgage (payment-period compounding), enter "2".

PRCDS	xxxxxx.xx	Available proceeds
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Blended Interest Rate Routine - Subprogram #2

This routine computes the blended interest rate to be used when an old mortgage is rewritten to include some additional funds. The blended interest rate is computed by taking into account the amount of the old mortgage at the old interest rate as well as the amount of the new funds advanced and the interest rate that applies to these funds.

<u>Prompt</u>	<u>User Response</u>
SECUR?_	Push the [Setup] or [Prog] Key and enter "2" to run this routine.
CUR MTGE 0?_	Enter the current balance of the existing mortgage.
CUR RATE 0%?_	Enter the existing mortgage interest rate percentage.
NEW MTGE 0?_	Enter the total amount of the new mortgage (including the current balance of the existing mortgage).
NEW RATE 0%?_	Enter the new interest rate.

INT RATE	xx.xxx%	Blended interest rate
PRCDS	xxxxxx.xx	Additional proceeds

CMHC Routine

This routine computes the minimum required downpayment¹⁶ for conventional and CMHC insured mortgages. If the CMHC option is chosen, the CMHC fees are computed.

The mortgage amount is computed from the entered price and downpayment and is passed to the Mortgage Find Payment Routine - [Mtge] function key.

<u>Prompt</u>	<u>User Response</u>
	Push the [Mort] function key to start this routine.
MORT/C/F 1/2/3?_	Enter "2" to run this routine.
PRICE 0?_	Enter the price of the property.
CMHC (Y/N)?_	Push [YES] to compute the minimum downpayment with CMHC insurance, or [NO] to compute it without.
DN PMT xxxxx?_	The minimum downpayment is computed and displayed. To use it, just push [ENTER]; otherwise, enter the desired downpayment amount. If a downpayment less than the computed amount is entered, an error will be reported.
CMHC \$ xxxxx.xx	The amount of the CMHC fee is displayed. ¹⁷ If no CMHC insurance was selected, this line will be 0.
PRCDS xxxxxx?_	The adjusted mortgage amount ¹⁸ will be displayed; to

¹⁶ For conventional mortgages, the minimum downpayment is computed as 25% of the price. For CMHC mortgages, the minimum downpayment is 5% of the price. The minimum downpayment is adjusted upwards to the next whole dollar.

¹⁷ Rates effective as of July 14, 2003. The CMHC Fee computation is based on the LTV% (loan-to-value ratio). The LTV% is found by dividing the mortgage amount by the price of the property and rounding the result to the nearest hundredth of a percent. The CMHC Fee is a percentage (see table below) of the mortgage amount based on the LTV%. The CMHC Fee is rounded to the nearest whole dollar.

<u>LTV%</u>	<u>Fee</u>
90.01 - 95.00%	3.25%
85.01 - 90.00%	2.00%
80.01 - 85.00%	1.75%
75.01 - 80.00%	1.00%
65.01 - 75.00%	0.65%
00.00 - 65.00%	0.50%

use it, push [ENTER]; otherwise enter the desired mortgage amount. The routine will continue through the HomeProtector Mortgage routine to find the payment. See Computing the payment on page 12.

Interest Bonus and Differential Routine - [IntB/D] Function Key

This routine computes three months' bonus interest on a principal amount and computes the difference in interest earned based on two interest rates over a term.

<u>Prompt</u>	<u>User Response</u>
	Push the [IntB/D] key to run this routine.
PR BAL 0?_	Enter the principal amount.
TERM-TO-GO 0?_	Enter the number of months over which to compute the interest rate differential amount.
CUR RATE 0?_	Enter the current interest rate.
NEW RATE 0?_	Enter the new interest rate.

The routine will compute the following items:

BONUS3 xxxxxx.xx	Three months' bonus interest at the current interest rate.
IN DIF xxxxxx.xx	The interest differential between the current and new interest rates over the term-to-go. (If the interest differential is less than zero, it is shown as zero.)

¹⁸ The adjusted mortgage amount is the sum of the price and the CMHC fee less the downpayment.

Equivalent Future Rate (EFR) Routine

This routine performs a comparison between two renewal options of different terms and interest rates. The short term can be of any length, and the long term is longer than the short term but not greater than the remaining amortization of the mortgage. The long-term rate can be higher or lower than the short-term rate.

The comparison is based over the number of months in the longer term and calculates the future short-term rate that would have to be in effect for the remainder of the comparison period to make the short-term option financially equivalent to the long-term option.

If the actual interest rate in effect for the remainder of the comparison period happens to be exactly the computed equivalent future rate, it does not matter which option (short or long) the borrower takes. If the actual rate happens to be higher than the computed equivalent future rate, the borrower will gain by selecting the longer option. Conversely, if the actual rate happens to be lower than the equivalent future rate, the borrower will gain by selecting the shorter option.

If the investment opportunity interest rate is set to zero, the differences are compared by simple arithmetic. If the investment opportunity rate has a value, the time values of the differences are compared.

<u>Prompt</u>	<u>User Response</u>
MORT/C/F 1/2/3?_	Push the [Mort] function key to start this routine and enter a "3" to run this routine.
BAL 0?_	Enter the current balance of the mortgage.
PMT 0?_	Enter the current mortgage payment.
PMT FREQ 12?_	Enter the payment frequency. ¹⁹
INT RATE 0%?_	Enter the current interest rate.
SHORT TERM 0?_	Enter the shorter option interest term in months.
SHORT 0%?_	Enter the interest rate offered for the shorter term.
LONG TERM 0?_	Enter the longer option interest term in months.

¹⁹ Allowed frequencies are 1, 2, 4, 12, 24, 26, & 52, corresponding to annual, semi-annual, quarterly, monthly, semi-monthly, biweekly, and weekly payments.

LONG 0%?_ Enter the interest rate offered for the longer term.

INV RATE 0%?_ Enter the investment opportunity interest rate.²⁰

AMORT	xxx	Remaining amortization.
EF RATE	x.xxx%	Equivalent future rate.

Equivalent Future Rate (EFR) Example

This example shows a practical application of the EFR routine. A borrower has a mortgage with a current balance of \$104,930.57, a current interest rate of 9.00%, and a monthly payment of \$915.74. The remaining amortization is 253 months.

The borrower is faced with renewing his or her mortgage and is trying to decide between a one-year and five-year renewal term. The one-year term offers a rate of 7.75% and the five-year renewal term offers a rate of 8.25%. We are going to compute the interest rate that would have to be in effect for the four-year period remaining after the one-year renewal term that would put the borrower in an equivalent financial position as taking the five-year option. Clearly, the rate for this four-year period would have to be higher than 7.75% (the short term rate) and even higher than the 8.25% rate. Using an investment opportunity rate (see below) of zero, we calculate the equivalent future rate to be 8.388%.

To illustrate that the calculated rate of 8.388% is correct, you can follow through the calculations below using the Mortgage routine in your calculator.

If the five-year renewal option is taken, the monthly payment will be \$866.98 and the principal balance at the end of the five-year term will be \$93,311.12.

²⁰ The purpose of the investment opportunity rate is to take into consideration the fact that one of the options (usually the shorter one) will have a lower interest rate and consequently a lower payment amount and that the savings could be invested to earn interest.

In the previous example, the long-term option has 60 monthly payments of \$866.98, and the short-term option 12 monthly payments of \$835.06, followed by 48 payments of \$874.53. If the borrower elects the short-term option, he will save \$31.92 for each of the first 12 payments, but will pay an extra \$7.55 for each of the 48 subsequent payments. The investment opportunity rate is the interest rate that the borrower would receive on this account into which he would make a series of 12 monthly \$31.92 deposits followed by a series of 48 monthly \$7.55 withdrawals.

At the end of the comparison period, there would be some interest left in this account which the borrower could apply to reduce the principal balance if the short-term option is selected.

The program suggests an investment opportunity rate that is 3.00% less than the short-term rate, however, any rate can be entered. The additional interest that the borrower earns with the investment opportunity rate has the effect of raising the equivalent future rate slightly.

If the one-year renewal option is taken, the monthly payment will be \$835.06 and the principal balance at the end of the one-year period will be \$102,841.67.

At the end of the one-year renewal period, the remaining amortization is 241 months ($253 - 12 = 241$). Using the principal balance of \$102,841.67 that exists at the end of the one-year renewal period, we calculate the monthly payment for the subsequent four years at the equivalent future rate of 8.388% to be \$874.53. The principal balance at the end of the four-year period is \$93,331.90.

The total of monthly payments over the five-year period with the short-term renewal option is \$51,998.16 ($12 \times 835.06 + 48 \times 874.53 = 51,998.16$). With the long-term renewal option, the total is \$52,018.80 ($60 \times 866.98 = 52,018.80$). Subtracting these two totals, we find the borrower will make \$20.64 more in payments if he elects the long-term option.

However, we also find by comparing the remaining principal balances at the end of the five-year period that he will owe \$20.78 less by taking the long-term option ($93,331.90 - 93,311.12 = 20.78$).

Thus if the interest rate for the four-year period happens to be exactly 8.388%, the borrower is in an equivalent financial position with either choice. (The small difference of \$0.14 occurs because the equivalent future rate is calculated to only three decimal places.)

If the borrower thinks that the four-year rate available after the first year will be greater than 8.388%, the long-term option is the better choice. On the other hand, if the borrower feels the four-year rate will be less than 8.388%, the short-term option will be the better choice.

The above computations assume an investment opportunity rate of 0%. If this rate is 4.75%, the equivalent future rate increases slightly to 8.401%. The inclusion of the investment opportunity rate takes into account the timing of the differences in payments. By selecting the long-term option, over the first 12 months the borrower is making a payment each month that is \$31.92 higher ($866.98 - 835.06 = 31.92$). However, for the subsequent 48 months, the borrower will be making a payment that is \$7.55 lower ($874.53 - 866.98$), and at the end of the five years, will owe \$20.78 less on the principal balance.

RSP/RRIF Routine - Subprogram #4

This routine computes the fund balance and available withdrawals for Retirement Savings Plans and Registered Retirement Investment Plans. It projects the interest earned and retirement fund balance at retirement. You can fund the plan with an initial lump-sum amount, a series of periodic contributions, or both.

The projected fund balance is shown at the selected retirement age. The routine will then project the available withdrawals over a specified period of time.

Contributions and withdrawals can be made at any interval: weekly, monthly, quarterly, and so forth.

The last part of the routine will calculate the fund balance at any age.

<u>Prompt</u>	<u>User Response</u>
	Push the [Setup] or [Prog] key and enter a "4" to run this routine. After you have run this routine, you can start it again by pressing the [Red] (Rework) function key.
RATE % xx.xx?_	Enter the annual rate at which you expect the fund earn interest or grow. ²¹
COMP FREQ 12?_	Enter the desired compounding frequency. ²²
S AMT xxxxxx?_	Enter the starting amount to fund the plan. If there is no starting amount, enter a 0. ²³
CONT AMT xxxxxx?_	Enter the amount of the periodic contribution. If there are no periodic contributions, enter a 0.

²¹ This is the assumed growth rate (after taxes) for the life of the plan. Conservative entries should be made here to avoid generating unrealistic projections. If you project a substantial change in the growth rate after a certain number of years, you could compute the projections in two passes. Compute the fund balance at the end of the first period using the first rate, then use that fund balance as the Starting Amount for the second period using the second rate.

²² Allowed interest compounding frequencies are 1, 2, 4, 12, 24, 26, 52 and 365 corresponding to annual, semi-annual, quarterly, monthly, semi-monthly, biweekly, weekly, and daily. If you use the annual option, the effective annual yield will be the same as the entered growth rate.

²³ The starting amount is used when a lump-sum contribution or rollover (from another plan) is made. It can also be used to reevaluate a plan.

CONT FREQ 12?_ Enter the frequency at which you wish to make periodic contributions to the fund.²⁷

AGE xx?_ Enter the current age of the plan holder in years.

RETIRE @xx?_ Enter the age at which the plan holder wishes to retire. This must be the same or greater than the current age.²⁴

BAL @xx	xxxxxxx	Fund balance at selected retirement age. ²⁵
TOT CON	xxxxxxx	Total contributions made.
TOT INT	xxxxxxx	Interest earned to retirement. ²⁶
ANN YLD	xx.xxx%	Effective Annual Yield.

YRS 20?_ Enter the number of years over which you wish to make withdrawals.

#/YR 12?_ Enter the number of withdrawals you wish to make each year.²⁷

WD AMT	xxxxxxx	The amount of each withdrawal.
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SHOW @xx?_ To view the fund balance at any age, enter that age at this prompt.

BAL @xx	xxxxxxxxx	The fund balance at the selected age.
BAL @xy	xxxxxxxxx	Continue to push [Enter] to view the balance
BAL @xz	xxxxxxxxx	at the end of each succeeding year.
	...	

²⁴ The retirement age is when the stream of contributions stops, and the stream of withdrawals begin.

²⁵ All amounts are entered and shown in whole dollars. If the calculated fund balance are too large, the message "IN THOUSANDS" will appear briefly indicating that the subsequent numbers are in thousands of dollars.

²⁶ This is the total interest earned during the contribution phase. Interest continues to be earned at the same rate during the withdrawal phase.

²⁷ Allowed contribution and withdrawal frequencies are 1, 2, 4, 12, 24, 26 & 52 corresponding to annual, semi-annual, quarterly, monthly, semi-monthly, biweekly, and weekly.

RSP Example #1

A 35-year-old wishes to make monthly contributions of \$135.00 each and expects to retire at age 65. He wants to know the maximum monthly withdrawal he could make over the next 20 year. The interest rate is 7%, compounded monthly. There is no starting amount.

The calculated fund balance at age 65 is \$165,657. The total of contributions is \$48,600 and the total interest earned is \$117,057. The effective annual yield (because of the monthly compounding) is 7.229%. The monthly withdrawal that could be taken over the next 20 years (until age 85) is \$1,284.

RSP Example #2

A 50-year-old wishes to transfer his retirement fund to a new plan, and wants to continue to make quarterly contributions of \$2,000.00 each until age 68. The old fund has a current balance of \$87,550 (this is entered as the Starting Amount). The assumed interest rate is 8.25%, compounded quarterly.

The calculated fund balance at age 68 is \$712,162. The total of contributions is \$231,550 and the total interest earned is \$480,612. The effective annual yield is 8.509%. The quarterly withdrawal that could be made over the next 18 years is \$19,075.

RSP Example #3

A 63-year-old wishes to transfer his retirement fund to a new plan, and wants to retire immediately. The old fund has a current balance of \$420,578 (this is entered as the Starting Amount, and Periodic Contribution is entered as 0). The assumed interest rate is 5.85%, compounded daily (365 times a year).

The fund balance at retirement is, of course, \$420,578, the Starting Amount. No interest is earned during the contribution phase because no periodic contributions are made. The effective annual yield is 6.024%. The weekly withdrawal (52 per year) that can be made over the next 21 years is \$669.

RSP Example #4

A 48-year old has just won \$5,000,000 in the lottery and wants to put it away for retirement at age 63. He doesn't want to make any additional contributions, but expects the fund to grow at 6.12% compounded monthly. The fund will grow to \$12,492,206 by age 63: he can then take monthly withdrawals of \$81,406 each over the next 25 years.

RSP/RRIF Calculation Notes

Periodic contributions are considered to be made at the beginning of each period, thus the fund balance at retirement is calculated as of one period after the last periodic contribution. If a starting amount is used, it is considered to be made at the beginning of the first period together with the first periodic contribution.

Periodic withdrawals are considered to be taken at the end of each period. This means there are two periods between the last contribution and the first withdrawal, e.g., if you're making monthly contributions and withdrawals, there are two months between the last contribution and the first withdrawal.

The contribution frequency can be the same or different from the withdrawal frequency (e.g. you could have weekly contributions and monthly withdrawals). Either or both can be different from the growth rate compounding frequency.

You can look at the fund balance at any point in the plan. At the "SHOW @xx?" prompt, enter the age at which you want to know the fund balance. Continuing to push [Enter] will show the balance for each succeeding year. You can push the [Backup] key to return to the "SHOW @xx?" prompt and change the age to start showing balances.

The preceding examples show different applications of this routine. The first illustrates a person starting a new retirement plan. Therefore the starting amount is 0.

The second example illustrates a rollover. The person has a retirement fund already with a balance. The balance is entered as the starting amount. In addition, the person wants to make a series of contributions to build the fund until he retires.

The third example has no contribution phase. The person has a lump sum, and wants to know how much they can withdraw from the fund making sure it will last the desired number of years.

The fourth illustrates a lump-sum starting amount being used to fund a plan with no subsequent contributions.

Very large funds can be calculated with this routine. If the values are large enough, the message "IN THOUSANDS" in appear briefly indicating that the results are in thousands of dollars. Entered and calculated amounts are rounded to the nearest whole dollar (or thousands of dollars if the amounts are very large).

This routine can also be used to reevaluate a retirement plan. Just use the current fund balance as the Starting Amount, and enter the person's current age. Enter the expected interest rate and stream of continuing contributions to recalculate the balance and available withdrawal stream at retirement.

Notes:

Battery Replacement & Maintenance

Error Messages

From time to time, the program may report an error. The information here provides a more detailed explanation of the error and the corrective action to be taken.

Errors take two general forms:

The first type is produced by one of the programs installed in the calculator and usually is the result of a data entry error or an unreasonable result (such as a loan with negative payments).

To recover from this type of error, push the [BackUp] key. If possible, you will be returned to the prompt that needs to be changed. In some cases, such as when the First Due Date is prior to the Start Date, you will be returned to the First Due Date prompt in the routine. If it is actually the Start Date that is incorrect, use the BackUp routine to enter the correct Start Date.

This type of error will appear as one of the following messages:

- AMORT + AGE > 72! In the HomeProtector routines, if the age plus the amortization period in years exceed 72, the borrower (or coborrower) is not eligible for insurance and this message will appear.
- AMORT TOO LONG! This occurs when computing the amortization term of either a loan or a mortgage and the computed amortization term exceeds 480 months. Use the BackUp routine to make the necessary changes (increase the payment and/or reduce the proceeds).
- DOB REQUIRED! A response is required to the DOB (Date of Birth) prompt. Use the BackUp routine to return to the DOB prompt.
- IAD DATE BAD! The Interest Adjustment Date is not between the Start Date and the First Due Date. If the Interest Adjustment Date is the same as the Start Date, no interest adjustment is made. Use the BackUp routine to correct the Interest Adjustment Date.
- INVALID DATE! The date just entered is not a good date, i.e., it does not exist. Make sure to enter the date in the format *mmdyy* -- only valid dates are accepted. Use the BackUp routine to correct the date.

- INVALID ENTRY! The entry just made is not allowed. Check the value entered and use the BackUp routine to correct it.
- INVALID PMT FREQ! The payment frequency entered is not allowed. Legal payment frequencies are 12, 24, 26, & 52 for monthly, semi-monthly, biweekly, and weekly payment intervals.
- START > FIRST! The Start Date occurs on or after the First Due Date. Use the BackUp routine to correct the date(s).
- L TERM > REM AMORT In the Equivalent Future Rate routine, the entered long term is greater than the remaining amortization.

The second type which appears as "ERROR # (IN ###)" is a system error whose significance can be determined from the following table. If one of these errors occurs, push the [CA] key to clear the error.

- ERROR 1 (IN ###) The batteries may be weak. Try replacing them with new ones. If this error persists, the calculator needs to be returned for maintenance.
- ERROR 2 (IN ###) A calculation error occurred because of a divide by 0 or overflow problem.
- ERROR 3 (IN ###) The calculator needs to be initialized.
- ERROR 4 (IN ###) Try to Initialize the Software Cartridge (See Initializing the Software Cartridge below). If this is not successful, return the calculator for maintenance.
- ERROR 7 A computed or entered number is too large to be displayed. Generally, dollar amounts are limited to \$999,999.99. (For transactions over \$999,999.99, the amounts can be divided by 10 before being entered into the calculator and the computed results multiplied by 10 to obtain the correct results.)
- ERROR # The calculator needs maintenance.

It is possible to compute illogical loans with the calculator (for example entering a proceeds amount of zero). Although the program may abort with an "ERROR 2 IN ###" message indicating an underflow or overflow condition, in a few cases the calculator may "hang" (the display will stay blank and the keys become inoperative). If this occurs, push the [CA] key or turn the calculator off and back on.

Installing Your Name in the LoanProtector Calculator

You can install your name (or an identification number, telephone number, or other message) in the calculator. Once installed, your name will appear briefly each time you start a routine.

To install your name, push the [Setup] or [Prog] key and enter a code of 726 in response to the "SECUR?_" prompt. The message "INSTALL NAME" will appear briefly, followed by a single question mark, "?_".

To enter a character (letter, number, or symbol), enter the appropriate code number from the table below and push [ENTER]. The character will appear in the display followed by a question mark. Enter the code number for the next character and push [ENTER] again. Continue entering code numbers for all the characters you wish to enter, and then push [ENTER] when you're done. If you make a mistake, push the [Backup] key to erase the last character.

You can enter up to 16 characters. The first character must not be a space (code 27), however, spaces can be used in any other position.

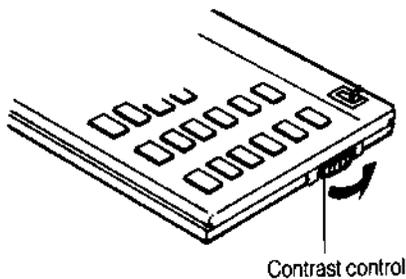
For example, to enter the name "LARRY 555-1234", enter the code numbers 12, 1, 18, 25, 27, 35, 35, 35, 28, 31, 32, 33, 34.

To remove a name without installing a new one, start the Install Name routine and just push [ENTER] when the "?_" prompt appears.

Character Code Table

A	1	P	16	1	31	(46
B	2	O	17	2	32)	47
C	3	R	18	3	33	+	48
D	4	S	19	4	34	.	49
E	5	T	20	5	35	.	50
F	6	U	21	6	36	/	51
G	7	V	22	7	37	:	52
H	8	W	23	8	38	:	53
I	9	X	24	9	39	<	54
J	10	Y	25	!	40	=	55
K	11	Z	26	"	41	>	56
L	12	(space)	27	#	42	?	57
M	13	-	28	\$	43	@	58
N	14	*	29	%	44		
O	15	0	30	&	45		

Adjusting the Display Contrast



The calculator is equipped with a control to adjust the contrast of the LCD (liquid crystal display). As the batteries age, the contrast will need to be adjusted from time to time. Adjust the display contrast with the knob on the right-hand end of the computer (under the On/Off switch). While looking at the display from a position about 70 degrees above the keyboard, first increase the contrast until black squares are clearly visible behind the characters and then decrease the contrast slowly until the

squares just disappear.

If the display contrast becomes too dim, the batteries should be replaced. The batteries are located inside the back cover--you will need 2 lithium CR-2032 batteries and a small screwdriver to replace the batteries.

Changing the Batteries

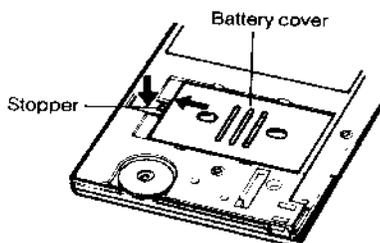
The batteries are of a long-life lithium type that will operate the calculator for about 300 hours of constant calculation. If you use it an hour a day, it should be about a year before the batteries need to be replaced. The calculator is equipped with an "automatic off" feature that turns the calculator off in about 5 minutes if no keys are operated. To turn it back on, press the [CA] key (next to the red [C·CE] key).

To replace the batteries, you should first have replacement batteries at hand. (Replacement batteries kits of the proper type are available from PROM Software, Inc.). Two lithium-type CR2032 batteries are required.

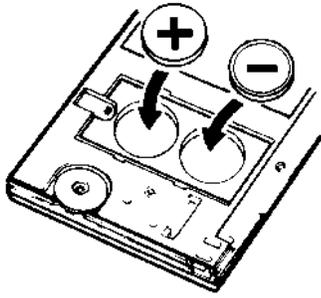
1) Make sure the calculator is turned off. Place the calculator face down on a table with the contrast adjusting knob in the upper left-hand corner (the writing on the back of the calculator will be right-side up).

2) Remove the Software Cartridge from the calculator.

3) Using a small screwdriver, remove the two screws. While lifting the edge of the calculator's back cover closest to you, slide it up to remove it.



4) Slide the silver-colored battery compartment cover upwards to open the compartment; remove the cover. The batteries are now disconnected; remove and discard them.

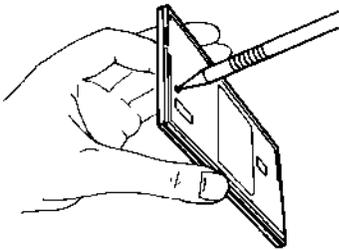


5) Install the new batteries, making sure the polarity (+ and -) is correct, and replace the battery compartment cover. (Make sure to replace the battery compartment cover--the batteries are not connected unless the battery compartment cover is in place.) Replace the back of the calculator by first hooking the 3 tabs on the top and then lowering the edge closest to you so you can replace the 2 screws.

6) Replace the Software Cartridge in the calculator. If it has been out of the calculator for more than about 5 minutes, you will have to initialize it. See Initializing the Software Cartridge below.

Initializing the Software Cartridge

After replacing the batteries or if you remove the Software Cartridge from the calculator, you may need to initialize the Software Cartridge with the following steps. Software Cartridges have a label on the back side (the side that faces the calculator) which has instructions similar to the following.)



1) Install the Software Cartridge in the calculator. With a pencil or straightened paper clip and the calculator ON, push the "ALL RESET" button on the left side of the back of the calculator. You should see 4 stars in the display (2 on the left, 2 on the right). (On some calculators, there may be a white label over the "ALL RESET" button. If so, gently lift up the lower left corner to reveal it)

2) Push [ENTER]. You should now see a single star at the right edge of the display.

3) Turn the calculator off, wait a few seconds, and then turn it back on. You should see "0." in the display. The calculator is now ready to be configured.

4) Push the [Setup] or [Prog] key. You should see "INITIALIZING..." appear ("CONFIGURING..." will appear on earlier versions of the software) for a moment and then, after several seconds, the "SECUR?" prompt will appear. Refer to Setup Routine on page 32 to select the correct province and desired language.

Setup Routine - [Setup] Function Key

Push the [Setup] or [Prog] key and at the SECUR?_ prompt, enter the desired code number and press [Enter].

Code = 4 **Run RSP/RRIF Routine** (see page 22)

Select Province and Language

Select the appropriate code number from the table below.²⁸

Province	English	French
Ontario	4167	5988
Quebec	9627	3072
All other provinces	2118	8703

Code = 1468 **Change Language**
ENG(1)/FRAN(2)?_ Enter a "1" for English, or a "2" for French.

Code = 9259 **Change Sales Tax Rate**
TAX x.xxx%?_ If the sales tax rate shown is correct, push [ENTER]; otherwise enter the desired rate as a percentage (e.g., enter 9.00 for 9%).²⁹

Code = 6356 **Calculating the Ontario Effective Cost of Borrowing**
Enables or disables the calculation of the Ontario Effective Cost of Borrowing in the Mortgage Routine.

²⁸ It is important to select the correct province. Insurance premium calculations vary by province, and the results will not be correct if the wrong province is selected. The Ontario Effective Cost of Borrowing option is activated in Ontario and deactivated in other provinces (see code 6356 above to turn this option on or off in any province).

²⁹ The tax is applied to the credit insurance premium. The rate is set automatically when the province is selected.