# PROPERTY ANALYZER 

A program for the HP 17BII and HP 19BII financial calculators


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A program for the HP 17BII and HP 19BII financial calculators

By Edric CANE

## DOCUMENTATION/RIGHT TO USE

## VERSION 1.0

This program is compatible with models:
HP 17B
HP 17BII
HP 19B
HP 19BII

Call Edric Cane Seminar for HP 95LX version

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For various people in the same office or company to use the program, each must own his/her individual documentation/right to use.
$\begin{array}{llllllllll}10 & 9 & 8 & 7 & 6 & 5 & 4 & 3 & 2 & 1\end{array}$

Edric Cane and Edric Cane Seminars make no representation other than good faith as to the appropriateness of this software to solve any given problem and as to the accuracy of this documentation. The user must retain responsibility for the numbers provided by the program and the uses he/she puts them to.

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Before a software program can be used, it must be keyed in. This is a one time occurence after which the program can be used over and over again for years. To key in a program, see APPENDIX TWO.

Each time you return to a program from other parts of the calculator, you must select and activate that program. To select and activate a program, see APPENDIX ONE.

## TO THE USER

I hope you enjoy this and my other real estate investment analysis programs. I hope they help you buy that property, make that deal, get that commission, and better serve the interests of your clients.

I have put a considerable amount of work and care in writing these programs, testing them, debugging them, improving them and preparing the documentation. It has often been a lonely task, as this is a one-man operation. I have been sustained by the thought of a thousand brokers and investors having access to numbers that would otherwise not be so easily accessible.

This creates a bond between us, author and users. I hope I get feedback, requests for improvements, suggestions for new programs. Though there are limits to my time and, at this stage, no staff or support service, you are welcome to try to reach me and request help if help is needed.

In return, I ask that you honor my copyright, that you purchase the program if you use it, that you do not condone others copying the program from your documentation or calculator. If a year from now there are a thousand professionals using the programs, I deserve to have sold more than just a couple of hundred copies.

My thanks to those who have given me early input, encouragement, and criticism. Chief among those--on all three counts-- is Wes Baker, CCIM and fellow instructor at UCLA Extension, and other members of the Los Angeles and Southern California CCIM chapters.

## Edric CANE

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## PROPERTY ANALYZER

## A program for the HP-17B/HP-19BII calculators

 By Edric CanePROPERTY ANALYZER gives you control over the complex relationships between price, down payment, cash-on-cash return requirements, financing variables, and Net Operating Income (NOI). It's as simple as keying in the data--as prompted by display labels--and solving for the unknown. That unknown can be any one of a dozen variables--the purchase price of course, but also the cash-on-cash return or down payment amount, the NOI or any of the variables affecting the financing: loan amount, loan-to-value ratio, rate or term.

- The program makes it possible to define real estate taxes on the property as a set percentage of the purchase price--allowing the program to automatically adjust the taxes and the NOI as a new purchase price is keyed in or calculated.
- The down payment can be expressed as a set percentage of the price or as a dollar amount.
- Loans can be defined as a given dollar amount, as a percentage of the purchase price, and as an unknown amount that the program itself determines.

PROPERTY ANALYZER considers a one year slice of time. It does not require or consider any projection of future income and expenses beyond that year. (See my INCOME PROJECTION / CASH FLOW ANALYSIS program for projection of future earnings and expenses).

## ASSEMBLY REQUIRED

Before the program can be used, it must be keyed into the calculator. This is a one time process. You can do it yourself or Edric Cane Seminars can do it for you. (See Appendix for details).

## THREE KINDS OF LOANS

Much of the power of PROPERTY ANALYZER comes from its ability to accommodate loans defined in three different ways:

1. A loan--referred to as LOAN 1--, of unspecified amount defined by its rate and amortized term. As you solve for other variables, the program automatically calculates the loan amount needed to meet the various requirements.

> Ex.: A 30 year amortized loan at $9 \%$ interest.
2. A loan defined as a given percentage of the selling price and by its rate and amortized term. It is referred to as LOAN 2.

$$
\begin{array}{ll}
\text { Ex.: } & \text { A loan at } 12 \% \text { interest, } \\
\text { amortized in } 15 \text { years, } \\
& \text { in the amount of } 10 \% \text { of the } \\
& \text { purchase price ( } 10 \% \text { loan-to-value). }
\end{array}
$$

3. An EXISTING LOAN defined by its current balance and the total payments due each year (annual debt service). This can be the balance of a loan that is being assumed, or the maximum new loan a lender agrees to make based on a Debt Coverage Ratio formula, or any loan or combination of loans that can be defined by the amount of the indebtedness and the total annual debt service.

$$
\begin{array}{ll}
\text { Ex.: } & \text { A } \$ 500,000 \text { loan with } \\
\text { annual debt service of } \$ 55,000 \text {. }
\end{array}
$$

To specify an INTEREST-ONLY loan for loans 1 and 2, key in a very long term, such as 999 years.

In practice, there should always be a loan 1. See later for details.

## PROGRAM LABELS

| PRICE | DNP\% | \$DNP | COC\% | ? LN 1 | MORE |
| :---: | :---: | :---: | :---: | :---: | :---: |
| N1 | 1\%1 | LTV2 | N2 | 1\%2 | MORE |
| EXLN | EX/DS | NOI\&TX | RETX\% | ?RETX | MORE |
| ?DS1 | ?LN2 | ?DS2 | ? DNP | ? CFBT | MORE |
| ?NOI | ?CAP |  |  |  | MORE |

MAJOR LABELS:
(Shaded above)
Everyone is familiar with the five Time Value of Money keys of financial calculators: N i PV PMT FV. If we key data into four of the variables, we can solve for the fifth.

The same kind of logic applies to the thirteen major labels of PROPERTY ANALYZER. We can key data in for twelve and solve for the thirteenth variable.

If the question makes sense, we can solve for the price, for the down payment, for the cash-on-cash return, for any one of the seven variables related to the loans--such as the amount, loan-to-value, rate or debt service, or the required Net Operating Income.

The ability to solve for any one of these variables provides exceptional assistance in the decison-making process that accompanies pricing or packaging a property for sale, preparing an offer, or negotiating an acceptable compromise between parties in a transaction.

SUBSIDIARY LABELS: (They all begin with "?")
Subsidiary labels provide bonus information that is automatically calculated every time we solve for a major label.

## LABELS: SUMMARY DEFINITION

See later for detailed explanations and definitions.

On the 17BII, the name of long labels may not appear in full in the display.

## MAJOR LABELS

Key data into these major labels and solve for the missing amount. You can solve for any one of these thirteen variables.

| PRICE | Purchase PRICE of property. |  |  |
| :---: | :---: | :---: | :---: |
| DNP\% | DOWN PAYMENT RATIO |  | The amounts are cumulative. Add for total down payment. |
| \$DNP | \$ DOWN PAYMENT. |  |  |
| COC\% | CASH-ON-CASH RETURN. |  |  |
| N1 | LOAN 1 | Amortized TERM (in years). |  |
| I\% 1 |  | Annual INTEREST RATE. |  |
| LTV2 | LOAN 2 | LOAN-TO-VALUE. |  |
| N2 |  | Amortized TERM (in years). |  |
| I\%2 |  | Annual INTEREST RATE. |  |
| EXLN | EXISTING LOAN | AMOUNT of known loan. |  |
| EX/DS |  | DEBT | VICE on EXLN. |
| NOI\&TX | NET OPERATING INCOME (Plus RE TAX). |  |  |
| RETX\% | REAL ESTATE TAX RATE. |  |  |

## SUBSIDIARY LABELS.

All subsidiary labels except for the last (?CAP) represent dollar amounts, often the dollar amount corresponding to a rate or ratio keyed into a major label.

Subsidiary labels provide bonus information. Their value is automatically calculated whenever you solve for a major label.

So you cannot key data into subsidiary labels or directly solve for their value.

You may recall them (Ex.: RCL ?LN1) or you may send the whole list to the printer: (GOLD PRINTER LIST).

Subsidiary labels begin with a question mark (?).

| ?LN1 | Amount of LOAN 1. |
| :--- | :--- |
| ?RETX | Amount of Real Estate Tax. |
| ?DS1 | Annual DEBT SERVICE for LOAN 1. |
| ?LN2 | Amount of LOAN 2. |
| ?DS2 | Annual DEBT SERVICE for LOAN 2. |
| ?DNP | Total dollar amount of DOWN PAYMENT. |
| ?CFBT | CASH FLOW BEFORE TAX (Net spendable). |
| ?NOI | NET OPERATING INCOME. |
| ?CAP | CAP. RATE (NOI as percentage of PRICE). |

## REMINDER

- Never key data into subsidiary labels.
- Never press a subsidiary label to solve for its value.


## MAJOR LABELS DEFINED

## PRICE PURCHASE PRICE of the property.

DNP\% DOWN PAYMENT RATIO

Contribution to down payment expressed as a percentage of price, such as 20 for a $20 \%$ down payment.

## \$DNP DOLLAR AMOUNT OF THE DOWN PAYMENT

The total down payment is the sum of the amounts specified by DNP\% and \$DNP. A subsidiary label (?DNP) automatically provides that total dollar amount.

If one of these two labels is left blank, then the other represents THE down payment. But we may use both, and impose a down payment contribution of $20 \%$ of the purchase price plus $\$ 15,000$, or we may solve for the dollar amount that needs to be added to a $20 \%$ down payment in order to meet various requirements.

## COC\% CASH-ON-CASH RETURN

The cash return before income tax expressed as a percentage of the down payment.

A 5\% cash-on-cash return means that a property purchased with a $\$ 100,000$ down payment should return $\$ 5,000$ the first year after expenses and debt service. A negative 5\% cash-on-cash return means that the buyer could expect to have to invest an additional $\$ 5,000$ to keep the loans current and the bills paid.

The dollar value corresponding to $\mathrm{COC} \%$ is given by the ?CFBT label: Cash Flow Before Tax or Net Spendable.

## N1 I\%1 TERM and RATE for LOAN 1

The Number of years and the annual rate.
The TERM (N1) is the AMORTIZED TERM (or 999 years for an interest-only loan). If the loan is "amortized over 30 years, due in 5 years" the value for N 1 is 30 , not 5 . The program is not concerned with when a loan needs to be paid back, only with the contribution that the loan makes to the purchasing of the property and with the drain on income that the payments represent.

LOAN 1 is essential. There should always be data for loan 1 even if a loan could also be classified in another of the loan categories.

LTV2 LOAN TO VALUE (LTV) ratio for LOAN 2
This is the amount of loan 2 expressed as a percentage of Price: 10 or 80 for a $10 \%$ loan or an $80 \%$ loan.

## N2 I\%2 TERM and RATE for LOAN 2

The 1 and 2 in loan 1 and loan 2 do not mean the legal order of subordination. It is just a way of identifying these loans and specifying that, if only one of these loans is needed, it should be loan 1.

The program assumes that loans 1 and 2 are loans requiring monthly payments, even though term and rate are keyed in as annual numbers.

## EXLN

Any loan amount defined by its dollar value.
This can be any indebtedness for which the dollar amount is a given, such as the balance of an old loan that is being assumed by the new buyer, or a new loan made available by a new lender.

## EX/DS <br> ANNUAL DEBT SERVICE on EXISTING LOAN

Of course, nothing prevents the user from using EXLN and EX/DS to key in the sum of two or more loans and their total annual debt service.
(Major Labels Defined continued on next page)

## RETX\% REAL ESTATE TAX RATE.

Property taxes as a percentage of the purchase price.
If real estate taxes are not affected by the sale of the property, RETX\% should be zero. NOI\&TX then represents NET OPERATING INCOME (NOI).

But there are states--California included-- where the amount of the property tax is significantly affected by the new purchase price. So until the purchase price is known, there is no way of establishing Operating Expenses or Net Operating Income (NOI).

NOI\&TX solves the problem. It is a value equal to NOI before the sale of the property PLUS real estate taxes before the sale. It is also equal to NOI after the sale plus the real estate taxes as assessed after the sale.

The following is true both before and after the sale despite the changing Real Estate Tax and the change in NOI that results:

GROSS INCOME<br>- OPERATING EXPENSES excluding R.E. TAX.<br>= NOI\&TX<br>- REAL ESTATE TAX<br>= NET OPERATING INCOME

When we solve for the price or key it in as data, then property taxes are automatically calculated using the Real Estate Tax Rate (RETX\%). The new NOI is given by subsidiary label ?NOI.

## SUBSIDIARY LABELS DEFINED

Subsidiary labels automatically provide bonus information every time we solve for one of the major labels.

## ?LN1

?RETX REAL ESTATE (PROPERTY) TAX
?DS1 ANNUAL DEBT SERVICE for LOAN 1
?LN2 Amount of LOAN 2
?DS2 ANNUAL DEBT SERVICE for LOAN 2
?DNP Amount of the DOWN PAYMENT
?CFBT CASH FLOW BEFORE TAX

This is the dollar value of the Cash-On-Cash return.
?NOI NET OPERATING INCOME after purchase.
If a tax rate was keyed in, this is NOI\&TX minus the new property taxes.

## ?CAP <br> CAP RATE

Net Operating Expense (NOI) after the sale expressed as a percentage of the purchase price.

## EXAMPLES

## SAMPLE DATA

In the following examples, we are going to use the same set of data except for the particular twist that each problem illustrates.

So, for instance, NOI\&TX, as previously defined, is always going to be $\$ 123,000$ and the down payment ratio always $20 \%$.

This does not make for very imaginative problems, but should make it much easier for the reader to focus on what is relevant to each problem.

Unless otherwise specified, we will use the following values:

| Down payment: | 20\% |
| :---: | :---: |
| Cash-on-cash return: | 5\% |
| Loan 1: TERM: | 30 years. |
| RATE: | 9\% |
| Loan 2: Loan-to-Value: | 10\% |
| TERM: | 15 years. |
| RATE: | 12\% |
| Known loan: AMOUNT: | \$500,000.00 |
| DEBT SERVICE: | \$55,000.00 |
| NOI or NOI + RE Tax: | \$123,000.00 |
| Property Tax rate as \% of Price: | 1.25\% |

## WITH ALL THREE LOANS ON THE PROPERTY

What is the price if all of the conditions specified above are to be met?

1 Key in the DATA and move back to the top menu level of the program.
2 Press PRICE to calculate the price.
We assume the following:

- The program is activated, ready to be used.
- The top menu level of the program is showing in the display.

| GOLD CLEAR-DATA |  |
| :---: | :---: |
| 20 | DNP\% |
| 5 | COC\% |
|  | MORE |
| 30 | N1 |
| 9 | I\% 1 |
| 10 | LTV2 |
| 15 | N2 |
| 12 | I\%2 |
|  | MORE |
| 500000 | EXLN |
| 55000 | EX/DS |
| 123000 | NOI\&TX |
| 1.25 | RETX\% |
| MORE | MORE MORE |
|  | PRICE |

PRICE $=1,112,805.10$

It makes sense to key in values in order, but this is not a requirement of the program. To correct a value keyed in by mistake, just overwrite with the correct data.

## recalling or Sending Variables to the PRINTER

In the process of calculating the price, a number of other values have been calculated. We may recall them individually. For instance, we should make a point of always recalling the amount of loan 1 (?LN1) as that important amount was not keyed in and should not be allowed to be negative:

$$
\text { RCL ?LN1 } \quad \text { ?LN } 1=278,963.57
$$

Or we may sent the whole list of variables to the printer. This provides us with all the subsidiary values, and also allows us to verify that the data we keyed in is indeed what we intended:

## GOLD PRINTER LIST



Note the wealth of information that has already been calculated, including the down payment of $\$ 222,561.02$, the annual debt service on loans 1 and 2, the NOI of $\$ 109,089.94$ as adjusted for the new real estate taxes of $\$ 13,910.06$, the cash flow before tax (net spendable) of $\$ 11,128.05$, and the cap rate of $9.80 \%$.

## CHECKING THE ANSWERS

To build confidence in the program and check your understanding of what the program does, it might be advisable on occasion to check that the requirements are met.

- The price, as can be expected, is the sum of the three loans plus the down payment.
- NOI is equal to the debt service on the three loans plus Cash Flow Before Tax.
- If we add real estate taxes to the NOI, we get $\$ 123,000$.
- The down payment is $20 \%$ of the price.
- ?CFBT is $5 \%$ of the down payment.
- Property taxes are $1.25 \%$ of the price.
- The Cap rate is indeed NOI expressed as a percentage of price.
- Loan 2 is $10 \%$ of the price.
- Debt service on loans 1 and 2 can be checked using the TVM functions of the calculator.


## "WHAT IF?"

We may normally expect to use the power of PROPERTY ANALYZER to answer a variety of WHAT IF questions, either from the point of view of the seller trying to package the offering and preparing the APOD form, or of a buyer seeking to achieve his/her own objectives while still making an offer that the seller will accept.

With the previous data still in the calculator, we may change any one of the major variables and recalculate the price. For instance:

What price if I am satisfied with a break-even cash-on-cash return?


What price if the buyer insists on a 5\% cash-on-cash return but has $\$ 250,000$ for the down payment?


Note that we had to key back in the $5 \% \mathrm{COC} \%$ requirement, eliminate the $20 \%$ down payment requirement, and of course key in the new requirement of a $\$ 250,000$ down payment.

We may also impose a price and solve for any one of the other major variables.

For instance: let's keep the cash-on-cash requirement and down payment amount as currently keyed in and let's ask ourselves from the seller's point of view:

If we make the second loan interest-only, what should be the rate on that loan to allow for a price of $\$ 1,200,000$ ?

| 1200000 | PRICE |
| :--- | :--- |
|  | MORE |
| 999 | N2 |
|  | I\%2 |

$\mathrm{I} \% 2=7.20$

Note the 999 year term: it is long enough to result in an interest-only loan for practical purposes, and short enough not to impose undue demands on the calculation.

We reject the rate of $7.2 \%$ as too low and decide on $8.5 \%$ instead. What cash-on-cash return do we now get if we keep the purchase price at $\$ 1,200,000$ as currently keyed in.....and required by the seller?

| 8.5 | I $\% 2$ |
| :--- | :--- |
| MORE MORE MORE MORE |  |
|  | COC\% |

COC\% $=4.37$

As we try out various combinations, variables that have been changed or recalculated retain their latest value unless changed back to the earlier value.

## IMPOSSIBLE REQUIREMENTS

Sometimes, a useful piece of information consists in learning that a set of requirements is impossible to meet. The seller cannot get his price, the buyer cannot get his net spendable: the requirements--whatever they are-just do not make sense.

How does PROPERTY ANALYZER advise us of the circumstance?

- It may resort to unrealistic assumptions, in particular a negative amount for loan 1.
- It may request that we key in initial guesses for the value being sought, and as we do so, no reasonable guess leads to a solution.
- It may show the impossibility of finding a correct solution by providing two values in the display, labelled LEFT and RIGHT, none of which are satisfactory.

Let's consider these responses separately.

## UNREALISTIC ASSUMPTIONS

A negative answer is perfectly valid when we solve for the cash-on-cash return. Buyers invest their down payment despite the expectation of a negative return--at least initially. But lenders know better: they do not invest if the promised rate of interest is negative. I know that, lenders know that, but the program doesn't.

The same may happen with the dollar amount of Loan 1 . If we make requirements that cannot be met, the calculator may be tempted to find a mathematical solution by creating a negative value for loan 1 . Under these circumstances, the program should normally refuse to give an answer. But circumstances may still occur where the program resorts to a negative Loan 1. When this occurs, the answer given is not valid.

So a negative interest rate or a negative amount for Loan 1 are not acceptable. We should particularly watch out for a negative Loan 1 as we do not see the amount unless we specifically recall the label. To make it easy to recall Loan 1 its label (?LN1) is singled out as the only subsidiary label on the top level of the label menu.

## MAKE OTHER GUESSES

The power of HP SOLVE comes from its ability to find a solution even when no direct equation is able to solve the problem.

When there is no direct formula, HP SOLVE resorts to a trial and error procedure. It works like a pond sloshing around after a big rock is dropped in: various parts move up and down until gradually a level of equilibrium is established for all areas of the water.

As the calculator resorts to this sophisticated trial and error procedure, some of the guesses are visible in the display. The upper and lower values of these guesses should converge into the answer.

When the initial guesses provided by the calculator do not lead to an answer, the calculator lets you know that it started with BAD GUESSES. This is an invitation to provide other initial guesses. You should key into the label your best approximation of what the answer is likely to be. Then you press the label again to solve for an answer.

Even better: you may provide two guesses that bracket the likely answer. For instance, if you know that the down payment ratio you are looking for is higher than $20 \%$, you may key in $20 \%$ and $100 \%$ as your guesses:

| 20 | DNP\% |
| :--- | :--- |
| 100 | DNP\% |
|  | DNP\% |

If no likely guesses keyed in by you lead to a solution, you should assume that there is no satisfactory solution.

You might also key in a guess and try again "just in case" any time the calculator is unable to find a satisfactory answer.

Even when you are not required to key in initial guesses doing so is an excellent way of speeding up the solving process.

## LEFT AND RIGHT ANSWERS

When no answers is found, the calculator may also provide two answers, labeled LEFT and RIGHT. On the HP 19BII it may even provide an answer but display two LEFT and RIGHT alternatives for some of the data. This is the calculator's way of letting us know that it was swaying between alternatives but that none are satisfactory. If the beeper is ON, it beeps as it gives up trying.

Sample display: LEFT :1,350,000.00000
RIGHT:1,299,081.34059
DNP\% = 52.96
The $52.96 \%$ answer should be discarded.
(HP 17BII would show only the top two lines with the bottom line displayed when you press CLEAR (CLR, the ON key).

LEFT and RIGHT answers mean that a satisfactory solution has not been found and that it is unlikely that there is one. It might be wise, however, to clear the data (GOLD CLEAR DATA), start keying in the data again from scratch, and provide a good initial set of guesses before giving up on the quest.

## "SOLUTION NOT FOUND"

You may get this answer when you press a subsidiary label as a question or when you have insufficient data for the program to even begin looking for a solution.

## SAMPLE IMPOSSIBLE PROBLEM

To test a problem that has no solution, go back to the list of initial data and modify it as follows: impose a price of $\$ 1,350,000$ and attempt to solve for the down payment ratio (DNP\%).

## AMBIGUOUS DATA

There are a few circumstances were any value provides a mathematically correct answer.

For instance, with neutral leverage (Cap. rate, cash-on-cash return, and loan constant on the financing are all equal), any down payment ratio meets the various requirements. If we solve for the down payment ratio, the calculator may find that the value already in the label--data left over from a previous question or imposed by initial guesses--provides a perfectly satisfactory answer and returns that value. Or it may be satisfied with the first answer provided by its own internal trial and error procedure. Of course, none of these answers are the only possible answers.

The best way to spot such circumstances is to notice that variables do not change when changing requirements would lead us to expect a change. An example:

> A million dollar property with a Net Operating Income of $\$ 90,000.00$ is purchased with an interest-only loan at $9 \%$ interest. What down payment (as a percentage or as a dollar amount) will allow the buyer to get a $9 \%$ cashon-cash return?

## LOAN COMBINATIONS

PROPERTY ANALYZER allows you to select from loans defined in a variety of ways. All combinations that include data for LOAN 1 are perfectly acceptable.

Let's provide the following practice problems:
> - A property is purchased with a $\$ 300,000$ down payment and a single loan at $10 \%$ interest amortized over 30 years.
> Find the price that meets the other requirements (COC\% $=5 \%$, NOI\&TX $=123,000 ; T A X \%=1.25 \%$ ).

NOTE: Here, on first solving for PRICE, the calculator informs you that it made "BAD GUESSES" and cannot go on without your assistance. This is an invitation for you to provide better initial guesses than the ones provided by the calculator. You should key in a guess, or better still a pair of guesses that bracket the answer. For instance, on the assumption that, if there is a price that meets the requirements, it must be somewhere between $\$ 10.00$ and $\$ 10,000,000.00$, key in:

| 10 | PRICE |
| :--- | :--- |
| 10000000 | PRICE |
|  | PRICE |

PRICE $=1,184,910.02$

- Same requirements as above, but now, as part of the financing, the buyer decides to assume a $\$ 500,000$ loan with annual debt service of $\$ 55,000$. What is the price?
(Answer: PRICE $=1,164,998.86$ )
- A property is purchased for $\$ 3,000,000$ with a $\$ 400,000$ down payment and two loans: a $10 \%$ seller carryback interest-only loan at $8 \%$ interest and a first loan at $10 \%$ interest, 30 years. The NOI is $\$ 295,000$ based on the new known purchase price. What is the cash-on-cash return and the net spendable (?CFBT)? (Answers: COC\% $=7.20 \%$ or $\$ 28,790.25$ net spendable).
- Same property. What is the cash-on-cash return if it is purchased with a $50 \%$ down payment? (Answer: 9.64\%)
- Let's go back to our initial data, except that we drop the existing \$500,000 loan. We have a $20 \%$ down payment and two loans only: one is $10 \%$ of the unknown price and the other one can only represent the rest of the purchase price, or $70 \%$ of the price. We want to calculate the price.

So we know the loan-to-value ratio for the two loans. One must be keyed in as loan 1, the other as loan 2. Which is which is irrelevant. Let's key the $10 \%$ loan-to-value loan as loan 1 :


PRICE $=1,177,142.57$

We may verify that loan 1 (?LN1) is indeed $10 \%$ of PRICE.
Similarly, if a property is purchased with a $20 \%$ down payment and an $80 \%$ loan, we just ignore the $80 \%$ and key the only loan in as loan 1. It automatically fills in the $80 \%$ space not taken up by the down payment.

## THE NEED FOR LOAN 1

Loan 1 is the only loan not in some way defined in its amount. It is the only one of the three categories of loans that is allowed to shrink or expand to meet the various requirements.

Let's take an extreme example of data that does not include loan 1 data:

> What is the price if I purchase an income property with a $\$ 500,000$ loan and a $\$ 250,000$ down payment?

The answer is obviously $\$ 750,000$.
We are able to find the answer with no concern for the cash-on-cash return, the NOI, or even the debt service on the $\$ 500,000$ loan. So these numbers are irrelevant and unrelated to the price.

Imposing any value for these variables would still lead to a $\$ 750,000$ price. So we cannot say: what is the price that results in a $5 \%$ cash-oncash return?

The same occurs whenever there is no data for loan 1. For instance:

> What is the price, if I purchase an income property with a $20 \%$ down payment, a $\$ 700,000$ assumable loan, and a $10 \%$ LTV second mortgage?

The $\$ 700,000$ loan fills in the gap left by the $20 \%$ down payment and the $10 \%$ second mortgage. So it must be for $70 \%$ of the value of the property. If the $\$ 700,000$ loan represents $70 \%$ of the price, the price must be $\$ 1,000,000$. Any additional criteria for the cash-on-cash return, term, rate, or debt service, or even for the NOI, become irrelevant!

Keying them in is the mathematical equivalent of asking "Who is buried in Grant's tomb?" while at the same time giving characteristics that do not belong to Grant.

## NEGATIVE PRICE

It is possible to ask PROPERTY ANALYZER to solve for PRICE (and only PRICE) without having data for Loan 1. Faced with the problems on the previous page, the program answers "Grant" and gives $\$ 1,000,000$ or $\$ 750,000$ as answers.

But there is a problem with such answers. The user may not realize that other requirements that may have been keyed in--cash-on-cash return, rate and term of the loans, debt service on the existing loan, NOI--were not and could not be taken into account. To draw the user's attention to this fact, the program is instructed to give the price as a NEGATIVE AMOUNT.

Without data for loan 1, both reality and the program make it possible to establish a price without any consideration for most of the variables.

But the program requires data for loan 1 to allow the various parts to connect. So if we know the price, or once we know the price, and we want to calculate one of the other variables, then we can and we must key one of the loans in as loan 1.

That is not a major obstacle, as once we know the price, any loan can be keyed in as loan 1. Squeezed between the down payment and the rest of the financing, it will automatically assume the correct value.

We saw an example of this when we considered the situation of a $20 \%$ down payment, a $10 \%$ second mortgage and a $70 \%$ first loan, where one of the two loans was keyed in as loan 1 and automatically assumed the loan-to-value required to fill the gap left open by the down payment and the other loan.

## "EXISTING" LOAN KEYED IN AS LOAN 1

It is even possible to key in an "EXISTING" loan as loan 1. If we do not know the actual rate and term we just key the loan in as if it was an interest-only loan.

To find the fictitious interest-only rate on our \$500,000 loan with an annual debt service of $\$ 55,000$, we divide the annual debt service by the loan amount and multiply by 100 :

$$
(55,000 \div 500,000) \times 100=11.00
$$

So let's solve the following problem:

> What is the cash-on-cash return if a property is purchased with a $\$ 500,000$ loan (debt service of $\$ 55,000$ ) and a $\$ 600,000$ down payment? (Total purchase price is obviously $\$ 1,100,000$ ). The NOI plus the current RE tax is $\$ 123,000$. Tax rate is $1.25 \%$.

Instead of keying in a $\$ 500,000$ loan with a $\$ 55,000$ debt service, we key the loan in as loan 1 , an interest-only loan (999 year term) at $11 \%$ :

| GOLD CLEAR DATA |  |
| :--- | :--- |
|  |  |
| 1100000 | PRICE |
| 600000 | \$DNP |
| 999 | N1 |
| 11 | I\% |
| 123000 | NOI\&TX |
| $1.25 \%$ | RETX\% |
| MORE MORE MORE |  |
|  | COC\% |
| GOLD |  |

## PRINTOUT



We find that ?LN1 and ?DS1 are indeed equal to $\$ 500,000.00$ and $\$ 55,000.00$.

## PRICE AND DOWN PAYMENT ARE UNKNOWN

An income property is financed with two loans: a \$500,000 loan with annual debt service of \$55,000 and a $10 \%$ carry-back loan at $12 \%$ interest, amortized over 15 years.

Find the purchase price and the amount of the down payment such that our other requirements are met.

Here, both the purchase price and the down payment ratio are unknown. In effect, the down payment is required to bear the burden of adjusting in relative size such that all the other requirements are met. This was previously the role played by Loan 1.

An interest-only loan at 5\% interest makes exactly the same demands on the investment as a down payment with a $5 \%$ cash-on-cash return requirement. So let's key the down payment in as Loan 1 data!

| GOLD | CLEAR DATA |
| :--- | :---: |
|  | MORE |
| 999 | N1 |
| 5 | I\%1 |
| 10 | LTV2 |
| 15 | N2 |
| 12 | I\%2 |
| 500000 | EXLN |
| 55000 | EX/DS |
| 123000 | NOI\&TX |
| 1.25 | RETX\% |
|  | PRICE |
| GOLD | PRINTER LIST |

This is really down payment data.

PRICE $=\$ 1,293,426.86$

## PRINTOUT



The down payment is listed as ?LN1 ( $\$ 664,084.18$ ), Cash-Flow-Before-Tax as ?DS1 (\$33,204.21).

Beyond the strict definition of the labels there is a mathematical reality that can be exploited creatively. This is what we have done here when faced with the apparent impossibility of solving for two unknown variables: price and down payment.

## WRAPAROUND LOAN

A wraparound or All-Inclusive-Trust-Deed (AITD) loan can be handled like any other loan.

But it is also possible, to some extent, to consider the underlying loan and the AITD equity as two separate loans with separate requirements. Let's give an example.

> A property is purchased with a $20 \%$ down payment and a wraparound loan created around an existing $\$ 500,000$ loan balance (debt service of $\$ 55,000$ ). The new lender wants $12 \%$ on his AITD equity. What is the price that meets the various other requirements?

Here, we have some ambiguity. The AITD equity is not an independent loan with an amortized term of its own. It is the difference between two loans that probably have different remaining terms and due dates. These considerations affect the yield on the AITD equity and are not part of the data. So let's just say that the AITD lender wants a $12 \%$ cash return each year on his equity, a "loan constant" of $12 \%$, independently of what the yield might ultimately be.

We key in the equity portion of the AITD as Loan 1, interest-only, at $12 \%$ interest, and the existing loan as EXLN.


The AITD equity is ?LN1 $(\$ 364,135.02)$ which, by adding the $\$ 500,000$ EXISTING loan, means a total AITD loan of \$864,135.02

The annual debt service on the AITD loan is ?DS1 $+\$ 55,000$, or $\$ 98,696.20$. We divide by 12 to get monthly payments of $\$ 8,224.68$.

If we know that the AITD is amortized over 30 years, we have all the information we need to allow the TVM functions of the calculator to give us the rate. The answer is $10.99 \%$.

## REQUEST FOR FEEDBACK

I am interested in receiving examples of creative applications of this program not illustrated in this documentation.

I am even more interested in receiving examples--should there be any--of circumstances where the program fails to find an answer that exists, or in any other way does not perform as expected.

Along with a description of the situation submitted to the calculator, I would find it most useful to receive a PRINTOUT of the data before any calculation is made, and a printout after the creative answer, or the misleading answer, has been calculated. I want to be able to duplicate the situation with the exact numbers that were used.

The address and telephone number of the user would also be greatly appreciated.

## EDRIC CANE SEMINARS

P.O.Box 1213

La Canada, Ca, 91011
(818) 957-3026

FAX: (818) 248-8855

## APPENDIX ONE

## ACTIVATING A PROGRAM

## and

# REVIEW OF BASIC CALCULATOR KNOWLEDGE 

Using programs requires some basic knowledge of calculator procedures. The following pages make a few essential points. Consult OWNER'S MANUAL to supplement, using INDEX as needed.

Apart from the software program itself in APPENDIX TWO, all the material in APPENDIX ONE and APPENDIX TWO is generic. It applies to all programs.

This allows me to include these appendices in more than one program documentation, and, if you use these programs, it allows you to know that you won't be missing out on program specific information if you study them only once.

## APPENDIX ONE Page 2

## PROGRAM ESSENTIALS

1 KEYING IN THE PROGRAM. Programs (called EQUATIONS or SOLVE EQUATIONS by the calculator and the OWNER'S MANUAL) need to be keyed in before they can be used. This is a one time procedure after which programs can be used over and over for years. Turn to APPENDIX TWO for the program and for instructions on keying it in.

2 ACTIVATING THE PROGRAM. Existing programs (programs that have been keyed in) need to be selected and activated when you want to use them. This process brings in the display the labels created by the program.

## TO SELECT AND ACTIVATE A PROGRAM:

| Move to MAIN MENU (GOLD and EXIT key): <br> Display shows: <br> FIN BUS SUM TIME SOLVE (19B:TEXT) | GOLD MAIN |
| :--- | :--- |
| Select SOLVE soft key: <br> You are now on the SOLVE menu showing: <br> CALC EDIT DELET (17B:NEW) | SOLVE |
| Use up and down arrow keys as needed to select <br> the specific program you want to use. | 19B: $\uparrow \quad \downarrow$ <br> 17B: |
| Press CALC soft key to activate the program: <br> The display shows: "VERIFYING EQUATION" <br> as the program is loaded into active memory. <br> Then, program labels appear in the display. <br> You are ready to use the program. | CALC |

3 PROGRAMS SHARE LABELS. If two different programs have labels with the same name, the corresponding memories are shared by the two programs. As you activate the second program you may find the shared label still retains data left over from the last time you used the first program. To avoid interference, it is wise to clear program memories on a newly activated program by pressing GOLD CLEAR DATA.

## MEMORY

With programs in the calculator, you do not want to erase continuous memory. See OWNER'S MANUAL (Index: MEMORY and MEMORY LOST) for details on changing batteries without losing continuous memory and other precautions.

## INSUFFICIENT MEMORY

If you get this message, you need to make more memory space by clearing data that you no longer need. A few pointers:

- Press GOLD MEM to check memory allocation.
- Clear lists and numbers from built-in functions by selecting the list or the function menu and pressing GOLD CLEAR DATA.
- On the HP 19BII, if you are going to use programs extensively, do not use the calculator for long lists of telephone numbers or addresses. These have a way of growing and using up precious memory space. (If you decide to clear a list, you might want to sort it and send it to the printer before you clear it).
- Program variables are the memories or boxes corresponding to each label into which the value given to the label can be stored. Variables use up memory space even if cleared of data and even if the program is not in use. Clearing variables on programs is a most efficient memory saving procedure. Think of this clearing process as deflating a kayak before storing it for the winter. The boxes are recreated as needed as each program is reactivate.
- To clear the variables on ALL your programs:

| Go to the MAIN MENU: | GOLD MAIN |
| :--- | :--- |
| Select SOLVE option: | SOLVE |
| Press GOLD CLEAR DATA and follow <br> prompts carefully. You want to delete the <br> variables (19B: VARS), NOT the equations! | GOLD <br> CLEAR DATA |
| 17BII: (See details below) | YES NO |
| 19BII: (See details below) | VARS |

## ON THE HP 17BII:

In response to the prompt: "DELETE ALL VARIABLES?", I like to press YES NO in rapid succession. The NO is then interpreted by the calculator as the answer to the next prompt: "DELETE ALL EQUATIONS?" This eliminates the possibility of answering YES to this second question, which would result in erasing all the programs.

I also avoid using the DELET label on the SOLVE menu which prompts: "DELETE THE VARIABLES?" and "DELETE THE EQUATION?" but asks the second question first if there are no variables to delete. This change in the order of the prompts on the HP 17BII is an invitation to press YES by mistake and erase that program.

## ON THE HP 19BII:

I clear all the variables on all the programs by pressing GOLD CLEAR DATA VARS as indicated above. My finger stays on keys in the left hand column of the calculator and there is little danger of pressing "BOTH" by mistake in response to the prompt: "DELETE ALL VARS, OR BOTH VARS \& EQUATIONS?"

With the HP 19BII, I also always clear variables as above on existing programs before keying in a new program or pressing EDIT to change an existing program, as it is not possible to exit out of edit mode if there is not enough memory to activate a program.

## LABELS

When activated, the program creates labels in the display. Like built-in labels, each program label gives its meaning to the soft (blank) key immediately below the label. These labels correspond to the variables used by the program. They prompt you as you key in data, solve for an answer, or recall the value given to the variable. For instance:

KEYING IN DATA: Let's imagine there is a DNP\% label standing for the down payment ratio. To key in a $20 \%$ down payment, key in 20 and press the soft (blank) key immediately below the display label DNP\%:

## 20 DNP\%

This puts 20 in the memory called DNP\%. Think of that memory as a box in which you now have the number 20 . To change the number in that box, just key in another value. It automatically replaces 20 .

SOLVING FOR AN ANSWER (ASKING A QUESTION): Just pressing the soft key corresponding to a label calculates its value:

## DNP\%

The program calculates the value that needs to be in the DNP\% box in order to make sense of other requirements. The display shows the answer and identifies it as being the value given to DNP\%: "DNP\% = 37.09"

RECALLING DATA: To check the value given to a label--without changing it--, recall it. It duplicates its value in the display:

## RCL DNP\%

You may also send the whole list of labels to the printer by pressing:
GOLD PRINTER LIST

## DATA and QUESTION

The basic logic of using a program consists in:

- Keying in the
- Asking the
- The calculator provides one or more

DATA
QUESTION
ANSWERS

Because of the specific objectives of each program, not all labels in a program are designed for the three purposes of keying in DATA, answering a QUESTION, and RECALLING values. Some may be used for only one or two of these purposes. Understanding which labels are designed for what purpose goes to the very "philosophy" of each program and is a key to using it efficiently.

Let's consider my four current investment real estate analysis programs.
PRICE/RATIO has six labels, and all six are "data and question" labels.
INCOME PROJECTION is at the other extreme. It has 31 labels and only one can be used to question for answers: the very first one, ?CFAT. Some of the other labels are used exclusiveley to key in data and others only to recall answers. Every time the "question label" is pressed, up to 21 different values are automatically calculated or updated to reflect values for the next year of the projection. So pressing the "question label" five times updates 21 different numbers for the first five years of the projection. To help identify which labels do what, all the labels that can be used only to retrieve answers begin with a question mark.

CAP/CASH-ON-CASH has five top row labels that are "data and question" keys. We can key data into four of the labels and calculate the fifth. They represent the heart of the program. If we choose to use the lower levels of program labels, we use two "data only" labels and six "recall only" labels.

PROPERTY ANALYZER has 13 "data and question" labels. With appropriate data in up to 12 of these labels, we may calculate the value for the one that was left out. 8 more labels are "recall only" labels--also identified by a question mark. Their value is automatically calculated when we solve for one of the thirteen initial labels.

## CALCULATOR FUNCTIONS AND SETTIINGS

- All BUILT-IN CALCULATOR FUNCTIONS remain operational along with program functions.
- Check the choice between ALGEBRAIC and RPN logic for arithmetic operations (RPN is the very convenient approach used by the HP 12C, algebraic is the normal approach used by most calculators). Use GOLD MODES or GOLD MODES MORE for making this choice.
- DISPLAY FORMAT. Because the programs use the decimal point you must select the decimal point (not the comma) to separate whole numbers from decimals (DSP or DISP, then the decimal point label). As this is a financial calculator, you probably want to select two decimals (DSP or DISP, then FIX 2 INPUT). The display format that you select does not affect internal calculations: even invisible decimals are used in the calculations.
- Check the OWNER'S MANUAL for the various CLEARING OPTIONS that you have. GOLD CLEAR DATA clears all the labels in the currently active program or built-in menu. It does not clear register memories.
- With the long lists of variables used by some programs, the INFRARED PRINTER becomes an extremely useful tool. There are two essential settings used in connection with the printer. You should tell the calculator if the printer is using the AC adapter or is working on batteries only. You can also instruct the printer to print on single lines or to use double space. Use GOLD MODES or GOLD PRINTER for these settings.


## THE CALCULATOR LINE

- The display line just above the labels is the calculator line. Whether labels are built-in calculator labels or program labels, numbers on the calculator line can be stored or recalled from register memories and arithmetic can be performed on them.


## YOU DO NOT NEED TO LEAVE AN ACTIVE PROGRAM TO USE THE CALCULATOR FOR ARITHMETIC CALCULATIONS.

- Numbers remain on the calculator line as you switch from one menu to another or from one menu level to another. (On the HP 17BII, you may need to press CLR (Clear, the ON key) if the number is hidden by a display prompt).
- In particular, if you key in a number and realize that you are on the wrong menu level, the number remains in the calculator line as you move to the correct menu level.
- If you recall data from a label, or allow the calculator to solve for that value, and you then want to transfer that amount to another label, you must press STO (store) or INPUT before you press that second label. Otherwise, the calculator thinks that you want to solve for that value instead of keying in new data.


## APPENDIX TWO

## KEYING IN THE PROGRAM

Keying in a program is a one time occurrence. It may take you as little as 15 or 20 minutes or as long as one hour or more, depending on the calculator, the operator, and whether you make mistakes or not.

Once keyed in, the program can be used over and over for years.

We call PROGRAM what HP in its documentation, and the calculator in the display, call EQUATION or SOLVE EQUATION. Everything that the calculator manual says about HP SOLVE and EQUATIONS applies to keying in and using this program.

Please note that program and documentation are copyrighted and cannot legally be used without purchasing the documentation/right to use. The author has put a considerable amount of time and work in writing these programs and the documentation. He hopes and trusts that fellow professionals will respect his copyright.

APPENDIX TWO Page - 2 -

## OPTION

## KEY IN THE PROGRAM, OR HAVE EDRIC CANE SEMINARS KEY IT IN FOR YOU

Keying in a program is not difficult. But Murphy is alive and well and programs are not tolerant of mistakes or misinterpretations.

So you may want to key in the program yourself, or you may want to consider letting Edric Cane Seminars key the program in for you.

## PRELIMINARIES

Keying in a program is a one time occurrence. It needs to be done leisurely because it needs to be done right.

- Take the time to explore the calculator keyboard and basic calculator procedures and editing functions from the OWNER'S MANUAL and basic procedures in APPENDIX ONE.
- Set the display format to the decimal point (DISP or DSP key, then "." soft key). Turn the BEEP option ON (GOLD MODES).
- With the HP 19B/BII models, making ample memory space available is particularly important before keying in a program because you lose the program that you are keying in if you do not have enough space to activate it. (On 17BII models pressing INPUT retains the program as is, with no need to activate it to save it. So you can make more memory space later if needed).

My four investment real estate programs use only $32 \%$ of total memory when all four together are properly keyed in and stored, leaving ample room for activating a particular program or using other calculator applications. But activating each individual program requires extra memory space, and editing an existing program requires still more while the old and the new versions are still both in memory.

My advice for 19BII users is to always clear variables on existing programs before moving into edit mode and not to use the calculator for long lists of phone numbers or notes.

- Make sure that you do not misinterpret characters:
- The parentheses are on a key on the same line as INPUT. Do not confuse with other brackets or with " $>$ " and " < " signs.
- The digits $\varnothing, 1$ and the multiplication sign ( $x$ ) should not be confused with the letters O , I , or X .


## GETTING READY TO KEY IN THE PROGRAM

| Move to MAIN MENU | GOLD MAIN |  |
| :---: | :---: | :---: |
| In the display, you should see the labels: FIN BUS SUM TIME SOLVE |  |  |
| Press SOLVE: | SOLVE |  |
| You are on the SOLVE menu, showing: CALC EDIT DELET (17B: NEW) |  |  |
| If needed, clear variables on other programs to make memory space, and carefully respond to prompts. You want to delete the variables (19B: VARS), not both the equations and the variables: | GOLD CLEAR DATA |  |
| 17BII: | YES NO |  |
| 19BII: | VARS |  |
| Prepare to key in a new program: 17BII: | NEW |  |
| 19BII: | GOLD $\downarrow$ |  |

You are now ready to key in the program exactly as in the frames on the following pages, beginning with the first letter of the program name.

> You are provided with TWO IDENTICAL VERSIONS of the software program: one typeset and cut up in sentences for your convenience (ignore blank lines), the other as sent by the calculator to the printer.

Use keys on the face of the calculator as needed, as well as letters and characters and edit keys on the cover side of the 19BII. On the 17BII the equivalent keys are soft keys and you toggle between alphabet and edit keys by pressing ALPHA or EXIT. (With the 19BII, do not press EXIT while you are keying in a program.)

## A REMINDER

This program, in its printed form or transcribed into your calculator, or in any other form whatsoever, is copyrighted software. It cannot be duplicated in any way except by the owner of this documentation/right to use in his/her own calculator for his/her individual use.

You have purchased the right to duplicate the program in your calculator. By keying it in your calculator, or by having someone else key it for you, you are recognizing that this program and documentation was purchased for your exclusive use and that you will not allow or condone others to use it or to acquire a copy of it from your material.

For different people in the same office to use this program, each one must own his/her individual copy of the documentation/right to use.

If you do not agree with these conditions and limitations, do not key in or use this program. Instead, contact EDRIC CANE SEMINARS at (818) 957-3026.

## NOTE, PROPERTY ANALYZER PROGRAM:

Last line but one: Key in BLANK SPACE before and after AND. 19B: Use bottom left SPACE key. 17B: Press WXYZ and blank label soft key.

## THE PROGRAM

```
PROPERTY.ANALYZER/CANE:
PRICE=(DNP%+$DNP+COC%
+?LN1+N1+I%1
+LTV2+N2+I%2
+L(?LN1:PRICExL(C: (1Ø\varnothing
-DNP%-LTV2)x.Ø1)-EXLN-$DNP)) xØ
+IF(N1=Ø:(-EXLN-$DNP)
\divG(C):1ØØx(-EX/DS
+L(?NOI:NOI&TX-PRICExRETX%x.ø1)
-$DNPxCOC%x.Ø1+(EXLN+$DNP)
xL(A:12\divUSPV(I%1\div12:N1x12)))
%(DNP%xCOC%x.ø1
+G (C) xG (A) x1Ø\varnothing+LTV2
xL(B:IF(N2=\varnothing:Ø:12
\divUSPV(I%2\div12:N2x12))))
+(L (?RETX:PRICExRETX%x.Ø1)
-?RETX+L(?DS1:?LN1xG(A))
+L(?DS2:L(?LN2:PRICExLTV2x.ø1)
xG (B) ) +L(?CFBT:L(?DNP:$DNP
+PRICExDNP%x.Ø1) xCOC%x.Ø1)
+?DS1+?LN2+?DS2+?DNP+?CFBT
+L(?CAP:?NOI\divPRICEx1\varnothing\varnothing) +?CAP+1
\divIF(?LN1<Ø AND PRICE>EXLN
:Ø:1))xØ)
```

[^0]
## PRESS: CALC

After you key in the last character of the program, press soft key CALC (17BII, press INPUT then CALC) and wait as the calculator tells you that it is "VERIFYING THE EQUATION".

You should then see PROGRAM LABELS appear in the display.

## "INVALID EQUATION"

If instead you get the message: "INVALID EQUATION", and the display soon returns to some part of the program itself, you have made a mistake that needs to be corrected. Turn the page to CHECKING THE PROGRAM for details.

## "INSUFFICIENT MEMORY"

If you get the message: "INSUFFICIENT MEMORY", you need to make more memory space before you can activate the program. See APPENDIX ONE for details.

## THE PROGRAM, PRINTER VERSION

The program on the following page is exactly the same as in the frame on the previous page. It is the program on the previous page as sent to the printer by the calculator itself. Every character on both programs should be exactly the same and you can use either one to key into your calculator.

The major purpose of this second copy is to make it easier for you to double check and spot any discrepancy or misunderstanding.

## THE PROGRAM

This program is for the exclusive use of:
keyed in his/her calculator, serial number:

[^1]
## $Q$ 15

Last line but one: Key in a BLANK space before and after the word "AND". 19B: Use bottom left SPACE key. 17B: Press WXYZ and blank label soft key.

After you key in the last character, press soft key CALC and wait as the calculator "verifies the equation".

[^2]
## CHECKING THE PROGRAM.

When you press CALC (17B models: INPUT CALC) after having typed in a program, you are initiating a checking process that must be carried out, the first time around, by the calculator and by yourself. The checking process is important because you want to be able to use the program over and over again with confidence, possibly for years.

There are four stages in the checking process:
1 The calculator itself "verifies the equation".
2 You check that you have the expected labels.
3 You check that the program gives the same answers as the res of the documentation.
$4 \quad$ You check that you get the answers you expect to get with your understanding and approach to the problem.

The program may pass each check with flying colors, or you may identify a problem. If you do, you need first to locate the error and then correct it.

We will discuss each stage separately below.

Every time a program is activated (CALC), the calculator loads the program into active memory and prepares to solve the equation by arranging it for its own purposes. As it does so, the display shows "VERIFYING EQUATION..." The very first time this takes place, the calculator may not have an equation that it can understand.
(3) If the equation makes sense, the calculator responds by displaying the program labels and you move on to checking these labels.
©
If the calculator cannot understand the equation, it does three things:

- It BEEPS if the beeper is turned on (GOLD MODES BEEP).
- The display shows "INVALID EQUATION" for a few seconds.
- The calculator then goes back to the edit mode of the program, with the cursor resting on the first character that the calculator was unable to interpret in mathematical terms.

You need to identify the error and correct it by editing the program.
Where the cursor stops as the display bounces back to the edit mode is an invaluable indication of the kind of mistake that was made in keying in the program. Maybe the display stopped exactly on the character that was mistyped. You correct the mistake and press CALC again to activate the program. The mistake may also be somewhere else. For instance:

The cursor stops on a closing parenthesis.

- This may mean that you closed one parenthesis too many. Deleting the parenthesis on which the cursor stopped may solve the problem.
- Or maybe you forgot to open a parenthesis earlier on in the program. The best the calculator could do was stop on the first parenthesis that closed without ever having been opened.
- It could also mean that you forgot a colon (:) earlier in the program, and the calculator expects that colon before it allows you to close a parenthesis.


## CHECKING THE LABELS

Once the calculator has satisfactorily verified the equation, and you have the program labels in the display, the first thing you should do is count your labels. Flip through the menu levels by pressing MORE MORE MORE as needed, comparing labels to those illustrated in the documentation.

If a label occurs with two different spellings, then you have created two separate unrelated variables that will throw your calculations off. This will often (but not always) result in one label too many in the display menu. Recall the duplicate labels to find which is incorrect, note its position in relation to other labels, and edit.

## CHECKING THE ANSWERS

Now you have the correct labels in the display. You need to use them with the data provided in the documentation to test that you get the expected answers. " + " instead of "-", " < " instead of ">", a misspelled variable that did not result in an extra label, etc, etc, etc, result in valid equations that give incorrect answers. You need to be able to duplicate the answers given as illustration in the documentation.

If you do not get the same answer as the documentation, clear the data and try again with the same data. Before you start looking at the program, you want to be sure that the error is not in the data itself.

If the error is not with the data that you keyed in, it is with the program that you typed in. Before you switch into edit mode and look for the error in the program itself, send all the variables to the printer including the wrong answer, or recall the labels systematically and write them down. With most programs, an incorrect intermediate value gives a valuable indication of where in the program the error was made.

## FINAL CHECK

A final check before you can use a program with confidence, over and over, probably for years. Test it with your own problems, problems that you have solve longhand in your own way. Maybe the program makes assumptions about definitions, tax laws, or calculations that you are not aware of, that do not apply to your situation, your area of the country, your standard approach to the problem. Maybe tax laws have changed.

At the earlier stages, you should not even entertain the thought that there might be an error in the program or the documentation. But at this stage, you should consider that possibility. The program does not allow you to give up control and responsibility for the numbers that it produces.

This final check and constant critical attention given to the answers provided by the program remain your responsibility even if the program has been keyed in by Edric Cane Seminars.

Four complementary software programs by Edric CANE can change your HP 17BII or HP 19BII into an investment analysis powerhouse:

> You cannot buy, sell, or broker income properties without having at your fingertips the numbers provided by these programs.

## PROPERTY ANALYZER

PROPERTY ANALYZER gives you control over the complex relationships between price, down payment, financing terms, Net Operating Income, and Cash-On-Cash return. Calculate the price if you know the other variables. If you know the price, solve for any one of twelve variables: down payment, cash-on-cash return, rate on one of the loans, term of a loan, amount of a loan, NOI, etc.

PROPERTY ANALYZER allows you to key in up to three loans defined by a dollar amount, the loan-to-value ratio, or as an unknown amount that the program itself determines. It allows you to key in the down payment as a dollar amount or as a percentage of price. At your option, it automatically adjusts property taxes to the new purchase price.

Key data in as prompted by display labels. Press one key to solve for the unknown variable. In the process 10 other values are automatically calculated, including cash-flow-before-tax, NOI, and Cap. rate.

## CAP/CASH-ON-CASH

| DNP\% | COC\% | CAP\% | I\% | TERM |
| :---: | :---: | :---: | :---: | :---: |

CAP/CASH-ON-CASH considers the same area of information as PROPERTY ANALYZER but from a different angle. It is a shorter program that concentrates on the ratios and accommodates only one loan.

It offers five top level labels illustrated above. If you key data into four of the five labels you can solve for the fifth. It's as simple as that. It is ideal for a quick "What if?" sequence leading to an acceptable combination. Given the price or the NOI, lower level labels provide the dollar value for these ratios, as well as loan data and loan constant.

## PRICE/RATIO

| GROSS | GIM | XP/V \% | CAP | NOI | PRICE |
| :---: | :---: | :---: | :---: | :---: | :---: |

PRICE/RATIO creates six labels and provides intuitive access to all the relationships between these variables. For instance:

A property is advertised as offering a Gross Multiplier (GIM) of 7.6 and a Cap. rate of 9.4. What Expense and Vacancy ratio (XP/V\%) was used by the selling party?

| 7.6 | GIM |  |
| :--- | :--- | :--- |
| 9.4 | CAP | XP/V $\%$ |

How much should you pay for a property with a gross income of $\$ 159,000$ if you apply a $35 \%$ ratio for Expense and Vacancy and you want a $9.25 \%$ Cap. rate?

| 159000 | GROSS |  |
| :--- | :--- | :--- |
| 35 | XP/V\% |  |
| 9.25 | CAP | PRICE $\quad$ PRICE $=1,289,189.19$ |

## INCOME PROJECTION

It puts a specialized spreadsheet in your calculator.
Key in data as prompted by display labels and at the press of a single key the program calculates and updates 20 variables: gross rental income, operating expenses, before and after tax cash flow, balance on the loans, interest for the year, cost recovery, tax liability, etc. Press that same key again and all the values are updated for each successive year. You may recall these values or send them all to the HP infrared printer.

INCOME PROJECTION is so flexible that it even accommodates adjustable rate loans, automatically recalculating the loan payments based on the remaining balance and remaining term when the rate is changed.

It provides an ideal way to fill in CASH FLOW ANALYSIS forms or to get the bottom line fast on various projection scenarios.

## PRODUCTS AND SERVICES

| PRICE/RATIO | $\$ 34.50$ |
| :--- | :--- |
| PROPERTY ANALYZER | $\$ 34.50$ |
| INCOME PROJECTION | $\$ 25.00$ |
| CAP/CASH-ON-CASH | $\$ 25.00$ |
| ALL FOUR PROGRAMS: | 119.00 |
|  |  |
| Keying in single program: | $\$ 20.00$ |
| Keying in the 4 programs: | $\$ 60.00$ |
|  |  |
| HP 17BII with one $\$ 25.00$ program keyed in: | $\$ 122.95$ |
| HP 17BII with one $\$ 34.50$ program keyed in: | $\$ 132.45$ |

Additional programs: add cost of the program and cost of keying in. HP 19BII: add $\$ 50.00$. Prices include mailing and handling. Overnight mail, add $\$ 10.00$. California residents, add sales tax.

As a DISCOUNT package, EDRIC CANE SEMINARS offers:
(1) the calculator,
(2) the four programs,
(3) already keyed in:

HP 17BII with 4 programs keyed in: $\quad \$ 239.95$
HP 19BII with 4 programs keyed in:
\$289.95

## WHICH CALCULATOR TO CHOOSE?

Both are excellent and do the job equally well. The HP 19BII has a few extra features--in particular text handling and 4 line display. I find that I do not need the extra features for real estate and finance and prefer the HP 17BII for its shirt pocket size, easy to read display, more efficient handling of available memory, and greater convenience in handling irregular cash flow data. This, I admit, is a very personal choice.

ORDER by MAIL, PHONE, or FAX, with CHECK or VISA/MC
EDRIC CANE SEMINARS
P.O.Box 1213

La Canada, Ca. 91011
(818) 957-3026 Fax (818) 248-8855

| Zip: |  | Box: |  |
| :--- | :--- | :--- | :--- |
| NINE | TEN | ELEVEN | TWELVE |



## You cannot buy, sell, or broker income properties without having at your fingertips the numbers provided by this program.

PROPERTY ANALYZER gives you control over the complex relationships between price, down payment, financing terms, Net Operating Income, and Cash-On-Cash return. Calculate the price if you know the other variables. If you know the price, solve for any one of twelve variables: down payment, cash-on-cash return, rate on one of the loans, term of a loan, amount of a loan, NOI, etc.

PROPERTY ANALYZER allows you to key in up to three loans defined by a dollar amount, the loan-to-value ratio, or as an unknown amount that the program itself determines. It allows you to key in the down payment as a dollar amount or as a percentage of price. At your option, it automatically adjusts property taxes to the new purchase price.

Key data in as prompted by display labels. Press one key to solve for the unknown variable. In the process 10 other values are automatically calculated, including cash-flow-before-tax, NOI, and Cap. rate.

PROPERTY ANALYZER is a powerful, flexible, convenient tool that in itself could justify your purchase of the HP 17BII or HP 19BII.


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(818) 957-3026 Fax (818) 248-8855
$\gg \$ 34.50 .00$ for documentation and right to use the software

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[^0]:    ${ }^{\circ}$ Copyright, Edric CANE, 1990, 1991.

[^1]:    PROPERTY. ANALYZER/CANE:P RICE $=$ (DNP $\%+\$ D N P+C O C \%+? L N$
    $1+N 1+I \% 1+L T V 2+N 2+I \% 2+L$ (? LN1:PRICEXL(C: (100-DNP\%LTVC) $\times .01$ )-EXLN-\$DNP) ) $\times 0$
    $+I F\left(N_{1}=0:(-E X L N-\$ D N P) \div G(\right.$
    C): $180 \times(-E X / D S+L$ (?NOI:NO I\&TX-PRICEXRETX\%X.81)-\$D NP $\times C O C \% \times 1+(E X L N+\$ D N P) X$
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    )) $\div(D N P \% \times C O C \% x .61+G(C) x$ $G(A) \times 100+L T V 2 \times L$ (B: IF (N2= 0:0:12〒USPU(I\%2 $\div 12: N 2 \times 12$ )) ) $+($ L (?RETX:PRICEXRETX \% $x .01$ ) -?RETX+L(?DS1: ?LN1 $\bar{X} G(A))+L(? D 52: L(? L N 2: P R I$ CEXLTV2X.01) $\times \mathrm{G}(\mathrm{B}))+\mathrm{L}$ (?CF
    BT:L(?DNP:\$DNP+PRICEXDNP $\% \times .81) \times C 0 C \% \times .01)+? D 51+? L$ $\mathrm{N} 2+$ ? $\mathrm{D} 52+$ ? $\mathrm{DNP}+$ ? $\mathrm{CFBT}+\mathrm{L}$ (?CA P: ? $\mathrm{NOI} \div$ PRICEX100 $)+$ ? CAP +1
    $\div I F(? L N 1<0$ AND PRICE〉EXL $\mathrm{N}: 8 \mathrm{~B}$ (1) ) $\times 6$ )

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