Real Estate Analysis Volume III

Catalog Number 26-1573

Radio Shack®

TRS-80 MICRO COMPUTER SYSTEM

1. Income and Expense
2. Appreciation or Depreciation
3. Variable Income Analysis
4. After Tax Overall Capitalization Rate

CUSTOM MANUFACTURED BY RADIO SHACK TC A DIVISION OF TANDY CORPORATION

Operating Instructions

For TRS-80 operating instructions, refer to your TRS-80 Manual. After you load and RUN the program, follow the instructions as they appear on the screen. You will quickly learn that you have a great deal of flexibility in using these programs, particularly with their self contained Editing sections. Here is a brief description of basic operating instructions with which you should quickly become familiar.

A. **Equipment**
Minimum hardware required is a 16K Level II Basic TRS-80, with cassette recorder.

B. **Powering Up**
Check all TRS-80 connections to verify that each component is properly attached; press ON button at right rear of machine; when MEMORY SIZE? appears on screen, press [ENTER].

C. **Loading Program**
Insert proper cassette into recorder and press the recorder's "PLAY" lever (rewind first if this was not done in previous use of the program); DO NOT press the red "RECORD" lever except when recording programs;

1. Type [C] [L] [O] [A] [D], and press [ENTER].

2. When READY ≥ appears on the screen, you are ready to proceed with execution of the program.

D. **Running Program**
After program is loaded, simply type [R] [U] [N] and press [ENTER]; if for any reason the program did not load properly on the first attempt, you can not RUN the program; in this case, rewind the cassette, press reset button on left rear of TRS-80, and return to Step C.

E. **Program Operation**
Once the program has been started in Step D, you simply follow all screen instructions by answering program input requests; the following conventions are used:

1. (.XXXXXX) indicates to enter number as a decimal; for example the number 12-1/2 per cent would be entered as .125; trailing zeros are not necessary.

2. (+/–$) indicates the response should be in whole dollar amounts, but in the event that the number is **negative**, a minus sign should preceed the number.

3. (Y or N) indicates a yes or no response is required. Enter a [Y] for yes and an [N] for no.

4. All other commands should be self explanatory.

Income and Expense

(Projection and Schedule of Incomes and Expenses)

Program Overview

An estimate of Net Operating Income is generally considered to be the single most important variable in the analysis and valuation of income producing real estate. This program provides a modular approach to projecting all income and expense categories, including vacancy and collection losses, and produces a monthly, quarterly, semi-annual or annual schedule of the results.

Income producing real estate may either produce income for the owner on a gross or net basis. If the income produced is "absolutely net", the owner pays no real estate taxes, insurance, maintenance, or other operating charges, or costs related to the real estate from the income which it produces. While such circumstances are not rare, as for example with long term absolutely net leases, it is more common to find "gross leases" or gross income from which the various operating charges must be deducted.

The INCOME AND EXPENSE PROGRAM permits you to define up to 2Ø lines of incomes, expenses and/or vacancy and collection losses per run; to independently vary each line item over a projection of up to 1Ø income/expense periods; and to screen display or print out a hard copy of the results. Inputs may be stated monthly, quarterly, semi-annually or annually, and the displayed results may be on a periodic basis which is different from the inputs.

In this program there are a number of built-in subroutines for varying future income and expense line items. A line item may be designated as having a future expectancy of remaining level, of changing up or down at a constant percent, or changing in an irregular pattern. In addition, expenses may be stated either in dollar amounts or as a percent of Gross Operating Income. There are numerous edit modes which facilitate corrections of entries, or repeated runs with sensitivity testing.

Because you define each line item's meaning, this program has broad applicability in not only real estate but other situations as well. In any application, if there is need to exceed the program's limit of 2Ø line items, the program can simply be run multiple times, and if desired, the results (sub-totals) summarized in a final run. Similarly, if more than 1Ø projection periods are needed, succeeding runs can produce projections for periods 11 through 2Ø, 21 through 3Ø, and so on. A 132 column printer is required for printouts of more than 5 projections.

In the past, it has been common for real estate investors and practitioners to refer to "stabilized income streams" in their analysis of real estate. This term was used to refer to income which would be treated for analysis purposes as though it would remain level over a given study period. While it might be understood that the particular income stream could vary from period to period, the stabilized income estimate treated income on an "average" income basis.

While there may be advantages to using stabilized income estimates in certain situations, there are also a number of inherent dangers. Averaging of income may reasonably approximate the proper results where there is no upwards or downwards trend to the future income pattern, but will mis-state the results where such trend does exist. Even more important, except where the appropriate information is not available, stabilizing of income lumps together all income and expense items, losing the opportunity to consider the individual variability of the individual income and expense items which produce net income. This may be a serious loss which can, in turn, produce inaccurate analysis or faulty conclusions.

For real estate income and expense projection purposes, the following terms and categories are important to know:

1. **GROSS POTENTIAL OR GROSS SCHEDULED INCOME**
   Either the total income which could be produced by 100% occupancy at market rents, or the total income which would be produced by 100% occupancy at the current rent schedule; it is important to distinguish between market rent and scheduled rent if there is a substantial difference.

2. **VACANCIES AND COLLECTION LOSSES**
   The losses from Gross Potential or Gross Scheduled Income due to non-occupancy or failure to pay required rents; these constitute a deduction from gross incomes.

3. **GROSS OPERATING INCOME**
   The income expected to be collected; gross potential or scheduled income less vacancy and collection losses; this most closely equates to a property manager's statement of collected income in usual situations.

4. **EXPENSES**
   Deductions from Gross Operating Income for the various costs of operating the real estate investment; principal categories include Fixed Expenses (Real Estate Taxes and Insurance), Variable Expenses (Management, Maintenance, Utilities, Cleaning, etc.), and Reserves (Roof Replacement, Appliances Replacement, etc.); for real estate analysis, distinction should be made between realty expenses (and incomes) and those associated with the businesses which occupy the real estate; only realty items should be included in the projections.

5. **NET OPERATING INCOME**
   Gross Operating Income less all categories of applicable real estate expenses; Net Operating Income is the net income produced by the real estate prior to any deductions for debt service, income taxes, or other personal considerations.

Once the Net Operating Income has been calculated or forecast, it is then possible to analyze the income using any of many programs from the Real Estate Analysis library.

Screen Shows: **You Type:**

SELECT A MAXIMUM OF 2Ø LINES FOR ALL PROJECTIONS
NUMBER OF INCOME SOURCES? . . . . . NUMBER
NUMBER OF EXPENSES? . . . . . NUMBER

SELECT ONE OF THE FOLLOWING PERIODIC BASES:
1. MONTHLY
2. QUARTERLY
3. SEMI-ANNUAL
4. ANNUAL

WHICH INPUT BASIS (1-4)? . . . . . NUMBER

SELECT ONE OF THE FOLLOWING PERIODIC BASES:
1. MONTHLY
2. QUARTERLY
3. SEMI-ANNUAL
4. ANNUAL

WHICH OUTPUT BASIS (1-4)? . . . . . NUMBER

NUMBER OF (PERIODS) IN PROJECTION . . . . . NUMBER
ANY CORRECTIONS (Y OR N)? . . . . . Y OR N

NAME FOR INCOME SOURCE NUMBER 1 (MAX=1Ø DIGITS)
ANTICIPATED FUTURE INCOME PATTERN
1. LEVEL (NO CHANGE)
2. PERIODIC % INCREASE OR DECREASE
3. IRREGULAR PERIODIC CHANGES

WHICH EXPECTED PATTERN (1-3)? . . . . . NUMBER
NUMBER OF UNITS. . . . . NUMBER
(PERIODIC) UNIT INCOME. . . . . NUMBER
(PERIODIC) % CHANGE (+/– .XXXXXX) XXXXXX
OR
INCOME FOR PERIOD NUMBER (N) . . . . . DOLLARS
(CONTINUE FOR ADDITIONAL PERIODS)
ANY CORRECTIONS (Y OR N)? . . . . . Y OR N

WOULD YOU LIKE TO SPECIFY VACANCY AND COLLECTION
LOSSES FOR THE PROJECTION PERIOD (Y OR N)? . . . . . Y OR N
(If Yes):
ANTICIPATED FUTURE V&C LOSS PATTERN
1. LEVEL (NO CHANGES)
2. IRREGULAR (PERIODIC) CHANGE ($)
3. IRREGULAR (PERIODIC) % AMOUNTS

WHICH EXPECTED PATTERN (1-3)? 1, 2, 3
(Enter Expected Changes If Any)

Screen Shows: **You Type:**

NAME FOR EXPENSE TYPE NUMBER 1. . . . . [NAME]
ANTICIPATED FUTURE EXPENSE PATTERN
1. LEVEL (NO CHANGE)
2. PERIODIC % INCREASE OR DECREASE
3. IRREGULAR PERIODIC CHANGES
WHICH EXPECTED PATTERN (1-3)? . . . . . [1, 2, 3]
(If Not Level, Enter Periodic Amount or Amounts)
ANY CORRECTIONS (Y OR N)? . . . . . [Y] OR [N]

(Enter names and data for subsequent expense categories)

(After All Categories Are Entered):
ANY CORRECTIONS FOR:
1. INCOME ITEMS
2. V&C LOSSES
3. EXPENSE ITEMS
ANY CORRECTIONS (Y OR N)? . . . . . [Y] OR [N]
(If there are corrections, screen display returns to previous part of the program)

(ONCE CORRECTIONS OR CHANGES ARE COMPLETE):
SELECT ONE OF THE FOLLOWING OPTIONS:
1. NEW PROJECTION
2. CHANGE LINE ITEMS
3. DISPLAY PROJECTION
WHICH OPTION (1-3)? . . . . . [1, 2, 3]

(**New Projection** returns to start of program for new entry)
(**Change Line Items** returns to Edit Menu for additional changes of individual lines)
(Display projection begins sequential display of results of calculations — To display all pages of display continue pressing [ENTER])

The final step of the above sequence provides screen display of program results, or optional hardcopy if you have a printer. Each line item is summarized in increments of five periods per screen display. If the screen display is too long for a single screen, the display will continue onto a second screen display by pressing [ENTER]. If more than 5 projection periods are used, the hardcopy option requires a 132 column printer.

Applications

Because of income tax laws and other investment factors, ownership periods of real estate investments ranging from five to ten years are common. This program is particularly well suited to analysis of typical investments held over such periods. The program may also be used in developmental analysis situations, lease analyses, and others.

The capacity of this program to be used for more than 2Ø line items and for more than 1Ø projection periods was discussed earlier. As an example, a shopping center might have 8Ø tenants and 87 income categories alone. By specifying 2Ø income items in four successive runs of this program, then 7 items in a final run, all income items can be projected for up to ten periods. The same technique can be handled for expenses, then a final run made in which income and expense totals from each projection are entered, along with vacancy and collection losses, if any.

As an example of common usage of the program, here is a sample apartment project's income and expense projections:

Screen Shows: **You Type:**

SELECT A MAXIMUM OF 2Ø LINES FOR ALL PROJECTIONS:
NUMBER OF INCOME SOURCES. 3
NUMBER OF EXPENSE TYPES 5

SELECT ONE OF THE FOLLOWING PERIODIC BASES:
1. MONTHLY
2. QUARTERLY
3. SEMI-ANNUAL
4. ANNUAL

WHICH INPUT BASIS (1-4)?. 1

SELECT ONE OF THE FOLLOWING PERIODIC BASES:
1. MONTHLY
2. QUARTERLY
3. SEMI-ANNUAL
4. ANNUAL

WHICH OUTPUT BASIS (1-4)? 4

(Note: The input basis refers to the income and expense frequency for data input; the output basis refers to the frequency for summarizing final results of calculations.)

NUMBER OF YEARS IN PROJECTION (MAX = 1Ø) . . . . . 1 Ø
ANY CORRECTIONS (Y OR N)? . . . . . N

Screen Shows: **You Type:**

NAME FOR INCOME SOURCE NUMBER 1 ..... L O W E R A P T S
ANTICIPATED FUTURE INCOME PATTERN
1. LEVEL (NO CHANGE)
2. PERIODIC % INCREASE OR DECREASE
3. IRREGULAR PERIODIC CHANGES
WHICH EXPECTED PATTERN (1-3)? 2
NUMBER OF UNITS 1 0 0
MONTHLY UNIT INCOME 2 2 5
YEARLY % CHANGE (+/–.XXXXXX) 0 5
ANY CORRECTIONS (Y OR N)? ..... N

NAME FOR INCOME SOURCE NUMBER 2 ..... U P P E R A P T S
ANTICIPATED FUTURE INCOME PATTERN
1. LEVEL (NO CHANGE)
2. PERIODIC % INCREASE OR DECREASE
3. IRREGULAR PERIODIC CHANGES
WHICH EXPECTED PATTERN (1-3)? 2
NUMBER OF UNITS 1 0 0
MONTHLY UNIT INCOME 2 5 0
YEARLY % CHANGE (+/–.XXXXXX) 0 5
ANY CORRECTIONS (Y OR N)? ..... N

NAME FOR INCOME SOURCE NUMBER 3 ..... S T O R E S
ANTICIPATED FUTURE INCOME PATTERN
1. LEVEL (NO CHANGE)
2. PERIODIC % INCREASE OF DECREASE
3. IRREGULAR PERIODIC CHANGES
WHICH EXPECTED PATTERN (1-3)? 1
NUMBER OF UNITS 4 5 0 0
MONTHLY UNIT INCOME 6 0
ANY CORRECTIONS (Y OR N)? ..... N

(Note: The stores have 4500 square feet of rentable space, rented at $.60 per square foot per month; you may input any combination of rent units and rent amounts, but be certain that you remain consistent with the periodic basis for input selected earlier.)

Screen Shows: **You Type:**

WOULD YOU LIKE TO SPECIFY VACANCY AND COLLECTION LOSSES
FOR THE PROJECTION (Y OR N)? . . . . . Y
ANTICIPATED FUTURE V&C LOSSES PATTERN
1. LEVEL (NO CHANGE)
2. IRREGULAR YEARLY CHANGE ($)
3. IRREGULAR YEARLY % AMOUNTS
WHICH EXPECTED PATTERN (1-3)? 3
V&C LOSSES FOR YEAR 1 (.XXXXXX) 1
V&C LOSSES FOR YEAR 2 (.XXXXXX) 09
V&C LOSSES FOR YEAR 3 (.XXXXXX) 075
V&C LOSSES FOR YEAR 4 (.XXXXXX) 07
V&C LOSSES FOR YEAR 5 (.XXXXXX) 06
V&C LOSSES FOR YEAR 6 (.XXXXXX) 05
V&C LOSSES FOR YEAR 7 (.XXXXXX) 04
V&C LOSSES FOR YEAR 8 (.XXXXXX) 04
V&C LOSSES FOR YEAR 9 (.XXXXXX) 04
V&C LOSSES FOR YEAR 10 (.XXXXXX) 04
ANY CORRECTIONS (Y OR N)? . . . . . N

(Note: If Expected Pattern Number 2 had been selected, the entries would have been made in dollar amounts.)

NAME FOR EXPENSE TYPE #1. . . . . MANAGEMENT
ANTICIPATED FUTURE EXPENSE PATTERN
1. LEVEL (NO CHANGE)
2. PERIODIC % INCREASE OR DECREASE
3. IRREGULAR PERIODIC CHANGES
WHICH EXPECTED PATTERN (1-3) 1
MONTHLY MANAGEMENT EXPENSE ($/%) 05
ANY CORRECTIONS (Y OR N)? . . . . . N

(Note: The monthly expense amounts may be entered as **either** a dollar amount or as a percent of Gross Operating Income; the program presumes that any decimal amount entered at this point indicates a percentage of Gross Operating Income, and that any whole amount which is 1.0 or greater is in dollars.)

NAME FOR EXPENSE TYPE #2. . . . . MAINT'NCE
ANTICIPATED FUTURE EXPENSE PATTERN
1. LEVEL (NO CHANGE)
2. PERIODIC % INCREASE OR DECREASE
3. IRREGULAR PERIODIC CHANGES
WHICH EXPECTED PATTERN (1-3)? 2
MONTHLY MAINT'NCE EXPENSE ($/%). 035
YEARLY % CHANGE (+/–.XXXXXX). 06
ANY CORRECTIONS (Y OR N)? . . . . . N

Screen Shows: **You Type:**

NAME FOR EXPENSE TYPE #3. . . . . U T I L I T I E S
ANTICIPATED FUTURE EXPENSE PATTERN
1. LEVEL (NO CHANGE)
2. PERIODIC % INCREASE OR DECREASE
3. IRREGULAR PERIODIC CHANGES
WHICH EXPECTED PATTERN (1-3)? 2
MONTHLY UTILITIES EXPENSE ($/%). 6 9 5 0
YEARLY % CHANGE (+/–.XXXXXX). 0 4
ANY CORRECTIONS (Y OR N)? . . . . . N

NAME FOR EXPENSE TYPE #4. . . . . R E E T A X E S
ANTICIPATED FUTURE EXPENSE PATTERN
1. LEVEL (NO CHANGE)
2. PERIODIC % INCREASE OR DECREASE
3. IRREGULAR PERIODIC CHANGES
WHICH EXPECTED PATTERN (1-3)? 1
MONTHLY R.E. TAXES EXPENSE. 0 2 2 5
ANY CORRECTIONS (Y OR N)? . . . . . N

NAME FOR EXPENSE TYPE #5. . . . . I N S U R A N C E
ANTICIPATED FUTURE EXPENSE PATTERN
1. LEVEL (NO CHANGE)
2. PERIODIC % INCREASE OR DECREASE
3. IRREGULAR PERIODIC CHANGES
WHICH EXPECTED PATTERN (1-3)? 3
INSURANCE EXPENSE FOR YEAR 1 ($/%). 5 2 5 0
INSURANCE EXPENSE FOR YEAR 2 ($/%). 5 5 0 0
INSURANCE EXPENSE FOR YEAR 3 ($/%). 5 5 0 0
INSURANCE EXPENSE FOR YEAR 4 ($/%). 6 0 0 0
INSURANCE EXPENSE FOR YEAR 5 ($/%). 6 0 0 0
INSURANCE EXPENSE FOR YEAR 6 ($/%). 7 0 0 0
INSURANCE EXPENSE FOR YEAR 7 ($/%). 7 0 0 0
INSURANCE EXPENSE FOR YEAR 8 ($/%). 8 5 0 0
INSURANCE EXPENSE FOR YEAR 9 ($/%). 8 5 0 0
INSURANCE EXPENSE FOR YEAR 10 ($/%). 1 0 0 0 0
ANY CORRECTIONS (Y OR N)? . . . . . N

ANY CORRECTIONS FOR:
1. INCOME ITEMS
2. V&C LOSSES
3. EXPENSE ITEMS
ANY CORRECTIONS (Y OR N)? . . . . . N

(Note: At this point it is possible to go back for any input changes which are considered necessary. Later this routine may be used for sensitivity testing.)

Screen Shows: **You Type:**

SELECT ONE OF THE FOLLOWING OPTIONS:
1. NEW PROJECTION
2. CHANGE LINE ITEMS
3. DISPLAY PROJECTION

WHICH OPTION (1-3)? 3

(Note: This is the normal option module to select a display of the calculated results; the calculations may be abandoned at this point by selecting **New Projection**, or modifications to the inputs may be made by selecting **Change Line Items**.)

Results are displayed as follows:

INCOME AND EXPENSE PROJECTIONS

DESCRIPTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
SCHED. INCOME					
LOWER APTS	$270000	$283500	$297675	$312559	$328187
UPPER APTS	$300000	$315000	$330750	$347287	$364652
STORES	$ 32400	$ 32400	$ 32400	$ 32400	$ 32400
TOTAL INC.	$602400	$630900	$660825	$692246	$725239
LESS V&C LOSS	$ 60240	$ 56781	$ 49562	$ 48457	$ 43514
GROSS OP. INC.	$542160	$574119	$611263	$643789	$681724

Press [ENTER] to continue.

DESCRIPTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
DEDUCT EXP.					
MANAGEMENT	$ 27108	$ 28706	$ 30563	$ 32189	$ 34086
MAINT'NCE	$ 18976	$ 21300	$ 24039	$ 26837	$ 30123
UTILITIES	$ 83400	$ 86736	$ 90205	$ 93814	$ 97566
R. E. TAXES	$ 12199	$ 12918	$ 13753	$ 14485	$ 15339
INSURANCE	$ 5250	$ 5500	$ 5500	$ 6000	$ 6000
TOTAL EXP.	$146932	$155159	$164061	$173325	$183114
NET OP. INC.	$395228	$418960	$447203	$470064	$498610

(Note: By pressing [ENTER], the remaining five years of calculated results will be displayed in successive screen displays.)

DESCRIPTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
% CHANGE NOI	0.00%	6.00%	6.74%	5.20%	5.98%
EXP/GOI RATIO	27.10%	27.03%	26.84%	26.92%	26.86%

(Note: This display will be presented after all periods of the projection have been shown on the screen. (**% CHANGE NOI**) indicates the annual change in Net Operating Income from the previous year. **EXP/GOI RATIO** shows total expenses as a percent of Gross Op. Inc.)

Screen Shows: **You Type:**

Press [ENTER] to Continue.

SELECT ONE OF THE FOLLOWING OPTIONS
1. NEW PROJECTION
2. CHANGE LINE ITEMS
3. DISPLAY PROJECTION

WHICH OPTION (1-3)?

At this point, you may either display the calculated results again, change line items, or perform a new projection with new input data.

It is possible that with very large numbers the precision of the TRS-80 may be exceeded, producing small errors. Small errors are generally considered of little practical consequence since all forecast incomes and expenses are simply estimates. Good practice in the use of forecasts is to clearly indicate the source and nature of the data, and to use reasonable rounding in the final results.

Print Option

The final Edit mode provided by this program permits either screen display of results, or hardcopy print-out if you have a printer. The final Edit mode is displayed above on this page. If the printer is turned on, a fourth option is stated: 4. PRINT PROJECTION. By answering WHICH OPTION (1-4)? with a [4] results will be printed. Once printing is complete, control is returned for further action.

Appreciation or Depreciation

(Required Value Changes for Selected Equity Yields)

Program Overview

The price or value of a real estate investment is of critical importance at least twice during the life of the investment: when the original purchase is made, and when the investment is sold. This program allows study of value changes over five and ten year investment holding periods which are consistent with up to six user defined equity yield rates. This allows analysis of prospects for a given yield, and testing of feasibility of a given investment price and mortgage terms.

Internally, this program uses the Ellwood formula to calculate required value changes over the future projection periods. Although the basic Ellwood formula, $R = Y - M (Y + P (1 / S) - f) - \text{Change} (1 / S)$, can be complicated and cumbersome to use, only simple inputs are required for this program. Likewise, the Ellwood change formula $(r - R / (1 / S))$, is built into the program, and critical calculations are transparent to you.

It is clear to most investors that if the value of the capital they invest does not change over an investment holding period (net resale proceeds equal original capital outlay), their return on investment will be equal to whatever their cash flow rate may be. If they receive less than their original investment in resale proceeds, their investment return has been **less** than the cash flow rate. If sale of the investment realizes more than the amount originally invested, investment return is **more** than the cash flow rate, since there is both cash flow and profit on the investment itself.

For investment real estate which is mortgaged at the time of purchase, or during the term of ownership, the simple relationships between equity cash flow rates and changes of equity value are sometimes obscured by other factors such as changes of **property** value, **property** incomes and expenses, and the like. A unique characteristic of real estate investments is that the equity investor may receive a highly satisfactory yield on the equity investment despite decline in property value or low cash flows during the investment holding period. Given a cash flow, however, resale price of the property is critical to the ultimate equity return.

By studying the future property resale prices which would be required to accomplish various rates of equity yield, an equity investor, appraiser, seller, prospective mortgagee, broker, and others can test given property prices and mortgage terms for their likely capacity to produce a given rate of return on the equity investment. Such calculations do not suggest a prediction that any given event **will** occur; rather, they find what future events **must** occur if given rates of yield are to be realized. Conversely, future option prices or anticipated value levels may be tested against the optimum price to be paid to accomplish a given rate of yield.

Screen Shows:	You Type:
ANNUAL NET OPERATING INCOME	DOLLARS
PRICE OR VALUE	DOLLARS
LOAN TO VALUE RATIO	.XXXXXX
MORTGAGE INTEREST RATE	.XXXXXX
TERM OF THE MORTGAGE	YEARS____ MONTHS____
NUMBER OF PAYMENTS PER YEAR	NUMBER
YIELD RATE "A"	.XXXXXX
YIELD RATE "B"	.XXXXXX
YIELD RATE "C"	.XXXXXX
YIELD RATE "D"	.XXXXXX
YIELD RATE "E"	.XXXXXX
YIELD RATE "F"	.XXXXXX
ANY CORRECTIONS (Y OR N)	Y OR N

(Five and ten year projections of equity yields with required percentage of property value change and resale price for each rate of yield.)

Applications

This program assumes a level net income stream during the investment holding period. If income is not expected to approximate a level pattern, it is possible to use an average or "stabilized" net income estimate instead. If there is a distinct upwards or downwards pattern to net income over time, the final results of this program's calculations may be viewed as approximations which slightly over or understate, depending upon income pattern.

As used in this program, "Price or Value" refers to the original cost or value of the entire investment to be analyzed. The program is designed to run only with a mortgage specified. With a mortgage, the total "price or value" will be funded with both mortgage and equity contributions. "Yield Rate A, B . . . F" are rates of yield on the **equity** investment, and consider the effects of both equity cash flow and equity reversion from property resale at the projected future price.

For example, an investor is offered a small real estate investment at a price of $15Ø,ØØØ. Net income is calculated at $14,25Ø, and is expected to remain level for the forseeable future. Mortgage financing is available in the form of a 75 percent loan-to-value loan, with monthly payments amortized over 25 years at an annual interest rate of 9-1/4 percent. The investor desires at least a 15 percent return on investment before income taxes, and believes that property values are likely to increase about 2 percent per year over the next 1Ø years on a straight line basis. What are the investor's prospects for earning a 15 percent equity yield in 1Ø years?

To proceed with calculations, we will test equity yield rates ranging from 6 percent to 21 percent by three percent increments:

Screen Shows:	You Type:
ANNUAL NET OPERATING INCOME	1 4 2 5 Ø
PRICE OR VALUE	1 5 Ø Ø Ø Ø
LOAN TO VALUE RATIO	. 7 5
MORTGAGE INTEREST RATE	. Ø 9 2 5
TERM OF THE MORTGAGE	YEARS 2 5 MONTHS Ø
NUMBER OF PAYMENTS PER YEAR	1 2
YIELD RATE "A"	. Ø 6
YIELD RATE "B"	. Ø 9
YIELD RATE "C"	. 1 2
YIELD RATE "D"	. 1 5
YIELD RATE "E"	. 1 8
YIELD RATE "F"	. 2 1
ANY CORRECTIONS (Y OR N)?	N

	FIVE YEAR PROJECTION		TEN YEAR PROJECTION	
YIELD	% CHANGE	PRICE	% CHANGE	PRICE
.Ø6	6.52	$14Ø,22Ø	16.45–	$125,326
.Ø9	2.13	$146,8ØØ	5.64–	$141,535
.12	2.8Ø	$154,199	8.6Ø	$162,894
.15	8.33	$162,49Ø	27.15	$19Ø,726
.18	14.5Ø	$171,748	51.Ø9	$226,635
.21	21.37	$182,Ø52	81.71	$272,558

ANY CORRECTIONS (Y OR N)?

The investor has anticipated a probable value in ten years of $18Ø,ØØØ ($15Ø,ØØØ + .2Ø x $15Ø,ØØØ). From these calculations it can be seen that a 15 percent equity yield requires a resale price of nearly $191,ØØØ in ten years, indicating the investor is unlikely to achieve a 15 percent return on equity investment based on these data. If property value increases at a rate of about 2.5 percent per year on a straight line basis, it appears this investment would meet the yield criterion.

Similarly, the calculated results may be used for other types of basic analysis. The property value can decline $3,2ØØ in five years and the investor will still earn a 9 percent investment return. In ten years, the property can decline approximately $8,5ØØ and still earn a 9 percent equity return. Over a ten year holding period, the investment can decline nearly $25,ØØØ and still earn a 6 percent before tax return on equity. During the same ten year period, the property must increase in value about 51 percent to achieve an 18 percent return on equity, or nearly 82 percent to earn 21 percent.

These projections aid in analyzing the "downside" of an investment (what happens if all goes wrong), the "upside" (what happens if all goes right), and the most probable events. Each is important to basic decisions.

Use of the "Any Corrections?" facilitiy permits additional testing and the application of sensitivity analysis. As an example, let us continue our original problem and test for the effects of 1Ø percent changes in each of the major input variables.

A. **Effect of Income Change** — increase the $14,25Ø net operating income expectancy by 1Ø percent: $14,25Ø x 1.1 = $15,675

Screen Shows:	**You Type:**
ANY CORRECTIONS (Y OR N)?	Y
WHICH ONE (1-7)	1
NET OPERATING INCOME	1 5 6 7 5
ANY CORRECTIONS (Y OR N)?	N

Results indicate the investor's desired 15 percent return now would be consistent with about a 2 percent value change in five years and just under 8 percent in 1Ø years, well within the investor's anticipation of future market change.

B. **Effect of Loan Ratio Change** — increase the 75 percent loan to value ratio by 1Ø percent: .75 x 1.1 = .825

Screen Shows:	**You Type:**
ANY CORRECTIONS (Y OR N)?	Y
WHICH ONE (1-7)	1
NET OPERATING INCOME	1 4 2 5 Ø
ANY CORRECTIONS (Y OR N)?	Y
WHICH ONE (1-7)	3
LOAN TO VALUE RATIO	. 8 2 5
ANY CORRECTIONS (Y OR N)?	N

Results indicate the desired equity return of 15 percent would be consistent with a 5.45 percent appreciation of the property in five years, and slightly under 18 percent in 1Ø years. Resale at $178,Ø48 in 1Ø years is within the investor's anticipations of the future.

C. **Effect of Mortgage Interest Rate Change** — decrease the mortgage interest rate by 1Ø percent: .Ø925 x .9 = .Ø8325

Screen Shows:	**You Type:**
ANY CORRECTIONS (Y OR N)?	Y
WHICH ONE (1-7)	3
LOAN TO VALUE RATIO	. 7 5
ANY CORRECTIONS (Y OR N)	Y
WHICH ONE (1-7)	4
MORTGAGE INTEREST RATE	. Ø 8 3 2 5
ANY CORRECTIONS (Y OR N)?	N

Results indicate a 15 percent equity return under these inputs would be earned with an increase in property value in five years to $155,757, or in ten years to $171,471, both well within the investor's future value change anticipations.

C. **Effect of Mortgage Term Change** — increase the mortgage term by 1Ø percent: 25 years x 1.1 = 27 years 6 months.

Screen Shows:	**You Type:**
ANY CORRECTIONS (Y OR N)?	Y
WHICH ONE (1-7)	4
MORTGAGE INTEREST RATE	. Ø 9 2 5
ANY CORRECTIONS (Y OR N)?	Y
WHICH ONE (1-7)	5
TERM OF THE MORTGAGE	YEARS 2 7 MONTHS 6
ANY CORRECTIONS (Y OR N)?	N

Results indicate an increase in the mortgage term will require a 9.48 percent increase in five years and about 3Ø percent in ten years to accomplish a 15 percent equity yield. This is beyond the investor's anticipations of likely future market trends.

Print Option

After screen display of results, the question ANY CORRECTIONS (Y OR N)? is asked to permit correction or repeated screen variation. Once this question is answered N, the question WOULD YOU LIKE A PRINTED COPY OF THIS ANALYSIS (Y OR N)? is asked if your printer is attached and turned on. Y produces a printed copy of the analysis, and N returns to the start of the program.

Variable Income Analysis

(Present Worth of Variable Income Streams)

Program Overview

For investment property, value may be said to be the present worth of anticipated future benefits. For income earning investments, future benefits which can be measured and analyzed include income receipts during the investment holding period, and the receipts from final disposition of the investment itself. While the future is an unknown, an investor's (and the market's) view of the probabilities of the future influence all investment decisions.

Many investors consider the probable patterns of future income receipts from real estate investments during the holding pattern to be more certain than many of the variables which may be considered. Market analysis and study of a particular parcel of real estate can normally produce reasonable estimates of future income earning expectancies. The perceived risks of achieving these estimates may be accounted for in the rates of discount used for calculating the present worths of future income receipts.

This program permits input and analysis of the present worths of variable future income streams, including investment reversion (if any). Because either before or after income tax cash flows may be analyzed, this program may be applied to any type or pattern of income stream. Like many other programs in the Real Estate Analysis series, this program can be used in conjunction with others in the series, especially the Income and Expense program. Up to a maximum of 240 individual cash flows may be analyzed.

A unique feature of this program is its ability to allow present worth sensitivity testing. Once cash flow amounts are entered, the corrections routine permits repeated calculation of present worth at a series of discount rates to be tested. Through continued iterations it is possible to discover the "internal rate of return" for a series of cash flows and final reversion. Alternatively, a series of net present values or profitability indexes can be calculated by separate comparison with a starting value.

Included among variables which can be considered by the program are the frequency of payments per year, and the circumstances of either payments in advance (beginning of period) or in arrears (end of period). Thus, the program may be user structured to handle monthly, quarterly, semi-annual or annual incomes (or payments) in advance or arrears over a maximum of 240 periods. By use of these facilities, the model can be applied to analysis of subdivisions, developmental projects, existing real estate, and virtually any other type of investment property. All compounding is presumed to occur with the same frequency as the receipts of income. Any reversion is presumed to occur at the end of the final investment holding period, regardless of whether payments are in advance or arrears.

Screen Shows:	You Type:
DISCOUNT RATE	.XXXXXX
TOTAL NUMBER OF PAYMENT PERIODS (MAX = 240)	NUMBER
NUMBER OF PAYMENTS PER YEAR	NUMBER
SELECT ONE OF THE FOLLOWING FOR PAYMENT METHOD	
1. BEGINNING OF PERIOD PAYMENTS	
2. END OF PERIOD PAYMENTS	
OPTION (1 - 2)?	1 OR 2
PERIOD 1 PAYMENT (+/–)	DOLLARS
PERIOD 2 PAYMENT (+/–)	DOLLARS
(Enter to the Nth period)	
REVERSION AMOUNT	DOLLARS
ANY CORRECTIONS (Y OR N)?	Y OR N

Screen Shows:

VARIABLE INCOME ANALYSIS USING A DISCOUNT RATE OF .XXXXXX

PAYMENTS/YEAR (BEGINNING OR ENDING PAYMENTS)

PERIOD	CASH FLOW	PWORTH F	PRESENT WORTH
(Summary by periods)			
TOTALS	XXXXXXXXX		XXXXXXXXX
REVERSION	XXXXXXXXX	.XXXXXXX	XXXXXXXXX
PRESENT WORTH OF INCOME AND REVERSION			XXXXXXXXX

Applications

While "stabilized" income estimates are frequently made for investment analysis purposes — treating income as though it would essentially remain level for an investment holding period— it is often possible to make more precise income and expense projections. While the certainty of such projections normally declines the farther the projection is made into the future, the application of present worth factors to calculate value indications to some extent helps compensate for actual variance in the future realizations. Under any circumstances, use of the most likely forecast amounts **without** averaging avoids the additional error which may be added to the analysis by averaging processes.

For example, an investor is examining the possibility of acquiring an investment which is expected to develop a series of increasing cash flows over the next five years, then have a resale value of $10,000, all before taxes.

The investor requires reasonable prospects for a return on investment of 12 percent, and wants to analyze the present worth of future cash flow expectancies after payment of debt service and final satisfaction of the mortgage. Analysis is as follows:

Screen Shows:	You Type:
DISCOUNT RATE	. 1 2
TOTAL NUMBER OF PAYMENT PERIODS (MAX = 240)	5
NUMBER OF PAYMENTS PER YEAR	1
SELECT ONE OF THE FOLLOWING FOR PAYMENT METHOD	
1. BEGINNING OF PERIOD PAYMENTS	
2. END OF PERIOD PAYMENTS	
OPTION (1-2)?	1
PERIOD 1 PAYMENT (+/–)	1 0 0 0
PERIOD 2 PAYMENT (+/–)	1 2 0 0
PERIOD 3 PAYMENT (+/–)	1 5 0 0
PERIOD 4 PAYMENT (+/–)	1 8 0 0
PERIOD 5 PAYMENT (+/–)	2 0 0 0
REVERSION AMOUNT	1 0 0 0 0
ANY CORRECTIONS (Y OR N)?	N

VARIABLE INCOME ANALYSIS USING A DISCOUNT RATE OF .120000
1 PAYMENTS/YEAR BEGINNING OF PERIOD PAYMENTS

PERIOD	CASH FLOW	P WORTH F	PRESENT WORTH
1	$1,000	1.000000	$1,000
2	$1,200	0.892857	$1,071
3	$1,500	0.797194	$1,196
4	$1,800	0.711781	$1,281
5	$2,000	0.635518	$1,271

PRESS ENTER FOR TOTALS

PERIOD	CASH FLOW	FACTOR	PRESENT WORTH
TOTALS	$7,500		$5,819
REVERSION	$10,000	.567427	$5,674
PRESENT WORTH OF INCOME AND REVERSION			$11,494

ANY CORRECTIONS (Y OR N)? . . . . . N

From these calculations, it appears that, to earn a 12 percent before tax return, the investor would not be justified in paying more than about $11,500 for the equity investment in this real estate investment. If a stabilized income estimate had been used instead, the investment would have an indicated value of over $11,700. ($1,500 x 4.037349 + $5674). While this is a relatively small difference in this instance, the stabilized estimate is not a correct representation of the actual expectancy, and could result in substantial error in larger investment or different income situations.

Another important application for this program is the handling of any cash flow situation involving both positive and negative cash flow expectancies. Many investment analysts today prefer the application of present value calculations as presented in this program to those calculations which are made in traditional internal rate of return routines. The handling of both positive and negative cash flows and avoidance of certain pitfalls of internal rate of return concepts are primary reasons for this perference.

To illustrate, an investor is presented an investment opportunity which involves a three year development program. The investor will require an after income tax return of 15% to be shown as a reasonable investment expectation before investing. Cash inflows and outflows are to be semi-annual, and cash flow expectancies are as shown below:

Screen Shows:	**You Type:**
DISCOUNT RATE	[.] [1] [5]
TOTAL NUMBER OF PAYMENT PERIODS (MAX = 240)	[6]
NUMBER OF PAYMENTS PER YEAR	[2]
SELECT ONE OF THE FOLLOWING FOR PAYMENT METHOD	
1. BEGINNING OF PERIOD PAYMENTS	
2. END OF PERIOD PAYMENTS	
OPTION (1-2)	[1]
PERIOD 1 PAYMENT (+/–)	[–] [9] [0] [0] [0]
PERIOD 2 PAYMENT (+/–)	[–] [4] [0] [0] [0]
PERIOD 3 PAYMENT (+/–)	[1] [2] [0] [0] [0]
PERIOD 4 PAYMENT (+/–)	[–] [3] [0] [0] [0]
PERIOD 5 PAYMENT (+/–)	[5] [0] [0] [0]
PERIOD 6 PAYMENT (+/–)	[8] [0] [0] [0]
REVERSION AMOUNT	
ANY CORRECTIONS (Y OR N)?	[N]

VARIABLE INCOME ANALYSIS USING A DISCOUNT RATE OF .150000
2 PAYMENTS/YEAR BEGINNING OF PERIOD PAYMENTS

PERIOD	CASH FLOW	PWORTH F	PRESENT WORTH
1	–$9,000	1.000000	–$9,000
2	–$4,000	0.930232	–$3,721
3	$12,000	0.865333	$10,384
4	–$3,000	0.804961	–$2,415
5	$5,000	0.748801	$3,744
6	$8,000	0.696560	$5,572

PRESS [ENTER] FOR TOTALS

Screen Shows: **You Type:**

PERIOD	CASH FLOW	FACTOR	PRESENT WORTH
TOTALS	$9,000		$4,565
REVERSION	$40,000	.647061	$25,918
PRESENT WORTH OF INCOME AND REVERSION			$30,483

ANY CORRECTIONS (Y OR N) ..... N

The investor can pay a maximum of slightly less than $30,500 under the presumptions of this problem and still have prospects for a 15 percent after income tax return on the equity investment. Note that because there are multiple changes of negative to positive income, internal rate of return calculations could be indeterminate because of multiple mathematical solution possibilities.

The present value calculations, as illustrated in these two examples, also lead to calculations of Net Present Value and Profitability Index for other investment analyses. Such calculations permit comparison among various investment alternatives with disparities in amount of capital outlay required, timing and amounts of income receipts, expected holding periods, and the like.

Print Option

A printed copy of the analysis may be obtained if a printer is attached to the system and turned on. With the printer on, an Intermediate Screen is displayed after asking ANY CORRECTIONS (Y OR N)? after the Edit Screen. The Intermediate Screen appears as follows:

```
SELECT ONE OF THE FOLLOWING OPTIONS FOR OUTPUT:
   1. SCREEN DISPLAY
   2. HARDCOPY LISTING
   3. CHANGE INPUT VALUES
   4. PERFORM A NEW ANALYSIS
OPTION (1-4)?
```

Selecting Option 2 will produce a printed copy of the analysis, and return control to the Intermediate Screen above. In the absence of an attached, turned on printer, the Intermediate Screen will not appear, and the program will display the analysis on the CRT only. Control will then be returned to the Edit Screen.

After Tax Overall Capitalization Rate

(Overall Rate Based Upon After Tax Considerations)

Program Overview

An overall capitalization rate expresses the direct relationship between net operating income and price or value. Investors have used the relationship I/R=V for many years. In this formula, I = income, R = the rate for capitalization of income, and V = value of the investment. Given any two of the three, the third may be calculated. The overall capitalization rate, often called the "overall rate", is a special application of this three way relationship between income, rate and value.

This program calculates an overall rate for use in investment analysis by considering the specific investment effects of applying certain portions of current federal income tax law. Included in the calculated overall rate are the effects of income tax savings from depreciation allowances and deductions of mortgage interest. The overall rate produced by this program is that rate consistent with a given after tax equity yield goal, and stated mortgage information. Changes in value of the investment over time may also be included in the analysis and calculations.

Overall rates are normally the simplest rates to derive from market information about investment real estate. For example, if a given parcel of income producing real estate sells for $4ØØ,ØØØ and is producing a current net operating income of $36,ØØØ, a 9 percent overall rate is indicated. ($36,ØØØ divided by $4ØØ,ØØØ = .Ø9). Similarly, the same numbers could apply to real estate which is offered for sale, or to be offered for sale. In each instance, the principal question could be, of what significance or meaning is the 9 percent overall rate?

Analysis of overall rates taken from the real estate market has become an important function of real estate appraising in the past 2Ø years. It has likewise become an important function of many other real estate disciplines as well. The Ellwood mortgage-equity techniques (made popular during this period) have been widely used by real estate practitioners, and investors to focus on effects upon equity yields of mortgage financing, property value change, and other variables. The focus of most of these studies has historically been on **before** income tax variations.

This program switches the focus of investment variables to their after income tax consequences on equity yield. During program execution, the user specifies the proportion of the total property investment which is depreciable, any anticipated changes in property value over a specified investment holding period, the method of depreciation, depreciable life of improvements, the investor's income tax bracket, the capital gains rate, and similar information. The resulting "after tax overall rate" may be used to analyze those found in the real estate market, to project investment value for an individual investor, and other applications.

Screen Shows:	You Type:
REQUIRED AFTER TAX EQUITY YIELD RATE	.XXXXXX
LOAN TO VALUE RATIO	.XXXXXX
MORTGAGE INTEREST RATE	.XXXXXX
TERM OF MORTGAGE	YEARS ____ MONTHS ____
PROJECTION PERIOD	YEARS ____ MONTHS ____
ANTICIPATED CHANGE IN PROPERTY VALUE (+/–)	.XXXXXX
PROPORTION OF VALUE WHICH IS DEPRECIABLE	.XXXXXX
ASSET'S DEPRECIABLE LIFE	YEARS ____
SELECT ONE OF THE FOLLOWING OPTIONS FOR DEPRECIATION METHOD: 1. STRAIGHT LINE 2. DECLINING BALANCE OPTION? (1 OR 2)	1 OR 2
ANNUAL NET OPERATING INCOME	DOLLARS
INVESTOR'S TAX RATE	.XXXXXX
CAPITAL GAINS RATE	.XXXXXX
ANY CORRECTIONS (Y OR N)	Y OR N

Screen Shows:

OVERALL CAPITALIZATION RATE:	
ADJUSTED FOR INTEREST DEDUCTIONS ONLY	.XXXXXX
DEDUCT DEPRECIATION ALLOWANCE	–.XXXXXX
AFTER TAX OVERALL RATE	.XXXXXX
INDICATED VALUE	DOLLARS

Applications

While there are many applications for this program, perhaps its most powerful uses are in conjunction with analysis of property which is to be purchased or sold, and in analysis of owned real estate while determining the acceptability of a given sale price. The following is an illustration:

A prospective purchaser of a real estate investment is offered an investment costing $15Ø,ØØØ, and producing a net income of $15,ØØØ. The overall rate relationship between price and value is 1Ø percent. Mortgage financing is available at up to 75 percent of property value, with monthly payments amortized over exactly 25 years at 9-3/4 percent annual interest. The investor would be interested in the investment if it appears reasonable that a 1Ø percent return to the equity investment can be earned after income taxes.

While the investor believes the property value will increase somewhat over the next 10 years, the investor conservatively would like for the investment to be capable of earning the required yield **without** future increases in property value. It appears that about 80 percent of the investment is in depreciable assets, which may be depreciated over a depreciable life estimated to be 25 years. The investor is in a 50 percent income tax bracket, and it is estimated that about 35 percent of sales proceeds will be required for capital gains and related taxes on disposition of the investment.

It should be noted that this program was specifically designed to use an average rate of capital gains and other taxes payable on disposition, to permit the program's use despite changes in specific tax laws. Average capital gains rates may be obtained from people in the real estate tax field or by making separate hand calculations in representative situations.

Calculations of the after tax overall rate for the investor in our example are as follows:

Screen Shows:	**You Type:**
REQUIRED AFTER TAX EQUITY YIELD RATE	.1
LOAN TO VALUE RATIO	.75
MORTGAGE INTEREST RATE	.0975
TERM OF MORTGAGE	YEARS 25 MONTHS 0
PROJECTION PERIOD	YEARS 10 MONTHS 0
ANTICIPATED CHANGE IN PROPERTY VALUE (+/–)	0
PROPORTION OF VALUE WHICH IS DEPRECIABLE	.8
ASSET'S DEPRECIABLE LIFE	YEARS 25
SELECT ONE OF THE FOLLOWING:	
1. STRAIGHT LINE	
2. DECLINING BALANCE	
OPTION? (1 OR 2)	1
ANNUAL NET OPERATING INCOME	15000
INVESTOR'S TAX RATE	.5
CAPITAL GAINS RATE	.35
ANY CORRECTIONS (Y OR N)?	N

Results of calculation are:

OVERALL CAPITALIZATION RATE:		
ADJUSTED FOR INTEREST DEDUCTIONS ONLY	.124430	
DEDUCT DEPRECIATION ALLOWANCE	–.017945	
AFTER TAX OVERALL RATE		.106485
INDICATED VALUE		$140,864

At this point, it appears that the investor's required after tax equity yield of 10 percent cannot be achieved with this combination of facts and the proposed purchase price of $150,000. It is possible, however, that some change in the income tax structuring of the investment might help the investment picture, and it is decided to test the use of accelerated depreciation using a 150 percent declining balance method which is found to be available in this instance.

Screen Shows:	**You Type:**
ANY CORRECTIONS (Y OR N)?	Y
WHICH ONE (1-12)	9
SELECT ONE OF THE FOLLOWING OPTIONS:	
1. STRAIGHT LINE	
2. DECLINING BALANCE	
OPTION (1-2)	2
DECLINING BALANCE RATE (%)	1 5 0
ANY CORRECTIONS (Y OR N)?	N

AFTER TAX OVERALL CAPITALIZATION RATE		
OVERALL CAPITALIZATION RATE:		
ADJUSTED FOR INTEREST DEDUCTIONS ONLY	.124430	
DEDUCT DEPRECIATION ALLOWANCE	–.022473	
AFTER TAX OVERALL RATE		.101957
INDICATED VALUE		$147,120

Based upon these calculations it would appear that there is an advantage to using the accelerated depreciation method, but that the price of $150,000 for the property is not yet justified. Users should be cautioned in making this change that it may have been proper to **increase** the projected capital gains rate to account for any income tax penalties at time of sale which are imposed on the accelerated depreciation method, or other factors.

An advisor to the investor in our example, after review of the above information, informs the investor that a 20 year depreciable life may be supportable. (Note that for purposes of this program this could be the average life under component depreciation, or other methods of scheduling). The effect of this change may be tested as follows:

Screen Shows:	You Type:
ANY CORRECTIONS (Y OR N)?	Y
WHICH ONE (1-12)	8
ASSETS DEPRECIABLE LIFE	YEARS 2 0
ANY CORRECTIONS (Y OR N)?	N

AFTER TAX OVERALL CAPITALIZATION RATE:		
OVERALL CAPITALIZATION RATE:		
ADJUSTED FOR INTEREST DEDUCTIONS ONLY	.124430	
DEDUCT DEPRECIATIONALLOWANCE	−.026909	
AFTER TAX OVERALL RATE		.097521
INDICATED VALUE		$153,813

Under the various presumptions and data stated above, it appears that a 10 percent after tax equity yield could be accomplished with accelerated depreciation and a depreciable life of 20 years, if these are available for this investment. Before making final decisions, these approximations should be worked in detail — particularly the question of probable taxes payable on resale.

Print Option

After screen display of results, the question ANY CORRECTIONS (Y OR N)? is asked to permit corrections or repeated screen variations. Once this question is answered N, the question WOULD YOU LIKE A PRINTED COPY OF THIS ANALYSIS (Y OR N) is asked if your printer is attached and turned on. Y produces a printed copy, and N returns control to the start of the program.

Important Information for Cassette Users

Free Modification for LEVEL II Units

A modification that helps cassette loads in LEVEL II computers is available **free** to TRS-80 LEVEL II owners. This modification makes the volume setting less critical so that variations in different tapes usually will not require volume readjustments.

Some of the more recent LEVEL II Keyboard units have had this modification factory-installed. To see if the modification has been included in your computer, look at the catalog number on the bottom of the keyboard case. The modification has been made if the number ends in -1. For example, if the number is 26-1004-1, the modification has already been installed; if the number is 26-1004, the modification has not been installed.

If the number does not end in -1 and you have not already had the cassette modification installed by Radio Shack, you may arrange for installation at your local Radio Shack store.

Using Your Cassette Deck

Many factors affect the performance of a cassette system. The most significant one is volume. Too low a volume may cause some of the information to be missed. Too high a volume may cause distortion and result in the transfer of background noise as valid information.

Three different cassette models have been supplied with the TRS-80 system – the CTR-40, CTR-41 and CTR-80. Each model has its own loading characteristics. The table below gives suggested volume ranges for each of the CTR models. Figures are for systems **without** the CLOAD modification.

Notice that volume ranges for LEVEL I and LEVEL II are different. This is because the LEVEL II data transfer rate is faster (500 baud vs. 250 baud). Also, notice that pre-recorded Radio Shack programs need a slightly **higher** volume setting than that required by your own CSAVEd tapes. The pre-recorded tapes are produced with high-speed audio equipment at a slightly lower level than the CSAVE process provides.

RECORDER MODEL	USER-GENERATED TAPES		PRE-RECORDED RADIO SHACK TAPES	
	LEVEL I	LEVEL II	LEVEL I	LEVEL II
CTR-40	YELLOW LINE	RED LINE	YELLOW LINE	RED LINE
CTR-41	6 – 8	4 – 6	6½ – 8½	5 – 7
CTR-80	4½ – 6½	3 – 5	5½ – 7½	2½ – 5

Recommended Volume Settings for RADIO SHACK Cassette Decks

(With CTR-40 and CTR 80, to increase volume, turn the control to the left. With CTR-41, turn control to the right.)

When information is being loaded from the cassette tape, two asterisks will appear on the screen. The one on the right will flash on or off each time a new line of data or program is read in. If the asterisks do not appear, or the one on the right does not flash, then the volume setting is probably too low. If the asterisks appear but one is not flashing, try increasing the volume setting. Use the reset button to stop the cassette and return control to you if loading problems occur.

Radio Shack programs are recorded at least twice on each tape (usually once on each side). You should do the same when you record programs on tape. This will give you a back-up if one does not load properly or if it becomes damaged.

Important Note: The CTR-41 requires that you keep the supplied "dummy plug" in the **MIC** jack at all times. However, the CTR-40 and the CTR-80 should never be used with the "dummy plug."

LEVEL I

Sometimes you will get an error message during an attempted CLOAD. This means that some information was lost or garbled. Adjust the volume level slightly and try again.

LEVEL II

In case of an error message, proceed as above. In LEVEL II, there is also a rare case in which the program has not loaded correctly *even though no error is generated.* So, after CLOADing a program, be sure to LIST it. If some data was garbled, then at some point in the listing, the display will be filled with meaningless words and characters. Adjust the volume and try again.

Hints and Tips

Computer tapes should be stored in a relatively dust-free area (a cassette case is recommended) and protected from high temperatures. Magnetic and electrical fields may alter recorded information, so avoid them (i.e. household appliances, power sources such as transformers and television sets, etc.).

The cassette deck supplied with the TRS-80 is very compatible with the system and will perform its duties with great success. To keep the cassette deck in top condition and thus minimize your problems, you sould periodically perform some routine maintenance on it. Dirty heads can cause as much as a 50% loss in volume. Also, heads become magnetized with use and may cause distortion. We recommend that you clean the head, capstan and pinch roller after every four hours of operation. Heads on new recorders should always be cleaned before use.

Note: Cassette cleaning and demagnetizing accessories are available from your local Radio Shack store.

IMPORTANT NOTICE

ALL RADIO SHACK COMPUTER PROGRAMS ARE DISTRIBUTED ON AN "AS IS" BASIS WITHOUT WARRANTY

Radio Shack shall have no liability or responsibility to customer or any other person or entity with respect to any liability, loss or damage caused or alleged to be caused directly or indirectly by computer equipment or programs sold by Radio Shack, including but not limited to any interruption of service, loss of buisness or anticipatory profits or consequential damages resulting from the use or operation of such computer or computer programs.

NOTE: Good data processing procedure dictates that the user test the program, run and test sample sets of data, and run the system in parallel with the system previously in use for a period of time adequate to insure that results of operation of the computer or program are satisfactory.

RADIO SHACK A DIVISION OF TANDY CORPORATION

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