TEXAS INSTRUMENTS

BA II Plus™
Advanced Business Analyst Calculator
Quick Guide to Settings and Concepts

Purpose of Guide

This Quick Guide is a supplement to the BA II Plus Guidebook. It includes brief examples of commonly used BA II Plus calculator settings and financial management concepts. Refer to your BA II Plus Guidebook for detailed BA II Plus instructions.

Keys and 2nd Functions

The primary function of each key is printed on the key. For example, press ON/OFF to turn the calculator on or off. Some keys provide a secondary function.

The secondary function is printed above the key. When you press the 2nd key, the character, abbreviation, or word printed above a key becomes active for the next keystroke. For example, press 2nd [QUIT] to leave a prompted worksheet and return to standard-calculator mode.

Decimal Place Settings

The BA II Plus displays two decimal places by default. You can change how many decimal places the calculator displays. You can display up to eight decimal places.

To set the number of decimal places to four:

Press	Display
[2nd] [Format] 4 [ENTER]	DEC = 4.0000
[2nd] [QUIT]	0.0000

This four-decimal setting continues indefinitely (even though the calculator is turned off and on), until you change it.

Payment and Compounding Settings (P/Y, C/Y)

The BA II Plus defaults to 12 payments per year (P/Y) and 12 compounding periods per year (C/Y). You can change one or both of the settings to any number. The examples below assume the BA II Plus is set to four decimal places.

To set both the P/Y and the C/Y to 1:

Press	Display
[2nd] [P/Y] 1 [ENTER]	P/Y = 1.0000
[↓]	C/Y = 1.0000
[2nd] [QUIT]	0.0000

The above example shows annual compounding. You may want to set the P/Y to a different number than the C/Y. The following example shows how to set the BA II Plus for a monthly payment that is compounded quarterly.

To set the P/Y to 12 and the C/Y to 4:

Press	Display
[2nd] [P/Y] 12 [ENTER]	P/Y = 12.0000
[↓]	C/Y = 12.0000
4 [ENTER]	C/Y = 4.0000
[2nd] [QUIT]	0.0000

The P/Y and C/Y settings continue indefinitely (even though the calculator is turned off and on), until you change them.

To calculate the future value of a dollar:

What is the future value of $1.00 invested for five years at an interest rate of 7% compounded annually? For this example, set P/Y and C/Y to 1.

Press	Display
[2nd] [CLR TVM]	0.0000
1 [+/−] [PV]	PV = ⁻1.0000
5 [N]	N = 5.0000
7 [I/Y]	I/Y = 7.0000
[CPT] [FV]	FV = 1.4026

Beginning- and End-of-Period Settings (BGN and END)

The BA II Plus can assume that payments occur either at the beginning (BGN) of a period or at the end (END) of a period. The BA II Plus default setting is END.

To set the calculator to beginning-of-period:

Press	Display
2nd [BGN]	END
2nd [SET]	BGN
CE/C	0.0000

A small BGN appears above the number display, indicating the mode is beginning-of-period. The BGN setting continues indefinitely (even though the calculator is turned off and on), until you change it.

To set the calculator back to end-of-period:

Press	Display
2nd [BGN]	BGN
2nd [SET]	END
CE/C	0.0000

Once you press 2nd [BGN], the 2nd [SET] keys act as a toggle switch between BGN and END.

Resetting the Calculator

Important: Reset the BA II Plus only when you want to erase all data stored in all memories and restore all settings to their factory defaults.

Resetting the calculator:

- Reverts decimals to two places.
- Reverts P/Y and C/Y to 12.
- Reverts to end-of-period payments (END).
- Erases all numbers stored in all ten memories.
- Clears the display and any unfinished calculation.
- Returns the calculator to standard-calculator mode.
- Clears all worksheet data and restores the default worksheet settings. Refer to the Notes section for each worksheet in the BA II Plus Guidebook to see how reset affects specific worksheets.

To clear all data and restore the calculator to factory defaults:

Press	Display	
[2nd] [Reset]	RST?	Lets you reconsider resetting the calculator

You have two options:

- [CE/C]   (To cancel the reset operation)

  — or —

- [ENTER]   (To reset the calculator)

Whether you cancel or reset the calculator, the BA II Plus returns to operation in the standard-calculator mode.

Clearing the Calculator

Clearing the calculator is different from resetting it. You can clear one or more values while retaining other data, whereas resetting the calculator clears all data and restores all settings to factory defaults.

To clear the calculator:

Press	To clear
→	One character at a time (including decimal points)
CE/C	An incorrect entry, an error condition, or error message
2nd [QUIT]	All pending operations in standard-calculator mode — or — Out of a prompted worksheet and return to standard-calculator mode (values previously entered remain in the prompted worksheet)
CE/C CE/C	An unfinished calculation — or — A keyed, but not yet entered, variable value in a prompted worksheet — or — Out of a prompted worksheet and return to standard-calculator mode (values previously entered remain in the prompted worksheet)
CE/C 2nd [CLR TVM]	All values (N, I/Y, PV, PMT, FV) in the TVM (Time-Value-of-Money) worksheet
2nd [CLR Work] *	A prompted worksheet (other than TVM) Also returns you to the first variable in the worksheet
2nd [MEM] 2nd [CLR Work] *	All values stored in all 10 memories
0 STO and the key for the number of the memory (0-9)	One memory

* You must be in the worksheet you want to clear before using 2nd [CLR Work]. Refer to the Notes section for each worksheet in the BA II Plus Guidebook to see how clearing affects specific worksheets.

Time-Value-of-Money (TVM)

The TVM concept assumes a dollar today is worth more than a dollar in the future because the dollar received today can earn interest until the time the future dollar is received. Use the TVM worksheet to analyze equal cash flows such as loans, annuities, mortgages, leases, and savings.

TVM variables

There are five TVM variables, which you can enter in any sequence. You can check the value of any variable during the calculation by pressing RCL and the variable key.

Variable Key	Meaning
N	Total number of payment periods
I/Y	Annual interest rate
PV	Present value
PMT	Payment amount
FV	Future value

You will usually enter three variables and calculate the fourth. In some FV calculations, you will enter four variables and calculate the fifth. Changing one variable does not affect either entered or calculated values in the other variables.

Positive and negative cash flows

In general, each Time-Value-of-Money problem will have at least two cash flows: one must be an outflow which is entered or computed as a negative value; the other must be an inflow which is entered or computed as a positive number.

To clear the TVM worksheet:

Press	Display
CE/C	0.00
2nd [CLR TVM]	0.00

The TVM examples use a two-decimal setting.

Time-Value-of-Money (TVM) (continued)

To calculate a car payment:

If your loan amount is $15,000 with an interest rate of 6.9%, how much will you pay per month if you spread your payments over four years?

For this example, set the BA II Plus to:

- Two decimal places
- 12 for P/Y and C/Y
- End-of-period payment
- Clear the TVM worksheet (see page 7)

Do not clear the TVM worksheet again until you have completed the entire car payment example.

Press	Display	
15000 PV	PV = 15,000.00	
48 N	N = 48.00	12 payments per year for four years
6.9 I/Y	I/Y = 6.90	
CPT PMT	PMT = ⁻358.50	Payment per month

You can always change one or more variables and recompute. The next example changes the payment variable, without disturbing the other TVM variables.

Press	Display	
300 +/– PMT	PMT = ⁻300.00	Payment is a negative number
CPT N	N = 59.12	Almost five years

If you want to repay the loan within four years, but need the payment to remain $300.00, you could determine the interest rate you would need.

Press	Display	
48 N	N = 48.00	
CPT I/Y	I/Y = ⁻1.98	

Since you probably won't find an interest rate that low, increasing your payment term to 60 months (five years) seems to be the most viable option.

Time-Value-of-Money (TVM) (continued)

To calculate a mortgage payment:

If your mortgage amount is $150,000 with an interest rate of 8%, how much will you pay per month if you spread your payments over thirty years?

For this example, set the BA II Plus to:

- Two decimal places
- 12 for P/Y and C/Y
- End-of-period payment
- Clear the TVM worksheet (see page 7)

Press	Display	
150000 PV	PV = 150,000.00	
8 I/Y	I/Y = 8.00	
30 2nd [xP/Y] N	N = 360.00	12 payments per year for 30 years
CPT PMT	PMT = ⁻1,100.65	Payment per month

Your monthly payment will be $1,100.65.

To calculate the future value of a current amount:

What is the future value of $2,000.00 invested for 7 years at an annual percentage yield (APY) of 9?

For this example, set the BA II Plus to:

- Two decimal places
- 1 for P/Y and C/Y
- End-of-period payment
- Clear the TVM worksheet (see page 7)

Press	Display
7 N	N = 7.00
9 I/Y	I/Y = 9.00
2000 +/− PV	PV = ⁻2,000.00
CPT FV	FV = 3,656.08

The future value is $3,656.08.

Time-Value-of-Money (TVM) (continued)

To calculate monthly retirement income:

If you are 25 years old and want to retire at age 60 with $1,000,000.00, how much do you need to save each month? In this example, your savings account pays 6% interest, compounded monthly.

For this example, set the BA II Plus to:

- Two decimal places
- 12 for P/Y and C/Y
- End-of-period payment
- Clear the TVM worksheet (see page 7)

Press	Display	
1000000 FV	FV = 1,000,000.00	
420 N	N = 420.00	12 monthly payments for 35 years
6 I/Y	I/Y = 6.00	
CPT PMT	PMT = ⁻701.90	

If saving $701.90 per month is too much, you can change one or more variables and recompute. Rather than seeing how much you need to save each month, the next example forecasts your monthly income.

To calculate monthly income:

Assuming you will live 20 years after retiring at age 60, and will earn 8% on your investments, what will be your monthly income from the $1,000,000.00?

For this example:

- Clear the TVM worksheet (see page 7)

Press	Display	
1000000 +/− PV	PV = ⁻1,000,000.00	This is a negative number
240 N	N = 240.00	Months from age 60 to 80
8 I/Y	I/Y = 8.00	Compounded monthly
CPT PMT	PMT = 8,364.40	

If you saved $1,000,000.00 by age 60, you could retire and receive $8,364.40 per month for 20 years.

Bond Valuation

You can use the BA II Plus to calculate bond maturity based on either an even or uneven number of years. An even number of years means that the month and day of the start and maturity dates are the same, with only the year changing. An uneven number of years means that the month and/or day vary, in addition to the year.

For bond maturity based on an even number of years, use either the:

- TVM worksheet

  — or —
- Bond worksheet

For bond maturity based on an uneven number of years, use the:

- Bond worksheet

Examples of using both worksheets to calculate the value of a bond for an even number of years follow.

To calculate the value of a bond using the TVM worksheet:

Assume the current date is January 1, 1999 and you want to know the value of a bond that matures in 15 years (on January 1, 2014). The bond has a face value of $1,000.00 and a coupon rate of 8%, which is paid semi-annually. Your required rate of return is 10%.

For this example, set the BA II Plus to:

- 2 for P/Y and C/Y
- 4 decimal places
- End-of-period payment
- Clear the TVM worksheet (page 7)

Press	Display	
30 N	N = 30.0000	2 payments × 15 years
10 I/Y	I/Y = 10.0000	Annual interest rate
40 PMT	PMT = 40.0000	8% interest ÷ 2 coupon payments per year
1000 FV	FV = 1,000.0000	Face value
CPT PV	PV = ‾846.2755	Present value

Bond Valuation (continued)

To calculate the value of this bond using the Bond worksheet:

Next, the Bond worksheet is used to calculate the example from the previous page.

Refer to Chapter 5 of your BA II Plus Guidebook for Bond worksheet details.

Press	Display	
[2nd] [Bond]	SDT = (Old contents)	Access the worksheet
[2nd] [CLR Work]	(Old contents)	You must be in a worksheet before you can clear it
1.0199 [ENTER]	SDT = 1-01-1999	Start date
[↓]	CPN = 0.0000	
8 [ENTER]	CPN = 8.0000	Coupon rate in percent
[↓]	RDT = (Old contents)	
1.0114 [ENTER]	RDT = 1-01-2014	Redemption date
[↓]	RV = 100.0000	100% of redemption value
[↓]	ACT	Actual day-count method
[2nd] [SET]	360	360 day-count method*
[↓]	2/Y	Two coupons per year
[↓]	YLD = 0.0000	
10 [ENTER]	YLD = 10.0000	Yield to redemption
[↓]	PRI = 0.0000	
[CPT]	PRI = 84.6275	100% of redemption value

* Bonds are usually calculated on a 360 day year, rather than a 365 day year.

Cash Flow Analysis (CF)

The BA II Plus Cash Flow worksheet analyzes unequal cash flows by calculating the internal rate of return (IRR) and/or net present value (NPV).

While using any BA II Plus prompted worksheet, look for small words and symbols that appear in the top line of the display. These help you to remember what you can and cannot do within a worksheet.

Refer to Chapter 2 of your BA II Plus Guidebook for an overview of worksheet operations, and to Chapter 4 for Cash Flow worksheet details.

To calculate the IRR and NPV for a cash investment:

This example assumes you have an investment of $7,000 that is projected to generate a 20% return. Over the next six periods, the investment will generate the cash flows shown below.

Year	Cash Flow No.	Cash Flow Estimate
1	1	3,000
2-5	2	5,000 each year
6	3	4,000

Next, you will access and clear the Cash Flow worksheet, enter the data, compute the IRR, and compute the NPV using an interest rate per period (I) of 20%.

Press	Display	
CF 2nd [CLR Work]	CFo = 0.00	You must be in a worksheet before you can clear it
7000 +/− ENTER	CFo = ⁻7,000.00	Initial cash flow
↓ 3000 ENTER	C01 = 3,000.00	Cash flow for first year
↓	F01 = 1.00	Frequency of C01 is 1
↓ 5000 ENTER	C02 = 5,000.00	
↓ 4 ENTER	F02 = 4.00	Frequency of C02 is 4, which represents cash flows for years two through five
↓ 4000 ENTER	C03 = 4,000.00	Cash flow for sixth year
↓	F03 = 1.00	Frequency of C03 is 1

Cash Flow Analysis (CF) (continued)

To compute the internal rate of return (IRR):

Press	Display	
IRR	IRR = 0.00	Look for the word Compute in small letters at the top of the display
CPT	IRR = 55.63	Look for an asterisk (*) in the display

When the word Compute appears in the display, it means the only function you can perform is to compute the value of IRR. The asterisk (*) indicates a computed answer.

To compute the net present value (NPV), using a 20% interest rate:

Press	Display	
NPV	I = 0.00	Look for the word Enter in small letters at the top of the display
20 ENTER	I = 20.00	
↓ CPT	NPV = 7,625.99	Compute the net present value

When the word Enter appears in the display, it means you can enter a different interest rate. If you enter a different interest rate and press ↓ CPT, the computed NPV reflects the change. When the NPV displays, you can press ↑ to return to the interest rate and change it again.

Clearing the Statistics Worksheet

The Statistics worksheet is comprised of two portions, data entry and statistical calculation. You enter values in the data-entry portion and compute results in the statistical-calculation portion.

You must be in a worksheet before you can use [2nd] [CLR Work] to clear it. Be sure you are in the correct portion of the Statistics worksheet before you clear it.

Refer to Chapter 7 of your BA II Plus Guidebook for Statistics worksheet details.

To access and clear the data-entry portion of the worksheet:

Press	Display	
[2nd] [Data]	X01	Old contents appear, if any
[2nd] [CLR Work]	X01 = 0.00	

To access the statistical calculation portion of the worksheet:

You do not need to clear the statistical calculation portion of the worksheet because clearing the data portion of the Statistics worksheet leaves zero data to compute.

Press	Display	
[2nd] [Stat]	LIN	Standard linear regression

Press [2nd] [SET] to display other statistics calculation methods. The other calculation methods are:

• Ln   Logarithmic regression

• EXP   Exponential regression

• PWR   Power regression

• 1-V   One-variable statistics

If the data portion of the worksheet contains information, press [↓] to step through the calculated values. If the data portion of the worksheet does not contain information, an error message appears when you press [↓].

Storing and Using Values in Memory

The BA II Plus has 10 separate memories. You can perform memory operations in either the standard-calculator mode or in the Memory worksheet. Refer to pages 1-16 and 8-19 in your BA II Plus Guidebook for Memory details.

To store a value in memory:

This example shows how to store the number 10 in memory 1 and the number 20 in memory 2. Repeat the process to store numbers in other memories. The memories are numbered 0 through 9.

Press	Display
10 [STO] 1	10.00
20 [STO] 2	20.00

To add stored values and store the sum in memory:

You can perform mathematical operations other than addition on stored numbers.

Press	Display
[RCL] 1 [+]	10.00
[RCL] 2	20.00
[=]	30.00
[STO] 3	30.00

To display each value stored in memory:

You can press [RCL] and a digit key 0 through 9 to display a previously stored value, or you can use the Memory worksheet to display stored values. This example uses the Memory worksheet.

Press	Display	
[2nd] [MEM]	M0 = 0.00	You access the Memory worksheet
[↓]	M1 = 10.00	
[↓]	M2 = 20.00	
[↓] (repeat to display other memory values)	M3 = 30.00	After displaying M9, press [↓] to return to M0.

Storing and Using Values in Memory (continued)

To clear a stored value from memory:

You can clear a value without disturbing values stored in other memories. A new value overwrites a previously stored value. Storing a value of zero is the same as clearing the memory.

Press	Display
0 [STO] 1	0.00
0 [STO] 2	0.00
0 [STO] 3	0.00

To clear all stored values from all memories:

This erases all numbers stored in all memories and reverts M0 through M9 to 0.00.

Press	Display	
[2nd] [MEM]	M0 =	Old contents appear, if any
[2nd] [CLR Work]	M0 = 0.00	

Acknowledgments/Bibliography:

Appreciation goes to the following for their contributions to the BA II Plus Quick Guide:

Emery, Douglas R., and John D. Finnerty. *Corporate Financial Management*. Prentice-Hall, Inc., a Simon & Shuster Company, Upper Saddle River, NJ 1997.

Keown, Arthur J., David F. Scott, Jr., John D. Martin, and J. William Petty. *Basic Financial Management Seventh Edition.* Prentice-Hall, Inc., a Simon & Shuster Company, Upper Saddle River, NJ 1996.

Gallagher, Timothy J., and Joseph D. Andrew, Jr. *Financial Management Principles and Practice*. Prentice-Hall, Inc., a Simon & Shuster Company, Upper Saddle River, NJ 1997.

For more information:

1-800-TI-CARES (1-800-842-2737)
ti-cares@ti.com
http://www.ti.com/calc