

# The HP 30b Business Professional

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**What is it?** The HP 30b is Hewlett Packard's new mid-range financial calculator. This machine is a very welcome addition to HP's financial calculator line. The HP 30b comes with a very small printed manual, which certainly seems to be the continuing trend. A larger PDF manual is available online as well as 40 learning modules that go into greater detail on how to use the HP 30b. This review will focus on the new features found on the HP 30b and differences between it and the HP 20b.



**Physical differences.** First off, the HP 30b uses rotate and click keys. This is a welcome improvement over the HP 20b keys, which many found to be inadequate. While the author never had any real problems with the HP 20b keys, it certainly is nice to have a good click when pressing a key. Secondly, the HP 30b comes with a metallic-looking faceplate compared to the shiny black faceplate on the HP 20b. The accompanying picture on the HPCC website does not quite do the real color justice – the real calculator color is more bronze/copper than pure silver as the picture would suggest. The back of the HP 30b is the same black plastic as on the HP 20b. The HP 30b comes with a slip case to protect it.

**Bond calculations.** The HP 30b includes two bond duration calculations – the modified duration and Macaulay duration. These measure a bond’s price sensitivity to fluctuations in interest rate movements by giving what is essentially a time value of money weighted average time to maturity. While the modified duration has been in other manufacturer’s calculators before, this may be the first time the Macaulay duration has ever been on a preprogrammed calculator.

**MIRR and FMRR.** The HP 30b extends the usefulness of the HP 20b’s cash flow analysis tools by including Modified Internal Rate of Return and, for the first time ever in a financial calculator, the Financial Management Rate of Return. Both of these tools address a problem with the basic IRR that occurs when the signs of cash flows switch from negative to positive to negative, etc. – there can be multiple interest rates that make the present value of the cash flows equal to the cost, which is the definition of the IRR. That’s a particular problem if you’re trying to use IRR to make a decision. MIRR and FMRR provide one rate of return that more accurately reflects the return an investor receives. They differ on how they manipulate any negative cash flows after the initial cash outlay.

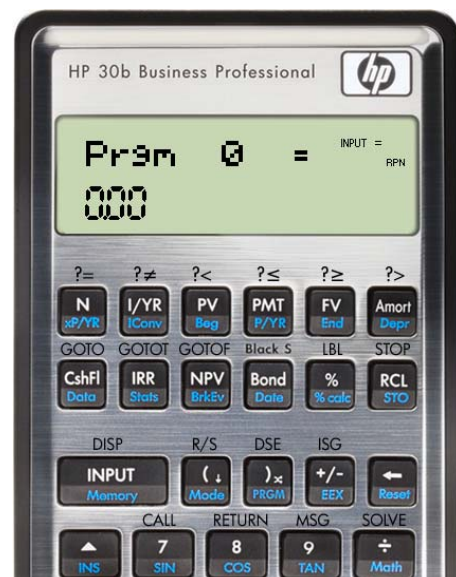
**Black-Scholes.** The HP 30b includes a menu that computes put and call option prices for European options using the Black-Scholes method. While Tony Hutchins provided the programs to compute these for the presently shipping HP 12c calculator manual, this is the first preprogrammed financial calculator from HP to have this built-in. This menu is invoked using the shift+hold method and is labeled on the keyboard above the BOND key.

**Canadian Mortgages.** A new Mode menu setting allows the choice of TVM Standard or TVM Canada. When TVM Canada is chosen, the compounding periods per year can be a different value from the payments per year. Canada is the name given since Canadian mortgages compound interest semiannually while having monthly payments, but any combination of compounding and payment frequencies per year can be specified.

**Other.** The Probability sub-menu in the Math menu has been extended by including the binomial probability distribution. There is also a choice in the Stats menu for frequency statistics, which is quite useful for analysis of grouped data. The Math menu has two new functions: IP for integer part and FP for fractional part.

**Still missing?** In the earlier HP 20b review, several things were listed as missing. Of these, the shift key position being more centrally located and the lack of a primary key for storing numbers remain on the wish list.

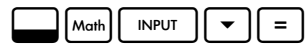
**Found? Programming.** Yes, that’s correct. The HP 30b contains programming abilities that are a mixture of several things: key recording macros, RPN and RPL too. Programming commands are mapped to the shift-hold positions of the top 4 rows of keys. These commands are not printed on the faceplate and will not execute in run mode, but only in program editing mode. To help the user who



wants to write programs more easily remember the command locations, a clear, thin, sticky overlay is provided which lays over the top four rows of keys.














The program catalog is entered by pressing shift and then the close parenthesis key. There are 10 program slots available in the program catalog (Prgm 0 through 9) and 290 bytes of programming space available on the machine. Note however that program memory cannot be backed up to any external device. Programs can be assigned to primary keys, shifted keys and shift-hold key positions. Six conditionals are present comparing two values. Each comparison pushes a 1 if true or 0 if false to the stack. Conditional transfers are goto if true (displayed as GT in a program but GOTOT on the keyboard overlay) and goto if false (displayed as GF in a program, but GOTOF on the keyboard overlay), but note that these conditionals consume the argument on the stack. A quick test for  $x=0$ ? and a branch to a label if true is (of all things) merely to place a GF XY instruction in a program and if the value in X is equal to zero, a branch to label XY will occur. This works because a zero is a false argument and GF will branch to the indicated label if the display contains a zero. An unconditional goto is also provided. Destinations for these gotos are any of 100 global numeric labels, 00 through 99. Four levels of subroutines are available using the CALL and RTN commands. Values can be displayed while a program is running using the DISP command. Even a short prompt of letters can be displayed using the MSG command. This has been put to good use to make a “high – low” number guessing game more fun.




If viewed as primarily a “macro recording” ability then some of the operating characteristics of HP 30b programming will make more sense. For example, to access the inverse sine function in the Math menu, the program steps will look like this:

 , which will take four program steps, take four bytes and show as Math Input Down = on four lines in the program listing. Each keypress required to navigate through a menu is recorded as a separate step and uses a byte. Some commands are merged and shown as one step, however, such as store, recall, and gotos.

For what are 290 bytes good? More than you might think. It is very easy to use these abilities to bring functions buried in menus out to the keyboard for much easier access. If you find yourself needing access to the inverse trig functions, short programs can pull them out of the Math menu and be assigned to the shift-hold locations for sine, cosine and tangent. If you find the need to use the built-in probability distributions, they can be brought out of the Math menu and assigned to keys. This is a great time saver. Short programs have also been written for things such as a prime factor finder, a translation of the HP 25 lunar lander game, base conversions for bases 2-10 and more.

**Found? HP Solve.** The solver is accessible by first writing a program that evaluates an equation such that it would equal zero, using memory registers to represent variables in the equation. For example, an equation of  $X - Y = Z$  would be rewritten as  $X - Y - Z = 0$  and entered as a program like this: RCL 1 RCL 2 - RCL 3 - RTN. Memory 1 would represent X, memory 2 represents Y and memory 3 represents Z. Store values into memories 2 and 3 and SOLVE 1 will find the value of memory 1 that makes the equation equal to zero. This forms the basis for the generalized odd days loan solver program found in the HP Solve examples learning module. This program includes conditional tests and branching and is an indication of the usefulness of the included HP Solve functionality.

**What are some other goodies included?** The mode menu settings can now be stored and recalled by pressing store or recall and then  . This key sequence brings up a 12 digit number with each position corresponding to a mode menu item and its setting. The two rightmost digits for example control the number of decimals displayed. Pressing      in run mode or in a program will change the number of decimals displayed to four regardless of the original value. Pressing       will change the operating mode to RPN and since 14 is an invalid value for the number of decimal digits displayed, will not change the display setting. This is described and a table of these values shown in the Programming Reference learning module.

The 100 memory locations used to store up to 50 pairs of statistics or cash flow data can be addressed indirectly using a location stored in memory 0. If 5 is stored in memory 0, the key sequence    will store the value in X into the 6<sup>th</sup> position of the statistics data area, since it is addressed starting with position 0. This allows for the use of a rather large data set and has already been used to compute and store nearly 700 digits of PI on the HP 30b as shown in the Programming Examples learning module.

And, of course, all the existing scientific functions (and other financial functions) are still present in the HP 30b.

**Conclusion.** This is a good financial machine that addresses many wish-list items left unfulfilled from the HP 20b. In many ways, this is the most powerful financial calculator HP has ever made. It is certain to give fits to the financial calculator designers at a certain company near Dallas, since there are a large number of empty spaces next to their models on any comparison chart. Now, HP, we're all still hoping (and waiting) for a new low-end scientific model ...