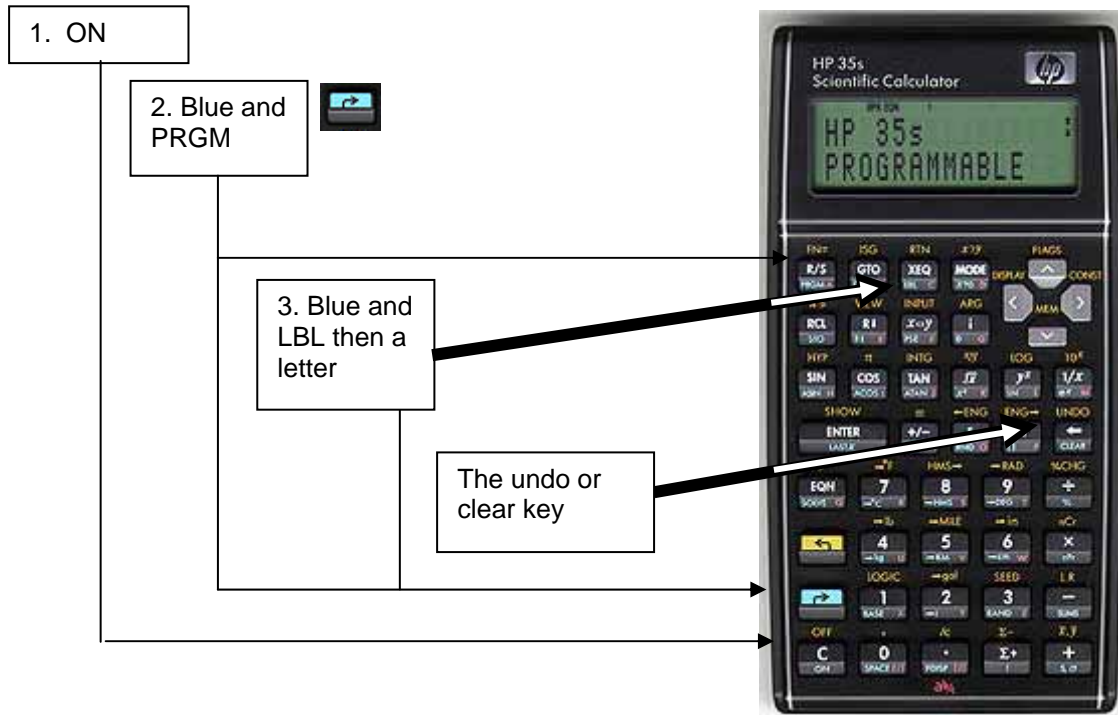


THE HP 35S PROGRAMMABLE CALCULATOR

A simple horizontal dial as a program. Not as an equation



Turn the device on, use the  blue key and then PRGM which is the top left key.

Then use the blue key and then LBL and enter a single letter such as:-

- H horizontal dial
- V vertical
- D declining vertical

and lines in the program will be that letter and a numeric suffix.

BY THE WAY: if you screwed up and did LBL again, you can undo the label with the UNDO or CLEAR button on the right hand side five buttons up from the bottom.



```

H001 LBL H
H002 INPUT A          yellow shift INPUT (2nd row, 3rd key over)   lAtitude
                        to enter "A" do RCL A, etc
H003 INPUT N          loNgitude
H004 INPUT R          legal ref
H005 INPUT T          time 6 to 18
H006 Z=ATAN(sin(A)*TAN(T*15))
H007 VIEW Z
H008 RTN
    
```

The above does NOT consider longitude nor its difference however

To consider longitude:-

```
H001  LBL  H
H002  INPUT A          yellow shift INPUT (2nd row, 3rd key over)   lAtitude
                          to enter "A" do RCL A, etc
H003  INPUT N          loNgitude
H004  INPUT R          legal ref
H005  INPUT T          time 6 to 18
H006  Z=ATAN(sin(A)*TAN(R-+T*15))
H007  VIEW Z
H008  RTN
```

A big frustration is getting used to being in a program for editing: blue shift, PRGM and exiting that with "C" (bottom left key), to move to execute the program with XEQ (top line, 3rd key in)

Another frustration is the need to enter "RCL" when entering a letter (label) in for example the INPUT, VIEW, or formulae.

Also, the calculator can operate in degrees or radians, and in algebraic mode or reverse polish notation (RPM). Remember to set them. This can be done in a program line with:-

```
H002  MODE 4
      which converts to ALG,
      do NOT type in ALG however
```

similarly H003 MODE 1
converts to DEG, but you yourself cannot enter DEG

So the program would now look like:-

```
H001  LBL  H
H002  ALG          MODE and 4
H003  DEG          MODE and 1
H004  INPUT A          yellow shift INPUT (2nd row, 3rd key over)   lAtitude
                          to enter "A" do RCL A, etc
H005  INPUT N          loNgitude
H006  INPUT R          legal ref
H007  INPUT T          time 6 to 18
H008  Z=ATAN(sin(A)*TAN(R-+T*15))
H009  VIEW Z
H010  RTN
```

Also, there is no method of copying data between a computer and the HP 35S.

Having said all that, the calculator works as advertised, and the program runs correctly. A loop could be added to display all the hours from say 6 to 18.

EQUATION OF TIME as an EQUATION, not as a PROGRAM

A	B	C	D	E
2	340			
3				
4	E = 7.36*Sin(2*3.1416*(b2-4.21)/365) + 9.92*Sin(4*3.1416*(b2+9.9)/365)			
5				
6	-8.47441			

2*3.1416/365 is 0.017214
 4*3.1416/365 is 0.034428

$$E = 7.36 * \sin(0.0172 * (b2 - 4.21)) + 9.92 * \sin(0.0344 * (b2 + 9.9))$$

-8.59081

$$= 7.36 * \sin(0.0172142 * (B2 - 4.21)) + 9.92 * \sin(0.0344284 * (B2 + 9.9))$$

-8.47479

Better resolution

The above works if the HP35S is in RADIAN mode (MODE 2)
 But for degrees (MODE 1) use:-

57.29565	5.729565
↓	↓
0.986299	0.19726

$$= 7.36 * \sin(0.9862987 * (B2 - 4.21)) + 9.92 * \sin(1.9726 * (B2 + 9.9))$$

First, the equation is added, to do this:-

EQN 5th row down, first key

Then, skip past the first two standard equations that come with the calculator, and then start typing

$$= 7.36 * \sin(0.9862987 * (D - 4.21)) + 9.92 * \sin(1.9726 * (D + 9.9))$$

You may use the LEFT and RIGHT scroll keys on the top right to move back and forth.

To run the EQUATION, select the formula, using EQN and the scroll up or down keys and when the EOT formula is on the bottom line of the screen, hit ENTER and it will ask for the variable "D", namely the Julian Day. Enter the JD, hit ENTER, then scroll down, and the resulting EOT is displayed in minutes and tenths of minutes.