CASIO fx-9860G Slim calculator sundial tools

The CASIO FX-9860G Slim graphical calculator can be programmed, however, it also has a spreadsheet which is the simplest option as far as simple sundial work goes. The graphing function is not useful and is extremely cumbersome and does not easily accept simple formulae such as the simple 2 wave EOT, however, the spreadsheet does accept such formulae easily.

The biggest problem I found was editing a cell. The secret is to move the cursor to highlight a cell,

- F2 for edit
- F3 for cell
- and do NOT use the up/down/left/right arrows to move back and forth on the menu line on the bottom of the screen.

Also, turning off the device was one of the many mysteries of the universe, since [SHIFT][AC/on] does not always seem to work. If you do [SHIFT] first, and then after releasing [SHIFT] then you hit [AC/on] then that tends to work.

The drivers for PC:Casio do not work with 64 bit Windows Vista.

I set the Casio spreadsheet options to use RADIANS (which is the default) rather than degrees, since these sheets are then similar to other Illustrating Shadows sheets. To do that,

- go to the main menu,
- then to s-sht,
- then SHIFT then MENU,
- then scroll down to “angle” and
- select F2 for radians.

The syntax for spreadsheet formulae is different, the Casio uses:-

- x in place of "*" for multiply
- ÷ in place of "/" for divide
- and superscripts for ATAN, ASIN, ACOS as SIN-1 etc…

www.casio.com

FX-9860GSlim Detail

A compact, slim body (7/8” at its thickest point), a large, high contrast display with backlight and an easy-to-use icon menu. All the functionality of the FX9860G including USB connectivity (cable included), 1.5 MB flash memory and a natural display option allowing for input and viewing of equations exactly as they appear in the textbook. Also includes syntax help and an on-board function manual, eliminating the need to carry the instruction manual.

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www.illustratingshadows.com

1. ALMANAC

The Casio has no color, my convention is used below which is YELLOW is user alterable data, BLUE is derived data.

JD		LAT	
40		32.75	
EOT MM.MM		DECL	
14.07		-14.67	
RISE NO CORR		SET NO CORR	
6.65		17.35	
LNG		REF	
108.2		105	
HR CORR		MIN CORR	
0.213333		12.8	
EOT AND LNG CORR MM.M			
26.87			
RISE W COR		7.093822	HH.HH
SET W COR		17.8017	HH.HH
JAN	FEB	MAR	
0	31	55	
APR	MAY	JUN	
90	120	151	
JLY	AUG	SEP	
181	212	243	
OCT	NOV	DEC	
273	304	334	

Spreadsheet for Casio fx-9860G Slim

Cell A4 contains
=7.36*SIN(2*3.1416*(A2-4.21)/365) + 9.92*SIN(4*3.1416*(A2+9.9)/365)

Cell C4 contains
=23.45*SIN(2*3.1416*0.9678*(A2-80)/360)

Select a number for a month, e.g. July would be 181, and add the day of the month to get the Julian day, JD

Enter the JD number in cell A2

The EOT is displayed in cell A4

Cell A6 contains
=360*ACOS(TAN(2*3.1416*C2/360)*TAN(2*3.1416*C4/360))/(2*3.1416*15)

Cell C6 contains
=24-A6

NOTE: The Casio uses x in place of "*" for multiply
÷ in place of "/" for divide
and superscripts for ATAN, ASIN, ACOS as SIN $^{-1}$ etc…
The Casio can be set to use degrees as opposed to radians, but for consistency with all the sheets elsewhere, radians were used.

NOTE: The sunrise and set are decimal hh.hh and they are not hh.mm

NOTE: Sunrise and set still need the LONGITUDE and EOT corrections.
and they are shown in rows 13 and 14

2. HORIZONTAL AND VERTICAL DIAL

LAT	LNG	REF	
32.75	108.2	105	
HOUR		HR CORR	M COR
13	HLA	0.21	12.8
H HLA	-6.45		
V HLA	-9.97		
CHECK ANGLE SENSE			

C4 has =(B2-C2)*4/60
D4 has =C4*60
B5 has =360*ATAN(SIN(A2*2*3.1416/360)*TAN(2*3.1416*15*(12+C4-A4)/360))/(2*3.1416)

NOTE: the Casio uses tan-1 and not ATAN
the Casio uses the divide symbol and not /
the Casio uses X and not * for multiply

B6 has =360*ATAN(SIN((90-A2)*2*3.1416/360)*TAN(2*3.1416*15*(12+C4-A4)/360))/(2*3.1416)

OTHER CASIO ISSUES

The documentation is somewhat obscure in that it is not intuitively obvious what functions can be used in a spreadsheet. So here are some clues.

Excel/Open Office
=int(cell)

CASIO
=[OPTN] [>] NUM (F1) ABS
INT
FRAC

so =int(cell) uses the above with INT
so =cell-int(cell) uses the above with FRAC