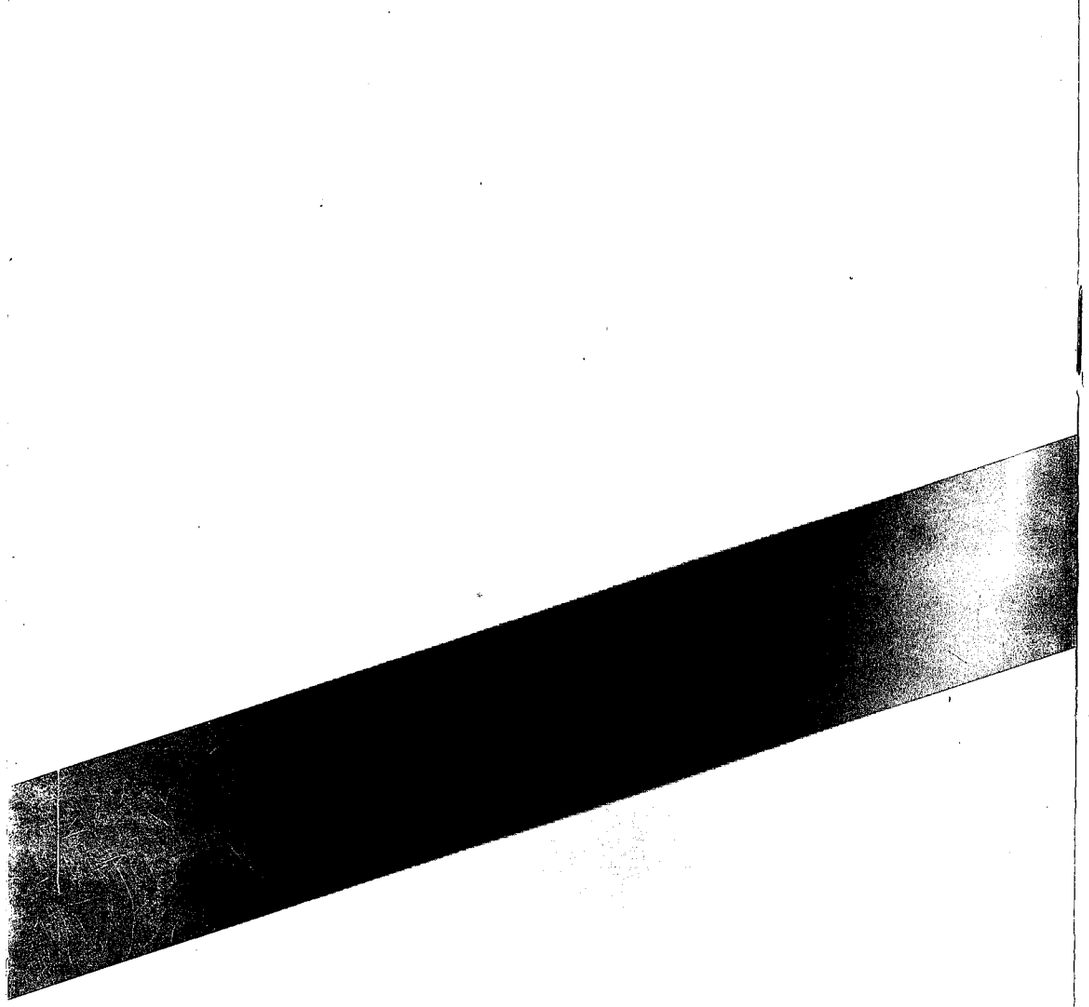


SATURN®
SATURN SYSTEMS, INC.

SATURN-CALC®

SYSTEM SUMMARY

SATURN®
SATURN SYSTEMS, INC.

Electronic spreadsheet...financial forecaster...visible calculator...By whatever name you call it, SATURN-CALC is one of the most powerful business tools you can own. It can simplify expense reporting, tighten inventory control, improve sales reporting procedures, make business projections easier than ever before, and perform many other sophisticated operations.

spreadsheet size

Whatever the job, SATURN-CALC is big enough to handle it. A single spreadsheet can have as many as 16,384 cells and up to 65,000 characters of text. It may contain up to 446 columns (A-QD) and 16,384 rows (1-16,384). And its size **isn't** affected by memory limitations; the amount of memory space available to you can affect the speed with which recalculations are done, but will not limit the size of your spreadsheet.

spreadsheet interface

Moreover, with SATURN-CALC your individual spreadsheets can interact with one another to form complete data applications. Copy information from one spreadsheet to another. Use data from one spreadsheet to calculate values in another. Automatically consolidate data from up to twenty separate stored spreadsheets at once and load the results into the active spreadsheet.

ASCII file structure

SATURN-CALC was programmed in assembly language to maximize system efficiency while minimizing use of memory space. Its file structure is compatible with SATURN-WP and other ASCII-based word processing systems, allowing you to edit and format hard copy reports and merge them with WP documents.

formatting capabilities

SATURN-CALC gives you total control over your spreadsheets' display characteristics. Individual cells can be formatted to display in any of hundreds of numerical, date, text or histogram formats. You can left-justify, right-justify or center text and choose from nine different date display formats.

Highlight key data by boldfacing or underlining cells or display labels in reverse video. Or hide data from view altogether by using the hidden cell format option. Individually adjust column widths or draw lines between columns. Use the Window command to split the screen into two portions, which can then be individually or simultaneously scrolled. In short, each spreadsheet can be tailored to your display needs, whatever those needs may be.

built-in functions

SATURN-CALC comes with over 60 pre-programmed, ready to use formulas, or built-in functions. These include

referential functions that access data from cells in the active or stored spreadsheets, allowing you to base calculations on the contents or locations of those cells;

logical functions that perform calculations based on the truth values of boolean expressions;

register functions that access ten separate registers for temporary storage of data or for use in intermediate calculations;

date functions that let you determine dates or base calculations on the amount of time passed (as for variable interest charges).

There are also **business functions**, **looping functions**, **statistical** and **arithmetic functions**. A complete list of SATURN-CALC's Built-In Functions is included in this System Summary.

product integration

While SATURN-CALC is a powerful stand-alone package, it is also an integral component of SATURN's complete line of DEC-compatible software. SATURN-CALC works with SATURN-WP, SATURN-GRAPH and SATURN-BASE to form a fully-interactive single menu driven system.

Create graphs directly from SATURN-CALC spreadsheets. Load SATURN-WP data entry files or SATURN-BASE output into spreadsheets. Load spreadsheet data into SATURN-BASE reports. Create SATURN-WP spreadsheet command files that automatically load templates into SATURN-CALC. And SATURN's interactive capabilities are constantly growing.

system requirements

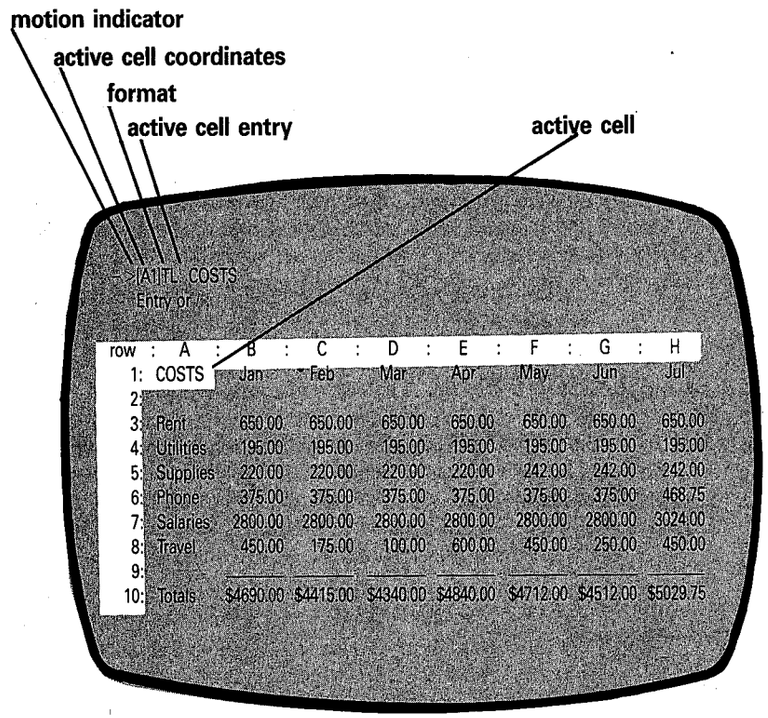
As do all SATURN products, SATURN-CALC operates across the complete spectrum of DEC computer systems:

Computers:

PDP-11
LSI-11
MICRO-11
VAX
PRO-350

Operating Systems:

RSX-11M	MICRO/RSX
RSTS-E	MICRO/RSTS
RT-11	MICRO/RT-11
TSX-Plus	MICRO/TSX-Plus
P/OS	VMS (Native Mode)



motion indicator—indicates the last direction in which the cursor was moved.

active cell coordinates—displays the column letter(s) and the row number.

format—indicates the display characteristics of values. Options: decimal (default), exponential, dollars and cents, text, date, histogram.

active cell entry—shows the entry as it was typed.

active cell—indicates, by cursor position, the cell in which an entry can currently be made.

THE SCREEN

The SATURN-CALC screen consists of two parts: the spreadsheet and the header area.

The **spreadsheet** is a grid of numbered rows (horizontal) and lettered columns (vertical). The intersection of a row and a column is a cell. Data can be entered only into the active cell, which is highlighted by the cursor.

Spreadsheets that are too large to fit on the screen can be scrolled horizontally or vertically. In addition, there is a split screen feature that permits simultaneous viewing of two distinct sections.

The **header area** includes the status line and the prompt/edit line. The status line has information about the location, format and contents of the active cell and the direction of cursor motion; the prompt/edit line is where cell entries are made and edited, commands are given and system messages are displayed.

GETTING STARTED

When you access SATURN-CALC, you may call up an existing spreadsheet or create a new one. If you specify a new spreadsheet, the system asks how many rows and columns you wish to use, then displays a blank spreadsheet of that size.

The prompt/edit line displays this message:

Entry or / :

Your response indicates whether you want to modify the spreadsheet in some way, read about your options, or enter data.

Typing the slash </> puts the system in the command mode, which enables you to make changes to the spreadsheet.

Typing <PF2> or a question mark <?> displays help text that tells you the options available and how to use them.

Pressing any of several movement keys (see below) will move you to a different cell or different portion of the spreadsheet.

Any other character is interpreted as an entry for the active cell.

CURSOR MOVEMENT

SATURN-CALC features automatic cursor advance at the conclusion of each entry. The direction of the movement is set whenever you press an arrow-key, <LF> or <TAB> to either conclude an entry or at the **Entry or /** prompt. An option of the Global command cancels and reinstates automatic motion.

In addition, the following features allow you to move the cursor anywhere on the spreadsheet.

To a specific cell—use the arrow-keys or press <=> and the cell's coordinates or logical name. When the cursor is on a cell on the edge of the screen, pressing an arrow-key moves the screen one column or row in that direction.

To an adjacent screen— press <PF1>, then the desired arrow-key. The part of the spreadsheet on the screen is replaced by an adjacent section of equal size.

To an adjacent row—press <=> <CR> to move the cursor from anywhere on the current row to column A of the next row.

ENTRIES

An entry is a unit of information. You type an entry just as you would write it on a paper spreadsheet. Characters appear on the prompt/edit line as you type them; concluded entries are transfered to the active cell and are also displayed on the status line. There are five kinds of entries:

Text—(e.g., Costs or Net Profit), used to label the rows and columns of numeric entries.

Numbers—(e.g., 43 or 6.52), which may consist of numerals, minus signs and/or decimal points.

Dates—(e.g., 12/1/84 or December 1, 1984 or Monday) the date, year, month or day of week may be displayed in a variety of formats and used in calculations.

Cell References—(e.g., A1 or {MARCH,TRAVEL} or [6,B1+5]), which may be a column & row designation, a logical name or a computed reference using a formula.

Formulas—(e.g., sum(A1...A5) or B5–B4), which allow you to do a variety of mathematical operations with the numbers you have entered.

If the entry is text or a number, it is displayed in the cell. If it is a formula or date, the calculated value is displayed in the cell.

Entries may be a maximum of 142 characters. They are truncated in the cell and on the status line, if necessary, but they appear in full on the prompt/edit line.

text

You can enter text into any cell by preceding the entry with one of these characters:

'	left-justifies text
"	right-justifies text
`	centers text
\	repeats a text-string across a row
\"	repeats text across a row, leaving blank spaces between columns

Or, if inserting text into several adjacent cells, use the Format command to designate those cells to accept any entry as text, eliminating the need for the above special characters.

If text is too long to fit in one cell, it is completed in the cell to the right, provided that cell does not already have an entry.

When working with large spreadsheets, you may use the Title Lock command to keep labels on the screen no matter what part of the spreadsheet is being displayed.

numbers

By default, SATURN-CALC displays numbers with 2 decimal places, both in the cell and on the status line (though the actual number you enter is used in calculation). Thus, an entry of 14 would be displayed as 14.00; 1.9999 would appear as 2.00.

The Format command lets you specify a different number of decimal places for display, as well as giving you such options as dollars and cents notation ($14.00), scientific notation (1.4 E + 01), commas after every third digit (14,000,000), and other options. Such notations need only be entered once, through the Format command, to be automatically applied to each new set of numbers you enter.

When performing calculations, SATURN-CALC uses 15 digits by default, regardless of the number of digits in your entry. However, the Scale function allows you to change the number of significant digits used in single cell calculations, and the Global command lets you make such changes for an entire spreadsheet.

dates

SATURN-CALC lets you display dates in any of nine different formats. Since the dates you enter are stored as integers, regardless of whether they display as names or numbers, they're available for calculations (for example, they can be used in formulas to calculate variable interest rates). And a set of Built-In Date Functions makes those calculations even easier.

cell references

The simplest type of cell reference consists of a column and row designation (e.g., A4, D11, QB2). You can also assign logical names or computed references to cells; used with Get and Lookup functions, these give you powerful table lookup abilities.

Up to 40 **logical names** (of up to 8 characters each) can be assigned to a spreadsheet. Logical names can be assigned to a cell, column or row, and can then define either all or part of a cell reference in the following manner:

{colname}row
col{rowname}
{colname,rowname}
{cellname}

where "colname" represents the logical name for a column, where "rowname" represents the logical name for a row, and where "cellname" represents the logical name for a cell.

Logical names can be used in the "goto" command and in any function. You can access logical names in another spreadsheet with the GET function.

Computed references let you assign a calculated value to determine the column (using 1 for A, 2 for B, etc.), the row or both the column and row of a cell. This value could be a number, a cell reference (in which case the value contained in that cell is used) or a formula. The format would be:

[colexpr]row
col[rowexpr]
[colexpr,rowexpr]

where "colexpr" is the formula for the column value and where "rowexpr" is the formula for the row value. Thus, for example, C[2*B7] would use twice the value in cell B7 to determine the row reference. If B7 had a value of 4, cell C8 would be referenced.

formulas

A formula is an entry that requires the system to calculate. It may include numbers, arithmetic or relational operators (see list below), cell references (including logical names and computed references) or any of more than 60 Built-In Functions like Sum, If, Average or Standard Deviation.

Formulas often include a range of cells. This is accomplished by typing the cell coordinates. Individual cells must be set off by commas; a contiguous block of cells is defined by typing one or more dots (or a colon) between the first and last cells. Examples:

sum(A1,B14) — sum of those two cells.
sum(A1..A8) — sum of cells A1,A2,A3...A8.
sum(A1..G1) — sum of cells A1,B1,C1...G1.
sum(A1..B2) — sum of cells A1,A2,B1, and B2.

To save you waiting time, especially in large spreadsheets using complex formulas, recalculation is controlled as follows:

By default, recalculation for a new spreadsheet occurs only at your explicit request.

Preceding a formula with a per cent sign <%> stops that one formula from being recalculated, and an option of the Global command enables or disables automatic recalculation for the entire spreadsheet.

In either case, pressing the exclamation point <!> or the comma <,> forces recalculation.

A formula may be as simple or complex as you want to make it. SATURN-CALC provides basic arithmetic and relational operators, and its dozens of Built-In Functions minimize repetitive typing of formulas.

Arithmetic Operators

Operator	Action
^	Exponentiation
*	Multiplication
/	Division
+	Addition
–	Subtraction

Relational Operators

Operator	Action
<	Less than
<=	Less than or equal to
>	Greater than
>=	Greater than or equal to
=	Equal to
<>	Not equal to
OR	Logical inclusive OR
AND	Logical AND

Operators are shown in order of precedence; those at the top of each list are performed before those below. Example: 2+2*3=8, not 12, because multiplication takes precedence over addition.

Formulas with more than one expression of equal precedence are evaluated from left to right. Expressions can be nested by placing them in parentheses. If there are parentheses within parentheses, the innermost expression is calculated first. Relational expressions show 0 if False and 1 if True.

Referential Functions

These reference other cells in the current or in stored spreadsheets. They may return either values found in those cells, or the locations of cells containing specified values. They are most often used with looping functions or in computed cell references.

CC Returns the number of the column (A=1, B=2, C=3, etc.) on which the cursor resides at the time recalculation occurs.

COL Returns the number of the column (such that A=1, B=2, C=3, etc.) in which the COL function resides (e.g., a COL function in cell C5 would return a 3). When used with FINDC, FINDR or ADDVAL, COL assumes the column number in each cell in the specified range as that cell is being evaluated.

CR Returns the number of the row on which the cursor resides at the time recalculation occurs.

GET(V,spreadsheet) Retrieves the value V from the spreadsheet named and calculates it on the current spreadsheet. V can be a cell reference, a complex formula, or even a logical name or a formula which includes another GET function.

GET(V) Returns value V from the current spreadsheet. When nested within another GET, this allows calculations using values from both the current and stored spreadsheets.

GET(V,#) This is used once you have implemented the Storage Auto-consolidate (/SA) command. It retrieves V from **each** of the spreadsheets assigned by that command and returns the **sum** of those values.

PUT(V,column,row) This places a value V (usually the result of a calculation) into a specified cell and into the cell in which the function appears. You specify the cell as you would for a computed cell reference, separating the formulas or values which assign column and row numbers by a comma.

PUTV(V,cellref) This is identical to PUT, except that you use standard cell references (A1, C12, D14, etc.) to specify which cell receives V.

ROW Returns the number of the row in which it resides (e.g., a ROW function in cell C5 would return a 5). When used with FINDC, FINDR or ADDVAL, ROW assumes the row number in each cell in the specified range as that cell is being evaluated.

VALUE Returns the value contained in the cell currently being evaluated. When used within looping functions such as ADDVAL, VALUE assumes the value contained in each cell in the specified range as that cell is being evaluated.

Logical Functions

These are functions which depend upon the truth value of an expression to determine which of two or more alternative values to calculate. In the explanations below, "Boolean expressions" are those containing relational operators, whose truth value can be tested (e.g., "A1 > 3," "B4 OR B5 OR B6 < C7+C8," etc.).

ERR Places the message **err** in a cell (usually used in an IF statement to signal that a given condition is now false).

FINDC(V,range) Returns the number of the column (such that A=1, B=2, C=3, etc.) in the specified range at which the Boolean expression V becomes true. If no such column exists, it returns a value of zero.

FINDR(V,range) Returns the number of the row in the specified range at which the Boolean expression V becomes true. If no such row exists, it returns a value of zero.

IF(V,V_t,V_f) This returns the value of V_t if the Boolean expression V is true and returns the value of V_f if V is false.

SEL(V,v_1,v_2,...v_n) This selects from among the values in the list ($v_1 \ldots v_n$) according to the following principle: it returns the value of the first item in the list (v_1) if V=1, the value of the second item in that list (v_2) if V=2 and so on. It returns a value of zero if V is greater than v_n or if V is less than or equal to zero.

WHILE(V,V_t) See Looping Functions for explanation of WHILE function.

Looping Functions

These are functions which perform a series of separate actions, either repeating a single calculation over a range of cells, performing a single calculation repeatedly for the same cell or carrying out several different calculations.

ADDVAL(V,range) or ADD(V,range) The ADDVAL function repeats a calculation (V) over a designated range of cells. The result of each calculation is added to the final result, which is displayed in the current cell. PUT functions can be used to place the results of ADDVAL's calculations in separate cells, while the final result, if not needed, can be placed in a hidden cell.

DO(V_1,V_2,...V_n) The DO function carries out a series of separate calculations (V_1,V_2,...V_n) in the order they are listed. It returns a value of zero to the cell in which it resides. By attaching PUT functions to these separate calculations, their separate results can be placed in other cells, while the result of any larger formula to which the DO function is attached remains unaffected.

WHILE(V,V_t) This function will repeatedly perform calculation V_t as long as V, a Boolean expression, remains true. Practically speaking, V_t will always use either a PUT or PUTV function or, if using registers, an ADDR function.

Register Functions

Registers give you someplace other than spreadsheet cells in which to store values. There are 10 registers, numbered 0-9. They can be used for **temporary** storage of data or for an intermediate calculation.

Data remains in a register until it is cleared, or until another value is loaded into that register. Recalculation does not clear registers. However, storing a spreadsheet does not store the values in the registers.

ADDR(register#,V) Adds value V to the contents already in the register, placing this new result in the register and in the cell containing the function.

CLRR This clears all registers to 0 and returns 0 to the cell containing the CLRR function.

LOAD(register #,V) This function places the value V into both the register named and the cell containing the LOAD function.

UNLOAD(register#) or UNL(register#) This returns the value in the specified register. Note that unloading that value does **not** clear it from the register.

Business Functions

For ease of explication, the following abbreviations are used to represent specific parameters of business functions:

A - amount of each monthly payment
F - future value
I_a - annual interest rate (expressed as a decimal fraction, e.g. 0.18)
I_m - monthly interest rate (I_a/12)
N - number of periodic monthly payments or payment number, depending on context
P - principal
PV - present value

In calculating depreciation rates:

C - current period to report on
L - number of periods in asset life
R - depreciation rate for declining balance (integer)
1.0 - simple declining method
1.5 - 150% declining balance method
2.0 - double declining balance method
S - salvage value of asset
V - original value of asset

CIAPI(P,I_a,N) Returns the amount paid as interest thru N months. Equivalent to the formula: $P * [(1+I_m)^{N-1}]$

CIFV(P,I_a,N) Returns the future value of a compound interest loan. Equivalent to the formula: $P * [(1+I_m)^{N}]$

DDB(C,V,L,R) Returns the declining balance depreciation value for the given period at the given rate (1.0, 1.5 or 2.0). Equivalent to the formula: $V * R/L * (1-R/L)^{(P-1)}$

DSL(C,V,L,S) Returns the straight line depreciation (book) value for the given period. Equivalent to the formula: (V-S)/L

DSYD(C,V,L,S) Returns the sum-of-years'-digits depreciation value for the given period. Equivalent to the formula: $2 * (V-S) * (L-C+1)/[L * (L+1)]$

FV(PV,I_m,N) Returns the future value of a loan with a given present value, interest rate and number of periodic payments.

LRP(P,I_a,N) Returns the monthly loan payment of direct reduction loan. Equivalent to the formula: $P * (I_m/[1-(1-I_m)^{-N}]$

LRPW(A,I_a,N) Returns the present worth of a direct reduction loan. Equivalent to the formula: $A * [1-(1+I_m)^{-N}]/I_m$

PV(F,I_m,N) Returns the present value of a loan with a given future value, interest rate and number of periodic payments.

SFP(F,I_a,N) Returns the required monthly payment for the desired sinking fund future value at the end of N months. Equivalent to the formula: $F * \{I_m/[(I_m+1)^{N-1}]\}$

SFFV(A,I_a,N) Returns the future value for a sinking fund. Equivalent to the formula: $A * \{[(I_m+1)^{N-1}]/I_m\}$

Statistical Functions

In the formulas used below to describe certain statistical functions, 'n' represents the number of cells in the range.

AVG(range) Calculates the average of the values in the range.

COUNT(r_1,r_2,...r_n) Calculates the number of non-blank cells (including cells containing a value of zero) in a specified range (r_1) or ranges. Note that single cell references will always be counted.

MAX(range) Calculates the largest value in the range.

MIN(range) Calculates the smallest value in the range. Text and blank cells are assigned a value of 0.

PROJ(S,P,Y) Calculates the projected value at the given point P on a line defined as having a slope of S and a y-intercept of Y as its starting point.

SLOPE(range) Performs a linear regression, returning the slope of the best fit line for the given range of data values.

STD(range) Calculates the standard deviation of the values in the range. Equivalent to the formula:

$$SQRT\{[V_1^2 + V_2^2 + \ldots V_n^2]/n - [(V_1 + V_2 + \ldots V_n/n]^2\}$$

STDE(range) Calculates the standard error of the values in the range. Equivalent to the formula: STD/SQRT(n)

SUM(range) Calculates the sum of the values in the range.

VAR(range) Calculates the standard variance of the values in the range. Equivalent to the formula:

$$(V_1^2 + V_2^2 + \ldots V_n^2)/n - [(V_1 + V_2 + \ldots V_n)/n]^2$$

Arithmetic Functions

ABS(V) Calculates the absolute value of V.

ATAN(V) Calculates the arc tangent of V in radians.

COS(V) Calculates the cosine of V in radians.

EXP(V) Calculates the exponential value of V.

FACT(V) Calculates the factorial value of V.

INT(V) Calculates the integer value of V by dropping any fractional amount.

LN(V) Calculates the natural logarithm of V.

LOG(V) Calculates the logarithm of V in base 10.

PI Calculates the value of pi (3.14159265358979).

SCALE(V,n) Defines the number of significant digits that the system uses in calculations for this cell. 'V' is the value to be scaled. 'n' (any integer 1-9) determines the number of significant digits used. This function is equivalent to the formula: $INT(n * 10^n + .5)/10^n$.

SIN(V) Calculates the sine of V in radians.

SQRT(V) Calculates the square root of V.

other trigonometric functions Tangent, arc sine, and arc cosine formulas are not built into SATURN-CALC. If you want to use them, type the formulas as shown below.

For:	Type:
tan(V)	1/ATAN(V)
arc sine(V)	$ATAN[V/SQRT(1-V^2)]$
arc cosine(V)	$PI-ATAN[V/SQRT(1-V^2)]$

Date Functions

In the following functions, "V" will most often be a cell reference; otherwise it must be a Julian date value (the number of days since January 1, 4713 B.C.). This value can be obtained by using the first function listed below.

Note: formulas, including the following Built-In Functions, are not accepted by cells formatted for either text or dates. You **can**, however, first enter the formula into a cell formatted for numbers and **then** change that cell's format to a date format.

JULD (month,day,year) Returns the Julian date value for the given month, day and year (each given as a two-digit number). This will display as a Julian number in cells having a numerical format; it will display as a readable date in cells (afterwards) formatted for dates.

DAY (V) Extracts and returns the day of the month (which will be a number from 1 to 31) from the given date value.

DOW (V) Extracts and returns the day of the week from the given date value. Depending on the cell's format, this will appear as a number from 1 to 7 or as a readable weekday name.

MONTH (V) Extracts and returns the month from the given date value. Depending on the cell's format, this will appear as a number from 1 to 12 or as a readable name.

YEAR (V) Extracts and returns the year from the given date value.

COMMANDS Commands are system functions that can change the format (display characteristics) of values, modify the size or arrangement of the spreadsheet, and perform system operations like storage and printing.

Typing </> at the **Entry or /** prompt puts the system in the command mode.

RECEIVE:
Press —> or <— for option information, <CR> to execute Command (A,B,C,D,E,F,G,I,M,N,O,P,S,T,V,W,X,Z,?):

The arrow keys will move the cursor to each command option letter, and will provide explanatory prompts for each. Press <CR> when the cursor is on the desired command; or type the letter of the command and <CR>. You'll then be prompted for whatever information that command needs to execute. At any point before a command is implemented, you can cancel the command by pressing <PF4>.

help

COMMAND: /?
RECEIVE: Displays listing all the commands and instructions on how to use them. Help text can also be accessed at any time by pressing <PF2>.

apply formula Apply Formula replaces the values from a range of cells with calculated values. It is useful for making occasional changes to an entire table of values, such as a price list.

COMMAND: /A <CR>
RECEIVE: Range to apply to:
TYPE: the range, then <CR>
RECEIVE: Formula to apply:
TYPE: The formula, then <CR>.

blank Blank removes the entry from one or a range of cells. It does not affect the format.

COMMAND: /B <CR>
RECEIVE: Blank range:
TYPE: the range, then <CR>. Examples:

<CR>	blanks the active cell.
A1..A12	blanks cells A1,A2,A3...A12.
A1..G1	blanks cells A1,B1,C1...G1.
A1..B3	blanks cells A1,A2,A3,B1,B2,B3.

copy Copy is a time-saving command for entering formulas identical except for cell references, for setting formats for entire rows or columns, or for copying one cell's contents or special status into other cells. When formulas are copied, SATURN-CALC automatically changes the cell references.

COMMAND: /C <CR>
RECEIVE: Copy from:
TYPE: the cell(s) with the data you want to copy
<CR>= the active cell
RECEIVE: Copy to:
TYPE: the cells where you want to put the data.

From/To Options
from one cell to:
another cell (from A1 to B1)
part or all of a row or column (from A1 to A2..A5)
a block of cells (from A1 to A2..D9)
from a row to:
another row (from A1..D1 to A2)
a column of rows (from A1..D1 to A2..D7)
from a column to:
another column (from A1..A5 to B1)
a row of columns (from A1..A5 to B1..D1)
from a block to:
another block of equal size (from A1..D7 to E1)

RECEIVE: Copy what (A,B,E,F,J,P,T,V,?) [all]:
A—All (combines actions of B,E,F,J,P,T,V). If "V" is a formula, the formula is copied and cell references are automatically readjusted.
B—copies "blank cell" status only.
E—copies math expressions (formulas) only.
F—copies the format only.
J—copies the jump status only.
P—copies the protected status only.
T—copies text (not formulas) only.
V—copies the calculated value only

Multiple copy options **are** allowed.
Some formulas may contain a cell reference that needs to remain constant. Typing an 'at' sign <@> in front of the column letter (@A1), row number (A@1), or both (@A@1) keeps those references constant.

delete

Delete removes rows or columns. The row and column labels for the rest of the spreadsheet are adjusted, and all cell references in formulas are changed accordingly. Default is one; if you specify more than that, rows below the cursor or columns to the right are deleted.

Put the cursor on the first row or column you want to delete; then
COMMAND: /D <CR>
RECEIVE: Delete column or row (C,R,?):

C specifies the column containing the cursor.
R specifies the row containing the cursor.
? displays the help text explaining Delete.

RECEIVE: Delete how many [1]:
TYPE: <CR> to delete the active row or column, or n <CR> to delete "n" rows or columns.

edit

Edit allows you to modify the active cell's entry. This is especially useful for making minor changes in long text strings or formulas; shorter entries are best changed by typing something new at the **Entry or /** prompt.

To edit an entry, put the cursor on the cell you want to edit; then
COMMAND: /E CR
RECEIVE: the cell's entry on the prompt/edit line.

You can then make any additions, corrections or deletions you wish to the entry. <CR> concludes the edit.

format

Format performs four distinct functions. It defines individual column width, protects a cell against modification, defines whether a cell will accept text, dates or values, and defines the display characteristics of values.

Put the cursor on the cell you want to format; then
COMMAND: /F <CR>
RECEIVE: Format ($,%,C,D,E,F,G,H,J,M,P,T,U,X,?) :

$—dollars & cents notation	**J—jump switch**
%—percent display	**M—dollars & cents notation with '$' fixed at left**
C—column width	**P—protected**
D—date formats	**T—text format**
E—exponential format	**U—unprotected**
F—decimal notation	**?—help text**
G—histogram format	**X—default format**
H—hidden value	

Of these, $,%,D,E,F,G,H,M,T,X are basic format types, which define the display characteristics of a cell. The remaining symbols—C,J,P,U—are status types, which determine the status, rather than the format, of a cell or group of cells.

format types These include dollars and cents notation (with floating or fixed "$"), percent format, text format, variable decimal place notations, exponential (scientific) notation, date formats (which can be used in calculations; nine different formats available), hidden cells (which appear blank, though their values are available for calculations), and graph format (which creates histogram bar charts).

format modifiers By combining the above basic format types with strings of format modifiers, you can define complex cell characteristics (e.g., "0$," indicates dollars and cents notation, but showing no decimal point or decimal places and with a comma after every three digits).

n	sets the number of decimal places,
(–	displays negative values in parentheses or with a trailing minus sign
,	inserts commas after every third digit,
Z	blanks cells having a value of zero,
_	underlines cells
B	boldfaces cell contents
L R C	chooses text alignment.

Format Examples

Entry:	47	1/2	11.98	–54.2	1000000
Format:	Receive:				
2F	47.00	.50	11.98	–54.20	1000000.00
0%	4700%	50%	1198%	–5420%	100000000%
3E	4.700E+01	5.000E–01	1.198E+01	–5.420E+01	1.000E+06
2$	$47.00	$.50	$11.98	$54.20–	$1000000.00
2M(	$ 47.00	$ .50	$ 11.98	$(54.20)	$1000000.00
1f,-	47.0	.5	12.0	54.2–	1,000,000.0

Date Format Examples:

01/16/85	January
16/01/85	Monday
16-Jan-85	Mon
January 16, 1985	Jan
Monday, January 16, 1985	

status types
These can be entered with the /F option to indicate a change in the status of the active cell (or column). This change in status does not affect the format already assigned that cell:

C	changes the active column's width (minimum width—1; maximum width—73 or 125, depending on screen width).
J	sets (and unsets) a cell's jump status; upon conclusion of an entry, the cursor moves from one jump cell to the next.
P	protects the active cell against modification
U	removes protected status from the active cell.

global Global comprises several command options that affect the default values of the spreadsheet. The system prompts:

Global Command (A,B,C,F,O,R,S,W,?):

A sets automatic motion, which causes the cursor to move at the conclusion of each entry. You can have the cursor move one cell at a time or 'jump' to a specified cell anywhere on the spreadsheet. The options are:

A—'one cell at a time' motion. Motion direction is shown on the status line.

J—'jump' motion. Cursor moves from one jump cell (designated by the Format command) to the next.

N—cancels both types of automatic motion.

B defines the number of spaces between columns. Default is zero; maximum is 5. You can also display characters (such as vertical bars) in these spaces.

C sets the default column width. Size may range from 1 to 73 (on an 80 width screen) or 125 (on a 132 width screen). Individual column widths set by the Format command are left unaffected.

F sets display characteristics of values, as in the Format commands /,$,D,E,F,M,T. The format specified becomes the default format for the entire spreadsheet. However, any cell already assigned a format different from the default will retain its format.

O determines the recalculation order. It also lets you specify a range of cells as the only cells to be recalculated (thus reducing recalculation time). The recalculation order options are:

R—calculation across rows (A1 to ZZ1, then A2 to ZZ2, and so on). This is the default order.

C—calculation down columns (A1 to A999, then B1 to B999, and so on).

N—natural calculation, which calculates according to the cell references in the values.

R sets the recalculation mode. The options are:

M—manual. The system calculates only after an exclamation point <!> or comma <,> is pressed.

A—automatic. The system recalculates every time a value changes.

S sets the number of significant digits the system uses in calculating. SATURN-CALC normally uses 15 digits in calculating; this "scale factor" lets you either change that to any number from 1 to 9, or set "auto-scale," in which the system calculates using the number of digits displayed in each cell.

W sets a 132 character wide screen. To restore an 80 character wide screen, command /GW again.

insert

Insert adds rows or columns to the spreadsheet. All cell references in values are adjusted accordingly, and formats are assigned based on those of adjacent rows or columns.

COMMAND: /I <CR>
RECEIVE: Insert column or row (C,R,?):
C adds a column to the left of the cursor.
R adds a row below the cursor.

You'll then be prompted for the number of rows or columns you wish to insert.

move

Move copies a range of cells from a stored to an active spreadsheet. Cell references are adjusted automatically.

COMMAND: /M <CR>
RECEIVE: File to move from?
TYPE: the filename, then <CR>
RECEIVE: Move from?

From this point on, Move works exactly like Copy, offering the same From/To and Values/Formats options. Logical names can be used in referring to cells in either spreadsheet.

names

Names allows you to assign logical names to designated cells, rows or columns, to delete any names already assigned or to display a listing of all logical names assigned to the current spreadsheet.

COMMAND: /N <CR>
RECEIVE: Enter name option (A,D,L,?):
A—Add logical name
D—Delete logical name
L—List all logical names

order

Order treats each row as a set of data, or record, to be sorted. It arranges rows according to the value of entries in the column(s) specified (especially helpful for organizing files read in by the Storage Load command).

COMMAND: /O <CR>
RECEIVE: Order what range of rows [all] :
Your response specifies the rows to be re-ordered.
TYPE: desired range, then <CR>
RECEIVE: Order by what column priority [A,B,...]:

Your response specifies which column(s) the system will analyze to perform the sort and, for each column, whether the sort will be in ascending or descending order and whether it will be numerical or alphabetical.

print

Print creates (but doesn't store) a hard copy or ASCII word processing file of the spreadsheet. This command has several prompts, with the default values shown in brackets. Pressing <CR> produces the default value; other options are explained below.

COMMAND: /P <CR>
RECEIVE: Print to [LP:] :
LP: is the default hard copy printer name. Typing a filename creates a word processing file with a .WPS filename extension. The file may be edited or reformatted without affecting the SATURN-CALC spreadsheet.

Print headings and formulas [No] ?
Headings are SATURN-CALC's column (A,B,C..) and row (1,2,3..) designations, not the labels entered. Formulas are printed beneath the spreadsheet.

Printer width [132] ?
Any other width available on your printer may be specified.

printer page length [0]:
Any other page length may be specified. Default will eliminate breaks between pages, and the next prompt will be skipped.

Report header rows:
One or more rows may be specified to provide header information that will appear at the top of each page.

Columns to print [all] :
One or more columns may be specified. If desired, columns may be printed out of alphabetical order.

Rows to print [all] :
One or more rows may be specified. Rows will print in the order listed.

storage

Storage has seven functions. It can read in four types of stored data:
- a new spreadsheet
- a data entry file
- a command file
- data consolidated from several spreadsheets

And it can store data from the current spreadsheet in three ways:
- write the spreadsheet to the computer disk
- create a command file
- create graphic displays from spreadsheet data (when used with SATURN-GRAPH).

COMMAND: /S <CR>
RECEIVE: Storage (W,R,C,O,L,G,A,?) :

W (Write) saves a copy of the active spreadsheet by writing it to the storage disk. It is when you select this option that you name a spreadsheet.

Each spreadsheet must have its own unique filename. When storing a new spreadsheet, give it a new name. When storing changes made to an existing spreadsheet, you can either replace the old version by using its original name, or save both versions by assigning a new name (As a safeguard, a prompt warns you whenever you assign an existing filename.).

The Write command also gives you the option of entering an encryption code of 5 to 142 characters, which will prevent the file from being read in again unless the same encryption code is entered.

R (Read) erases the active spreadsheet and displays a different spreadsheet (reading it in from the system disk). Changes made to the active spreadsheet are *not* saved unless you've previously used the **/SW** command. The system prompts for the name of the spreadsheet that you want displayed. If the spreadsheet was written with an encryption key, the system will also prompt for the key.

C (Command file read-in) executes a command file. A command file is an ASCII file consisting of SATURN-CALC commands and entries; when you read in such a file, these commands are carried out in the active spreadsheet as though you were initiating them from the terminal.

Such files are an extremely efficient way to store spreadsheets, offer a convenient means of editing or fixing corrupted spreadsheets and are perfect for templates.

You must have SATURN-WP or other ASCII text editor to use this feature. You can create the command file in SATURN-WP or by using SATURN-CALC's **/SO** command; you can then edit the file in the word processor.

O (Output to a command file) works as a write-out counterpart to the **/SC** command (which reads in ASCII command files). That is, it copies all or selected portions of your spreadsheet into a WP command file.that can then be read back into SATURN-CALC using the **/SC** command. The file can be edited using SATURN-WP and, by writing out only selected aspects of the sheet, you can instantly create templates.

RECEIVE: Output what (A,D,F,J,P,T,V,?)-list all desired [All]
These output options are:
A list all
D list only default and setup information
F list only formats for each cell
J list only jump status
P list only protection status
T list only text and formulas
V list only numeric values

You may string together several options to write out whichever elements of your spreadsheet you wish.

L (Load) reads in ASCII or binary, fixed length record files—such as SATURN-WP Data Entry Files. This feature, by merging data entry or numeric files with spreadsheets, allows you to perform calculations on data from invoice, inventory or similar files.

In converting the file into spreadsheet format, each field is assigned a column, each record a row. In order to perform the load, you'll first need to examine the file to be loaded so as to determine:
which records to load,
which fields to load,
their order and length,
the type of data contained in each.

Next, create a spreadsheet having enough rows and columns to accomodate these records and fields; adjust the column widths and cell formats to correspond to the types and lengths of fields being loaded.

Finally, enter the spreadsheet, place the cursor on the cell in which you want the first record and field to appear, and initiate the Storage Load command. You'll be prompted for:
- the name of the file to be loaded;
- whether it's ASCII or binary;
- (if binary) whether there is a header to load and, if so, its size in bytes;
- which records to load;
- which fields to load, the type of data contained in each and which column will receive each.

Listed below are the types of data that can be loaded. The first three types are valid with ASCII and .DEF files; all data types are valid for binary fixed length records.

An - alphanumeric, 'n ' characters long
Nn - numbers, 'n' characters long
Dn.p - signed DIBOL number 'n characters long with 'p' decimal places
F - 4 word double precision floating point
F2 - 2 word single precision floating point
I - 1 word integer
B - 1 byte (0-255) unsigned integer

G (Graph) is used to create graphs directly from SATURN-CALC data by means of SATURN-GRAPH, a separate software product. Assuming you have both SATURN-CALC and SATURN-GRAPH, this option will translate your spreadsheet data into Pie, Line or Bar Charts or United States Demographic Maps.

A (Auto-Consolidate) retrieves and totals (consolidates) data from up to twenty different stored spreadsheets. Several monthly budget spreadsheets could thus have their totals automatically consolidated into a single quarterly or yearly spreadsheet.

Auto-consolidation involves a four-step process:

1. Create a word processing file listing the filenames of each of the spreadsheets containing data to be consolidated.

2. In the new spreadsheet, place in each cell you want consolidated a GET function of the format **GET(V,#)**. V may be either a cell reference or a formula.
3. Initiate the **/SA** command and answer the prompt for the word processing filename.
4. Instruct the system to recalculate.

For each GET function, SATURN-CALC will retrieve V from each spreadsheet listed in the word processing file, total those values and return the result to the cell in which the GET function appears.

title lock Title Lock freezes specified row and/or column labels on the screen no matter what part of the spreadsheet is being displayed. These will appear in reverse video on terminals having that capability. Title locks remain in effect on stored spreadsheets.

COMMAND: /T <CR>
RECEIVE: Title type (C,R,B,N,?):

C locks all columns to the left of the cursor.
R locks all rows above the cursor.
B (Both) combines the action of C and R.
N (Negate) cancels all title locking.
? displays the Title Lock help text.

values Values uses a separate display to indicate the value of several important parameters for the current spreadsheet.

COMMAND: /V <CR>
RECEIVE: A display of the following values:

The name of the current spreadsheet (if it has been stored/named).
The number of columns (and the last column's letter code).
The number of rows.
The recalculation mode.
The calculation order.
The amount of remaining space available for text (in bytes).
The number of cells available (for inserting rows or columns).
The default column width.
The width of the active column.
The number of spaces between columns.
The size of the current file (in blocks).
The size of the current work file (in blocks).
The global numeric scaling factor.
The number of buffers in memory available for this job (generally, recalculation proceeds faster with more buffers).

To return to the spreadsheet, type <CR>.

window

Window splits the screen to allow viewing of sections of the spreadsheet that are normally too far apart to be seen at the same time. Once Window is in effect, you can scroll each window independently or both windows together.

Put the cursor in the column or row where you want to split the screen; then,
COMMAND: /W <CR>
RECEIVE: Window type (C,R,?):

C splits the screen vertically at the cursor and adds a new set of row headings.
R splits the screen horizontally at the cursor and adds a new set of column headings.
? displays the Window help text.

Pressing the semicolon <;> moves the cursor from one window to the other. The cursor goes to the cell it last occupied in the other window.

Once Window is in effect, you can scroll each window independently or both windows together, or bring back a single window display.

exit

Exit ends the SATURN-CALC program and returns you to the SATURN Main Menu. If you want to save the changes made to the active spreadsheet, use the Storage Write command before you Exit.

COMMAND: /X <CR>
RECEIVE: Exit [No] :
TYPE: Y <CR> to implement, or **<CR>** to cancel, the command.

zap

Zap clears the active spreadsheet from the screen and displays a new, blank spreadsheet. If you want to save the changes on the active spreadsheet, use the Storage Write command before you Zap.

COMMAND: /Z <CR>
RECEIVE: Zap [No] :
TYPE: Y <CR> to implement, or **<CR>** to cancel, the command.

If you type 'Y', SATURN-CALC proceeds as if you were creating an entirely new spreadsheet, prompting you for the number of rows and columns to create.