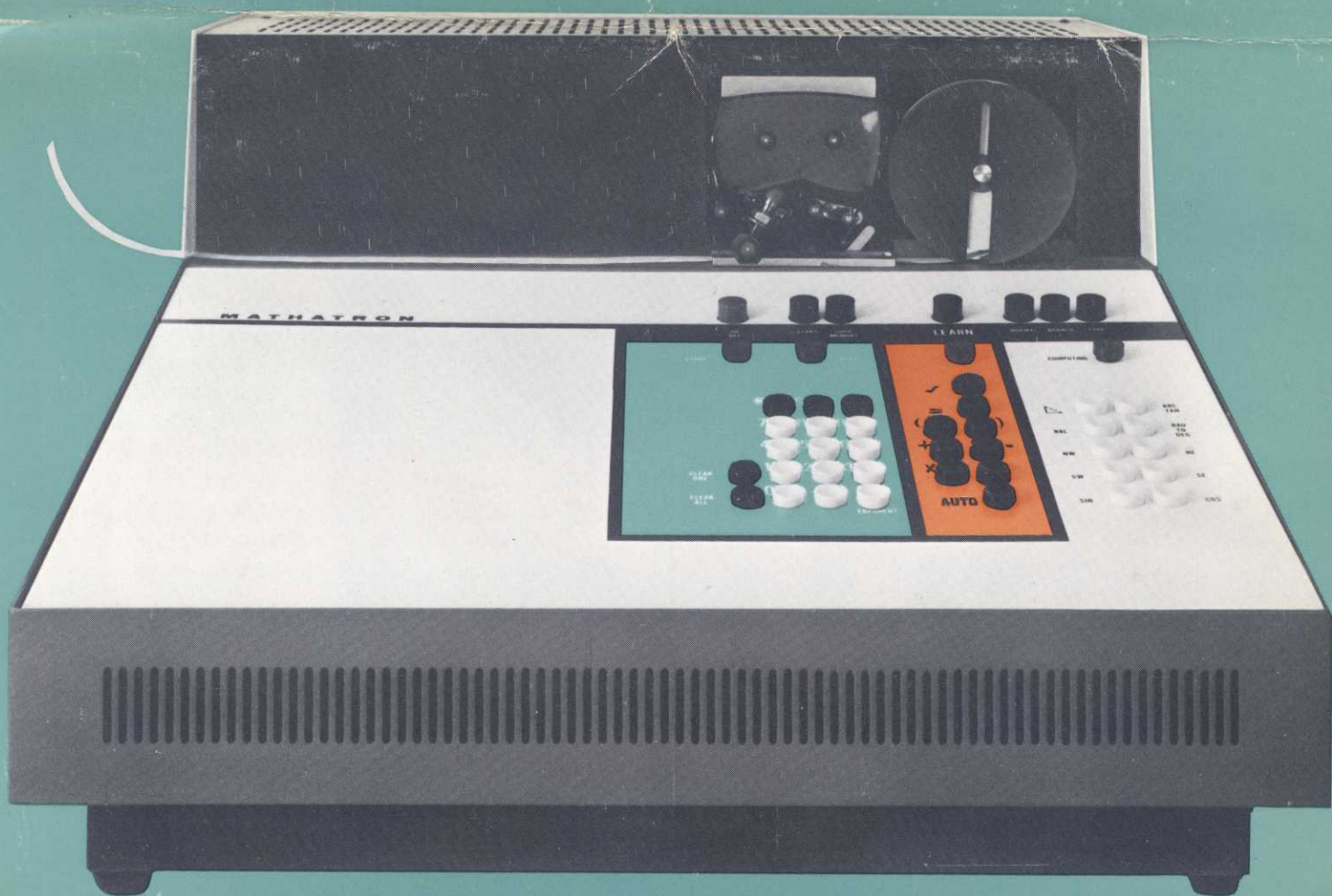


Wright
LINE

DATA PROCESSING ACCESSORIES

MATHATRON

... much more than just a calculator



This fundamental difference makes MATHATRON

THE FORMULA YOU WRITE LIKE THIS

$$((2-3\div 64)\div(8\times 14.7))^{(1.416\div 3)} =$$

YOU KEY INTO MATHATRON LIKE THIS

((2 - 3 ÷ 6 4) ÷ (8 × 1 4 . 7)) ^ (1 . 4 1 6 ÷ 3) =

AND MATHATRON PRINTS OUT LIKE THIS

$$((2-3\div 64)\div(8\times 14.7))^{(1.416\div 3)} = .144541421$$

The difference is much more than just language. . . . MATHATRON is an electronic mathematician, capable of solving algebraic equations keyed into the machine exactly as they are written.

Unlike calculators of either mechanical or electronic types, MATHATRON understands and unfailingly observes the rules of algebra. It multiplies and divides before it adds and subtracts. It automatically places the decimal point in the correct position in the answer. It allows you to use conventional parenthecation and mathematical symbols and it automatically extracts the square root of entire quantities within parenthesis.

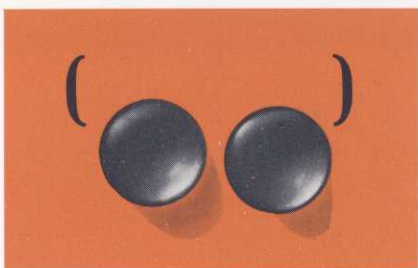
MATHATRON has a memory which allows it to store and recall numbers and formulas. It can learn and automatically work a complex formula. Power-of-ten exponent provides up to 100 column number capacity. MATHATRON automatically retains and prints the nine most significant digits adding all additional digits to the exponent.

If you are considering an electronic calculator of any type, it will pay you to seriously investigate MATHATRON . . . its unique mathematical capabilities and ease of operation make it much more than just a calculator.

. . much more than just a calculator



the UNIQUE MATHEMATICAL CAPABILITIES of MATHATRON



PARENTHICATION

The left and right parentheses, so valuable in writing a mathematical expression, are keyed directly into MATHATRON exactly as they appear in a written equation. The ability of MATHATRON to recognize the meaning of parenthesis and to make the correct mathematical interpretation eliminates complicated and time consuming intermediate computations and storage necessary with electronic calculators. It is even possible to nest parenthesis with MATHATRON.



AUTOMATIC SQUARE ROOT

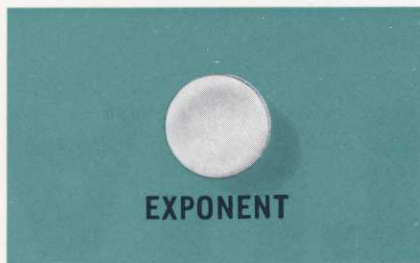
By expressing square root as the power of $\frac{1}{2}$, the MATHATRON has the ability to automatically extract the square root of an entire mathematical quantity as enclosed in the parentheses. The combination of the closing parenthesis and the power of $\frac{1}{2}$ in a single key stroke eliminates the necessity of solving the equation in stages, and adds

further to the machine's ability to accept algebraic equations exactly as written.



POWER LOG (OPTIONAL)

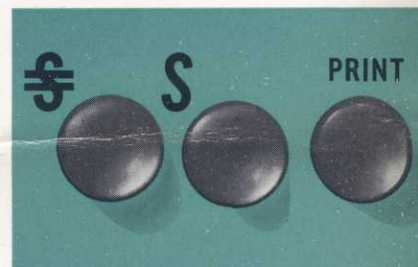
With a single keystroke, MATHATRON will automatically extract \log_e of a number or raise e to any whole or fractional power. This key also makes it possible to raise any number or quantity to any whole or fractional power; or to extract any root of any number or quantity.



POWER-OF-TEN EXPONENT AND SIGNIFICANT DIGIT RETENTION

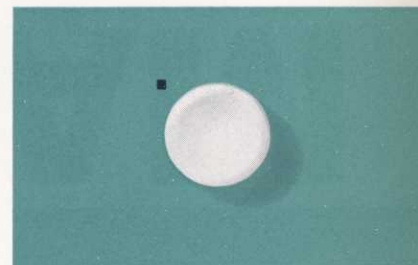
The Power-Of-Ten exponent extends the machine number range beyond nine significant digits to a one hundred column capacity. Numbers of large or small magnitude may be entered using a power-of-ten exponent, and answers of more than nine digits will appear as the nine digits

plus a power-of-ten exponent. MATHATRON will always retain the nine most significant digits. The decimal point will be automatically placed in the correct position in the answer.



NUMBER STORAGE

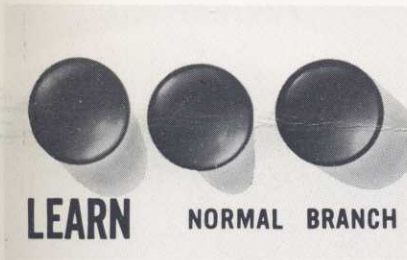
MATHATRON provides up to 88 separate storage registers for numbers. Each storage register is capable of storing a number of nine digits plus a decimal point, sign and power-of-ten exponent giving a number range of 10^{-42} to 10^{58} .



FULL FLOATING DECIMAL POINT

Decimal points are keyed into MATHATRON exactly as they are written in the equation and are automatically placed in the correct position in the answer. With MATHATRON, there is no need for mental

calculations or for counting off to determine the correct placement of the decimal point. MATHATRON's floating point allows a greater number range than possible with fixed point equipment.



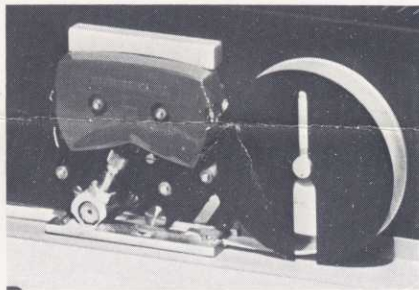
FORMULA MEMORY

MATHATRON will learn and store complex formulas. It will solve formulas repetitively for any number of variables without the necessity of reentering the formulas or constants. MATHATRON will learn and store formulas involving up to 480 steps of algebraic instruction including square roots, logarithmic, exponential and trigonometric functions. It can also make logical decisions. MATHATRON can be equipped so that master formulas can branch to sub-formulas, execute them, and continue along the original path — all automatically.

FORMULA PACKS (OPTIONAL)

Formula packs are pre-wired formulas that may be activated with a single keystroke. MATHATRON may be equipped with any of the program packs shown on page 7. In addition, special formula packs can be furnished to customers' specifications.

the OUTSTANDING PHYSICAL FEATURES of MATHATRON



SERIAL STRIP PRINTER

Every number or mathematical symbol that is keyed into the MATHATRON is permanently printed from left to right on the paper tape in the exact sequence with which it is entered. The tape provides a permanent record of the computations which can be used to detect errors or to retrace the mathematical steps performed in the equation. The printed record also eliminates the re-entry of problems.

SOLID STATE

The basic MATHATRON combines extensive and highly sophisticated electronic circuitry in a compact package. It is fully transistorized to provide highly reliable service with a minimum of maintenance. Because of its solid state components, it is rugged, and will operate reliably without the need for special environmental conditions.



EXPANDABLE MODULAR DESIGN

As your requirements grow, so can your MATHATRON. Its modular design allows the addition of extra formula and number storage capability, formula packs, paper tape punch/reader, page printer and code converter. In addition, MATHATRON can be interfaced with electromechanical equipment and instrumentation.

BASIC MATHATRON MODELS



Model 424

Model 424 has four registers for the storage of numbers. Each register will accommodate up to nine digits plus two digit exponent, decimal point and sign. This model has a memory capacity for up to 24 steps of algebraic instruction. Automatic Power Log as described on page 4 is available as an option. A trigonometric formula package consisting of sin, cos, tan and their inverses is also available as an option.



Model 848

Model 848 has eight registers for the storage of numbers. Each register will accommodate up to nine digits plus two digit exponent, decimal point and sign. This model has a memory capacity for up to 48 steps of algebraic instruction. Automatic Power Log as described on page 4 is available as an option. The Mathematics, Statistics and Surveying Program Packs are also available as options with this model. The additional optional devices shown below are also available for the Model 848.



OPTIONAL PROGRAM STORAGE (APS)

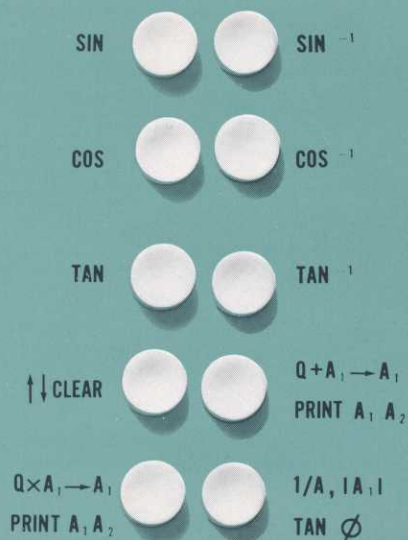
This unit, cable-connected to a MATHATRON with 8 storage registers and 48 steps of formula memory, adds 9 banks of memory of 48 steps each and adds 40 storage registers to the system. It increases the flexibility and capability of the MATHATRON tremendously providing a total of 480 steps of memory and 48 storage registers. The number of storage registers can be increased up to 88 by using formula memory as storage registers.



PAPER TAPE PUNCH/READER AND PAGE PRINTER (PTP)

Adds off-line program storage on punched tape and 8- $\frac{1}{2}$ -inch-wide typed copy record of all inputs and outputs. Frequently used programs can be stored on tape for fast, accurate input. The page printer records not only the calculations but also any alphabetic or numeric information that might be useful in identifying or explaining such calculations in later re-use. Tabular material, such as surveying tables, is automatically typed in statistical columnar form. Dual reader models are available for automatic switching from program tapes to direct entry data tapes.

and OPTIONS



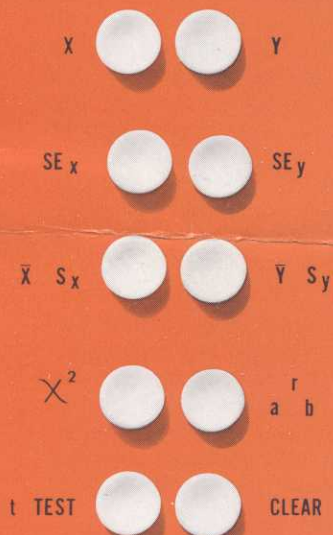
COMPLEX NUMBER/TRIG PACK (OPTIONAL)

This optional pack contains 10 special formulas for the calculation of trigonometric functions and the manipulation of complex numbers. The main keyboard includes the standard MATHATRON algebraic operators. The optional Power Log function may be added to make this a true transcendental machine. Any one of the standard math functions may be called with the touch of a button.

Sin	Computes Sin θ
Cos	Computes Cos θ
Tan	Computes Tan θ
Sin ⁻¹	Computes Angle θ
Cos ⁻¹	Computes Angle θ
Tan ⁻¹	Computes Angle θ

Complex Add
Complex Multiply
Complex Divide
Accumulator Shift

These four formulas make the MATHATRON a complex number calculator. Complex number accumulators allow running computation of problems in complex number algebra without re-entry of intermediate data.



STATISTICS PACK (OPTIONAL)

The statistics pack is a powerful, easy to use option for computing summations, averages, standard deviations, correlations, chi-squares, t-tests, and standard errors. To select the desired formula, simply push one or more of the 10 special buttons shown on the left and enter the data through the easy-to-use keyboard. The MATHATRON will solve the equation and print answers to 9 significant digits. Both input data and results will appear in printed form for a permanent record and audit trail.

x	Accumulates $\sum x, \sum x^2, N$
y	Accumulates $\sum y, \sum y^2, \sum xy$
r, a, b	Computes correlation coefficient and a, b of least squares $Y_c = a + bx$
\bar{x}, S_x	Computes mean x and standard deviation x
\bar{y}, S_y	Computes mean y and standard deviation y
X^2	Computes chi-square statistic
t-TEST	Computes Student's t
SEx	Computes Standard Error of X
SEy	Computes Standard Error of Y
CLEAR	Clears accumulator for new data



SURVEYOR PACK (OPTIONAL)

The optional Surveyor pack completely eliminates the need for looking up functions in tables, interpolating, and checking. After selecting appropriate combinations of the 10 special program buttons, you simply enter angles and distances directly on the main keyboard. Eight independent registers store intermediate results, constants, and answers. For example, during entry of bearings and distances of a traverse, both coordinates are accumulated automatically as a by-product. All inputs and answers are automatically printed out for permanent record. The MATHATRON PTP is an indispensable aid in more complex problems. Surveyors and civil engineers will find the solutions to many of their day-to-day problems with the Surveyor pack. A few of the basic operations are:

Close, balance and inverse traverse	Coordinates on a curve
Area-lot, circular sections, etc.	Curve calculations
Road layout and intersection	Triangulation



Model 4280 T

Model 4280 T has 10 memory banks of 48 steps each for a total of 480 steps of formula memory. There are 42 independent storage registers and 40 more shared registers. Input is through the MATHATRON numeric keyboard and the punched paper tape (8 level ASCII code) reader. Paper tape offers unlimited formula storage and fast, automatic, error free entry of frequently used or complex problems. Output is through an alpha-numeric typewriter keyboard, page printer, and paper tape punch and reader (8 level ASA code).

The uses of the paper tape reader-punch and page printer are many. Tables, forms and reports can be automatically generated from complex equations. Equations of any complexity can be plotted between designated limits and for a given interval. Statistical parameters like the chi square statistics can be computed from the given values of $N \times 3$ contingency table. Several complex formulas such as these can be combined and manipulated automatically in solving higher order calculations.

Standard automatic operators that can be called in any formula are: log of any positive number, anti-log of any number in the range of -96.7 to 133.6, sine and cosine of any angle in the range of -18×10^6 to 1×10^{10} degrees, arc tangent of any number. All these operators are independent of the formula memory. Master formulas can automatically branch to sub-formulas, execute them and continue along the original path.

Automatic Power Log as described on page 4 is available as an option. A dual paper tape reader to allow entry of data tapes is also available as an option to the Model 4280 T.

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A DIVISION OF BARRY WRIGHT CORPORATION



DATA PROCESSING ACCESSORIES