
+ 1 1 4 2 2, 1 8 4 7 3
e^x
LOG_e^x
√x
x²
CHANGE SIGN
7
8
9
CLEAR DISPLAY
CLEAR ALL
4
5
6
1
2
3
0
.
ENTER
÷ =
x =
−
+
CLEAR ADDER
RECALL ADDER
WANG

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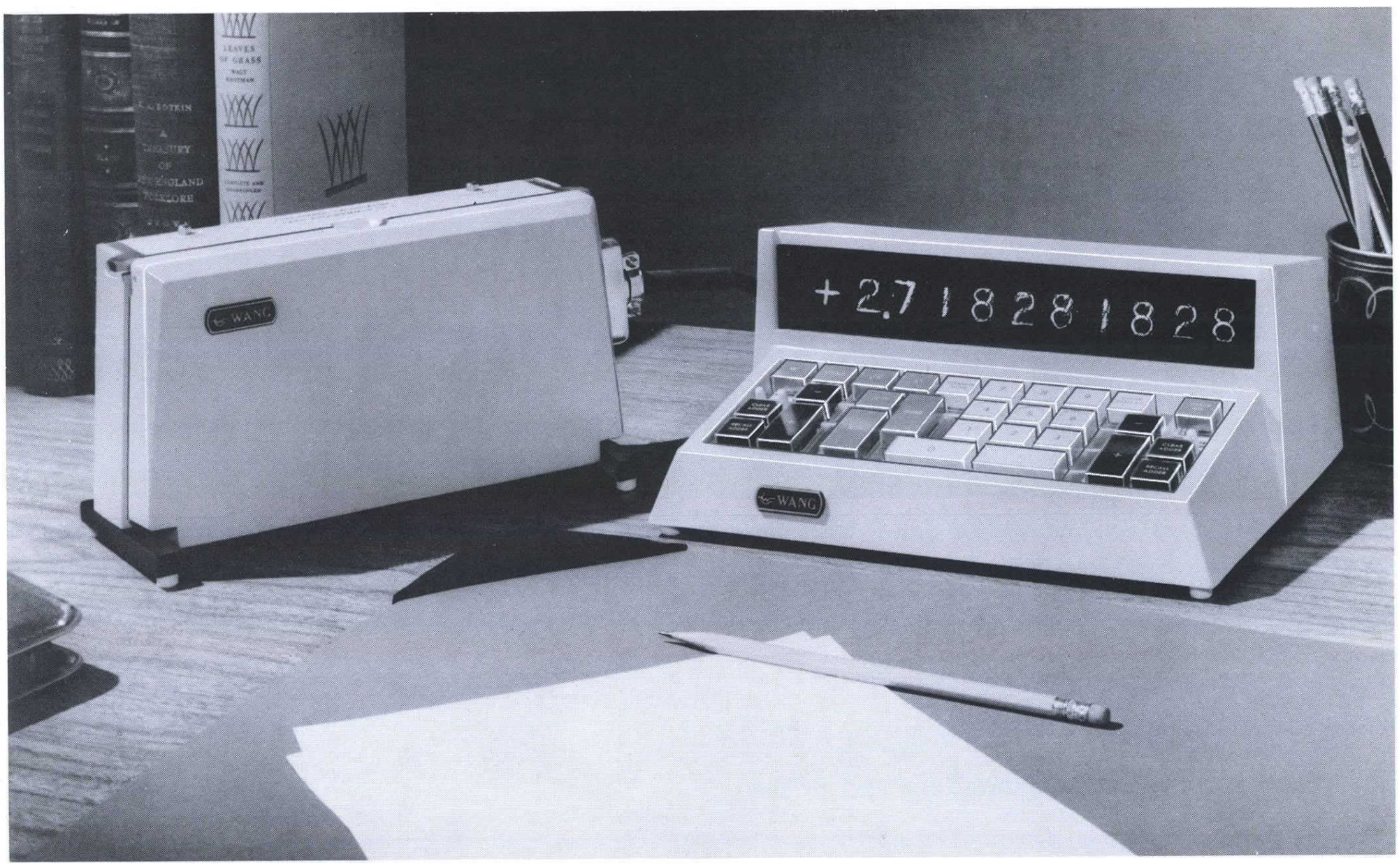
Wang Laboratories' Headquarters
in Tewksbury, Massachusetts.

Relatively new, these facilities have twice been enlarged
by additions — to over 50,000 square feet, on an 85-acre industrial park.
Visitors are welcome.

CONTENTS



Model 320K Keyboard with CP-1 Card Programmer

INTRODUCTION

Wang Laboratories offers a choice of eleven basic keyboard consoles, nine companion electronic packages, and various basic accessories. A complete line of even more-powerful add-on items, Series 370/380, is also available, including still four more keyboards. All items are fully described in the following pages.

300 SERIES ELECTRONIC CALCULATORS

Wang Series 300/362 Electronic Calculators revolutionize point-of-work calculations. All models provide unprecedented operating speed, data accuracy, and work simplicity. Over 10,000 already delivered have won approval from leading universities, research laboratories, design engineers, statisticians, and financial users.

These calculators have four primary distinguishable features. First, they contain a unique digital circuit which directly generates logarithms. This simplifies calculations for the user, and increases calculator reliability, while reducing price through design simplicity compared to old-fashioned techniques for calculator design. The log register is particularly valuable when raising numbers to integer or fractional powers, or taking integer or fractional roots. Illustrative examples abound — in business, for example, it facilitates compound interest, bond value, annuity, and mortgage calculations.

Second, the keyboard is designed for convenient desk-top use. It is separate from its electronic package for optimized size and human-engineered for intuitive use. The new owner discovers most of the important operations of the machine simply by pressing the keys. Operator training is accomplished in minutes.

Third, up to four keyboards may be connected to a single electronic package, Model 300SE, 310SE, or 320SE, for fully-simultaneous operation. This feature provides cost-sharing of the computing module, giving the user substantial economic advantages. The cost savings provided by standardization on Wang Calculators become particularly significant within multiple-user facilities such as laboratories, departments, and offices.

Still another distinguishing characteristic remains. Because of the ability to separate keyboard consoles from electronic packages, with interconnecting cables up to 200 feet in length, it is possible to interpose accessory items in series connection between the two main components on a quick-connect, plug-in basis. This allows the inclusion, now or later, of accessory programmers, output printers, extra data storage, and other items. Only Wang offers this ability to select optimum equipment to meet particular requirements, then grow as the user's needs grow. This is invaluable in reducing equipment obsolescence and maximizing the user's return on his investment.

FEATURES:

- Single keystrokes perform $+$, $-$, $\times$, $\div$, $\frac{1}{X}$, $\sqrt{X}$, X^2, Ln X, e^x operations.
- Ln X, e^x keys are operations, not programs: allow calculation of $X\pm^y$, Ln_x Y.
- Answers are visually displayed to 10-digit precision with floating, properly-positioned automatic decimal point location.
- Intermediate answers may be stored and recalled at random.
- **Two** independent adders aid in a wide range of calculations with step-saving economy.
- Duplex accumulation switches control automatic summation of products, multipliers, and/or entries. For example, ΣX^2 and ΣX can be simultaneously accumulated with each X^2 calculation when solving statistical problems.
- Up to four keyboards can be operated at the same time using one simultaneous electronic package, reducing per-user cost to as low as $1,070.
- Models are available with extra storage registers, or extra accumulators, for advanced calculations.
- Trigonometric keyboards are available in six models for single-keystroke calculation of $\sin\theta$, $\cos\theta$, arcsin X, and arctan X.

- Addition of a CP-1 Card Programmer to any keyboard automates calculations. Only variable inputs need to be indexed, giving true man-machine interaction.
- Numerous other important accessory items also in quantity production, require no equipment modification for later installation.
- High reliability for all models, proven through years of use, over ten thousand units installed. No routine maintenance — nothing to wear out or readjust.
- Over 50 sales / applications / service centers, staffed with skilled, experienced professionals, are available to provide assistance to you.

BRIEF DESCRIPTION

All instruments in the 300 Series are actually three machines in one. These are the product section, which handles multiplication and division; plus two independently operating but interconnecting arithmetic accumulating sections. In addition to adding and subtracting, the latter also serve as storage registers for automatic accumulation of sums of products, entries, and/or multipliers, and have separate recall keys to display their contents at any time. In other words, intermediate answers are storable and recallable at random for the convenience of the user.

The basic keyboard has two adders, a multiplication or log register, and a display register. Numbers are entered via a 10-key keyboard into the display. The decimal point position is automatic, and is entered as it would be written. Automatic alignment of the decimal point takes place in any arithmetic combination. Simple addition and subtraction can be performed in the two adders. Multiplication, division, reciprocals, $\text{Log}_e X$ and e^x are performed in the multiplication register. The registers are independent, and therefore the use of one register does not destroy the contents of any other. Automatic accumulation switches are available on the two adders so that products and entries as well as multipliers can be automatically accumulated. These features enable considerable keystroke reductions when performing calculations for such diverse applications as invoicing extensions and computation of standard deviation in statistical applications.

SERIES 370/380 PROGRAMMABLE CALCULATING SYSTEMS

The exclusive Wang building-block modular calculator design concept enables those who own any Wang calculator to enjoy add-on advances in calculating power. Series 370/380 Programmable Calculating Systems utilize standard Electronic Packages, Series 300-362, including simultaneous-operation models. Sophisticated program capability, greatly increased data storage capacity, and a variety of peripheral devices for input and output are added to the basic Wang calculator without modification, reducing equipment obsolescence from increasing requirements. The breadth and depth of selection in the Series 370/380 family allows optimum matching of equipment capability to a great variety of applications, while retaining the lowest cost/highest performance calculations.

COMMON CHARACTERISTICS:

Detailed description of the many Wang calculators appear on the following pages. Complete specifications unique to each model are given. Certain comments on common characteristics of all models are in order:

POWER:

All models are normally furnished for 115 vac ± 10%, 50 to 400 hertz power operation. Except as noted, 230 vac, 50 hertz input is offered on special order at no extra charge. Please specify when ordering.

Mixture of Keyboards: It is possible to intermix keyboards in various less-powerful models for less-sophisticated operations. For example, a 320SE Simultaneous Calculator with log and exponent capability may be required for business or scientific calculations, yet one or more users may not need log or exponent — or even square or square root. The latter users may be equipped with Model 310K or 300K Keyboards. Exception: Do not parallel other types of keyboards with 360 or 362 Keyboards.

MODEL 300 ELECTRONIC CALCULATOR

For business applications requiring addition, subtraction, multiplication, division, and reciprocals.

The Model 300 is a high-speed electronic calculator, furnished with a separate keyboard, for space saving, and a cable connected electronic package, for expansion. A choice of electronic packages is offered — a single-terminal unit, Model 300E; and a four-terminal unit, Model 300SE, for simultaneous operation of four keyboards. Model 300K Keyboards are used with either electronic package.

Operations include addition and subtraction, with two independent registers for this purpose, and multiplication, chain multiplication, division, and instant reciprocals. Keys are provided for all functions including random-access recall of either accumulator. A standard 10-key configuration is used to enter numbers with full floating decimal point location. Duplex accumulating switches are provided for automatic accumulation of entries and/or multipliers in the right adder, and for extensions or products in the left adder.

Display is provided in normal order with the polarity sign, numerical values and automatic properly-positioned decimal point. The illuminated visual readout is produced by ⅝ in. high glare-free indicator tubes. The range of display is ±.0000000001 to ±999999999.9. Beyond this range, indicated answers may still be correct but for decimal location, which must be relocated 10 places to the right from the position given, as indicated by a flashing signal light.

SPECIFICATIONS

	MODEL 300K KEYBOARD	MODEL 300E ELECTRONIC PACKAGE	MODEL 300SE ELECTRONIC PACKAGE
Size	4½ in. h, 8 in d, 10¼ in. w	Portable Case 9 in. h, 17 in. l, 5 in. w	Portable Case 8 in. h, 24 in. l, 5 in. w
Weight	6 lbs.	15 lbs.	25 lbs.
Cables	12 ft. attached (to elect. pkg.)	6 ft. attached, 3-wire (power cable)	6 ft. attached, 3-wire (power cable)
Temp. Range	0°C to 45°C	0°C to 45°C	0°C to 45°C
Power Input		115vac ± 10%, 50-400 Hz (230vac special order, no charge)	115vac ± 10%, 50-400 Hz (230vac special order, no charge)
Power Consumption	5 Watts (from electronic package)	35 Watts	45 Watts

Price	$450	$1,240	$2,480

ELECTRONIC CALCULATORS

MODEL 310 ELECTRONIC CALCULATOR

For statistical and business applications — adds $\sqrt{X}$, X^2 to model 300.

The Model 310 provides all the features and functions of the Model 300, and adds instant $\sqrt{X}$ and X^2. The duplex accumulation switches, in addition to their normal functions, provides ΣX, ΣX^2, ΣY, ΣY^2, $\Sigma(X+Y)$, $\Sigma X \cdot Y$, $\Sigma\sqrt{X}$, and $\Sigma\frac{1}{X}$. The accumulated totals are recallable to the display at any time.

With the addition of square and square root functions, the Model 310 offers the statistician the most convenient, easy-to-use calculator available for calculations of mean, variance, and standard deviation.

To illustrate:

$$\text{Mean } (\overline{X}) = \frac{\Sigma X}{n}$$

$$\text{Variance } (\sigma^2) = \frac{\Sigma Xi^2 - \frac{1}{n}(\Sigma X_i)^2}{n}$$

$$\text{Std. Dev } (\sigma) = \sqrt{\frac{\Sigma Xi^2 - \frac{1}{n}(\Sigma X_i)^2}{n}}$$

When solving the equations, the product accumulator and multiplier accumulator switches enable the sum of the variables (ΣX_i) and the sum of the squared variables (ΣX_i^2) to be automatically accumulated in the two adders as the variables are squared. The mean ($\overline{X}$) is readily found by recalling the contents of the right adder and dividing by the number of variables (n). The variance (σ^2) is found by recalling the contents of the right adder, depressing the X^2 key, dividing by the number of variables, subtracting this amount from the contents of the left adder, and dividing by the number of variables.

Standard deviation (σ) can quickly be found at this point by depressing the square root key.

These and other calculations may be automated by a CP-1 Card Programmer (see page 9 for details). Preprogrammed and verified punched card libraries provide the statistician with speedy and reliable tools when performing repeated applications. Variables to a problem can be inserted into a program at any preprogrammed location. This virtually eliminates the need for the user to manually perform tedious repeated mathematical operations. The modular expansion capability of Wang Calculators is retained so that the statistician may, for example, later add a 370 System for more complex calculations (analysis of variance, multiple regression, etc.).

Select a Model 310E Electronic Package for single-keyboard application, or a Model 310SE for 4-terminal simultaneous keyboard operation. Both packages use Model 310K Keyboards.

SPECIFICATIONS

	MODEL 310K KEYBOARD	MODEL 310E ELECTRONIC PACKAGE	MODEL 310SE ELECTRONIC PACKAGE
Size	4½ in. h, 8 in. d, 10¼ in. w	Portable Case 9 in. h, 17 in. l, 5 in. w	Portable Case 8 in. h, 24 in. l, 5 in. w
Weight	6 lbs.	15 lbs.	25 lbs.
Cables	12 ft. attached (to elect. pkg.)	6 ft. attached, 3-wire (power cable)	6 ft. attached, 3-wire (power cable)
Temp. Range	0°C to 45°C	0°C to 45°C	0°C to 45°C
Power Input		115vac ± 10%, 50-400 Hz (230vac special order, no charge)	115vac ± 10%, 50-400 Hz (230vac special order, no charge)
Power Consumption	5 Watts (from electronic package)	35 Watts	45 Watts
Price	$460	$1,435	$2,870

MODEL 320 ELECTRONIC CALCULATOR

Widely used for general purpose applications and specifically for science, engineering, and statistics.

The Model 320 adds to the 310 two new functions, instant $\log_e X$ and e^x. These operations are executed with 12-digit accuracy for lnX, and 11-digit accuracy for e^x, displaying the first 10 digits of 14 digit operations. The Model 320 allows the user to generate logs and exponents to any base, simplifying calculations in many areas of application. For example, this unique Wang feature allows the business user to calculate mortgage payments, compound amount, annuity value, etc., without time-consuming, error-prone references to tables. Engineering, scientific and statistical applications are self-evident.

Chain multiplication and division, using cumbersome numerical values, can be readily manipulated by using the log and antilog approach to problems. Techniques for using the log keys can be learned in minutes. A CP-1 Card Programmer connected to the keyboard gives the user a very powerful pre-programmable calculating instrument. Program libraries containing an extensive range of useful verified programs are available to give users punched-card programming capability. A competent staff of programmers at Wang Laboratories will assist the user when requirements for special programs are required.

Both single-input (Model 320E) and 4-input simultaneous electronic packages (Model 320SE) are available. A choice of keyboards is also offered. Select the Model 320K for routine, general-purpose calculations. For trigonometric calculations, select instead the Model 320KT, which contains built-in hardwired programs for single-keystroke calculations of sine, cosine, arc sine, and arc tangent. Refer to page 8 for additional details on trigonometric keyboards.

SPECIFICATIONS

	MODEL 320K KEYBOARD	MODEL 320KT/KR KEYBOARD	MODEL 320E ELECTRONIC PACKAGE	MODEL 320SE ELECTRONIC PACKAGE
Size	4½ in. h, 8 in. d, 10¼ in. w	5¼ in. h, 9½ in. d, 12 in. w	Portable Case 9 in. h, 17 in. l, 5 in. w	Portable Case 8 in. h, 24 in. l, 5 in. w
Weight	6 lbs.	9 lbs.	15 lbs.	25 lbs.
Cables	12 Ft. attached (to elect. pkg)	12 Ft. attached (to elect. pkg)	6 Ft. attached, 3-wire (power cable)	6 Ft. attached, 3-wire (power cable)
Temp. Range	0°C to 45°C	0°C to 45°C	0°C to 45°C	0°C to 45°C
Power Input			115vac ± 10%, 50-400 Hz (230vac special order, no charge)	115vac ± 10%, 50-400 Hz (230vac special order, no charge)
Power Consumption	5 Watts (from electronic package)	5 Watts (from electronic package)	35 Watts	45 Watts

Price	$470	$920	$1,625	$3,250

ELECTRONIC CALCULATORS

MODEL 360 ELECTRONIC CALCULATOR

One of two popular extra-storage models, with features of Model 320 and with four extra registers.

This calculator provides all the features and functions of the Model 320, preceding page, but has extra random-access core storage registers to hold constants, intermediate answers, or multiple results. The basic 320 Keyboard is regrouped to permit addition of eight keys, as shown, for storage and recall of 10 to 14-digit numbers. This important feature is especially significant to the statistician, as it allows him to develop all terms required for calculation of variance and other functions without reentry of data.

The Model 360 is of additional significance as an extremely useful model for later expansion into a Series 370/380 System. Although a large capacity external data storage unit, such as the Wang Model 373, may then be used, the registers of the Model 360E are useful as "scratch-pad" memory.

Both single-input (Model 360E) and 4-input simultaneous electronic packages (Model 360SE) are available. Users with trigonometric calculations are invited to specify the Model 360KT or KR Keyboard with built-in trig programs (see 320KT/KR, preceding page, and page 8, Trigonometric Keyboards). Others should select the Model 360K Keyboard, or a Series 370/380 Keyboard.

SPECIFICATIONS

	MODEL 360K KEYBOARD	MODEL 360KT/KR KEYBOARD	MODEL 360E ELECTRONIC PACKAGE	MODEL 360SE ELECTRONIC PACKAGE
Size	4½ in. h, 8 in. d, 10¼ in. w	5¼ in. h, 9½ in. d, 12 in. w	Portable Case 9 in. h, 17 in. l, 5 in. w	Portable Case 8 in. h, 24 in. l, 5 in. w
Weight	6 lbs.	9 lbs.	15 lbs.	25 lbs.
Cables	12 Ft. attached (to elect. pkg)	12 Ft. attached (to elect. pkg)	6 Ft. attached, 3-wire (power cable)	6 Ft. attached, 3-wire (power cable)
Temp. Range	0°C to 45°C	0°C to 45°C	0°C to 45°C	0°C to 45°C
Power Input			115vac ± 10%, 50-400 Hz (230vac special order, no charge)	115vac ± 10%, 50-400 Hz (230vac special order, no charge)
Power Consumption	5 Watts (from electronic package)	5 Watts (from electronic package)	35 Watts	45 Watts
Price	$500	$950	$1,995	$3,990

MODEL 362 ELECTRONIC CALCULATOR

Newest and most-powerful calculator — adds 12 storage registers, each capable of addition and subtraction — may be split into 24!

The Model 362 is unquestionably the most powerful electronic calculator available. It provides all the features and functions of the Model 320, with a keyboard arrangement similar to the 360. The four extra registers of the latter are replaced by 12 registers, each of 14 digit capacity (plus sign and decimal storage). Each register may be used as a storage register or as an accumulator, providing independent addition and subtraction in up to 14 registers in all! When used as storage, any register may be "split" into two "halves," each with independent store and recall operation. Capacity is six digits, sign, and full 10-place decimal location for each half register. Thus, in addition, to its two accumulators common to all models, it provides up to 24 additional registers!

All extra-register operations require two keystrokes. First, initiate the proper operation (store full, recall H_B, etc. — one of the eight right hand keys shown in the photo above. Then designate which register is used by depressing one of the number keys (0 - 9, or CLEAR DISPLAY or CHANGE SIGN for the last two registers — the normal functions of the latter two keys being prevented by the previous execution of the register operation). This extremely efficient design provides an ultra-compact, extremely powerful yet quite economical solution to technical calculations.

Select a Model 362K Keyboard for general use — a Model 362KT or KR Keyboard for trigonometric calculations — or a Model 370-2 or 380-2 Keyboard for sophisticated programmed calculations.

SPECIFICATIONS

	MODEL 362K KEYBOARD	MODEL 362KT/KR KEYBOARD	MODEL 362E ELECTRONIC PACKAGE
Size	4½ in. h, 8 in. d, 10¼ in. w	5¼ in. h, 9½ in. d, 12 in. w	Portable Case 11.8 in. h, 17 in. l, 7 in. w
Weight	6 lbs.	9 lbs.	20 lbs.
Cables	12 Ft. attached (to elect. pkg)	12 Ft. attached (to elect. pkg)	6 Ft. attached, 3-wire (power cable)
Temp. Range	0°C to 45°C	0°C to 45°C	0°C to 45°C
Power			115vac ± 10%, 50-400 Hz (230vac special order, no charge)
Power Comsumption	5 Watts (from electronic package)	5 Watts (from electronic package)	35 Watts

Price	$500	$950	$2,295

ELECTRONIC CALCULATORS

TRIGONOMETRIC KEYBOARDS

A choice of six more keyboards for single keystroke generation of trigonometric functions.

These keyboards are available for five electronic package models (320E or SE, 360E or 360SE, or 362E) in a choice of two configurations: KT, for keyboard input of angles in degrees; and KR, for input in radians, Thus, trigonometric keyboard models are, respectively: 320KT or KR, 360KT or KR, and 362KT or KR.

To operate, enter the argument (or sine or tangent) and depress either the sine or cosine key (or $\sin^{-1}$ or $\tan^{-1}$). The program will display the results in degrees and fractions, eliminating need for table reference, and error-prone tedious interpolation.

Trig function programs utilize both accumulators, as well as the log registers, and therefore these registers should not be used before trig calculations. If extra storage is necessary for other operations, select a Model 360 or 362 Calculator with extra storage (not affected by trig calculations). Note: Calculations of other functions such as tangent, and simple trigonometric identities of only a few steps, are performed manually after automatic generation of a suitable basic function.

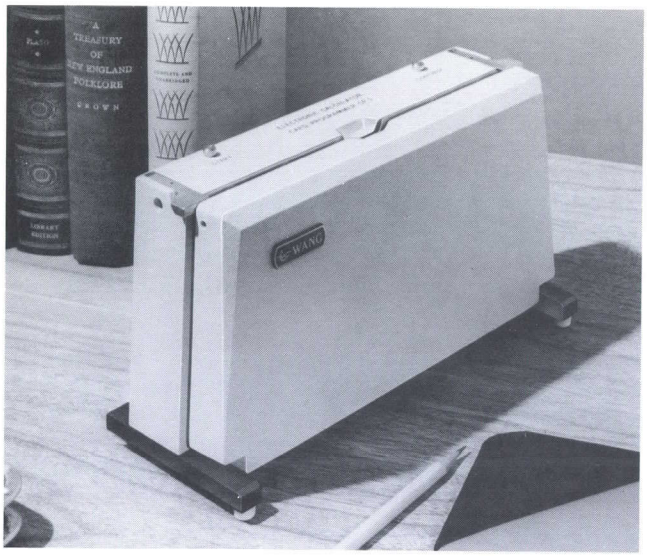
All contain built-in hard-wired programs for generation of the following functions:

KEY FUNCTION	RANGE OF INPUT VARIABLES		PRECISION OF OUTPUT
	DEGREES	RADIANS	
SIN	$0° \leq \lvert X \rvert \leq 67.5°$ $67.5° \leq \lvert X \rvert \leq 90°$	$0 \leq \lvert X \rvert \leq 1.178$ $1.178 \leq \lvert X \rvert \leq 1.571$	Error $\leq 10^{-9}$ Error $\leq 10^{-8}$
COS	$0° \leq X \leq 22.5°$ $22.5° \leq X \leq 157.5°$ $157.5° \leq X \leq 180°$	$0 \leq X \leq .393$ $.393 \leq X \leq 2.749$ $2.749 \leq X \leq 3.1415$	Error $\leq 10^{-8}$ Error $\leq 10^{-9}$ Error $\leq 10^{-8}$

KEY FUNCTION	RANGE OF INPUT	PRECISION OF OUTPUT	
		DEGREES	RADIANS
SIN^{-1}	$.013 \leq X \leq 1$	Error $\leq 5 \times 10^{-7}$ Deg.	Error $\leq 10^{-8}$ Rad.
TAN^{-1}	$.106 \leq X \leq 7.596$ $0 \leq X \leq .106$ $7.596 \leq X \leq 10^{9}$	Error $\leq 10^{-6}$ Deg. Error $\leq 5 \times 10^{-6}$ Deg. Error $\leq 5 \times 10^{-6}$ Deg.	Error $\leq 10^{-8}$ Rad. Error $\leq 10^{-7}$ Rad. Error $\leq 10^{-7}$ Rad.

MODEL CP-1 CARD PROGRAMMER

The CP-1 is a compact, general-purpose plug-in accessory which automates calculator operations when used with Series 300-362 Keyboards. It reads 80-step 2-digit octal program codes, corresponding to keyboard operations, as shown in the table below.



The CP-1 is series-connected between the electronic package and the keyboard by use of the attached 12-foot cable and side-panel connector. One CP-1 may be used with each terminal of the electronic package (up to four for a simultaneous electronic package). The CP-1 may be used in conjunction with a trigonometric keyboard on the same electronic package terminal, but cannot initiate trig programs under card program control. Extension cables up to 50 feet in length may be used to interconnect the CP-1 with an electronic package.

The CP-1 is enclosed in a cast housing with START and CONTINUE push button controls at the top. Bifurcated contacts and a high mechanical advantage lever closure mechanism provide reliable reading of static tab cards. Built-in electronic circuits are solid state, and of plug-in construction.

Programs are prepared using pre-scored tab cards, as shown, prepared using a Portapunch and stylus (see MISCELLANEOUS). Simply determine the sequence of manual keystrokes required to execute the problem. Record these, and look up the corresponding program codes from the table. Now push out the pre-scored bits of a card, using the Portapunch, in sequence, as required. Use a STOP code whenever an input number is to be indexed by hand via the keyboard.

An excellent library of programs is furnished free with each CP-1. Also included are 200 tab cards and a program pad.

SPECIFICATIONS

Size	5½ in. h, 9½ in. l, 2½ in. w
Weight	6½ lbs.
Cable	12 ft. attached (to elect. pkg)
Temp. Range	0°C to 45°C

Price	$800

CODE LISTING FOR PROGRAM CONTROL

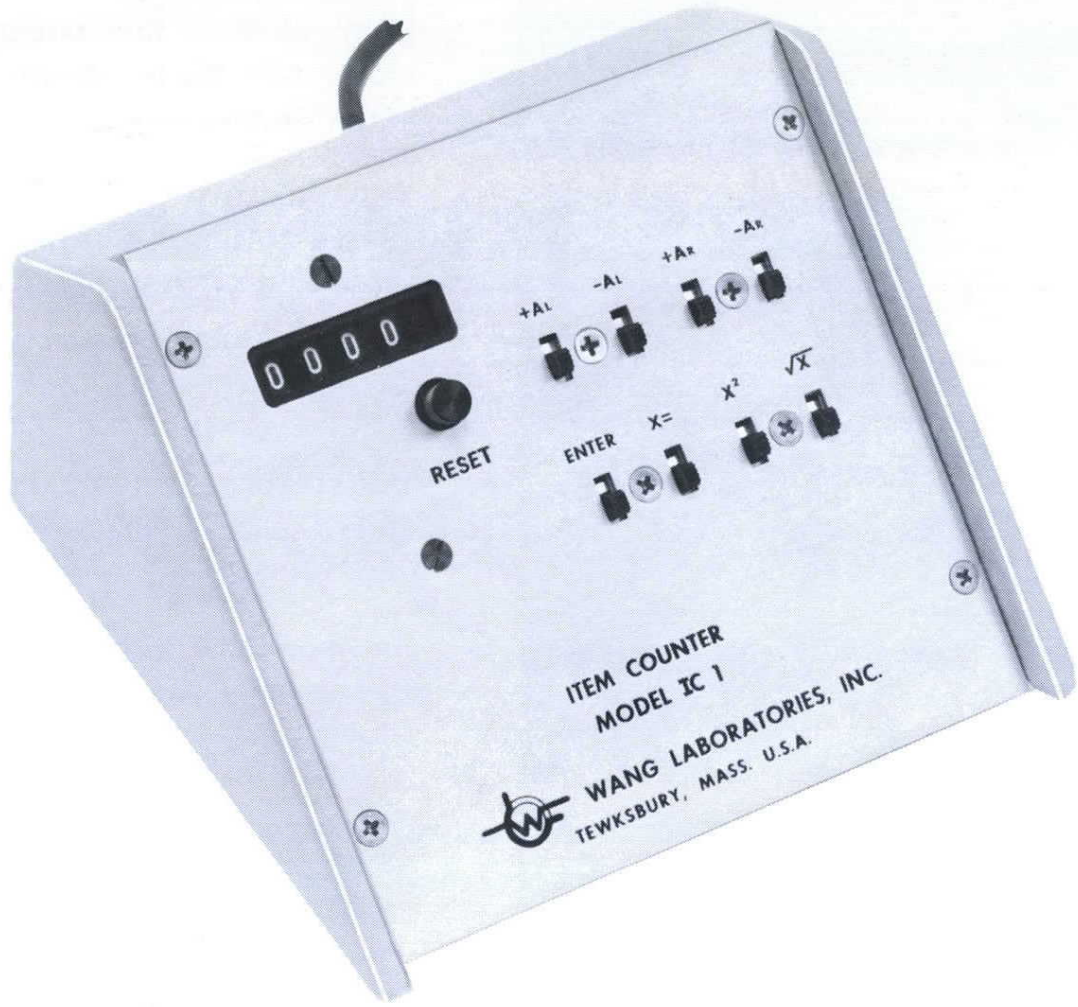
Program Code	300-360 OPERATION	362 OPERATION
01	Stop	Stop
10	Store Reg 0	Store Half B
11	Store Reg 1	Store Half A
12	Store Reg 2	Add Full
13	Store Reg 3	Store Full
14	Recall Reg 0	Recall Half B
15	Recall Reg 1	Recall Half A
16	Recall Reg 2	Subtract Full
17	Recall Reg 3	Recall Full
41	Enter	Enter
42	$\text{Log}_e \times$	$\text{Log}_e \times$
43	e^x	e^x
44	$\sqrt{\times}$	$\sqrt{\times}$
45	$\times^2$	$\times^2$
46	$\times =$	$\times =$
47	$\div =$	$\div =$
50	Clear Right Adder	Clear Right Adder
51	Recall Right Adder	Recall Right Adder

Program Code	300-360 OPERATION	362 OPERATION
52	+ Right Adder	+ Right Adder
53	− Right Adder	− Right Adder
54	Clear Left Adder	Clear Left Adder
55	Recall Left Adder	Recall Left Adder
56	+ Left Adder	+ Left Adder
57	− Left Adder	− Left Adder
60	Numeral 0	Numeral 0 or Reg 0
61	Numeral 1	Numeral 1 or Reg 1
62	Numeral 2	Numeral 2 or Reg 2
63	Numeral 3	Numeral 3 or Reg 3
64	Numeral 4	Numeral 4 or Reg 4
65	Numeral 5	Numeral 5 or Reg 5
66	Numeral 6	Numeral 6 or Reg 6
67	Numeral 7	Numeral 7 or Reg 7
70	Numeral 8	Numeral 8 or Reg 8
71	Numeral 9	Numeral 9 or Reg 9
75	Decimal Point	Decimal Point
76	Clear Display	Clear Display or Reg 10
77	Change Sign	Change Sign or Reg 11

BASIC ACCESSORIES

IC-1 ITEM COUNTER

The IC-1 Item Counter enables the calculator user to monitor and have as ready reference the number of like items that have been entered into a calculation.



DESCRIPTION

A keyboard attachable accessory, the IC-1 can be factory-installed to any calculator keyboard in the 300 Series. To accommodate the IC-1, the keyboard must be fitted with an IC-1 output connector (no. 57-60140) to mate with the input connector (no. 57-30140) on the 18-inch cable of the IC-1.

In operation, the IC-1 can count up the number of items in any of the $+$, $-$, $\times$, $\div$, $\sqrt{\times}$, and $\times^2$ operations. It can also count up any combinations of these operations (e. g., all $+$ and $-$ operations on the left adder, or all $+$ and $-$ operations on both the left and right adders, etc.). The range of count is 1 to 9,999.

OPERATION

Operation of the IC-1 Item Counter is controlled by a set of selector switches. When a desired function is to be counted, set the appropriate switch by pushing it to the upper position. Then "zero out" the counter readout by pressing the black knob immediately below the readout window. The counter is now ready to function.

EXAMPLE 1

Count the Number of Items in an $\times^2$ Operation:

Set the counter "$\times^2$" selector switch to the upper position. Set all other selector switches to the lower positions. Set the counter readout to zero. Operate the keyboard for all values of $\times$ to be squared. The IC-1 will indicate the number of calculations of the $\times^2$ function.

EXAMPLE 2

Count the Number of Multiplications:

Set the "$\times=$" switch of the IC-1 to the upper position. Set all other switches to the lower positions and set the counter readout to zero. Perform multiplications on the keyboard as usual. The IC-1 will indicate the number of multiplication operations performed.

EXAMPLE 3

Count the Number of Divisions:

Set the "Enter" switch of the IC-1 to the upper position. Set all other switches to the lower positions, and set the counter readout to zero. Perform divisions on the keyboard; the IC-1 will indicate the number of division operations performed.

ORDERING

A keyboard must be modified to accept the IC-1. When ordering the IC-1 Item Counter be sure to specify the *#57-60140 output attachment to the keyboard.* This permits the IC-1 Counter to be plugged into the modified keyboard. Any existing keyboard now in use can also be retrofitted with an IC-1 Counter. See below.

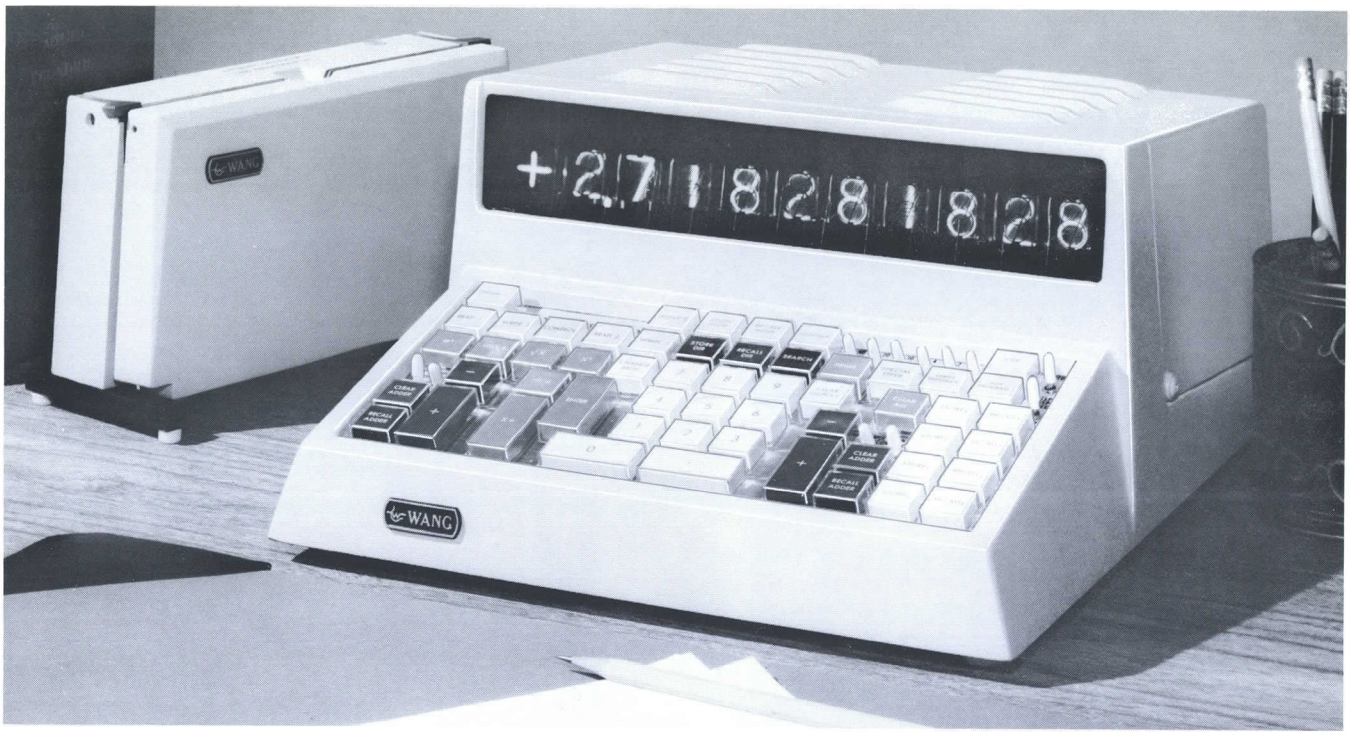
SPECIFICATIONS

Size	5 in. h, 5¼ in. l, 3⅝ in. w
Weight	2 lbs.
Cable	1½ ft. attached (to keyboard)
Temp. Range	0° C to 45° C

Price	$120 $140 (retrofit)

MODEL 370/370-2 PROGRAMMING KEYBOARD

Provides calculator keyboard functions, adds connections for powerful programming devices, extra data storage, and input/output peripheral devices.



FEATURES:

- Programming is made more flexible by being able to loop, branch, execute subroutines, and manipulate arrays.
- Data storage capacity is raised from 5 to 16 or 64 independent registers using optional Model 372 or 373 Storage Units.
- Simplicity of card programming is retained, using 80-step tab cards in Model 371 Card Readers, for as many as 480 steps of program.
- Allows connection of optional accessories including a typewriter, a teletypewriter, a CRT display, or on-line electronic input. Full alpha-numeric capability.
- Retains ease of use and other features of basic Wang calculators including logarithm and exponent operations.
- Fastest, most powerful calculating system, especially for rapid solution of complex problems with loops, branches, and subroutines. Highly recommended for statistics — and for on-line systems.

The Model 370 Programming Keyboard is intended for use with all Series 300-360 Calculator Electronic Packages. The Model 370-2 is identical to the Model 370 except for the change in name of eight keys as required for use with a Model 362E Electronic Package. Conversion between models of keyboards, if desired, may be accomplished in minutes. System configurations including the 370-2 and 362E are especially desirable, both for low cost and for the extra accumulators of the 362E. Series 370 Keyboards provide the standard keyboard input and data display functions of Wang Model 360K Keyboards, plus additional keys for system control. Electronic circuitry is added for operation in a more-powerful system configuration, with rear panel connections for programming card readers, extra data storage, etc. Internal logic adds decision-making test commands for programmed loops, branches, and subroutines. A 12-foot attached cable connects to the electronic package.

Circuits and keys are provided for full system control, input and output. Additional keys allow on-line "debugging" of programs. An extremely versatile dictionary of program codes (next page) allows powerful system combinations to be connected on a modular, building-block basis. Other system elements are described on the following pages.

SPECIFICATIONS

Size	6 in. h, 14 in. d, 11½ in. w
Weight	16 lbs.
Cables	6 Ft. attached, 3-wire (power cable) 12 Ft. attached (to elect. pkg)
Temp. Range	0° C to 45° C
Power	115vac ± 10%, 50-400 Hz. (230vac special order, no charge)
Power Consumption	20 Watts

Price	$1,200

SERIES 370/380

MODEL 371 CARD READER

Used in conjunction with 370/370-2 for program control with powerful decisions, loops, branches, and subroutines.

The Model 371 is the primary programming device of Series 370 Calculating Systems. One to six card readers may be used with each 370/370-2 Keyboard. Each reader holds an 80-step tab card, providing in all a capacity of 80 to 480 steps of program. Loops and branches are performed not only within individual readers but to other readers, and it is frequently practical to exchange sets of program tab cards in the course of solving a problem. For example, when inverting a 6 × 6 matrix, a set of two cards is used to sequence the entry of matrix coefficients into storage, another for inversion, and another to display the results; only two readers are required for the entire program.

Readers are furnished with attached cables for series connection of multiple units to a 370/370-2 Keyboard. Indicator lamps show which reader is in use. Bifurcated contacts provide highly-reliable card hole sensing, and a well-designed closure mechanism with a high mechanical advantage lever assures proper card registration.

SPECIFICATIONS

Size	5½ in. h, 9½ in. l, 2½ in. w
Weight	6½ lbs.
Cable	3 Ft. attached (to keyboard)
Temp. Range	0° C to 45° C

Price	$600

370 380 CODE	370/380 KEY COMMAND	376 KEY
00		
01	STOP	A
02	SEARCH	B
03	SEARCH & RETURN	C
04	RETURN	D
05	SKIP IF +	E
06	CONTINUE	F
07	MARK	G
	320E 360E 362E	
10	— STORE 0 STORE H_B	H
11	— STORE 1 STORE H_A	I
12	— STORE 2 ADD FULL	J
13	— STORE 3 STORE FULL	K
14	— RECALL 0 RECALL H_B	L
15	— RECALL 1 RECALL H_A	M
16	— RECALL 2 SUB FULL	N
17	— RECALL 3 RECALL FULL	O
20	SKIP IF OVERFLOW	P
21	CONTROL	Q
22	READ 1	R
23	READ 2	S
24	WRITE 1	T
25	WRITE 2	U
26	STORE DIRECT	V
27	RECALL DIRECT	W
30	SKIP IF 0	X
31		
32	STORE INDIRECT	Z
33	RECALL INDIRECT	
34		
35		

370 380 CODE	370/380 KEY COMMAND	376 KEY
36	GROUP 1	
37	GROUP 2	
40		
41	ENTER	!
42	$LOG_e \times$	"
43	e^x	#
44	$\sqrt{\times}$	$
45	$\times^2$	%
46	$\times .=$	&
47	$\div =$	'
50	CLEAR A_R	(
51	RECALL A_R	)
52	$+ A_R$	*
53	$- A_R$	+
54	CLEAR A_L	,
55	RECALL A_L	?
56	$+ A_L$	=
57	$- A_L$	/
60	0	0
61	1	1
62	2	2
63	3	3
64	4	4
65	5	5
66	6	6
67	7	7
70	8	8
71	9	9
72		
73		
74		
75	DECIMAL POINT	.
76	CLEAR DISPLAY	
77	CHANGE SIGN	–

MODEL 372 DATA STORAGE

Adds 16 random-access core storage registers to Series 370/380 Calculating Systems.

The 372 Data Storage Unit has 16 independently addressable core storage registers. Each register is capable of storing a 10-digit number with its plus or minus sign and decimal point. The 16 registers of a single 372 Unit form a 2 x 8 matrix with row count R and column count C. The two digit address code RC specifying row count R and column count C identifies any of the 16 registers in the 2 x 8 matrix. For example, the address code for the register identified by row count 1 and column count 6 is "16". Up to four 372 Data Storage Units can be connected to form an 8 x 8 matrix with row count R(0, 1, 2, 3, 4, 5, 6, or 7) and column count C(0, 1, 2, 3, 4, 5, 6, or 7). Slide switches on each of up to four multiple connected 372 Units are set to numbers 0, 1, 2, or 3 in the same order in which the units are connected.

Any 372 register RC can be directly accessed by keyboard or program operation. The number N in the display is stored in register RC by setting Special Operation Code switches "40-20-10-4-2-1" to add up to RC and pressing Store D and Special Code keys. The number N stored in register RC is recalled from storage and displayed by setting Special Operation Code switches to add up to RC and pressing Recall D and Special Code keys. For programmed storage of displayed number N in register RC, or recall and display of Number N stored in register RC, simply program a **Store Direct** (Code 26) or a **Recall Direct** (Code 27) instruction followed by address code RC.

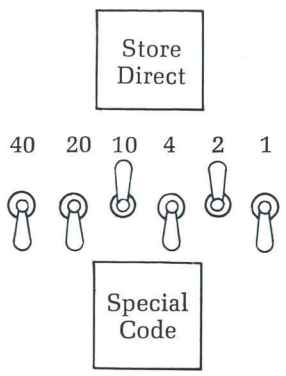
SPECIFICATIONS

Size	11.8 in. h, 17 in. l, 7 in. w
Weight	14 lbs.
Cable	12 Ft. attached (to keyboard) 6 Ft. attached, 3-wire (power cable)
Temp. Range	0°C to 45°C
Power	115vac ± 10%, 50-400 Hz (230vac special order, no charge)
Power Consumption	20 Watts
Capacity	16 registers
Price	$1,000

COLUMN

ROW	0	1	2	3	4	5	6	7
0	00	01	02	03	04	05	06	07
1	10	11	12	13	14	15	16	17
2								
3								
4								
5								
6								
7								

Keyboard Entry



KEY STORE DIRECT

SET OPERATION CODE SWITCHES TO 12

KEY SPECIAL CODE

The display register contents would be stored in register 12.

MODEL 373 DATA STORAGE

Adds not 16 but 64 core storage registers, with direct random access and indirect store/recall operation.

Identical in appearance to the Model 372 (preceeding page), the 373 has 64 registers, each of 10 digits, arranged in an 8 x 8 matrix. A similar addressing system is used; each register being identified by a two-digit code specifying row number and column number. Both numbers range from 0 through 7, thus the X in the illustrative figure is in register 53 and the Y in 04. The use of the **STORE DIRECT** and **RECALL DIRECT** commands is identical to that of the 372.

However, the 373 can also be addressed indirectly through a pair of registers identified as the row and column counters. The **STORE INDIRECT** and **RECALL INDIRECT** commands, followed by a code representing any of several options, provide highly flexible means of programming (particularly true when matrix manipulation is required). The mode of indirect memory addressing enables sequential storage or recall of data row by row, column by column, or in lines diagonally across the 8 x 8 memory matrix. This relative form of addressing provides capability for a very compact program. More information is available from the Model 370 system reference manual.

The storage layout of Figure 2 results from the series of instructions in Table I. Assume all registers were cleared previously.

TABLE I

COMMAND	CODE	COMMAND	CODE
Recall Indirect	33	Clear Display	76
Row Set 3	23	3	63
Recall Indirect	33	Store Indirect	32
Column Set 1	01	Row +	61
Clear Display	76	Clear Display	76
1	61	4	64
Store Indirect	32	Store Indirect	32
Column +	41	Column Set 6	06
Clear Display	76	Recall Indirect	33
2	62	Row —	62
Store Indirect	32	Clear Display	76
Row Column +	60		

SPECIFICATIONS

Size	11.8 in. h, 17 in. l, 7 in. w
Weight	17 lbs.
Cables	12 Ft. attached (to keyboard) 6 Ft. attached, 3-wire (power cable)
Temp. Range	0°C to 45°C
Power	115vac + 10%, 50-400 Hz (230vac special order, no charge)
Power Consumption	25 Watts
Capacity	64 registers

Price	$2,500

COLUMN

ROW	0	1	2	3	4	5	6	7
0					Y			
1								
2								
3								
4								
5				X				
6								
7								

373 DATA STORAGE
Figure 1.

COLUMN

ROW	0	1	2	3	4	5	6	7
0								
1								
2								
3		1	2					
4				3				
5							4	
6								
7								

Figure 2.

COLUMN

ROW	0	1	2	3	4	5	6	7
0	00	01	02	03	04	05	06	07
1	10	11	12	13	14	15	16	17
2	20	21	22	23	24	25	26	27
3	30	31	32	33	34	35	36	37
4	40	41	42	43	44	45	46	47
5	50	51	52	53	54	55	56	57
6	60	61	62	63	64	65	66	67
7	70	71	72	73	74	75	76	77

Matrix with Register Identifications
Figure 3.

MODEL 376 INPUT/OUTPUT WRITER, #33ASR
MODEL 377 CONTROL UNIT

Adds alpha-numeric printout, with multi-column programmable format, and ASCII-code punched paper tape output and tape input for data, programs, and alphabetical headings.

The Model 377 is a portable electronic control unit which serves as interface for the Model 376. The latter is a slightly modified 33ASR Page Printer/Tape Punch/Tape Reader, with a keyboard which may be used to prepare input tapes off-line, or as an on-line remote system keyboard. Page printout format is completely programmable.

Output of numeric data in the 370/380 display is produced by a 2-step command (WRITE 1, followed by a code indicating the desired number of digits or spaces before and after the decimal). The output always includes printout; punched tape output may be programmed on or off. Numbers are printed with the decimal point properly positioned and aligned in columns.

In addition to numeric output, the 376/377 configuration provides printout of alphabetic information under program control. Card or tape programs are used as sources, with 2-step commands (WRITE 2, followed by the character desired). The paper tape reader of the 33ASR may also be used, with information automatically transposed to the output.

The tape reader of the Model 376 may be activated by keyboard or program instruction, with program control switched to the punched tape. Hole patterns of the first six tracks (channels) of the tape are interpreted exactly as the hole patterns in program cards. Branching between 376 tape and 370/380 card or mag tape programs is completely programmable.

SUMMARY of INPUT/OUTPUT COMMANDS

COMMAND	CODE	DESCRIPTION
READ 1	22	Reads codes on paper tape
WRITE 1 DP	24 DP	Types number in display (DP format)
WRITE 1 CR/LF	24 71	Carriage return and indexes one line
WRITE 1 LF	24 70	Double line index *without* carriage return
WRITE 1 SPACE	24 6X	Produces 2× spaces along print line (e.g., 24, 64 = 8 spaces)
WRITE 1 PRINT ON	24 72	Turns printer on
WRITE 1 PRINT OFF	24 73	Turns printer off
WRITE 1 PUNCH ON	24 74	Turns punch on
WRITE 1 PUNCH OFF	24 75	Turns punch off

SPECIFICATIONS

	MODEL 376 INPUT/OUTPUT WRITER	MODEL 377 CONTROL UNIT
Size	33 in. h, 22 in. w, 18½ in. d	Portable Case 9 in. h, 17 in. l, 5 in. w
Weight	56 lbs.	14 lbs.
Cables	12 Ft. attached, 3-wire (power cable) 12 Ft. attached (to control unit)	6 Ft. attached, 3-wire (power cable) 12 Ft. attached (to keyboard)
Temperature Range	50°C	0° to 45°C
Power	115vac ± 10%, 60 Hz. only	115vac ± to 10%, 50-400 Hz. (230vac special order, no charge)
Power Consumption	300 Watts	25 Watts
Rate	10 characters/sec (alpha) 5 characters/sec (numeric)	
Price	$1,400	$1,400

MODEL 379-5/7 OUTPUT WRITER

Adds to any Wang calculator equipped with a Series 370/380 Keyboard the ability to type numeric data and alphabetic headings and messages. An IBM Selectric Typewriter is used as the printing mechanism, with ability to tabulate output in columnar format under program or keyboard control.

FEATURES:

- Uses fast, reliable, versatile Selectric Typewriter.
- Full alpha-numeric capability.
- Wide carriage for handling large forms.
- Usable from top as a conventional typewriter.
- High-performance, yet economical solution to user printout needs.

DESCRIPTION

The Model 379-5/7 Output Writer System is furnished in two parts; a Model 379-7 Output Writer, with a Wang solenoid undercarriage to activate all typewriter functions (except ribbon shift), and a Model 379-5 Output Writer Control, which powers the solenoids and controls the output format.

All typewriter operations are controlled by 2-step program codes, or two consecutive keystrokes. Output format is completely programmable and is formatted independently for each printout. The contents of the calculator display register are typed with the decimal point properly positioned, and the number of digits before and after the decimal are independently programmable. If more digits before the decimal are programmed than in fact exist, blank spaces are inserted; this is especially useful for separating columns. The sign of a number is indicated after the number; a blank space symbolizes "+", and a "−" is typed for negative.

Automatic program codes include on and off, tabulate, shift to upper case, shift to lower case, carriage return and line feed, line feed only, space (multiple spaces as programmed), type contents of display, and type alphabetic or special characters as desired.

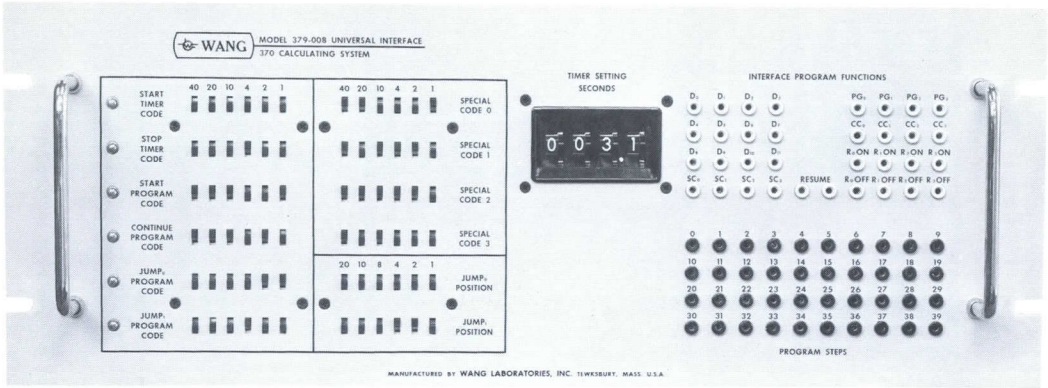
SPECIFICATIONS

Color:	IBM Opal Grey
Carriage Width:	15½″ (13″ writing line)
Character Pitch:	12/inch
Characters:	Standard alpha-numeric, upper and lower case
Type Face:	Prestige Elite (Code 012)
Special Characters:	Available from standard commercial sources (interchange typing head)
Speed:	13 characters/second
Connections:	Model 379-5 Control has 12 ft. attached cable with quick-disconnect connector for Model 370/380 Keyboard or storage Model 379-7 Output Writer has similar cable for connection to Control
Size:	Model 379-5: 17″ L x 11.8″ H x 7″ W, in portable case Model 379-7: Standard extra wide Selectric, except bottom cover lowered slightly
Option 1: Option 2:	10 character/inch pitch — no charge (specify type face) Pin-feed platen — $100 additional (specify feed hole pitch)

Price:	Model 379-5 Output Writer Control	$ 800	Combined Price
	Model 379-7 Output Writer	$1,000	$1,500

MODEL 379-8 UNIVERSAL INTERFACE

Accepts input data from digital voltmeters, electronic counters, etc., for automatic on-line operation of Series 370/380 Calculating Systems with measuring instruments. Accommodates almost all applications due to general-purpose design and built-in system hardware.



FEATURES:

- Single or dual input, or more, up to 12 digit total capacity.
- Wide-range input circuits for maximum interface compatibility.
- Accepts and provides versatile instrument control and output commands.
- Built-in 4-channel input scanner increases utility.
- Fully programmable, with 40-step patch panel for input subroutines.
- Low-cost, high-performance answer to on-line calculating system needs.

DESCRIPTION:

The Model 379-8 Universal Interface contains the following circuits:

1. A 4-channel, 3-wire reed relay analog input scanner, for multi-channel input to a single A/D converter.
2. A 12-digit electrical data interface (parallel binary-coded-decimal, 1-2-4-8 code).
3. A system clock, or timing pulse source, with measurement commands generated at intervals up to 999.9 seconds, selectable in increments of 0.1 seconds.
4. Device control circuits for closed-loop control of one, two, or more data sources.
5. A 40-step linear "mini-programmer" for sequencing of data, system commands, and calculator codes by interconnection of banana-jack patch cords.
6. A 115 volt, 60 Hz power supply.

These circuits provide complete compatibility with virtually all sources of parallel 1-2-4-8 BCD data. Level shifts as small as 3 volts, or as great as 100 volts, of either polarity — or bi-polar — and of either sense — are accommodated. Input impedance for all circuits is approximately 50 kilohms, and output impedance of device control circuits is approximately 2 kilohms.

The interface is suitable for use with all commercially-available digital voltmeters and electronic counters with 1-2-4-8 BCD output, as well as other electronic devices of similar output.

SPECIFICATIONS

Circuits:	All solid-state (except scanner relays), with replaceable plug-in circuit module construction.
Package:	Rack mounting, 7″ H x 19″ W x 14″ D.
Power:	115 vac ± 10%, 60 Hz.
Trigger Threshold:	Adjustable from −10 to +10 volts.
Sense:	Selectable.
Minimum Level Shift:	± 3 volts each side of threshold.
Maximum Input:	± 100 volts.
Patch-cord Program:	Front panel patch cord 40-step "mini-programmer"
Input Connectors:	Rear-panel Amphenol 57-40500 (2 mating connectors furnished).

Terminals and Switches:

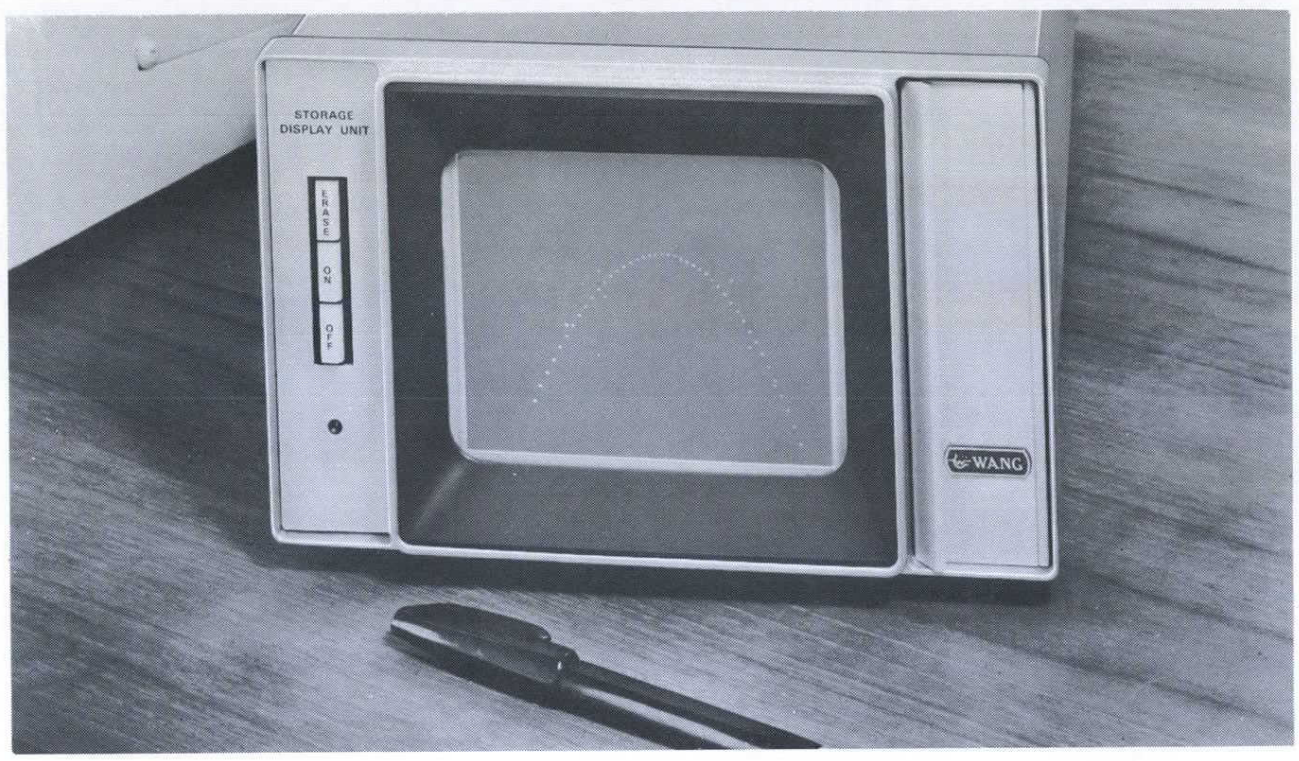
- 4 output pulses
- 4 conditional continue inputs
- 4 relay "on"
- 4 relay "off"
- 2 resume
- 12 data inputs
- 4 special codes (individually switch-selectable)
- 2 jump positions (individually switch-selectable)
- 1 timer start code selector
- 1 program start code selector
- 1 program continue code selector
- 2 program jump code selectors

Price	$2,500

SERIES 370/380

MODEL 379-9/10 CRT DISPLAY

An Important Output Module for Wang 370/380 users.



FEATURES:

- Stores and displays graphic information on 8 cm x 10 cm screen.
- Permits true man-machine interaction.
- Gives a graphic, intuitive check on accurate digital results.
- Plots (X, Y) coordinates under program control.
- Simple to operate, simple to control.
- Complete flexibility.
- Low cost.
- Fully compatible with Wang 370/380 Calculating Systems.

The Wang 379- 9/10 CRT Display is designed to give the user that instinctive feeling for his problem. This is often necessary during the initial stages, when trying to get a "handle" on the problem. In curve fitting, for example, it is possible to display the data points and the fitted curve! In a vibration analysis, the system behavior can be displayed, with varying system parameters.

The 379-9/10 System consists of the Model 379-10 CRT Display Unit, and the Model 379-9 D/A Control Unit. A 3⅛" square section of the viewing screen is used for the display. There are 1000 points on the Y-axis and 1000 points on the X-axis. Operation of the Display System is extremely simple. Three front-panel push-buttons are provided for turning off the unit, turning on the unit, and erasing the screen. There are four program commands for controlling the system. Each command requires two 370/380 program steps (below).

COMMAND	2-STEP CODE		FUNCTION
ERASE	Group 2, (37)	Erase (60)	Erases the entire display screen.
SET X	Group 2, (37)	Set X (61)	Sets the second, third, and fourth digits of the W-register as X-coordinate.
SET Y	Group 2, (37)	Set Y (62)	Sets the second, third, and fourth digits of the W-register as Y-coordinate.
DISPLAY	Group 2, (37)	Display (63)	Displays the dot (X, Y) on the screen.

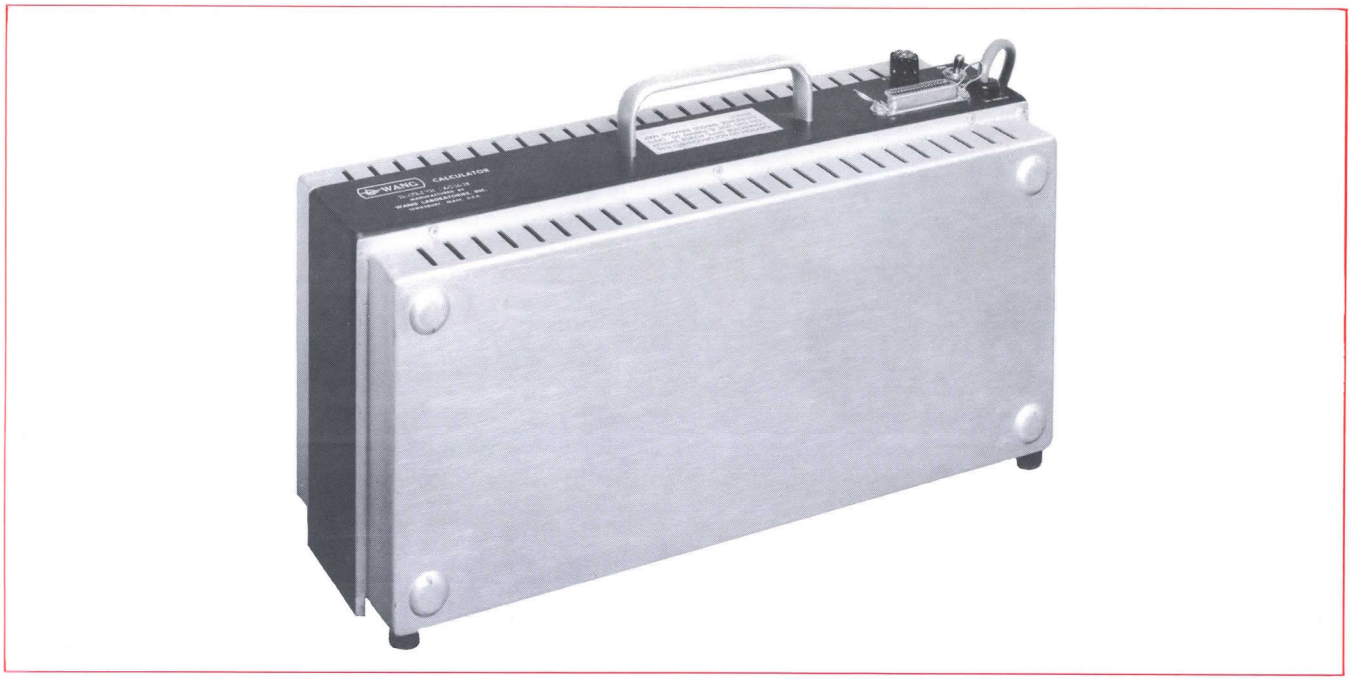
SPECIFICATIONS

	MODEL 379-9 D/A CONTROL	MODEL 379-10 CRT DISPLAY
Size	Portable Case 9 in. h, 17 in. l, 5 in. w	5½ in. h, 17¼ in. l, 8½ in. w
Weight	14 lbs.	18 lbs.
Cables	6 Ft. attached, 3-wire (power cable) 12 Ft. attached (to CRT Display)	6 Ft. attached, 3-wire (power cable)
Temperature Range	0°C to 45°C	0°C to 45°C
Power	115vac ± 10%, 50-400 Hz. (230vac special order, no charge)	115vac ± 10%, 50-400 Hz. (230vac special order, no charge)
Power Consumption	35 Watts	57 Watts

Price	$1,250	$1,500	Combined Price $2,500

MODEL 379-12 TRIG PACK
MODEL 379-13 CARD READER INTERFACE

Both provide branching and looping at 370 speeds using the 380 System.
Trig Pack adds fast trigonometric subroutines.



Both units, identical in appearance, packaged in a portable configuration similar to Series 300E-360E Electronic Packages, provide fast subroutine program capability to Series 380 Systems at low cost. Up to six Model 371 Card Readers may be interfaced to a 380/380-2 using either the Model 379-12 or the Model 379-13.

Additionally, the Model 379-12 provides useful trigonometric functions for both Series 370 and Series 380 Systems. These hard-wired subroutines consists of Sinθ, Cosθ, Arc sine X, Arc tangent X, and π. Each function may be initiated by keyboard or program as a 2-step operation (CONTROL, followed by number keys 1 through 5, respectively).

To address Model 371 Card Readers connected to either the Model 379-12 or 379-13, again 2-step operations are used (CONTROL, analagous to SEARCH, followed by the subroutine number). Subroutine code 03, followed by 04, conditionally returns program control to the 370/380 Keyboard. The 370/380 program causes the subroutine to continue from its stopped position using CONTROL, CONTINUE PROGRAM (77) codes. A CONTINUE code in the subroutine returns control to the main program.

The Models 379-12 and 13, when used with Model 371 Readers for subroutines, operate on all standard 370/380 commands except SEARCH & RETURN, RETURN, and SKIP IF OVERFLOW.

SPECIFICATIONS

	MODEL 379-12 TRIG PACK	MODEL 379-13 CARD READER INTERFACE
Size	Portable Case 9 in. h, 17 in. l, 5 in. w	Portable Case 9 in. h, 17 in. l, 5 in. w
Weight	15 lbs.	15 lbs.
Cables	12 Ft. attached (to keyboard) 6 Ft. attached, 3-wire (power cable)	12 Ft. attached (to keyboard) 6 Ft. attached, 3-wire (power cable)
Temperature Range	0°C to 45°C	0°C to 45°C
Power	115vac ± 10%, 50-400 Hz (230vac special order, no charge)	115vac ± 10%, 50-400 Hz (230vac special order, no charge)
Power Consumption	20 Watts	20 Watts

Price	$1,200	$800

SERIES 370/380

MODEL 380/380-2 PROGRAMMING KEYBOARD

Adds sophisticated programming capability, optional extra storage, and optional printing capability to any Wang calculator.

FEATURES:

- The 380 provides decision-making tests for programs, which can perform sub-routines, loop, and branch.
- The 380 adds optional extra storage capacity, up to 64 registers, addressable through the keyboard or by program control.
- The 380 offers a choice of data output options, including an economical, reliable Selectric Output Writer with alpha-numeric, program-formatted page or form printing.
- The 380 is of open-ended bus-line design, to allow addition of other input, output, or storage devices, or on-line electronic input, increasing versatility and preventing obsolescence.
- The 380 retains all the advantages of the Wang Calculator, including fast, legible numeric indicator tube display; silent, swift operation; and square root, logarithm, and exponent functions.
- The 380 learns programs by remembering keyboard operations and storing their sequence on removable, reusable magnetic tape cartridges — no special techniques are required.
- The 380, while high in performance, is low in cost, and provides the greatest program, storage, and arithmetic capability available to the user at the price. Compare, for example, this configuration: Models 380-2 & 362E, providing up to 640 step programs, 12 or 24 storage registers, with square root, log, and exponent: $3,795.

The magnetic tape cartridge of the 380 Keyboard is used to learn a sequence of keystrokes executed to perform a given calculation manually under operator control. Subsequently, identical calculations are automatically, repetitively performed without further operator instruction. Once finished, the programs may be erased or the cartridge may be removed and retained for reuse.

The built-in magnetic tape transport accepts plug-in tape cartridges with continuous-loop 2-track tapes with a program capacity of 40 to 640 steps per track. Keys are provided for all commonly used program instructions, so that by selection of the learn mode and execution of the proper keystrokes, the program is permanently stored without need for table reference or special program assembly techniques. Programs will loop and branch, perform subroutines, and make decisions. Program codes are provided for memory addressing, typewriter form output (alphanumeric, for business application), auxiliary data input, etc. Error indication is provided to ensure program operation, and a unique DISPLAY PROGRAM key enables program codes to be displayed by the display tubes for convenience in checking programs.

The magnetic tape steps through programs at rates of up to 15 steps per second, depending on the details of the program being used, at speeds consistent with the performance of peripheral equipment. Up to sixty-four unique identifying programs or subroutine marks may be used for each channel of the tape, so that single programs may have numerous branches or subroutines, or up to sixty-four programs may be stored on one channel of a cartridge.

The program learning feature of the 380 System, coupled with the direct and simple organization of the entire 300 Series of system modules, rewards the 380 user with significant advantages. The 380 as his computing instrument is immediately accessible to him. It is under his direct command and control, and provides immediate answers. The owner-user is his own "programming specialist", yet he need not learn any special language to program the 380. His direct answers from the 380 enable him to immediately proceed to his next most important step — analyzing and using the information generated.

Select the Model 380 for use with Series 300-360 Electronic Packages, or the Model 380-2 for use with the 362E. Refer to page 22 for a listing of tape cartridges.

SPECIFICATIONS

Size	6 in. h, 14 in. d, 11½ in. w
Weight	16 lbs.
Cable	12 Ft. attached (to elect. pkg) 6 Ft. attached, 3-wire (power cable)
Temp. Range	0°C to 45°C
Power	115vac ± 10%, 60 Hz only. (230vac, 50Hz on special order)
Power Consumption	35 Watts

Price	$1,500

MISCELLANEOUS ITEMS

This section briefly describes various accessories for calculators and 370/380 Series Systems. Descriptions are generally in order of appearance on the Wang price list, page A5.

Extension Cables: These are used for interconnection between keyboards and electronic packages. Keyboards may be operated remotely, up to 200 feet from the electronic package, except KT/KR, 370, and 380 Models which are limited to 50 feet. Extension cables are offered in 25-foot increments, from 25 to 200 feet. Cables may be ordered with one end unterminated (the connector not yet installed), for installation through cable ducts and conduit. Odd lengths are not available; order the next higher standard length.

T CONNECTOR: A small device used to parallel two keyboard cables into one electronic terminal. T connectors may be arranged to allow the operation of four keyboards per non-simultaneous electronic package (Figure 1), or up to sixteen on one simultaneous electronic package. When the latter setup is used, one keyboard of each group of four may be operated at any one time.

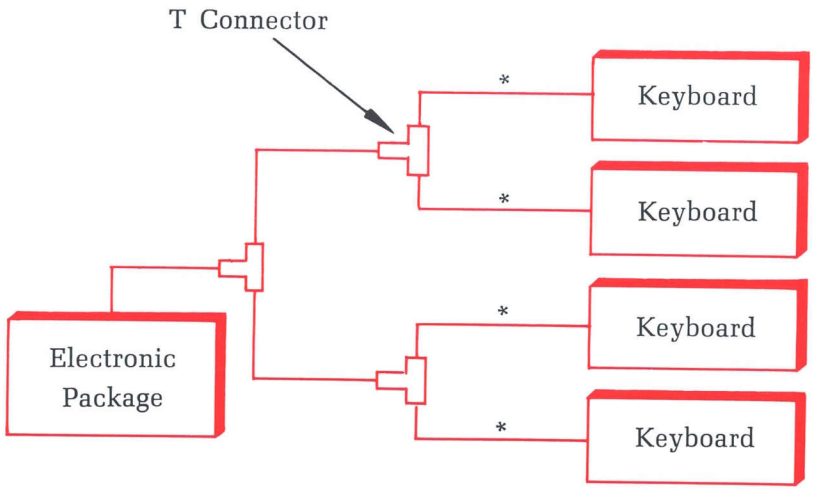
PT Connector: Same as T connector except one input has priority.

MX Multiplexer: This chassis contains solid-state logic and plug-in switching relays for automatic interconnection in any combination of sixteen keyboards and a single simultaneous electronic package. Any four of the 16 keyboards may be used at one time.

MX Connector: This is a T connector for use with the MX Multiplexer to allow up to 16 more non-simultaneous keyboard inputs to a simultaneuos electronic package for occasional keyboard use.

Cable and Connectors: Cable may be ordered in bulk, with separate connectors as required. 30-conductor AWG No. 26 wire is furnished, in a 0.300″ O.D., 80°C PVC jacket. Male connectors are offered for connection to the electronic package, and female for the keyboard. Connector assembly drawing #5315 gives soldering instructions. If cables are installed within or behind walls, order a Surface Mounting Box and a Wall Mount Cover Plate. This provides a neat termination of the extension cable near the user's desk for connection of a keyboard.

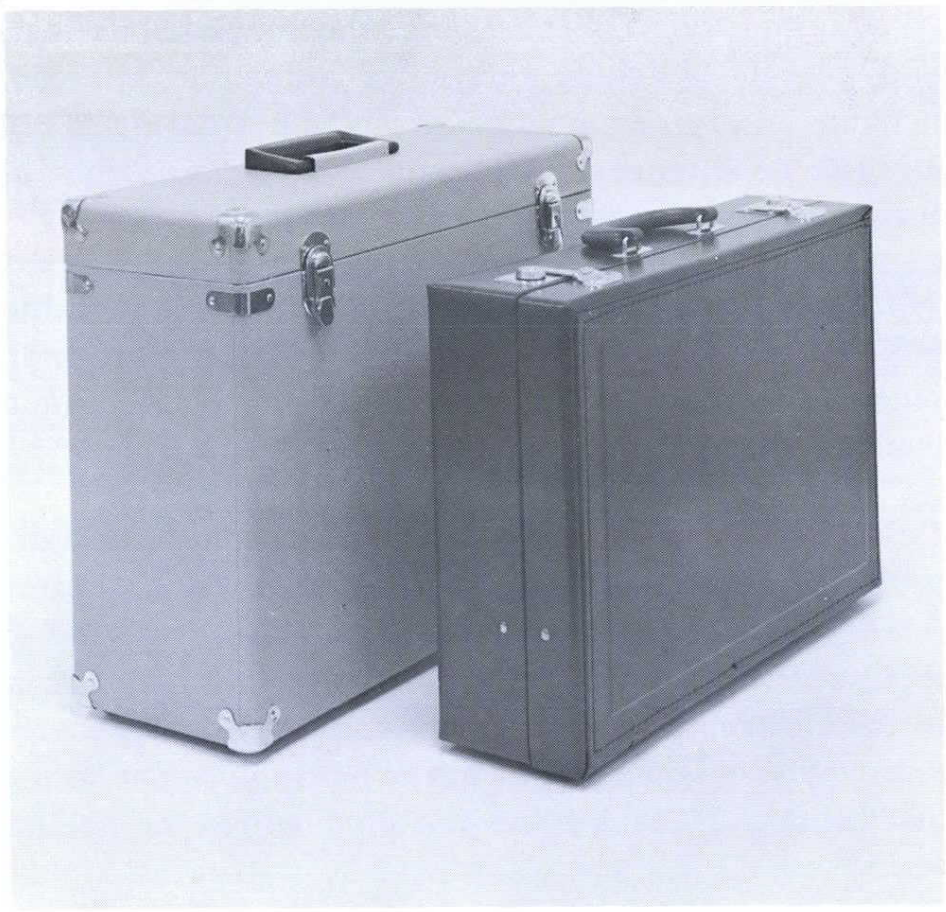
Filters and Transformers: A Line Filter is offered to reduce interference from devices which impress electrical noise on the AC power line. Examples are some mechanical calculators, and X-Ray machines. Two sizes of isolation transformers are also offered for the same purpose. For moderate line noise suppression, with excellent voltage regulation of varying or consistently low-voltage power lines, order a Voltage Control Transformer. Note: Before ordering any such devices, contact the nearest Wang office for on-the-job trial. Rarely are they needed.



*Up to 200 foot cable length. Extension cables, if used between T connector and electronic package, should be kept short. This configuration may be repeated up to four times for four-terminal simultaneous packages.

Figure 1. Typical T Connector Arrangement With Non-simultaneous Electronic Package.

MISCELLANEOUS ITEMS



Carrying Case: A ruggedized "suitcase" is offered for transporting 300E-362E Electronic Packages, and an attache case is available for carrying one or two keyboards and a CP-1.

Cabinets: "Relay-rack" floor-standing electronic equipment enclosure cabinets are offered in various sizes. These are modern in style, finished in calculator beige, with contrasting brown trim panels. They accept all Series 370/380 components except simultaneous-input calculator electronic packages and desk-top instruments such as keyboards and card readers. Each rack-mounted item, such as a 362E, 373, 377, etc., is mounted behind a 7″ high x 19″ wide panel. Cabinet capacity can be determined by the model number; for example, a 4R cabinet can accommodate four such rack panel mounted instruments. It is advisable to order a cabinet large enough to accept at least one more device; the empty space will be covered by a blank panel. Note: Add $50 to the price of each item for rack panel mounting.

Magnetic Tape Cartridges: Plug-in blank program cassettes for 380/380-2 Keyboards. Order by program capacity (per track) as follows:

180-0040	40 steps/track
180-0080	80 steps/track
180-0160	160 steps/track
180-0320	320 steps/track
180-0480	480 steps/track
180-0640	640 steps/track

Cartridges are individually boxed and contain labels for identifications of program content. A full assortment is suggested, with extra 40 and 80-step units for common short programs.

Portapunch: Manufactured by IBM, this item is recommended as ideally suited for low-cost preparation of CP-1 or 370 program cards. A stylus is also included.

Program Pads: Pad-form worksheets for preparation of programs, retention of program running instructions and description. Specify:

700-1201A	Calculator Program Worksheets
700-1210	370 Program Description Forms
700-1209	380/380-2 Program Description Forms
700-1211	Program Description Forms (Continuation Sheet)
700-1202A	370-380 Program Worksheets

Program Cards: Pre-scored 80-step tab cards for CP-1 or 371 programs. Order #700-1208 for either instrument.

Manuals: One each operating instructions and program library furnished free. Additional program libraries: Prices on request. Additional 370 manuals, Vol. I & II: Refer to price list.

APPENDIX

TERMS and CONDITIONS

TERMS AND CONDITIONS OF SALE

Acceptance: Purchase orders become firm orders only when accepted by Wang Laboratories, Inc., 836 North Street, Tewksbury, Massachusetts.

Prices: All prices are for the 48 contiguous States and District of Columbia. Shipments are FOB Tewksbury, Mass. Add 8% to prices shown for shipments to Alaska, Hawaii, or Puerto Rico.

Payment: Terms are Net 30 days, for accredited customers.

Title: Title does not pass to the purchaser until the purchase price, including all taxes, has been paid.

Risk of Loss: The purchaser assumes the risk of loss or damage of the equipment by the carrier.

Warranty: Except as noted, this equipment is warranted against defects in workmanship and materials for 90 days from installation. Parts are warranted for a period of 1 year, exclusive of labor. Refer to page A8 for details.

Taxes: State and local taxes are added as applicable.

Delivery: Equipment is shipped in accordance with the published delivery schedule in effect at the time of acceptance. Dates shown are approximate, and delivery is subject to unavoidable delays.

Quantity Discounts: Quantity discounts are available on individual orders, or on the total amount of an annual order with individual releases, as follows:

AMOUNT	DISCOUNT
Up to $25,000	None
25,001 to 50,000	2%
50,001 to 75,000	3%
75,001 to 100,000	4%
100,001 and up	5%

Ordering Address:

WANG LABORATORIES, INC.
836 North Street
Tewksbury, Massachusetts 01876
Telephone: 617 851-7311
TWX: 710 343-6769
TELEX: 94-7421

Orders may also be placed with the nearest Wang Sales/Service Center.

Service Points: Field sales/service centers are listed at the rear of this catalog.

Payment Address: All invoices are submitted from and all payments are to be directed to our general offices:

WANG LABORATORIES, INC.
836 North Street
Tewksbury, Massachusetts 01876

Installation, Instruction, and Consultant Terms: Equipment requires no special installation. Modules are readily attached (plugged in) for use in office environments. Extension cables with mated connectors are also plug-in items.

Users are responsible for installation of hidden extension cables (i.e, between-the-wall installations, and over-the-ceiling installations). Wang Laboratories offers technician service for soldering of unassembled input or output connectors at listed cost. One-end assembled cables may be ordered in standard lengths. Bulk and unassembled cables may be ordered in increments of 100 feet.

Operating instructions are shipped with each calculator free of charge. Special purpose instruction of groups or individuals is available and can be obtained by special quotation.

Electrical characteristics: 115vac ± 10%, 50-400 Hz single-phase standard. 115 volts, 60 Hz where indicated. 230 volt operation available on special order at no extra charge. 3-wire power cord with grounding conductor supplied.

Export Packing:

Commercial export packing — $55
Military export packing per MIL-M-3685 — $250

Items of Foreign Manufacture: None. All equipment is manufactured in U.S.A.

RENTAL OF CALCULATORS AND SYSTEMS

Wang Laboratories provides four methods by which Wang electronic calculators may be rented or leased. These are summarized below:

LEASE (MINIMUM OF ONE YEAR) WITH PURCHASE OPTION

- Billing quarterly, due beginning of period.
- Rates are 6% per month during 1st year, 5% per month 2nd year, 4% per month 3rd year, 3% per month 4th year, 3% per month subsequent years or 10% toward purchase.
- Purchase option exercisable at the end of each quarterly period — 50% of lease payment is credited toward 90% of purchase price.
- Cancellation accepted at the end of 1st year or 3 month notice thereafter.

LEASE (MINIMUM OF ONE YEAR) WITHOUT PURCHASE CREDIT

- Billing quarterly, due beginning of period.
- Rate: 4.2% per month.
- Cancellation accepted at the end of 1st year or 3 month notice thereafter.

RENT (MINIMUM OF 3 MONTHS) WITH PURCHASE OPTION

- Billing quarterly, due beginning of period.
- Rate: 8% per month of purchase price.
- Purchase option exercisable at the end of any rental month. 60% of rental payment is credited toward 90% of purchase price.
- One month notice accepted for cancellation after initial 3-month minimum.
- Change to lease: Lease terms apply as if lease started on commencement of rental. Lower rate effective on making this change. Term starts from initial date of rental. Change effective at beginning of next period.

RENT (MINIMUM OF 3 MONTHS) WITHOUT PURCHASE CREDIT

- Billing quarterly, due beginning of period.
- Rate: 5% per month.
- One month notice accepted for cancellation after initial 3-month minimum.

Additionally, Wang Laboratories can suggest appropriate leasing companies, or cooperate with any suggested.

Note: Lease or rental payments include any possible cost of service. Applicable federal, state, and local taxes are to be added.

PRICE LIST

48 Contiguous States and District of Columbia

MODEL	NOMENCLATURE	PRICE
	300 Series Keyboards	
300K	Keyboard	$ 450.00
310K	Keyboard	460.00
320K	Keyboard	470.00
320KT or KR	Keyboard, Trigonometric	920.00
360K	Keyboard	500.00
360KT or KR	Keyboard, Trigonometric	950.00
362K	Keyboard	500.00
362KT or KR	Keyboard, Trigonometric	950.00
	300 Series Electronic Packages	
300E	Electronic Package	1,240.00 (P)
300SE	Simultaneous Electronic Package	2,480.00
310E	Electronic Package	1,435.00 (P)
310SE	Simultaneous Electronic Package	2,870.00
320E	Electronic Package	1,625.00 (P)
320SE	Simultaneous Electronic Package	3,250.00
360E	Electronic Package, 4 Storage Registers	1,995.00 (P)
360SE	Simultaneous Electronic Package, 4 Storage Registers	3,990.00
362E	Electronic Package, 12-24 Storage Registers	2,295.00 (P)
	Basic Accessories	
CP-1	Card Programmer, 80 Steps	800.00
IC-1	Item Counter	120.00
IC-1	Item Counter (Retrofit)	140.00
	370/380 Series	
370	Programming Keyboard	1,200.00
370-2	Programming Keyboard, for 362E	1,200.00
371	Card Reader	600.00
372	Data Storage, 16 Registers	1,000.00 (P)
373	Data Storage, 64 Registers	2,500.00 (P)
376	Input/Output Writer, 33ASR	1,400.00
377	Control Unit, 33ASR	1,400.00 (P)
379-5&7	Output Writer, Control (379-5) and Writer (379-7)	1,500.00 (P) (S)
379-8	Universal Interface (Rack Mount Only)	2,500.00
379-9&10	D/A Control Unit (379-9) and CRT Display (379-10)	2,500.00 (P) (S)
379-12	Trig Pack	1,200.00 (P)
379-13	Card Reader Interface	800.00 (P)
380	Programming Keyboard, Magnetic Tape	1,500.00
380-2	Programming Keyboard, Magnetic Tape, for 362E	1,500.00

PRICE LIST (cont'd.)

MODEL	NOMENCLATURE	PRICE
	Miscellaneous Items	
	Extension Cable, 25′ length	$ 30.00
	Extension Cable, 50′ length	50.00
	Extension Cable, 75′ length	70.00
	Extension Cable, 100′ length	90.00
	Extension Cable, 125′ length	110.00
	Extension Cable, 150′ length	130.00
	Extension Cable, 175′ length	150.00
	Extension Cable, 200′ length	170.00
	T Connector	25.00
	PT Connector	25.00
	MX Multiplexer	5,000.00
	MX Connector	25.00
	Cable only, per foot	.80
	Cable Input Connector	5.00
	Cable Output Connector	5.00
	Wall Mount Cover Plate	5.00
	Surface Mounting Box	5.00
	Line Filter	35.00
	Transformer (E)	25.00
	Transformer (SE)	35.00
	Voltage Control Transformer	60.00
	Carrying Case (E)	35.00
	Carrying Case (K)	15.00
3R	System Cabinet, 29″ H X 19″ W X 22″ D, 3 Rack	360.00
4R	System Cabinet, 36″ H X 19″ W X 22″ D, 4 Rack	440.00
5R	System Cabinet, 43″ H X 19″ W X 22″ D, 5 Rack	520.00
6R	System Cabinet, 50″ H X 19″ W X 22″ D, 6 Rack	600.00
180-0040	Magnetic Tape Cartridge, 40 steps	12.00
180-0080	Magnetic Tape Cartridge, 80 steps	12.00
180-0160	Magnetic Tape Cartridge, 160 steps	12.00
180-0320	Magnetic Tape Cartridge, 320 steps	12.00
180-0480	Magnetic Tape Cartridge, 480 steps	12.00
180-0640	Magnetic Tape Cartridge, 640 steps	12.00
	Portapunch	15.00
	Program Pads, each	1.50
	Program Cards per hundred	3.00
	Manuals	3.00

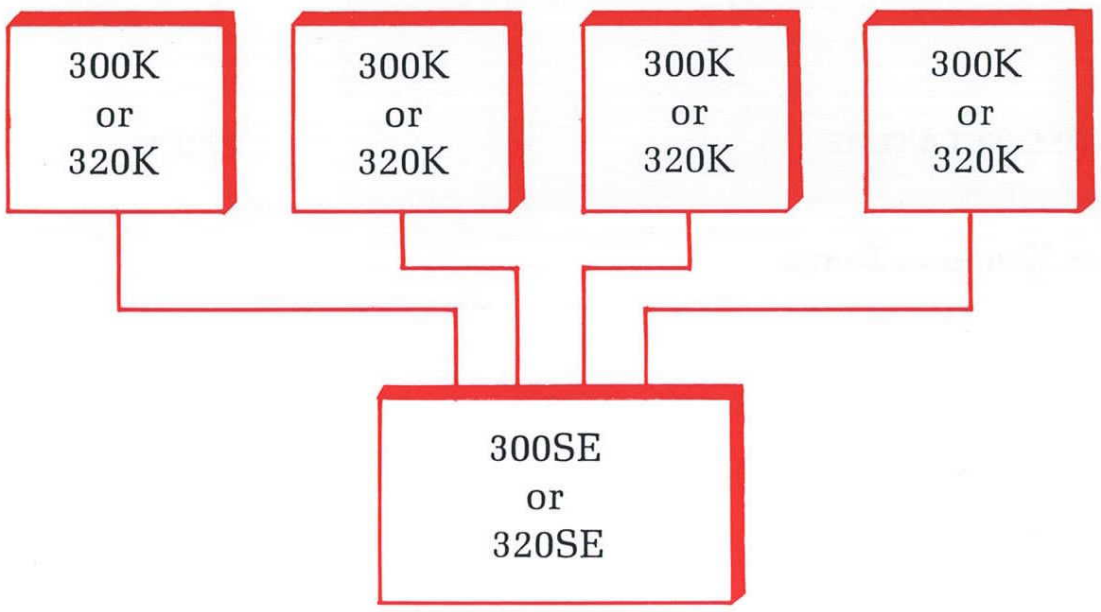
(P) Prices are for portable units.
Add $50 for rack panel mounting.
Please specify when ordering.

(S) Separate prices for 379-5, $800; 379-7, $1,000; 379-9, $1,250; and 379-10, $1,500.

Note: All prices are for the 48 contiguous States and District of Columbia. Shipments are FOB Tewksbury, Mass. Add 8% to prices shown for shipments to Alaska, Hawaii, or Puerto Rico.

TYPICAL CONFIGURATIONS

TYPICAL CONFIGURATIONS AND PRICES

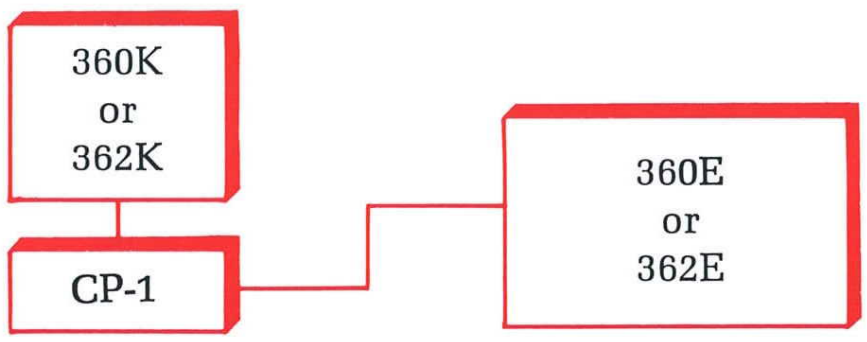


Example No. 1

One Model 300SE Simultaneous Electronic Package	$2,480
Four Model 300K Keyboards	1,800
Total Cost	$4,280
Cost per Station	$1,070

Example No. 2

One Model 320SE Simultaneous Electronic Package	$3,250.00
Four Model 320K Keyboards	1,880.00
Total Cost	$5,130.00
Cost per Station	$1,282.50

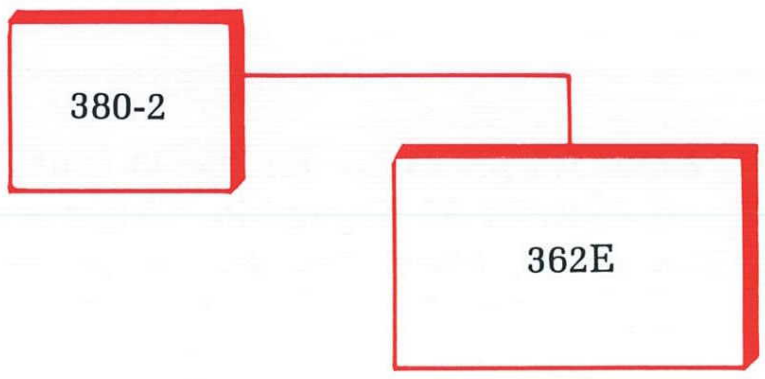


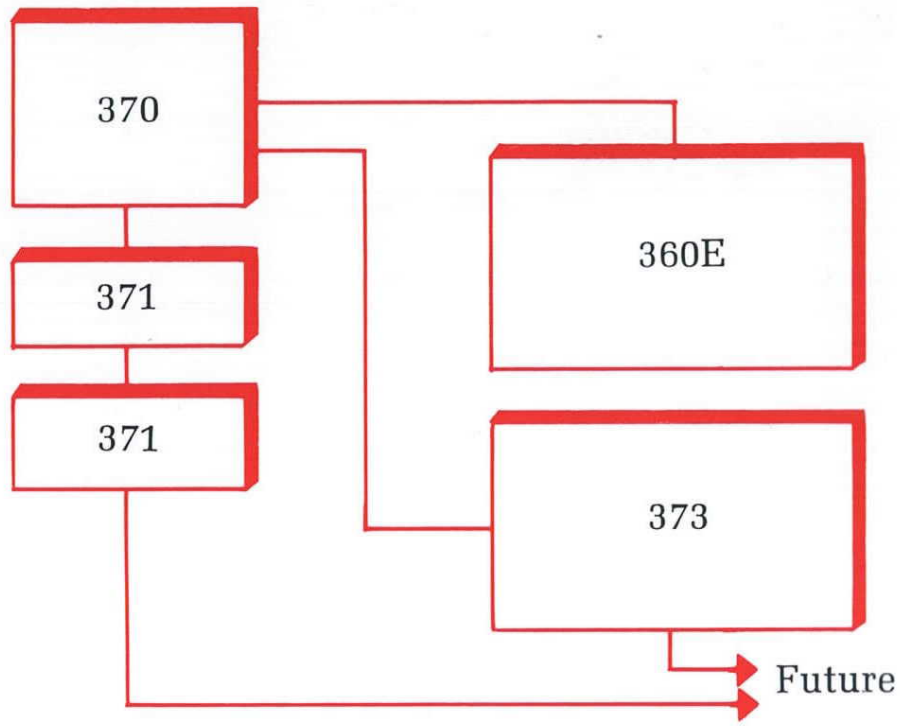
Example No. 3

One Model 360E Electronic Package	$1,995
One Model 360K Keyboard	500
One Model CP-1 Card Programmer	800
Total Cost	$3,295

Example No. 4

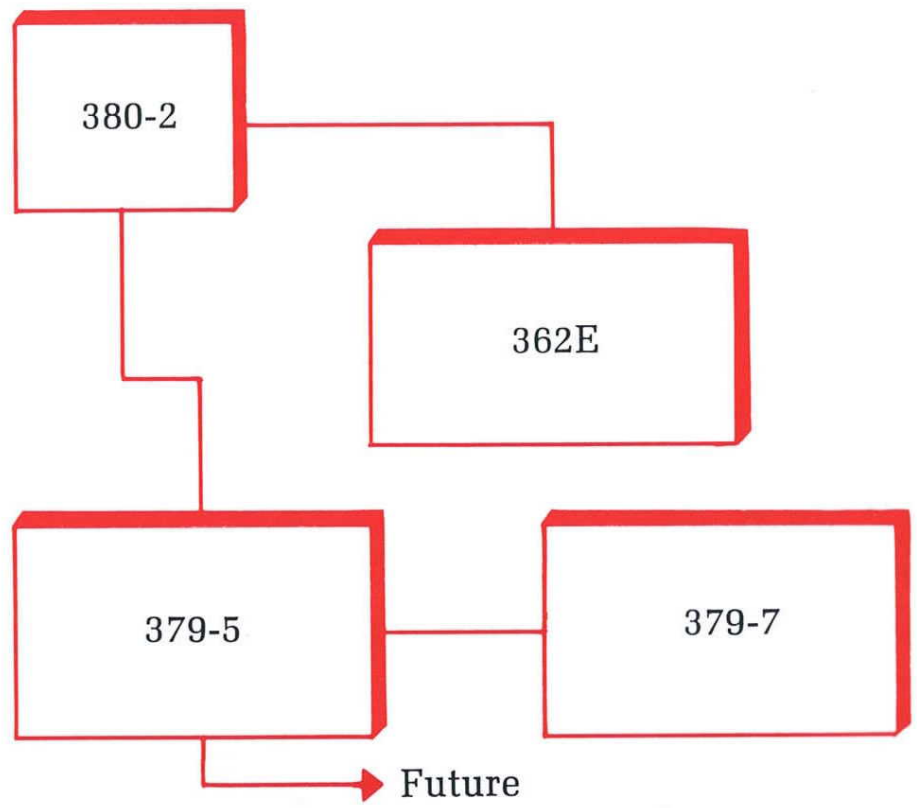
One Model 362E Electronic Package	$2,295
One Model 362K Keyboard	500
One Model CP-1 Card Programmer	800
Total Cost	$3,595





Example No. 5

One Model 360E Electronic Package	$1,995
One Model 370 Keyboard	1,200
Two Model 371 Card Readers	1,200
One Model 373 Data Storage	2,500
Total Cost	$6,895



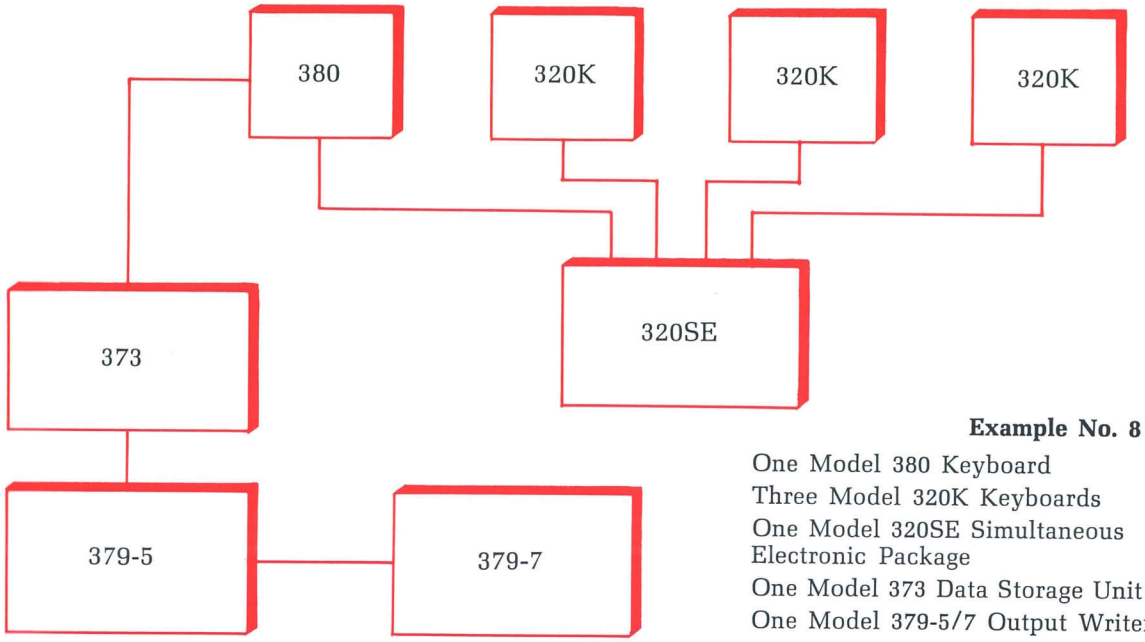
Example No. 6

One Model 362E Electronic Package	$2,295
One Model 380-2 Keyboard	1,500
One Model 379-5/7 Output Writer and Control	1,500
Total Cost	$5,295

Example No. 7

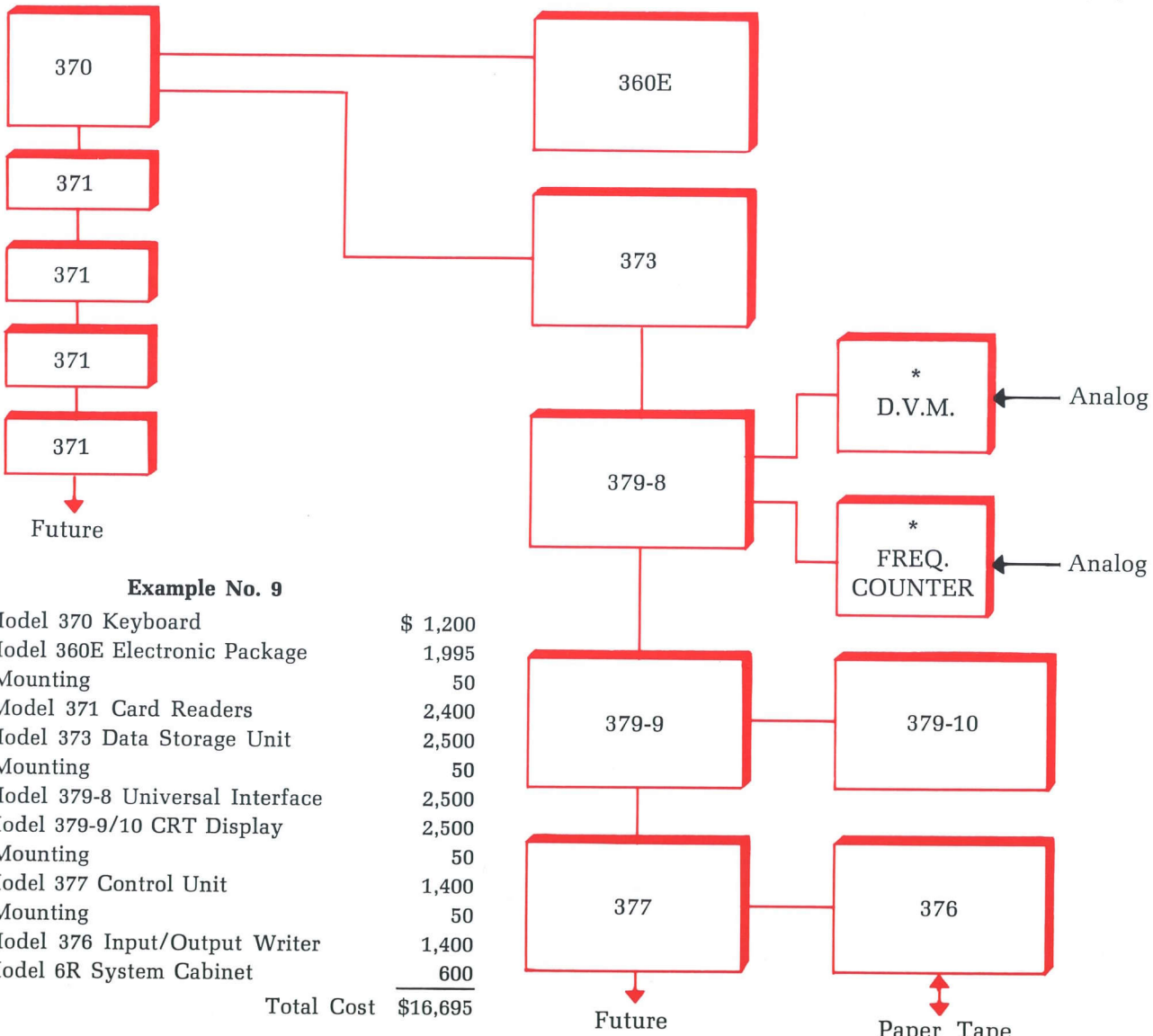
One Model 362E Electronic Package	$2,295
One Model 380-2 Keyboard	1,500
Total Cost	$3,795

TYPICAL CONFIGURATIONS AND PRICES



Example No. 8

One Model 380 Keyboard	$ 1,500
Three Model 320K Keyboards	1,410
One Model 320SE Simultaneous Electronic Package	3,250
One Model 373 Data Storage Unit	2,500
One Model 379-5/7 Output Writer	1,500
Total Cost	$10,160



Example No. 9

One Model 370 Keyboard	$ 1,200
One Model 360E Electronic Package	1,995
Rack Mounting	50
Four Model 371 Card Readers	2,400
One Model 373 Data Storage Unit	2,500
Rack Mounting	50
One Model 379-8 Universal Interface	2,500
One Model 379-9/10 CRT Display	2,500
Rack Mounting	50
One Model 377 Control Unit	1,400
Rack Mounting	50
One Model 376 Input/Output Writer	1,400
One Model 6R System Cabinet	600
Total Cost	$16,695

**Customer Furnished Equipment*

MAINTENANCE SERVICE

Maintenance and repair services are offered on Wang equipment as indicated below. GSA purchased items are warranted for one year rather than 90 days. This schedule applies only for domestic USA orders:

WARRANTY:

Full 90 days warranty including labor and parts. Parts only are warranted for one year, exclusive of labor.

Our liability under this warranty is limited to the repair and adjustment of the instrument within 90 days of the date it was delivered to the original purchaser, and to the replacement of any defective parts, except readout tubes, transistors, and fuses. Tubes, transistors, and fuses are subject to the standard RETMA guarantee.

Teletype warranty is four (4) hours per day or one thousand (1,000) hours total life.

Equipment returned to us for servicing must be carefully packed and shipped with transportation prepaid. WANG LABORATORIES, INC. does not assume any liability for consequential damage and, in any event, WANG LABORATORIES, INC. liability shall in no case exceed the original purchase price of the product.

ANNUAL MAINTENANCE CONTRACTS:

Applicable after 90 day warranty for coverage within 75 mile radius of Service Center.

7.2% of selling price per year on electronic equipment.

12% of selling price per year on mechanical equipment.

Above maintenance consists of adjusting and replacing parts when needed and keeping machine in first class operating condition, including all intervening calls necessary between one regular annual inspection (on mechanical units only), but excepting repair necessitated by accident, current fluctuation, fire, abuse, or negligence.

A surcharge of 4% of the Maintenance Service Contract will be added to the price of the contract for every ten (10) miles over the 75 miles from the Service Center. For example: A 320 Simultaneous Package, purchase price is $3,250.00; therefore, service up to 75 miles would be 7.2% or $234.00. If this unit were 85 miles from the Service Center, the 4% for the additional ten (10) miles would be $9.36, or a total of $243.36.

DISCOUNTS:

10% for $2,000 or more of Service Contracts in one location.

20% for $4,000 or more of Service Contracts in one location.

30% for $8,000 or more of Service Contracts in one location.

40% for $16,000 or more of Service Contracts in one location.

50% for $32,000 or more of Service Contracts in one location.

POST-WARRANTY SERVICE CALLS WITHOUT A MAINTENANCE CONTRACT:

Time Charge:	$12.50 per hour portal to portal.
Automobile Charge:	$ .10 per mile, or public transportation expense, if used.
Material:	Per component price schedule if one year warranty has expired.

REPAIR PARTS

Repair parts prices for Wang electronic calculators are tabulated below. When parts are ordered with calculators or Series 370-380 items, any discounts given to those items will apply. When parts are utilized with Wang maintenance service, next section, parts are invoiced on the maintenance order, in accordance with the applicable terms of that item. Commercial shipments are FOB Tewksbury, Massachusetts.

REPAIR PARTS LIST

ITEM NOMENCLATURE	PRICE	ITEM NOMENCLATURE	PRICE
Printed Circuit Cards			
No. 501 to No. 508	$ 72.00	No. F 502 to No. F 504	$ 93.60
No. 509	144.00	No. F 505	72.00
No. 510 to No. 522	93.60	No. F 506	72.00
No. 523 to No. 526	72.00	No. F 511 to No. F 515	93.60
No. 527	180.00	No. 5364B	200.00
No. 528 to No. 540	93.60	No. 5368A	175.00
No. 541	216.00	No. 5530	175.00
No. 551-2, 3, 4, 5	72.00	No. 5574A	350.00
No. 564 to No. 581	93.60	No. 5678	350.00
No. 589	93.60	No. 5712	75.00
No. 595 to No. 599	93.60	No. 5734	864.00
No. F 501	72.00		
Printed Circuit Card Sets			
300E Card Set, 19 Cards	$1,699.20	360E Card Set, 22 Cards	$1,972.80
300SE Card Set, 31 Cards	2,800.20	362E Card Set, 26 Cards	2,383.60
310E Card Set, 21 Cards	1,843.20	370K Card Set, 11 Cards	1,267.40
310SE Card Set, 33 Cards	2,944.80	372E Card Set, 14 Cards	1,432.80
320E Card Set, 21 Cards	1,843.20	373E Card Set, 18 Cards	2,455.20
320SE Card Set, 33 Cards	2,944.80	377E Card Set, 12 Cards	1,058.40
Miscellaneous Parts			
Readout Tube	15.00	Toggle Switch	$ 2.00
Key Blank	2.00	Microswitch	2.00
Lamp Bulb	2.00	Condensor	12.00

DIRECTORY OF SALES AND SERVICE OFFICES

ALABAMA
Birmingham 35206
747 Highland Avenue
(205) 595-0694

ARIZONA
Phoenix 85010
Bishop Enterprises
Post Office Box 5378
(602) 265-8747

CALIFORNIA
Beverly Hills 90211
489 South Robertson Boulevard
(213) 278-3232, Telex 67-4572

Burlingame 94010
1799 Old Bayshore Highway
(415) 692-0584
Telex 34-0540

Los Angeles 90045
Suite 407
5250 West Century Blvd.
(213) 776-2985

Sacramento
(916) 489-7326

San Diego 92109
Post Office Box 9295
(714) 234-5651

Santa Barbara
(805) 962-6112

COLORADO
Aurora 80010
Bishop Enterprises, Inc.
126 Del Mar Circle - Suite C
(303) 364-7361

CONNECTICUT
North Haven 06473
385 State Street
(203) 288-8481 or 288-8482
Hartford
(203) 223-7588

DELAWARE
Via Haverford, Pennsylvania 19041
354 Lancaster Avenue
(215) 642-4321

DISTRICT OF COLUMBIA
Via Silver Spring, Maryland 20910
7961 Eastern Ave.
(301) 588-3711

FLORIDA
Orlando 32814
1000 Woodcock Road
(305) 841-3691, Telex 56-4313

Fort Lauderdale 33304
Suite 608, International Bldg.
2455 Sunrise Blvd
(305) 563-8458, 563-8459, or 563-8450

Tampa 33609
P. O. Box 18318
(813) 877-6590

GEORGIA
Atlanta 30005
3512 Chamblee-Dunwoody Road
(404) 457-6441

Atlanta 30319
Suite 124
1645 Tullie Circle North East
(404) 633-6327

IDAHO
Via Aurora, Colorado 80010
Bishop Enterprises, Inc.
126 Del Mar Circle, Suite C
(303) 364-7361

ILLINOIS
Chicago 60635
6832 West North Avenue
(312) 889-2254

Morton 61550
356 East Hazelwood
(309) 674-8931

INDIANA
Indianapolis 46202
Measurement Instruments, Inc.
1635 North Gent Avenue
(317) 631-0909

IOWA
Rembrandt
(712) 286-5578

Via Chicago, Illinois 60635
6832 West North Avenue
(312) 889-2254

Via Omaha, Nebraska 68131
33 Kiewit Plaza
3555 Farnam Street
(402) 341-6042

KANSAS
Kansas City 64106
1024 Locust St.
(816) 421-0890

KENTUCKY
Via Cincinnati, Ohio 45215
Measurement Instruments, Inc.
338 Ridgeway
(513) 531-2729

LOUISIANA
Metairie 70003
7809 Airline Highway, Suite 306 D
(504) 729-6858

MARYLAND
Baltimore 21204
6800 Loch Raven Boulevard
(301) 821-8212

Silver Spring 20910
7961 Eastern Avenue
(301) 588-3711

MASSACHUSETTS
Tewksbury 01876
836 North Street
(617) 851-7311
Twx. 710-343-6769
Telex 94-7421

Pittsfield
Via Loudonville, N.Y. 12211
12 Delucia Terrace
(518) 463-8877

MICHIGAN
Dearborn 48126
Measurement Instruments, Inc.
14217 Michigan Avenue
(313) 278-4744

Grand Rapids 49505
Measurement Instruments, Inc.
822 Cherry St., S.E.
(616) 454-4212

Midland 48640
Measurement Instruments, Inc.
136½ Townsend Street
(517) 835-7300

MINNESOTA
Bloomington 55431
9001 Bloomington Freeway
Suite 106
(612) 881-5324

MISSISSIPPI
Jackson 39211
P.O. Box 12111, Colonial Station
(601) 982-1721

MISSOURI
Kansas City 64106
1024 Locust Street
(816) 421-0890

Clayton 63105
200 South Bemiston Ave., Suite 307
(314) 727-0256

NEBRASKA
Omaha 68131
33 Kiewit Plaza, 3555 Farnam Street
(402) 341-6042

NEVADA
Reno 89502
John Lakey Company
1685 Chaska Place
(702) 322-4692
(702) 323-1439

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