***SISTER ENGINEERING***

RUPTUR

Our approach is to reimagine daily electronic devices with a DIY approach and aesthetic. The first born of this seasonal collaboration between Sister Engineering and Ruptur Vision is the ***Postfix Operator***.

This calculator pays homage to the world's first scientific calculator, the **Hewlett Packard 35 Pocket Calculator,** which used Reverse Polish or Postfix Notation as opposed to algebraic notation that is seen on today's calculators. This method allows you to perform complex operations on a calculator in a way that mirrors the way our brains process problems. It breaks down the complexity of equations and you no longer have to worry about misplaced parenthesis.
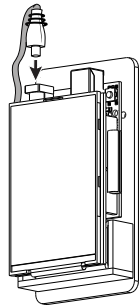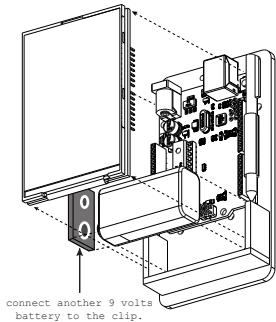
Insert the power connect into the slot to turn on your calculator.

Take it out to turn off.
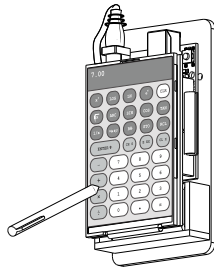
Use the **pen** or **your fingers** to make your operations via the touch screen.

connect another 9 volts battery to the clip.

Your battery has an autonomy of 10 hours. In case it dies:

1 - Turn off your calculator.
2 - Remove the LCD screen from the Arduino board.
3 - Then connect another 9 volts battery to the clip.
4 - Place the screen and battery back to their initial position.
5 - Turn on your calculator

The Postfix Operator

From Hanna and Larry with love !

SIMPLE CALCULATIONS

The ***Postfix Operator*** uses Reverse Polish notation. Operator symbols (**+** , **-**, *****, **%**) are placed after the arguments being operated on. For example, to add **12** to **13**

To add 3 to 12

Press	See
1	1.
2	12.
ENTER↑	12.
3	3.
+	15.

- Both the numbers are in the machine before you press **+, - , x** or **%**
- The Enter key puts the number entered into an internal register (a place that holds numbers). Pressing the **+, - , x or %,** key causes the addition, subtraction, multiplication or division of the previous two numbers entered to occur immediately and the result to be displayed.

Whenever a calculation is completed, and a new number is entered, the ***Postfix Operator*** performs an automatic **Enter** before accepting the new number. This allows more complex calculations to take place.
See for example **((2+3)/4 +5) *6,**

	(2 + 3)/4 + 5)·6	
Press	See	Comments
2	2.	
ENTER↑	2.	
3	3.	
+	5.	Add 2 and 3
4	4.	
÷	1.25	Divide the sum by 4
5	5.	
+	6.25	Add 5 to the quotient
6	6.	
×	37.5	Multiply by 6

Calculations that involve only one number are easy! You just key the number into the machine and press the operator that does what you want. For example, to get the **Square root** of **49.**

Press	See
4	4.
9	49.
√x̄	7.

To find the reciprocal of **25.**

Press	See
2	2.
5	25.
1/x	.04
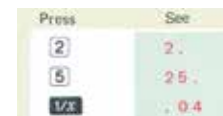
To find the area of a circle with a **3** foot radius, I.e., **A=πR^2** with **R=3** feet.

POWERS OF NUMBERS

We've seen how you can get the square of a number, (**x ^2**) and to take its reciprocal (**x^-**). The x^y key lets you find any power of a positive number. Heres how you do **2^7**.

BIG AND LITTLE NUMBERS

Suppose you square **987654** by pressing
987654
Enter
2
x^y
The result you see is

9.754604237   11

This is how the **Postfix Operator** displays numbers above ten billion. The number is read as **9.754604237 x 10^11.** This notation is known as "scientific notation". The 11 means move the decimal point 11 places to the right. Now press **1/x**. You will see...

1.025156916-12

Which is read **1.025156916 X 10 ^-12**.

Numbers larger than **10^10** or smaller than **10^-2** are automatically displayed in scientific notation. You can enter numbers in scientific notation by using the **EEX** (Enter Exponent) key. For example, to enter **15.6 X 10^12**

NEGATIVE NUMBERS

The **CH S** key is used for entering negative numbers and changing the sign of a computed result. For example, to compute **(-3 ←)**

THE OPERATIONAL STACK / MEMORY

The **Postfix Operator** has four number registers, which we call **X, Y, Z** and **T**. They are arranged in what is called a "stack".

The **X** Register is always displayed.

The **R**(down symbol) (ROLL DOWN) key lets you review the stack contents without losing data. It also allows you to reposition data within the stack.

The **x⇌y** key exchanges the contents of the **x** and **y** stack. Your **Postfix Operator** has an additional memory register for storing constants. It is not affected by computations. To store a number press **STO** (STORE) and to recall a number that you stored previously press **RCL** (RECALL).

LOGARITHMS AND TRIGONOMETRY

Your **Postfix Operator** computes trigonometric functions of angles measured in degrees

For example to find sin 30.5 (degrees USE the degree symbol)