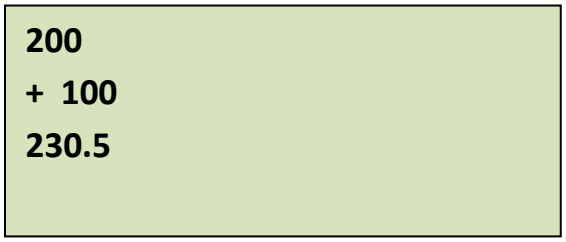
Tenkey calculator for Epson HX-20
Version 3.2
Macieksoft Systems
--(E:> <:3)--

Tenkey calculator software is designed to provide comfortable way of doing calculations using Epson HX-20. This software mimics operation of typical printing calculator. It has functions like 120 memory registers, printing with or without tracing* and includes basic mathematical functions (addition, subtraction, multiplication, division and powers). It has statistical calculations module to help with statistical calculations.
It can also be used as framework as it includes functions to execute user defined code.

Usage:

You can use numpad keys or upper row keys to input numbers. You **should not use NUM mode at all, all inputs are made using normal (upper case) mode and both numeric key sets (numpad and upper row) are active simultaneously.** When entering numbers they will appear on lower row on LCD screen. Lower row is keyboard entry register, upper row is result register that shows result of calculations and middle row shows recently executed function. There are also 120 memory registers that can be accessed using read/write operations. To perform math operations you should use numpad math keys (+,-,*,/) and upper line ^ key. **Software is designed for German keyboard and may not work correctly on other keyboard variants (not tested). It may require changes in code to make it work on other keyboard variants. If you have some spare time you can test if it works on USASCII keyboard and other variants. Author (@macieksoft) will be happy to know if it works well on other keyboard variants.**

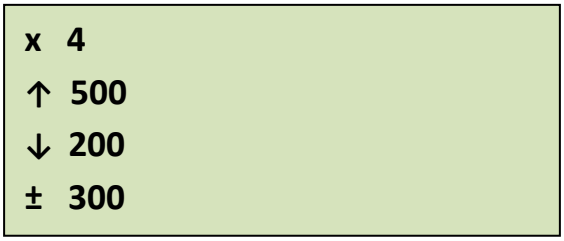
This is example on how screen can look during calculation.



-Upper row shows result of current calculations (200)
-Middle row shows recently performed operation (add 100)
-Lower row shows number input by the keyboard (230.5)

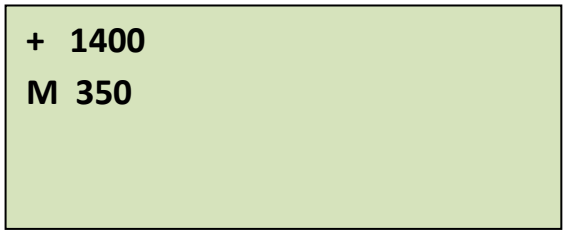
To use statistical module input values using SPACE (press SPACE after inputting each number). Then press S to process the data and display results. After this results are processed and displayed. To go to the second page press any key, then press any key to display graph, then press any key again to return to normal mode. Statistical results are stored in memory cells 11-110 and can be extracted using memory read operation. For detailed information please read programmer's manual, it describes memory register map used by statistical engine.

This is example on how first page looks like.



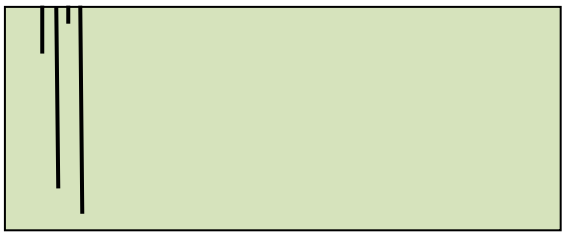
-1st line shows number of values you have input (4)
-2nd line shows highest value (500)
-3rd line shows lowest value (200)
-4th line shows difference between highest and lowest value (300)

This is example on how second page looks like.



-1st line shows sum of all values
-2nd line shows mean

This is example of graph screen (3rd screen).
-The longer the bar the higher the value
-Results are drawn from left to right, so the leftmost is the first and rightmost if the last value you have input



Keyboard description:

Upper row 1,2,3,4,5,6,7,8,9,0: Numeric input
Numpad 0,1,2,3,4,5,6 (German keyboard M,J,K,L,U,I,O): Numeric input (same as above)
. (dot): Input decimal separator
Numpad ? (German keyboard -): Change sign

Numpad + (Ger kbd P): Addition
Numpad – (Ger kbd Ü): Subtraction
Numpad * (Ger kbd Ö): Multiplication
Numpad / (Ger kbd Ä): Division
Upper row ^: Power
RETURN: Put value from keyboard register into result register

DEL: Clear keyboard register
CLR: Clear both (keyboard and result) registers

Right arrow: Input memory cell to read in keyboard register then press this key. Value saved in that register will appear in keyboard register
Left arrow: Input memory cell to save in keyboard register then press this key. Result register will be stored in that memory cell

< (grey key on Ger kbd): Print result register (requires printer to be ON)
> (grey key on Ger kbd, < + SHIFT): Print keyboard register (requires printer to be ON)
Upper row #: Opens description input dialog. Enter description and then press RETURN. This prints result together with specified description (requires printer to be ON)
Q: Enable tracing. P will be visible on LCD screen to show that tracing is enabled*
W: Disable tracing*

SCRN up down key: Displays memory registers 1,2,3,4,5,6 on LCD screen, then press any key to return to calculation mode

Y, X,C,V keys starts user defined programs. To define program input commands between lines: 9100-9199 for Y, 9200-9299 for X, 9300-9399 for C, 9400-9499 for V

S: Processes statistical data and displays results.
SPACE: Used to input values to statistical stack. Simply input number and press SPACE to add number to statistical stack.

Blue text shows functions that are being traced on paper when tracing mode is enabled.

Memory map:

Memory registers 1-10 can be freely used by user as they don't affect statistical module. Memory registers above 10 are used by statistical module, you can read them freely but be cautions when storing anything into them as this may cause abnormal behavior of statistical module. Read programmer's manual for details on all memory registers.

Trace print function:

Trace mode traces execution of certain functions. It requires printer to be ON and trace mode to be enabled with Q key. When tracing is enabled (P) is shown in the first row of the screen. Manual printing of result and keyboard register is possible even when trace mode is OFF (read keyboard reference chapter for details). Also it is possible to print graphs and statistical module result, simply use build in COPY function (press CTRL+PF2) when watching results or graph.

Installation:

V3.2 is distributed by sound file in .MP3 format. This is mono file so it should work regardless of the type of jack or cable you have. Both types (3 pin stereo and 2 pin mono) of 3.5mm jack to jack cables should work. Just connect your sound card output to the EAR connector of your HX-20. You must have enough volume, on my computer it requires MAX volume in MP3 player program and 40% volume set in Windows. When you have them connected and volume set type on your HX20: **LOAD "CAS1:"** and press **RETURN**. Computer should show SEARCHING and then you start playback of audio file. It should show "FOUND TENKEY30" after about 10 seconds and then it should start loading. When the file is loaded correctly it should show > sign at the beginning of the next line, then you can start the program using **RUN** command or by **PF5** if it has default assignment.
If it get stuck on loading (no FOUND shown) simply press BREAK key, increase volume and start operation from the beginning. Use your common sense and do not increase volume too much, especially when you have powerful amp after a computer.

Changelog (since V2.3):

V2.3

-Added possibility to execute custom programs

V3.0

-Most of program has been rewritten for major performance improvement
*-Removed trace print option (to be added in later versions)
-Added option that displays recently executed function
-First version to be digitalized using HX-20 to soundcard connection
-Hopefully first version to be released to the public

V3.1

-Added statistical module
-Expanded memory to 120 registers (needed for statistical module)

V3.2

*-Trace printing has been reimplemented
-Graph drawing implemented as part of statistical module
-Some code changes regarding numpad keys handling to reduce the size of code