

AccessionIndex: TCD-SCSS-T.20121208.012

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Object name: MADAS Portable Calculator

Vintage: c.196x

Synopsis: Model 20BTZG 10-digit fully-automatic decimal mechanical calculator.

S/N: 96236.

### Description:

In 1891 Hans Egli began developing his famous *Millionaire* calculator, the first commercially successful machine to multiply in one action instead of iteratively. Manufacture was begun in 1893. Number entry was via levers. The company he founded, H.W.Egli S.A., Zurich, Switzerland, introduced the *MADAS* series of fully-automatic calculators from 1913, again with number entry via levers. In 1931 these were redesigned as the *MADAS Portable*, with a keyboard, in both hand-cranked and motor-driven form, and these were made in various versions until the 1960s. They automatically performed the four basic arithmetic functions, using a mechanism based on a master cam shaft, redolent of a 19<sup>th</sup> Century automata.

To quote from the excellent Swiss website dedicated to MADAS calculators [2]:

Madas 20BTZG, as its sister 20BTG, is considered as the culminating point of development concerning the calculators made by the firm Egli. It was also the most expensive one (four times the price of a 16eN, for example). An additional register is fitted to this model. This is an "Accumulator Product Register", generally named "Register IV". It can be cleared only by means of a "thumb-lever" to its immediate right. Whereas, normally, "Register I" clears automatically before the formation of each new product, "Register IV", as its name implies, accumulates successive products. It may be disconnected by moving the lever situated on the machine-casing to the left of "Register III".

A black lever situated to the right of "Register I and II" allows choosing if a number added into "Register I" is added to, or subtracted from "Register IV". In this way, for example, by using this control, it is possible, while forming positive individual products in "Register I", to accumulate them negatively in "Register IV" or vice versa. This carriage, named "Triplex", is more complex than on other models. Several hundred of manufactured pieces have to be assembled. Removing and refitting the Triplex carriage is a rather tricky task, as we can see with the presentation, explained in detail by John Wolff, on its John Wolff's Web Museum.

Model 20BTZG, like all other models with a "Z" in the model-number, has a tens-carry-over which extends to the full capacity of the Product register (Register I), while models without "Z" have tens-carry to two dials to the left of that aligned with the extreme left-hand column of keys.

The model number (20BTZG) indicates as follows:

- 'B': technical improvements over corresponding fully-automatic 'A' model
- 'T': has cumulative (triplex) register
- 'Z': has complete capacity carry-over in the product register
- 'G': has mid-1950s modernizations: new bottom plate, device for inverting the revolution Register, new modernized keyboard, grey color

The 20BTZG had ten key columns, as well as dividend setup and keyboard clearing keys, full-capacity carry-over, and a negative multiplier bar. It had tabulator buttons for setting the number of decimal places in division, as well as fixed decimal point alignment in multiplication. Once decimal points were set, they remained correct throughout all calculations.

There were six named registers: a 10-digit multiply *Register 0*, a 20-digit product *Register I*, a 10-digit counter *Register II*, an entry *Register III*, a 20-digit accumulation or triplex *Register IV*, and a control *Register V*. The latter stored the first factor in a multiply while the second was set up, and at left on it was a *Carriage Return Lever* to optionally disable the usual carriage return to its normal extreme left position after multiplication. The accumulator register could be enabled, disabled, complemented or cleared.

There were three sets of twirlers for direct setting of values, the first two on the carriage to set values (e.g. the dividend) of the product *Register I* and accumulator *Register IV*, the third at lower front to set the value of the multiplier *Register 0*. Beside the multiplier register there was a zero key to clear the multiplier, a control to clear or retain the multiplier after use, and a control to subtract the product from the accumulator (*negative multiplication*).

The ↓ key transferred data from the product register to the multiply register. The ⋮ key transferred data to the left of the product register, ready for division. The keys marked **0**, **I**, **II** and **III** cleared the multiply, product, counter and entry registers respectively. The **DIV**, **+** and **-** keys invoked divide, add and subtract, while the long bar started a multiply. A smaller bar beside it invoked a negative multiplication. Carriage shift keys indicated direction of movement as per the arrow shown.

These were large desktop calculators, weighing 17.6kg and measuring 31.5 x 37.8cm, with a 430rpm electric motor made by Siemens.

The MADAS calculator in this collection was purchased by the Engineering School, Trinity College Dublin, in 1960 for <sup>IR</sup>£500, and there is a manual in the collection; this documentation is properly part of the Literature category of this catalog, but is listed here too for convenience. <<< ***Listed where? Manual is in display cabinets*** >>>

*Trivia: 'MADAS' stands for 'Multiplication, Automatic Division, Addition, & Subtraction'*

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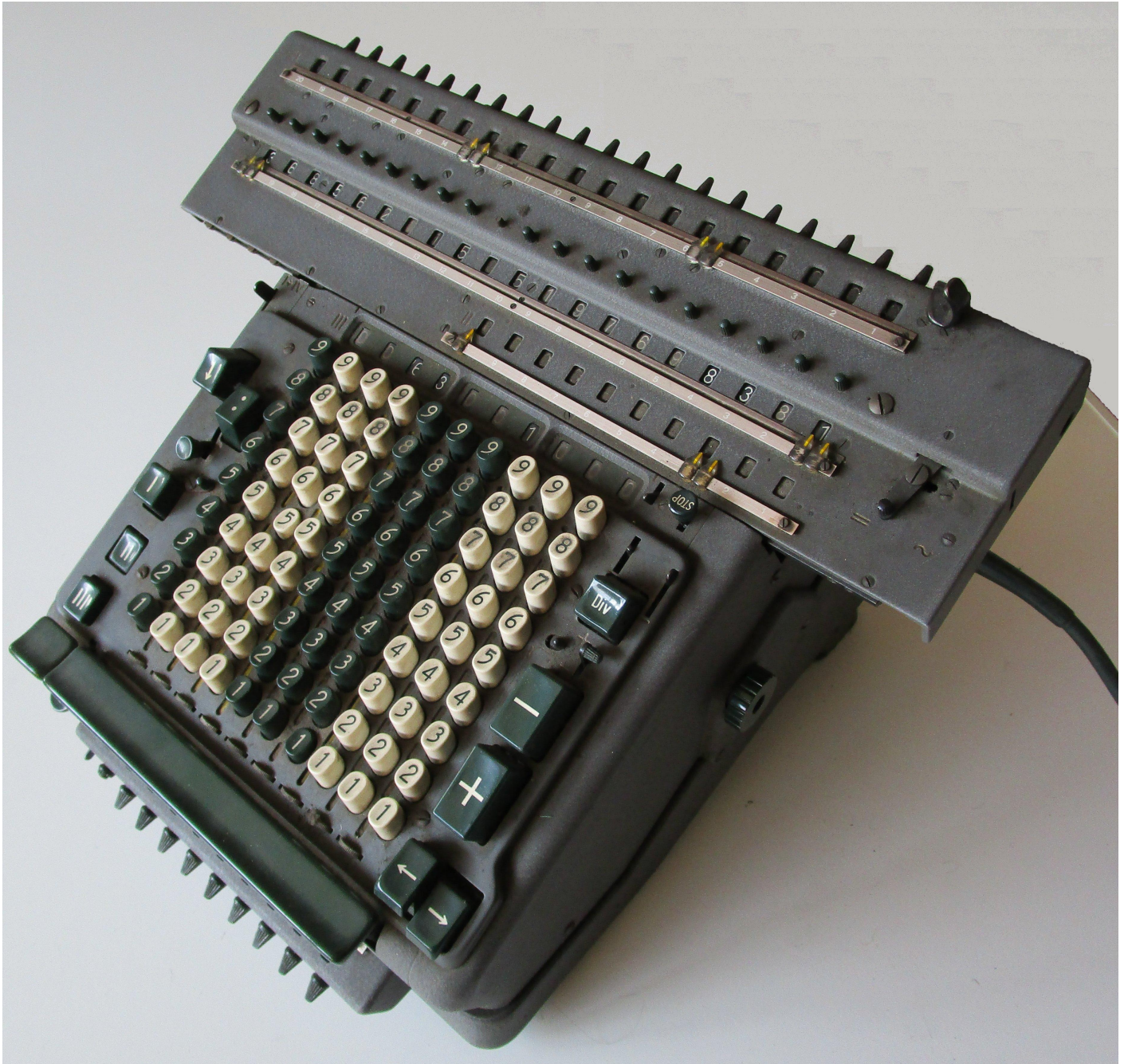
Accession Index	Object and Identification
<a href="#">TCD-SCSS-T.20121208.012</a>	MADAS Portable Calculator, Model 20BTZG 10-digit fully-automatic decimal mechanical calculator. S/N: 96236, c.196x.
TCD-SCSS-T.20121208.012.01	MADAS Portable Calculator, Model 20BTZG 10-digit fully-automatic decimal mechanical calculator. S/N: 96236, c.196x. Motor markings: Type: A38, U.p.m: 4000, Volt: 220/230, Amp: 0.3, No. 123152, S/N: 96236
TCD-SCSS-T.20121208.012.02	MADAS 20BTZG Calculator Manual.
<a href="#">TCD-SCSS-T.20121208.001</a>	Lightning Calculator, 7-digit decimal mechanical adding machine with rotary input dials, c.1908.
<a href="#">TCD-SCSS-T.20121208.002</a>	Brunsviga Adding Machine, Decimal pin-wheel mechanical adder/subtractor (pincalculator), c.1913. S/N: 6214, Markings: <i>AGS No.50</i>
<a href="#">TCD-SCSS-T.20121208.003</a>	Master Adding Machine, 9-digit decimal mechanical adding machine, c.192x.
<a href="#">TCD-SCSS-T.20121208.004</a>	Brunsviga 13RK Adding Machine, Decimal pin-wheel mechanical adding machine (pincalculator) , c.195x.
<a href="#">TCD-SCSS-T.20121208.005</a>	ADDO Model 9 Sterling Calculator, 8-digit mechanical £-s-d (Sterling) adder/subtractor, c.1927.
<a href="#">TCD-SCSS-T.20121208.006</a>	R.C.Allen Model 8s Sterling Calculator, 8-digit mechanical £-s-d (Sterling) adder/subtractor, c.193x.
<a href="#">TCD-SCSS-T.20121208.007</a>	Burroughs T890-9 Protectograph, Bank cheque embosser, c.195x.
<a href="#">TCD-SCSS-T.20121208.008</a>	Facit TK Calculator, Hand-cranked 13-digit decimal mechanical calculator. S/N: 202895, c.1936.
<a href="#">TCD-SCSS-T.20121208.009</a>	Facit NEA Calculator, Electrical motor-driven 13-digit decimal mechanical calculator. S/N: 273356, c.1943.
<a href="#">TCD-SCSS-T.20121208.010</a>	Plus 509 Adder, Quinary mechanical adding machine with 'half keyboard', c.195x.

## References:

1. Gerald Saudan, *Madas Computing Machines*, see: <http://www.madas.ch/>  
Last viewed 6-Apr-2016.
2. Gerald Saudan, *MADAS 20BTZG Calculator*, see: [http://www.madas.ch/?page\\_id=3921](http://www.madas.ch/?page_id=3921)  
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[also see attached folder in this catalog]

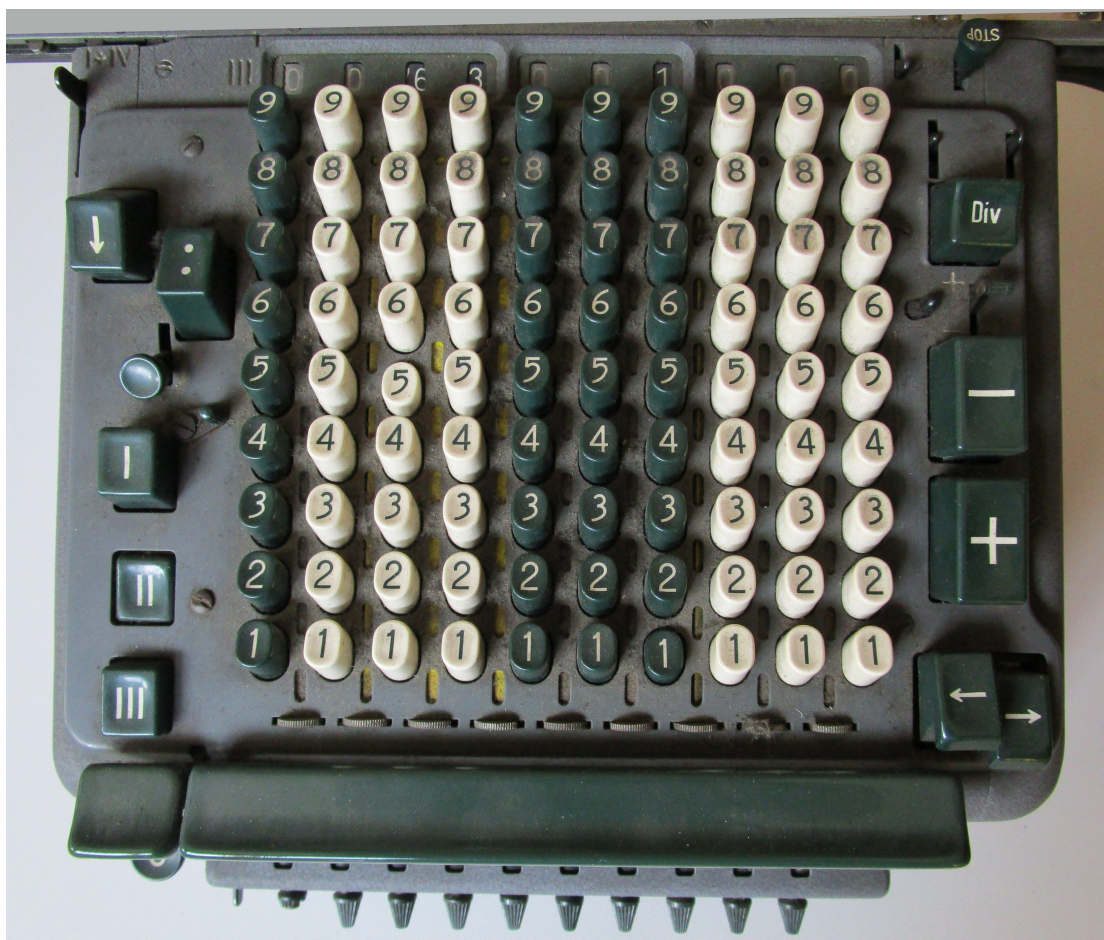
3. John Wolff, *Calculators by Hans W. Egli, Zurich*, see:  
<http://www.johnwolff.id.au/calculators/Egli/Egli.htm>  
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4. Ray Mackay, *Recollections on the MADAS Calculator*, see:  
<http://www.xnumber.com/xnumber/madas.htm>  
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5. Ray Mackay, *Internals of the MADAS 20BTZG*, see:  
<http://www.xnumber.com/xnumber/Madas/overview.gif>  
Last viewed 7-Apr-2016.  
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*Figure 1: MADAS 20BTZG Calculator three-quarter view*





*Figure 2: MADAS 20BTZG Calculator keyboard with entry Register III above*



*Figure 3: MADAS 20BTZG Calculator carriage  
Note accumulator product Register I and accumulator Register IV twirlers*





Figure 4: MADAS 20BTZG Calculator lower front closeup showing multiplier Register 0



Figure 5: MADAS 20BTZG Calculator lower front closeup showing multiplier twirlers and controls



Figure 6: MADAS 20BTZG Calculator serial number  
Model specifiers: BTZG, S/N: 96236





*Figure 7: MADAS 20BTZG Calculator rear view*



*Figure 8: MADAS 20BTZG Calculator bottom view of electric motor details*

*Type: A38, U.p.m: 4000*

*Volt: 220/230, Amp: 0.3*

*No. 123152*