

# *The differential white cell blood counter with integrated Alarm-System for supervising the laboratory (compatible to areas with a weak power-supply)*

In the laboratory, the percentage of the Leukocytes in the blood have often to be counted. This can be done with the Metamorphosis very simply and comfortably. But the laboratory can also be supervised and there is a alarm if somebody unauthorized is going into the rooms. This alarm can also activate a Telephone-call

## *Instruction manual*

<b>Connection of the counting-module</b>	<b>1</b>
<b>The Program switch in the middle of the device</b>	<b>1</b>
<b>Keyboard-Functions</b>	<b>2</b>
<b>Submenu 1: Reset counters</b>	<b>2</b>
<b>Submenu 2: Counting</b>	<b>2</b>
<b>Submenu 3: Show all counter values</b>	<b>2</b>
<b>Submenu 4: Display of the names and the corresponding values</b>	<b>2</b>
<b>Submenu 5: Input Final Counter-Value, Select language</b>	<b>2</b>
<b>Submenu 6: Input of the telephone number (for the Alarm-notification)</b>	<b>2</b>
<b>Submenu 7: Input of time</b>	<b>3</b>
<b>Submenu 8: Programming the timer</b>	<b>3</b>
<b>Submenu 9: Status Outputs and Manual Mode</b>	<b>3</b>
<b>Hints</b>	<b>3</b>
<b>How the Alarm-System is working?</b>	<b>3</b>
<b>Loading of NiCd/NimH-Accumulator</b>	<b>3</b>
<b>Loading of new Software</b>	<b>Fehler! Textmarke nicht definiert.</b>
<b>Loading of the measured values on the PC</b>	<b>4</b>
<b>Comments to the Electric wiring</b>	<b>5</b>
<b>Features:</b>	<b>5</b>

## *Connection of the counting-module*

Connect the counting-module in accordance with the description at the backside of the module to the metamorphosis (see Electrical-wiring at the end)

## *The Program switch in the middle of the device*

**Position 1: Counting-Mode:** Now you enter the values with the keyboard or the external counting-module

**Position 2:** In this position, the **Alarm system** is activated and after a waiting time of 30 seconds it is active.

**Position 3:** In this position, the alarm system is activated and immediately active. Everything can be tested and in the Display you can see which function is running (hearing, speaking, switching..)

Look chapter "Alarm-System" for more Information

**Position 4:** If somebody is alone in the Laboratory he can use the device to initiate automatic a Alarm, if something happens to the person (working with dangerous chemicals etc). If the person is not moving for a longer time the Alarm will be activated (Telephone-call etc)

**Position 5:** In this position you can activate a **Panic-Call** with a switch. That means if a disabled Person or anybody needs help he can only press a switch to activate a Alarm. This can be a radio-Switch as well. It can be connected to any of

the Alarm-Inputs. To avoid false-Alarm there is a delay for this activation

## ***Keyboard-Functions***

From the Basic-Menu (the menu on the display after being switch on) you can select different Sub-Menus by pressing the key 1 to 9. In the Sub-Menus you can jump from one value to the other by pressing "#". When the value is active for input it is flashing. So if you input wrong data, press "#" several times until you come again to the value. Return from the Submenu always by pressing the key "\*"; During counting you can go any time back to the Basic-Menu and continue later with counting. You can switch off the lamp (if there is one connected) in the Basic-Menu with "0" and on with "1";

Following Functions can be **selected by the keyboard**:

- 1 = Reset counters
- 2 = Counting
- 3 = Display all Counter values
- 4 = Display Counter values with text
- 5 = Input of the Maximum Counting-value, Select language
- 6 = input of the telephone number
- 7 = time-input, display of the adjustable Output-voltage
- 8 = Input of the Timer-values
- 9= Status Outputs and Manual-Mode

➤ Hint: For to get known which key relates to which function, you can put a small information-paper for the according Software (you get them with the Metamorphosis) left of the keyboard.

### ***Submenu 1: Reset counters***

With the button 1 in the Basic Menu you reset the counters. Return to Basic Menu always with the button "\*"

### ***Submenu 2: Counting***

With the button 2 in the Basic Menu you activate the counter; now the buttons 1-7 at the keyboard or at the external keyboard can be pressed for counting. If the sum is 100, the Counting is finished and there is a Beep. The values are stored until they are Reset with Submenu 1. The counter are related as following:

- 1 = Neutrophil immat.
- 2= Neutrophils mat.
- 3= Lymphocytes
- 4= Monocytes
- 5= Eosinophils
- 6= Basophils
- 7= Diverse
- 8= free Counter. Can be Reset in this Menu with key "0". Will not be Reset if the device is off.

### ***Submenu 3: Show all counter values***

Here all counter-values are displayed (corresponds to the percent-values) in one display. In the first line counter one to three; Second line four to seven;

### ***Submenu 4: Display of the names and the corresponding values***

Here the components are show one by one with the corresponding Names

### ***Submenu 5: Input Final Counter-Value, Select language***

Any final Counter-value can be set here. Standard-value is 100.

If you press "#" then you can select which Language you want. Enter key "0" for German language and key "1" for English. Going back to the Basic Menu with "\*"

### ***Submenu 6: Input of the telephone number (for the Alarm-notification)***

A telephone number can be input in here. This number will be dialed if alarm-mode is activated and there is a alarm. Going back to the Basic Menu with "\*". If you want to have no telephone-notification then enter key "#" to get it deleted. In this case the horn is switched on automatic if there was a alarm.

## ***Submenu 7: Input of time***

Here, you can input the time (required for the timer). After the device had been switched off, you have to input this time again. Furthermore the **optional Output-voltage**, which can be adjusted with the regulator at the right side, will be displayed here. This voltage can be used for any device with 3-10V and max. 2A. See appendix for electrical connection. Be careful not to change the voltage when a device is connected. This could destroy the device!

## ***Submenu 8: Programming the timer***

With the key "8" from the Basic-Menu you can input the data for the timer. You can program a time to get a connected device being switched on and off. First you give the Start-Time (hour and minute). You remember, to the second value you come with key "#". And at "for" you give a time how long the device should be switched on. If you enter the value from 1-100 "for..." will be in second. If you enter the time from 101-200 the value "for..." will be in minutes. That means 105 means for example 5 minutes. If you enter the time from 201-224 the value "for..." will be in hours. That means if you enter 204 for example the device will be on for 4 hours. Furthermore there is a short alarm when the timer starts, so that you can also use this function as a alarm-clock. Should the device not be switched on, you enter "0" at "for...".

➤ **Notice:** The Timer and alarm-lamp use the same output, but you can use them parallel. If you switched on the lamp manually (with key "#" in the Basic-Menu) then manual-mode is on for one hour and Timer is not working.

## ***Submenu 9: Status Outputs and Manual Mode***

If you select Nr. 9 from the Basic-Menu, then you see which output is on (1) and which is off (0); In this case the automatic is still active. The output mean: 6= Alarm-Lamp; 7= external Horn; The other outputs are not used for the alarm-system, anyway you can see and switch them. If you press 1 till 7 then you manually can switch on and off the outputs and the manual mode is active. That means that no more output is switched on automatically, until you return from this Submenu.

## ***Hints***

- If the Telephone-notification is not working, connect the Telephone-cable reverse. If it is still not working, make sure that your Telephone-System supports Tone-Dialing (DTMF-Dialing). Suppose not, you can set Pulse-Dialing in the Software (Const Pulswahl = 1), translate the program (F7 in Bascom) and download it (F4 in Bascom).

## ***How the Alarm-System is working?***

If you turn the Program-Switch to Position 2 the Alarm-System is activated after 30 seconds and you have time to leave the room. An alarm can be detected by the sound-detector or with the moving-detector directly at the device. Anyway you can add some more external sensors (see electrical wiring). So turn the sensor in the according directions which have to be supervised. You can tear out the Noise-Sensors in order to achieve this. If there is a alarm, and you did not enter a telephone-number (Menu 6) the alarm-horn will be switched on after a delay. Optional there is a delay output on which you can connect a lamp for example. This is a good way to get the thief think there is somebody present.

If you entered a telephone-number (Menu 6) this telephone number will be dialed if there was a alarm. First there are several "Beeps". Afterwards you can hear for about 15 sec. what is happening in the room. Now you can speak through the telephone into the room (provided that a loudspeaker is connected). After another "Beep" you can get the horn switched on if you say "horn or alarm or any other word" loud in the telephone. Otherwise the Alarm-horn will not be switched on automatic, only the lamp (if you connect one). That means if you want to have the horn been switched on in any case, connect it instead of the lamp. When there was a alarm "active" will be displayed on the LCD. The alarm-horn and lamp is deactivated after about 3 minutes. To get know how the alarm-system works set the Program-switch to position 3 and watch what is displayed on the LCD-Display.

## ***Loading of NiCd/NimH-Accumulator***

Put the Accumulator (NiCd or NimH) in the according compartment (look for "+" and "-", the spring is always Minus!), and they will be Quick-charged automatic. The green LED is on. Loading is finished when the green light is off; For NiCd-Accumulator it is advised to press the "Refresh-Button" may be every month after putting them to the compartment. Then the yellow lamp will be on for some time and they will be discharged before being charged (To avoid the memory-effect). If you have 6 batteries you have to set the switch to 6 batteries, otherwise to two batteries.

## ***Loading of new Software***

To load new Software into the Metamorphosis you have to Start the Program „**BootLoader.exe**“ (on the CD in the \Boot-Loader-Folder).

- ✓ Connect Data-cable to Serial Port. If you have no serial Port, install the USB-serial-Adapter first.
- ✓ Start the Program, Select Options „19200 Baud“ and the according COM-Port.
- ✓ Then „File“, „Select File“ and navigate to the according \*.bin file.
- ✓ Then „File“ „Upload“
- ✓ If only "Sending #123" appears, switch the Metamorphose off and on.
- ✓ If still no Download-Window is popping up, something with the cable is wrong or with the Metamorphose

If there was another Software in the Unit before (Solar charge controller for example), then reset all Parameters first by Menu 8, Parameter 19

### **Installing of the Compiler BASCOM**

- ✓ If you want to make Programm-changes you must install first the Software BASCOM from the CD (you get it with the Metamorphosis). To install it call \BASCOM-AVR\Setup.exe. Install to the folder C:\BASCOM-AVR (**and not to C:\Programme\MCS Electronics\BASCOM-AVR as recommended**)
  - ✓ But you have to take care not to put too much code in the Chip and not exceed 128 000 Byte. Otherwise it would overwrite the Bootloader and you can not load programs any more. From 2.2009 on with the new M256-chip this problem does not appear any more.
  - ✓ To make your own programs, install \Bascom\_new\_Version\update.bat as well to get the latest Version of BASCOM
  - ✓ After you downloaded the Program-Files from the Internet you have to unpack the files first by double-click on the .exe file. If you get a .zip-file you have to use Win-zip or you can install the Windows-Commander from the CD to unpack it.
  - ✓ Now connect the cable (you get with the Metamorphosis) to the parallel Interface of the PC (big plug) and at the appliance (the plug with two cables coming out) and switch it on.
  - ✓ Start the Software using the Explorer and Double-Click on C:\BASCOM-AVR\Bascavr.exe. But you can also go to the Start-Button and Programs and \ MCS Electronics\BASCOM-AVR to Start it.
  - ✓ Select „Options“, „Programmer“; Select MCS-Bootloader
  - ✓ Select "File" and "Open" and open the file with the extension .bas (from Floppy or where you have it after downloading and unpacking it from Internet).
  - ✓ Then select in the Menu "Program", "Send to Chip" or simply press key "F4".
  - ✓ Then Press button "Chip" and "Autoprogram". The program will be loaded now
  - ✓ After everything is downloaded, switch off and on again the Metamorphosis. Now the new Software should run
  - ✓ For additional Testing you can use the internal Terminal-Program (Ctrl + T); Make these adjustments:
  - ✓ Go to Options, Communication and set the Baudrate to 19200 and also at Compiler, Chip, Communication, Baudrate
- ✓ If you are using BASCOM frequently you should buy the license for about 80 Euro at

### **MCS Electronics:**

[http://www.mcselec.com/index.php?page=shop.product\\_details&flpage=shop.flpage&product\\_id=86&category\\_id=5&option=com\\_phpshop&Itemid=1](http://www.mcselec.com/index.php?page=shop.product_details&flpage=shop.flpage&product_id=86&category_id=5&option=com_phpshop&Itemid=1)

### **Problems?**

- ✓ The cable is connected in the right way? The Metamorphosis is switched on?
- ✓ For XP install the Software from the CD \Programmer\_XP\ParPort.reg by just clicking on this file
- ✓ The PC must be set top ECP/EPP mode in the BIOS (pops up after start and key F2 or Del or ...?)
- ✓ Optional you can use for Windows 98 from the CD \programmer\_win98\ Charge\_Controller.BAT to download the Software

### **Loading of the measured values on the PC**

- To load the measured values on the PC you have to install the Software "Dialer" first from the CD. For this call \Dialer\install.bat on the CD.
- Now connect the metamorphosis with the cable, connect the plug with two cables coming out to the Metamorphosis. Put the other side with the small plug with "PC" written on it (not the big plug you used for downloading Software!) at the serial interface of the PC (small plug at the backside). If there is a modem connected it has to be removed temporarily.
- Then call the program C:\Meta\Dialer.exe"
- After the start selected the COM-Port. Begin with COM1 and if it doesn't go select COM2
- Now press the button "Upload"; the data will now be loaded and "End" will be displayed when finished.

- Now you can look at the data with the function "Data" and "View uploaded data" you can write comments, print it and import them in Microsoft Word or Excel for example (import to Excel: File, open, Typ "all files", then go to folder C:\Meta\data.txt, then Data is separated by Blank)

## ***Comments to the Electric wiring***

(see external Excel-sheet for the Terminals-connection)

Connection of an **alarm-horn**. Connect 12V-Devices at terminal 3 (+) and 4 (-). There has to be a bridge between terminal 1 and 2. Using 110V/220V devices the bridge between terminal 1 and 2 has to be removed and at terminal 2 the incoming 220V has to be connected. At terminal 3 the outgoing 220V to the appliance. The other incoming 220V has to be connect directly (using a external auxiliary terminal ) with the appliance.



must be a cable-terminal 1 and 2 terminal 3 is the (using a

connection for 220V

To shock a thief you can connect a **lamp** which will be switched on after a certain time. This connection is also the output for the Timer. 12V-Devices at terminal 6 (+) and 9(-) and there must be a bridge between terminal 5 and 6. Using 110V/220V devices the bridge between terminal 5 and 6 has to be removed and at terminal 6 connect the incoming 220V. At terminal 7 connect the outgoing 220V to the appliance. The other incoming 220V has to be connect directly (using a external auxiliary terminal ) with the appliance.

Optional at terminal 31 (+) and 32 (-) a **12V-Batterie as a Buffer** can be connected. For a short-term buffer, it is possibly to connect a 9V-Batterie (battery-clip from Alternative Technology) at this terminal. Another possibility of the buffering is putting in 6 NiCd-Cells in the according compartment. Do not forget to set the loading-switch to 6 cells!

Additional **external alarm-sensors** (for example Moving-Detectors) can be connected like this: The relay of the first sensor has to be connected at terminal 79 and 80. The second at terminal 79 and 81. The third at terminal 83 and 84. For a 5V-Sensor at terminal 78 a 5V-voltage is available. This sensor is normally already installed at the Metamorphosis.

**Puls-Watch:** at terminal 98 and 84

**Panic-Switch:** Can be connected to any of the Alarm-Inputs (Terminal 83/81 or 83/82 or 83/84)

**Free-Counter:** at terminal 50 and 52

## ***Features:***

- *Seven fast counter with display of the subtotal*
- *Display of the names of the components and the according percentage values*
- *Very simple operation*
- *Up to 570 measurements are stored on the Chip. With the cable you can get the data be loaded on a PC*
- *This protocol can be printed out directly or can be processed further on in Word or Excel etc.*
- *The default final value of the counter is 100. But any other value is possible and can be entered.*
- *Additionally one Output is programmable as a timer (maximum 220V, 10A)*
- *Furthermore there is a four channel alarm system integrated*
- *A Moving.- and Noise-Detector is already integrated. Further external alarm-sensors (three loops with several alarm-sensors) can be connected.*

- *After a alarm is coming there can be a telephone-notification as well. Now you have three Telephone-numbers to select (all or just one). With the Telephone you can hear what is happening in the laboratory and you can speak to the thief. Optional a lamp can be switched on delayed*
- *For supervising of critical persons (sudden death of children or old people) you can connect a cheap (Joggers) Pulse-Watch to the Metamorphosis and if the Pulse is going down a Alarm will be activated*
- *With NimH-Battery-Backup. When there is a Power-failure, it switches Automatic to the rechargeable Batteries. So it works also in areas with weak power-supply. Integrated charging Unit (Optional).*
- *When there is a power-failure, it switches automatic to the rechargeable Batteries. So it works also in areas with weak power-supply*
- *Adjustable voltage output 3-12V, 2A (Option)*
- *If somebody is alone in the Laboratory he can use the device to initiate automatic a Alarm, if something happens to the person (working with dangerous chemicals etc). If the person is not moving for a longer time the Alarm will be activated (Telephone-call etc)*
- *Panic-Call: Using a switch you can activate a Panic-Call. To avoid false-Alarm there is a delay for this activation*
- *A free Input is used for a free-running counter for any purpose*
- *You could even make your own Program-Modifications. Additional Software can be loaded into the Metamorphosis and is available in the Internet. (Software for irrigation, powerful alarm-system, solar-regulator etc)*
- *Different language-versions are available and can be selected*
- *You can use the same device for different applications; this gives you a high availability. If you buy several units and one is broken you can take the other one until replacement is coming*

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