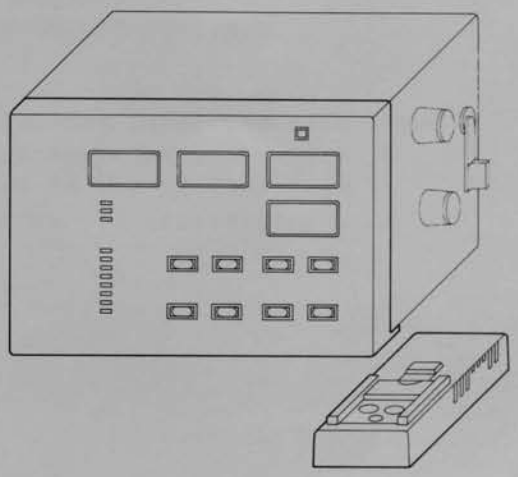
durst

Modular 70 Micro
Micro Memory
Micro T
Micro T Memory
Service Manual



SERVICE MANUAL

- MODULAR 70 MICRO
- MICRO MEMORY
- MICRO T
- MICRO T MEMORY

Summary:

1. MODULAR SYSTEM COMPONENTS

- MODULAR 70 LUMO
- MODULAR 70 COLOR
- MODULAR 70 MICRO
- MODULAR 70 VARIO

2. GENERAL VIEW OF THE DIAGRAMS AND PRINTED CIRCUIT BOARDS

DIAGRAMS	MODULAR 70 LAMP	AF63154
	DIGITAL PCB	CX63201
	ANALOG PCB	CX63251
	POWER PCB	CX63301
	PROBE PCB	CX63351
	STABI EST 305 N	
	MICRO T wiring diagram Micro Table	AB63202
	INTERFACE PCB	AB63201
PRINTED CIRCUIT BOARDS	MICRO DIGITAL	CX6320A
	MICRO ANALOG	CX6325A
	MICRO POWER	CX6330A
	MICRO PROBE	CX6335A
	STABI EST 305 N (G-E EST 12)	IT19328
	MICRO T INTERFACE	AB6320A
EPROM VERSION	MICRO / MICRO T	CX6320P0Z
	MICRO MEM / MICRO T MEM	CX6320Q1Z

3. TECHNICAL DATA

Main voltage	100 V ÷ 240 V
Frequency:	50/60 Hz
Fuse 1 220 V	1 AT
Fuse 1 120 V	2 AT
Lamp voltage:	12 V / 100 W

4. MODULAR 70 LUMO (LAMP AF63154)

The transformer (T1) is switchable form 100 V to 240 V.

Secundary output:

Between point 11 and 13: 11.5 V eff / 8 A
" " 11 " 17: 17 V eff / 6 A

A thermo switch (NTC) is integrated in the transformer. This switches off if 125°C are reached.

To avoid over heating of the color head due to continuous light a break of 10 minutes has been programmed in case the lamp is on for more than 20 minutes.

The display shows: FOC OFF 600

Keep pressed the key "light". The display counts to 0

If the transformer is retrofitted with a stabilisator the 17 V eff are used as voltage which is stabilised. The stabilisator is connected to the electronic module EST 305 N (See inside LUMO).

a) STABI EST 305 N (Lamp stabilisator)

Specifications:

Output voltage	12 V (RMS)
Type of regulation	Phase chopping

To achieve an excellent regulation with as little components as possible, the LSI U210B (Telefunken) is being used.

This IC features:

- Automatic crossover detection
- Input overvoltage protection
- Output short circuit protection
- Automatic pulse repeat
- 3 mA current consumption
- 220 V supply voltage

- The resistor in series to the main has limited wattage (R r): 1.5 W

- Trigger pulse: 125 mA

- Trigger pulse is short circuit protected

- Internal control amplifier

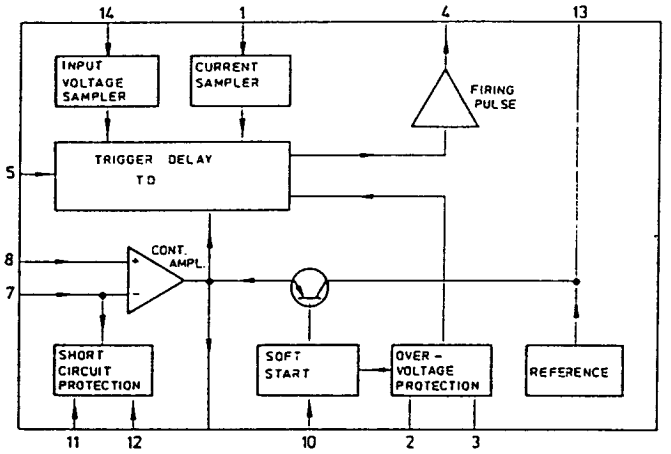
- Soft start

Warning:

To measure, use meter/oscilloscope with floating ground!

CIRCUIT DESCRIPTION (U 210 B)

2 is negative reference (VCC)
14 is positive reference (VDD)



The control IC uses the transformer output voltage as supply voltage (17 ACV).

The lamp voltage is used as feedback voltage to the control amplifier. The output voltage can be adjusted with P1.

C3 is the timing capacitor which determines the soft start slope.

When the mains is applied, the output does not surge at once, but increases gradually until reaching the nominal voltage.

Across C1, R2 a negative voltage is formed - taking "0" as reference - which is used as the overvoltage protection input to the U210B.

The voltage across C9 is measured and determines the trigger delay time.

The firing pulses are applied at pin 2 of the optocoupler. The same firing pulses appear at pin 4 of the optocoupler.

b) ADJUST THE LAMP VOLTAGE

Measure the lamp voltage on the clamping bar X12/1 and 2 or clamping bar X14 with a V-meter (RMS).

Lamp on.

The lamp voltage is + 11.7 V eff

Change resp. adjust the stabi version (EST 305 N) with the trimmer P1 (1 KΩ) (see page 4.3).

Error: Lamp doesn't light

Check the following points:

- lamp
- fuse
- short circuit plug X3/6a and 6b and the unit (diagram AF63154)

Measure the voltage on the transformer

between point 11 and 13: 11.5 V
" " 11 " 17: 17 V

Power off.

Check the thermo switch with a Ohm meter (between F1/1 and switchable mains transformer point 1).

Disconnect module EST 305 N and short circuit clamping bar X12/3 and 1.

Lamp is on.

5. MODULAR 70 COLOR

Mechanical dismounting of the filter assy

Remove the turning knobs for Y, M, C.

Remove the screw of the HL-lever.

Loosen the screws on the lower part of the light box and remove the whole filter assy from the housing.

The springs holding the single dichroic filters can be removed without problems.

6. ENTRY TO THE TEST PROGRAM

Press and hold the keys "mode" (S2), "Ref. value" (S3), "Channel" (S6) and "Exp. time" (S7) simultaneously for 2 sec. and power on.

The Y, M, C and D displays show: 000 and then go off.

The indicator LEDs lit up one after one and then stop at the "NEG." (red) and "multipoint" (green) LED.

Now the display shows the following values:

Y	M	C	D
222	222	222	222
555	555	555	555
888	888	888	888
HHH	HHH	HHH	HHH
310	311	312	313
100	100	100	---
000	000	000	000
000	000	000	---

The display goes off (becomes dark) and a new cycle is started.

KEY CHECK

When pressing the keys the display shows:

key	display
S2 function	00.1
S3 Ref. value	00.2
S4 +	00.4
S5 -	00.8
S6 Channel	01.0
S7 Exp. time	02.0
S8 Color bal./Dens corr.	04.0
S9 Light	08.0

Light off.
Press key "measure".

The display shows 80.0 (±1), the exp. time display jumps from 80.0 to 0F5.

Are the displays out of tolerance, adjust on the PCB Analog (CX6325A) with the trimmer R17 the value to 80.0 (±1).

To terminate the test program press "timer".

The (Y, M, C) display shows 000 and exp. time 10.0 sec.

7. POWER PCB (CX63301)

The voltage of 12.7 V AC being on plug X3/1a and 5a is regulated by V3 and on the output of the voltage regulators V2 (7805) there is a voltage of + 5 V (Tol. + 4.9 V ÷ 5.4 V).

If the relais K1-A is activated by the exp. relais (flat band cable X1/1) the contact K1-B (plug X3/6a, 6b aux) is closed.

The lamp is on.

Errors:

Check the voltage

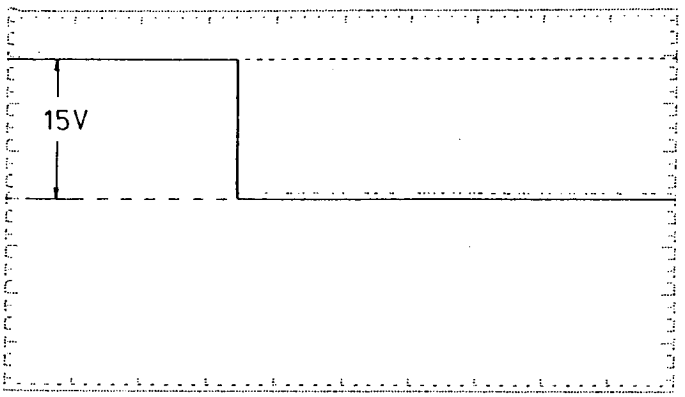
Check the input voltage regulator V3

On the plug X3/1a and 5a the output voltage is 12.7 VAC.

Warning:
To measure use a RMS voltmeter and not an oscilloscope.

Check on the output V2 (7805) + 5 V

If the relais doesn't close, check pulses exp. relais (X1/1).



Short circuit X1/1 (exp. relais) and ground, the relais must close. If it doesn't check diode V1 or the relais K1/A (MZF-A100) and the contacts.

8. ANALOG PCB (CX63251)

On this PCB are located the following independent components:

a) reference voltage
b) Auto brightness control
c) Reset
d) voltage / timer converter

a) reference voltage

The voltage dividers R25, R26 and C8 produce the reference voltage. On the measuring point P7 to ground are + 0.45 V (Tol. + 0.44 ÷ + 0.50 V).

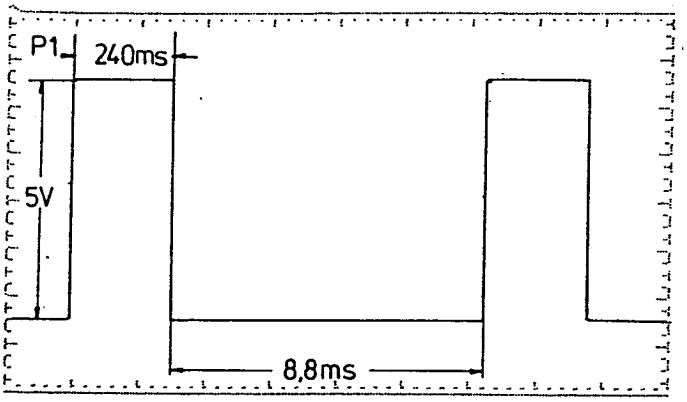
b) auto brightness control

If the room light is on, the display is bright. If the room light is off, the display becomes dark.

This bright / dark effect is recognized from the photodiode V4 (BPW34). It is compared by the voltage amplifier V1 with the clock signal BD on the output V3/2 and directed by the Schmitt-Trigger V2.

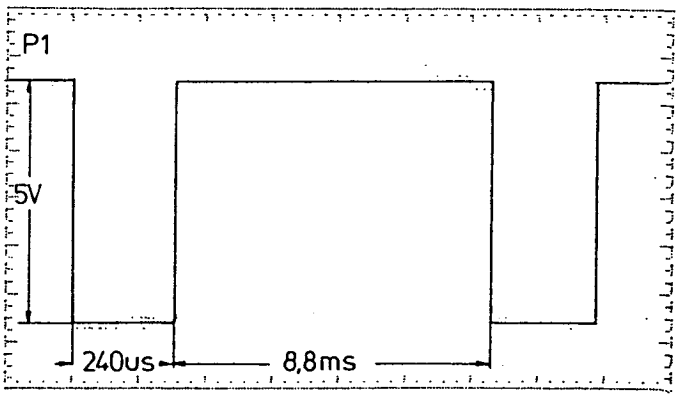
Measure the pulses on point 7 (0.45 V) and P1 (ATUO BC) as follows:

diag. 1



Light on the photodiode

diag. 2



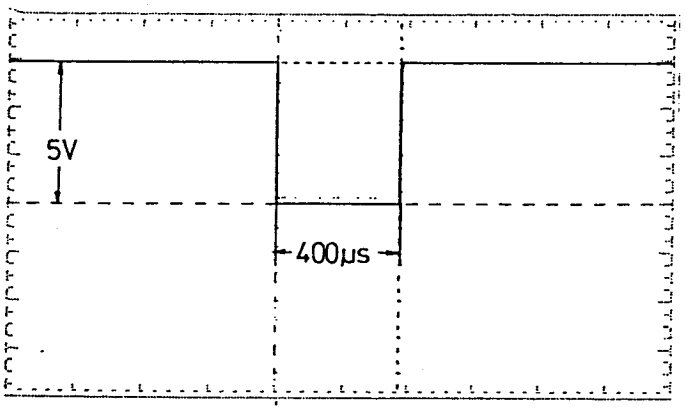
Photodiode
dark

Bright - dark adjustment

Do the brightness zero adjustment as follows and adjust it with trimmer R2.

Darken the photodiode V4. The pulse P1 is inverted (s. diag. 2).
Adjust the neg. pulse with trimmer R2 until the pulse is 0.4 msec. (s. diag. 3).

diag. 3



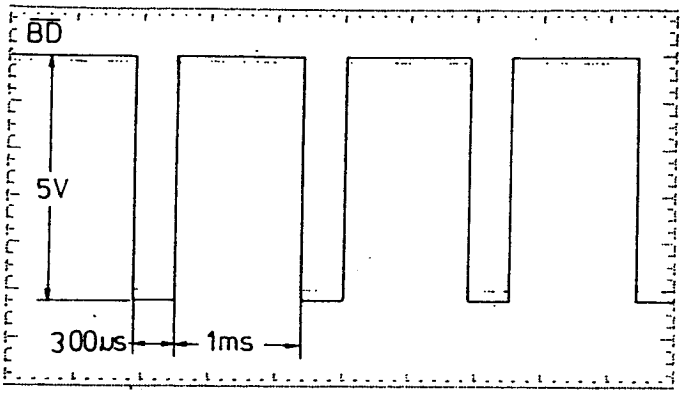
Errors:

No bright - dark effect

Check the photodiode V4 and the output V1. The photodiode V4 must go from L to H on the output V1/6.

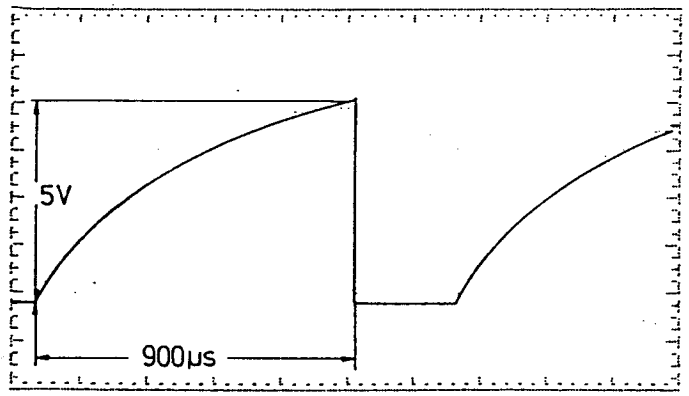
Check if on V3/5 a clock signal BD is present.

diag. 4



This BD pulse is converted on the output V3/2 to sawtooth signal. By turning the trimmer R2 the pulse length is changed.

diag. 5



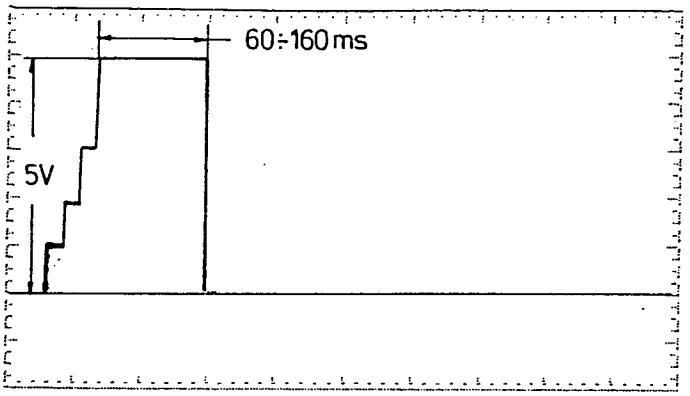
The Schmitt-trigger V2 (P1) directs resp. inverts the pulses (s. diag. 1 and 2) in dependance to the photodiode (bright or dark).

c) Reset circuit

The reset pulse is produced by V3 and V2 after powering on the main voltage.
It initialises the CPU.

Power on.

diag. 6



Errors:

Check + 5 V

When powering on check the previous pulse RST (s. diag. 6).

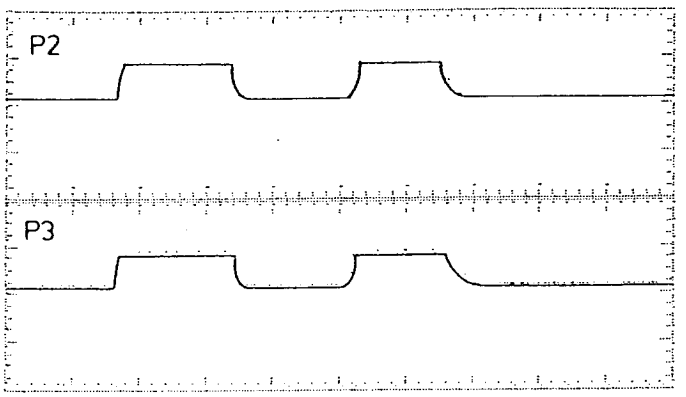
Check for interrupted flat band cable

d) Voltage / time converter

In this part the analog probe signal for Y, M, C is converted into a digital signal and it is shown on the display. By changing the F. stop the probe output signal is changed. In this case a main value of the 3 color signals is formed which is used for the calculation of the exp. time. This main value is calculated with a programmed value and then it is displayed as time difference on the display.

The probe output signal reaches the Fet inputs (V9/1 for Cyan (P2), V9/3 for Magenta (P3) and V9/8 for Yellow (P4).

Probe output signal P2 (cyan), P3 (magenta)



The Fet switch is activated by the pulse P1.0, P1.1., P1.2 and P1.3, which is comming along the flat band cable (X10) from the micro processor V1.

The output signals of the Fet switch V9 are led together and reach the input of the integrator V14/2.

The Zener diode V15 delivers a reference voltage of + 2.58 V + 2.6 V.

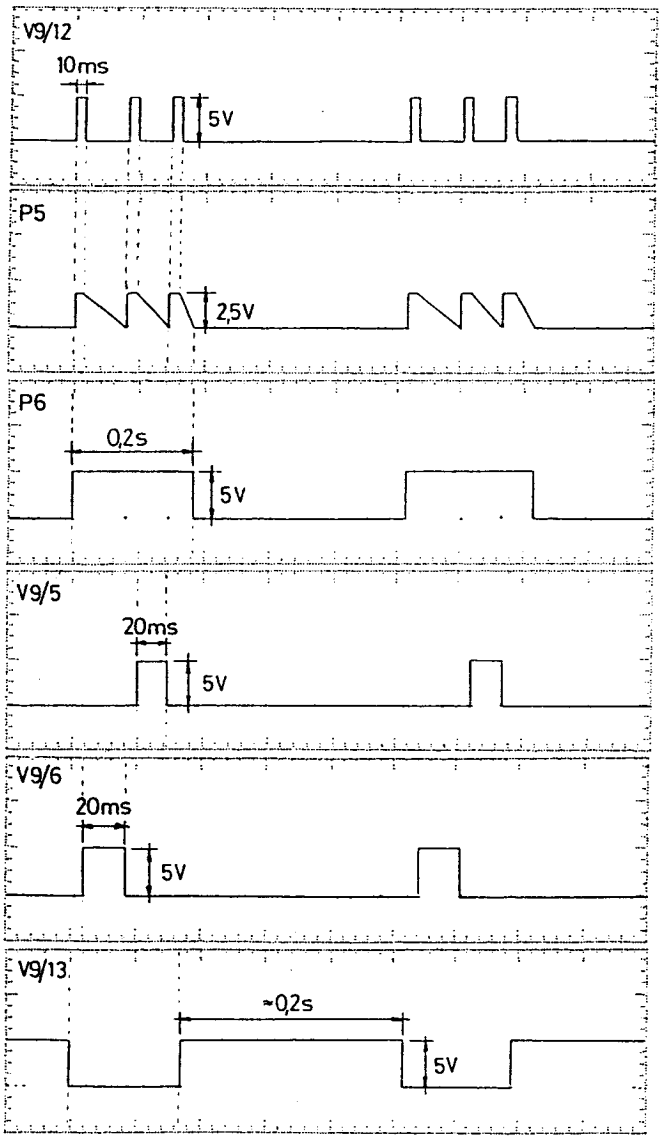
By the pulse P1 3 the Fet switch V9/D is closed and the condensator C3 is loaded.

The condensator C3 is unloaded by the integrator V14 against the reference value + 0.45.

The pulse width determines the value for the 3 color displays.

In the program is stated a base value for the exp. time. It is compared to the main value of the 3 color displays and calculated.

Diag.



Adjustment with the trimmer R17

Power off.

Disconnect probe.

Short circuit the inputs P2 (C), P3 (M) and P4 (C) and connect the reference voltage (+ 0.45 V) point 7.

ENTRY TO THE TEST PROGRAM

Press the keys (mode" (S2), "ref. value" (S3), "channel" (S6) and "exp. time" (S7) simultaneously. Keep them pressed for 2 seconds and power on.

Press the key "measure".

The display shows 80.0 (±1), the exp. time display jumps from 80.0 to 0F5.

Are the displays out of tolerance, adjust the value to 80.0 (±1) using the trimmer R17 on the analog PCB.

Press the key "timer" to exit from the test program.

Loosen all bridges.

Failure check

Power off.

Disconnect the probe cable.

Short circuit the inputs P2 (C), P3 (M) and P4 (Y) and connect them to an external voltage source (P7).

Set the external voltage to approx. 2 V.

Power on.

Select function Cal. ref. by pressing the key "function" and tap the key "+" or "-"

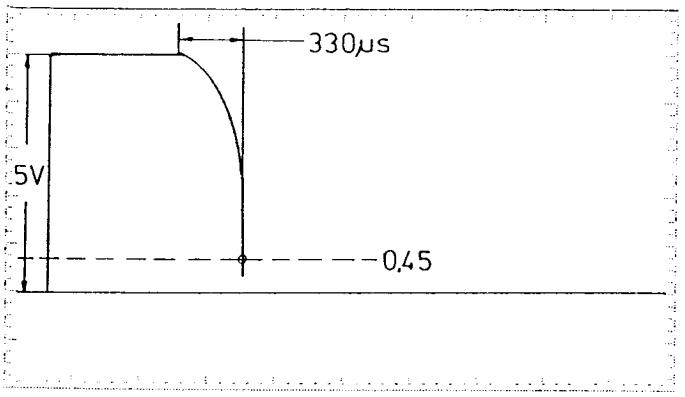
Select photometer mode by pressing the keys "function" and "channel" simultaneously.

The leds (V40) zero and (V39) measure light up.

Adjust the 3 color displays with the external voltage until 000 / 001 is displayed.

Measure the external voltage with a V-meter. The displayed voltage must be between 2.2 V and 2.8 V.

Measure on measuring point P5 against P0 (ground):



If the external voltage is more than 2.8 V the 3 color displays show: H H H

Press "clear" to exit the photometer mode

The led zero and measure become dark.

Disconnect the connections and bridges.

Connect the probe.

Failures

The color display Y shows a value 37 and it is impossible to change it.

Check the following:

Does the P1 0 signal reach the input of the Fet switch V9/6.

Is the same signal present on P4 as on input V9/8 and output V9/9.

Does a signal passing P1.3 reach V9/12 to close the Fet switch and to load the condensator.

Check V14/6 and V3/14 and the pulse diagram (s. page 8.5).

The same is valid for Magenta and Cyan and the Exp.time display.

9. DIGITAL PCB (XC63201)

The PCB consists of the input keys and the display for Y, M, C and exp. time, the leds for the functions as well as the micro processor V1, Eprom V4, the RAM V8 and the peripherie components.

This PCB conists of an input, display and logic part.

The input and display part consists of:

- the input keys
- 3 color displays
- exp. time display
- leds

The logic part consists of:

- micro processor V1
- Eprom V4
- Programmable keys and display interface V6
- 2Kx8 zero power TM RAM V8
- peripheri components

a) INPUT AND OUTPUT FUNCTIONS V6

The component V6 is a programmable keyboard / display I/O interface which in connection with the micro processor executes the following functions:

The outputs (V6) SL0 ÷ SL3 select thru V12 (decoder/multiplexer) the keys and thru V13 (decoder/multiplexer) the displays.

The key pressure is recognized by the inputs V6 (RL0 ÷ RL7).

The outputs (V6) A0 ÷ A3 and B0 ÷ B3 are used for the data transfer to V14. The outputs SL0 ÷ SL3 are syncronised and deliver the multiplex signal for the display or led.

The in- resp. outputs (DB0 ÷ DB7) are bi-directional data bus. All data and commands are transferred by these data bus.

The clock pulse is 1.38 MHz produced by the 11 MHz quarz (G1) and divided by V5.

b) KEY, DISPLAY AND LED CONTROL

Power on.

By pressing the following key combination you can check:

Press and hold key "function" (S2).

By tapping the key "+" or "-" (S4, S5) the leds V17, 18, 30÷35 lit up one after one.

The transistor V53 (BC327) controls the leds V17, 18, 30÷35.

The transistor V53 is activated by V13 and V6. If no led is activated check the output on V6 (SL0 ÷ SL3), V13 (74HC154) or transistor V53.

Press and hold the keys "function" (S2) and "ref. value" (S3). By tapping the key "+" or "-" (S4, S5) the leds (V36 ÷ V38) lit up one after one.

The leds (V36 ÷ V41) are activated by the transistor V54 (BC327).

The transistor V54 (BC327) delivers + 5 V to the anodes of the leds (V36 ÷ V41). The transistor is activated by V13 (74HC154) and the V6 (SL0 ÷ SL3).

By pressing the keys "+" and "-" (S4, S5) simultaneously the led V39 (red) lits up and the led V41 (green) becomes dark.

The output V6 (A0 ÷ A3, B0 ÷ B3) and V14 the led V39 is activated.

If the led doesn't lit up, check transistor V54.

The transistor V54 is activated by V13 and the keyboard component V6.

By pressing the key "channel" (S6) and "exp. time" (S7) the led V40 (red) lits up.

If the leds don't lit check the led, transistor (V54), R4, R5.

By pressing the keys "exp.time" (S7) and "dens.corr." (S8) the led V41 (green) lits up.

If you press the key "light" (S9) for more than 2 seconds, the lamp goes on.

The display shows: FOC ON 0 0 0

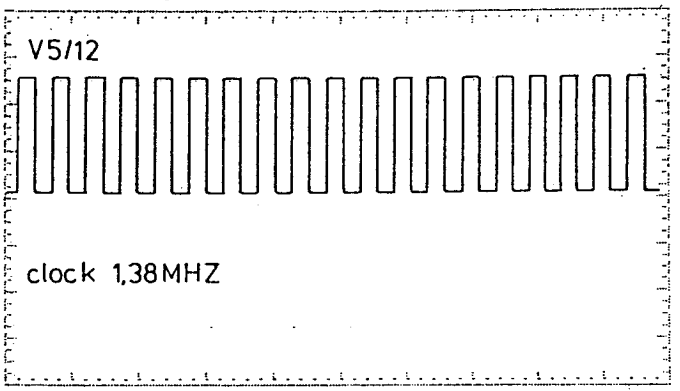
Press key "light" (S9) again for 2 seconds.

The display shows: FOC OFF 0 0 0

In the next step we see the CPU V1 (80C31BH). This is a CMOS-CHIP-8BIT CONTROL-ORIENTED CPU WITH RAM AND I/O.

The clock signal input is connected to an extern pulse generator (G1 (quarz 11 MHz). This pulse generator delivers the pulse for the inputs XTL1 and XTL2 for the CPU.

This clock frequency (11MHz) is divided to 1.38 MHz by V5 (synchronous binary counter) on the output Q2 and it delivers the clock pulse for V6.



The outputs P10 ÷ P13 activates on the analog PCB (CX6325A) the fet switch V9 (Y, M, C channel).

The output P15 activates the exp. relais on the power PCB thru the transistor V9 (BSS100).

The output P16 delivers the exp.end pulse for the roll paper connection Micro T.

The inputs, outputs P30, P31, P34 and P35 are used only for the Micro T.

Input P32 (INTO) is the input for the probe signal.

P0.0 ÷ P0.7 is an 8 bit bidirectional I/O port and it is used as data bus. It is connected with V3, V8 (RAM), V4 (Eprom), V6 and V2.

Attention:
Switch S1 (film ch) must be closed!

Otherwise it is impossible to select a film channel.

P2.0 ÷ P2.7 is an 8 bit bidirectional I/O port with intern pullup resistors and it is used as address bus. It is connected with V8 (RAM), V4 (Eprom) and V7.

10. PROBE (CX63351)

The key S1 (exp.) starts an exposure. The display counts the value (exp. time) against zero. The key S1 can also be used as an interrupter.

The wirings for Y, M, C consist of the photodiode, the operation amplifier and the diode, as well as the offset trimmer.

If light falls onto the photodiode a voltage resp. a current is produced which delivers the voltage on the output of the operation amplifier.

The max. voltage with room light is 3.3 V (± 0.3 V).

a) OFFSET ADJUSTMENT

Entry to the test program.

When powering on press and hold (for 2 seconds) the keys "mode" and "zero" simultaneously.

Press the key "measure" (room light on).

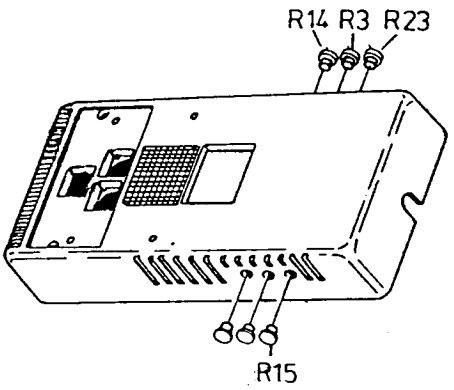
The Y, M, C and D displays show: 000, then the exp. time display jumps from 80.0 to OF5 and returns to 80.0.

Loosen the stoppers on the right side of the probe.

Darken the room, the Y, M, C displays show 80.0 (± 4.0)

Now you can adjust the offset voltage of the operation amplifiers V11 (Y), V5 (M) and V1 (C) with the respective trimmers R23 (V11), R14 (V5) and R3 (V1) (see diag. 1).

diag. 1



The value 4.0 corresponds to a voltage related to + 0.45 V of ± 0.4 mV.

Exit the test program by pressing the key "timer".

a) **PROBE CALIBRATION**

Attention:
For the calibration a second probe (Musterprobe) is necessary (for comparison).

Select the photometer mode.

Select function "cal.ref." (press and hold key "function" and tip "+" of "-" until cal.ref. lits).

Press the keys "function" and "channel" simultaneously. The leds zero (red) and measure (red) lit. The 3 displays go to H H H (room light on).

Swing out HL.

Roomlight off.

The 3 color displays go to r r r

Connect the second probe, put it into the middle of the base plate and mark.

Switch the enlarger light on by pressing the key "light".

Note the values in the Y, M, C display.

Attention to the M value, as it can be changed (trimmer R15).

Enlarger light off (key "light").

Disconnect the second probe and connect the probe which must be checked. Put it into the marking.

Enlarger light on (key "light") and check the values for Y, M, C on the display.

Set the M value to the previous value using R15 (see diag.1).

By pressing the key "clear" you can exit the photometer mode resp. the calibration of the M channel.

If Y, C are incorrect, check the offset calibration.

11. GENERAL CHECK

Initialise the RAM memory.

Press the keys "function", "ref. value" and "channel" and power on.

Keep pressed the keys until the display shows 10.0 sec.

Room light off and start Hpr (by pressing "light" and "+").

Sensibility of the photodiodes (probe)

Swing out filters.

Enlarger light on (key "light")

Function cal. ref. (key "function" and "+" or "-")

Press the keys "function" and "channel" simultaneously (photometer mode).

Put the probe into the middle of the base plate and adjust the F. stop until the 3 displays show the following values:

Y 065	M 070	C 145
± 20	± 20	± 4

Are the values out of tolerance, check the probe calibration (see page 10.2).

If the diffuser (Probe) is in, the difference is between 70 and 100.

Y 70 ÷ 100 M 60 ÷ 90

If necessary repeat Hpr.

Press "clear".

Probe diffusor out.

a) LINEARITY CHECK AND NOISE OF THE PHOTODIODES

Select function integral or multipoint ("function" and "+" or "-").

Use lens 50 mm and set F. stop 8

Swing out the filter

Light on.

Diffuser in (not Probe)

Press key "zero".

Swing in the filter

Modify the magnification factor and filters Y, M until the display shows:

Y 130 ±5 M 130 ±5 C 40

Press the keys "timer" to store the value

Set F. stop to 5.6.

Insert a ND 1.0 gelatine filter into the negative carrier.

Swing out the filter

Press "zero".

Swing in the filter

Set the F. stop from 5.6 to 8 and modify the magnification factor until C 40 is displayed.

The displays for Y, M must show 130 ±5.

Press "clear".

If you don't reach these values, check the calibration of the probe.

Remove the ND 1.0 Gelatine filter from the negative carrier.

b) PROGRAM AND ANALYSIS

All further steps refer to the reference HL calibration.

Select mode Neg.

Swing out filter.

Set the exp.time to 5 sec. (key "exp.time" and "+" or "-").

Select function cal.ref. and press key "ref.value".

No negative in the carrier.

Attention:
Starting from now, there are descriven 2 different Eprom versions:

- old Eprom
- new Eprom

For the new Eprom version go to page: 12.5.1.

OLD EPROM VERSION

Enlarger light on (key "light")

The display goes to UL ref X

X = any value

Adjust the value 330 by opening or closing the F. stop or by turning the D shutter.

Press and hold the keys "channel" and "timer" until the timer led (green) stops blinking (HL REF 330 is stored).

Select function Cal.

Adjust P03 while keeping pressed the "channel" key.

PAP Er ret P03

Turn out the Y, M, C filters (turning knobs on the color head)

Light on.

With the filters out, press key "measure".

Swing in the filters and press "timer".

The display shows: 400 400 400 270

Press and hold the "channel" and "timer" keys until the timer led (green) stops blinking).

The display returns to Y, M, C 000 and exp. time 5 sec.

CHECK X. COMP MODE

Select X. comp (insert a ND1. 0 filter into the negative carrier).

Set exp. time to 50 sec. and press "channel" (P03 must stay the same).

Display P 5LP REF P03

Light on.

Swing out the filters and press "measure".

Swing in the filters and press the keys "timer".

The display goes to:

Y 085 M 095 C 100 ±5 exp. time 50

Change the magnification factor and repeat the above working cycle.

The displayed filter value changes according the magnification scale.

Press "channel" and "timer" for 2 sec. and hold them until the timer led (green) stops blinking.

CHECK FUNCTION FILM OFFSET

Select function film offset.

(remove the ND1.0 filter from the negative carrier).

Set F03 by pressing the key "channel" (before doing so, there is F0.1).

Swing out filters and press the keys "measure".

Swing in the filter and press "timer".

The display goes to:

Y 000 M 000 C 000 exp. time 05.5 sec.
±2 digit

Press the keys "channel" and "timer" for 2 seconds.

The display shows 000 and exp. time 50.0 sec.

CHECK FUNCTION INTEGRAL

Select function Integral.

Light on.

Swing out filter and press "measure".

On the display the cyan channel is blinking for 2 seconds and the display shows:

Y XXX M XXX C 000

exp. time 50.0 sec. ±3

X = any value

Swing in filter and set the displays manually to 000 for Y, M.

Press the keys "timer" and the displayed values are confirmed in the memory.

Exp. time shows 50 sec ±3

Stay in the function integral, swing out filter, press "measure".

Swing in filter and set the display manually to 000 for Y, M and set 5 sec. exp. time.

Press "timer" to store the displayed values in the memory.

Exp. time shows 5 sec. ±3

Insert the ND1.0 filter in the negative carrier.

Swing out the filter and press "measure".

Swing in the filter and set the display menaually to 000 for Y, M.

Exp. time shows 50 sec. ±3

The more exacter the ND gelatine filter is the more exacter is the time.

Confirm with the key "timer".

Initialise the unit.

c) CHECK OF THE TABLE OF CALIBRATION VALUES

CHECK OF THE CAL. REF.

Set cal. ref. (key "function" and "+" and "-").

Press and hold the keys "ref. value" and "exp. time". The color displays go to:

Y 300 M 300 C 300

exp. time 000 neg. and pos.

Press "clear".

The cal. value on the mode B/W is not important.

The display shows: no ref CH.

CAL. CHECK

Select function Cal. (key "function" and "+" or "-").

Press key "channel".

The displays shows:

PAP Er ref P01÷30

Press key "ref. value".

The display shows:

Y 310 M 311 C 312 exp. time 313

Press "clear".

X. COMP CHECK

Select X. Comp (key "function" and "+" or "-").

Press the key "channel".

The displays show:

P. SLP rEF P01÷P30

Press key "value".

The display shows:

Y 100 M 100 C 100 exp. time ...

CHECK OF THE FILM OFFSET

Select function film offset (key "function" and "+" or "-").

Press key "function".

The display shows:

FIL M rEF F0.1

F0.1 can be modified from F01÷F30 by pressing key "channel" and "+" or "-". Should it not be possible, close dip switch S1 (see page 9.4).

Press "ref. value".

The display shows:

Y 000 M 000 C 000 exp. time 000

Press "clear".

CHECK FUNCTION INTEGRAL ON NEG. AND POS.

Select mode Neg.

Press and hold "function" and "ref. value" and "+" or "-" simultaneously.

Select function integral (key "function" and "+" or "-").

Press the keys "ref. value" and "exp. time" simultaneously.

The display shows: nEG Int. LC 050

Press "clear".

Select mode Pos.

Press and hold "function" and "ref. value" and "+" or "-" simultaneously.

Press and hold the keys "ref. value" and "exp. time" simultaneously.

The display shows: POS Int. LC 010

Press "clear".

CHECK FUNCTION MULTIPOINT ON NEG. AND POS.

Select mode Neg.

Select function multipoint ("function" pressed and "+" or "-").

Press and "ref. value" and "exp. time" simultaneously.

The display shows: neg MPL LC 100

Press "clear".

Select mode Pos. (press and hold "function" and "ref. value" and "+" or "-")

Press "ref. value" and "exp. time" simultaneously.

The display shows: POS MPt LC 020

Press "clear".

These values are only used to control. They are entered by the manufacturer. (see the additional explanation in the operating manual Modular 70/Micro, page 17).

The values can be changed by pressing the keys "+" or "-" or "ref. value".

By pressing the keys "channel" and "timer" eventual changes in the memory can be done.

On each initialising these entered values are displayed.

Should these values be incorrect, check Eprom V8 and if necessary replace it.

12. MODULAR 70 MICRO MEMORY

When powering on the unit displays MICRO MEM and after 2 seconds it goes to the normal program.

To avoid a difficult programming of the Micro, Durst has stored the most important and most used paper and film types in the unit.

The calibration values are only reference values, as sometimes the emulsion layers of the paper and film types are not identical. Also the process conditions of your film and paper development may differ.

a) Precalibrated paper and film types
with channel assignment

color papers process RA4

Labcolor CQA	paper channel P01
Tetenal TT-Speed	" " P02
Fujicolor FA	" " P03
Kodak Ektacolor Supra	" " P04 to P30

Color-negative films

Kodacolor Gold 100	Film channel F01/Multipoint
	" " F02/Integral
Kodak Ektar 125	" " F03/Multipoint
	" " F04/Integral
Fujicolor HG 100	" " F05/Multipoint
	" " F06/Integral
Fuji Reala	" " F09/Multipoint
	" " F10/Integral
Agfa XRG 100	" " F11/Multipoint
	" " F12/Integral

Dia-Direktpapier

Cibachrome AII CPSA	Paper channel P01

Color dia film

Ektachrome 100	Film channel F01/Multipoint
	" " F02/Integral

SW paper

Multigrade III	Paper channels P01 to P30

This calibration concerns X.COMP mode only.

The precalibration concerns the "Cal.ref" (HL), "Cal" (paper), "Film offset" (films) and "X.COMP" (Schwarzschild) in the neg and pos modes.
In the BW mode only "X.COMP" is precalibrated.

Table with the calibration values

NL reference (Cal.ref)

Display shows: Exp.time
for Neg. mode = 274
for Pos. mode = 305

You can call it up as follows:

- Select "cal.ref"
- Press "ref.value" (change the light, so that no error message -HHH or rrr appears)
- Press "clear" to exit.

Paper channels for Neg. mode

Function calibration	Yellow	Magenta	Cyan	Exp.time
P01	333	345	394	278
P02	327	361	394	281
P03	336	347	393	297
P04 to P30	332	343	393	283

You can call them up as follows:

- Select Cal mode.
- Press and hold "channel" and use "+" or "-" to select the channel
- Press "ref.value".
- Press "clear" to exit.

Function X.COMP	Yellow	Magenta	Cyan
P01	113	104	105
P02	106	117	124
P03	103	101	97
P04 to P30	113	104	106

You can call them up as follows:

- Select X.COMP mode.
- Then do the same steps as described on Cal mode.

Film channels for neg. mode

Function	Film offset				Film (measure) values (*)		
Film offset	Y	M	C	D	Y	M	C
F01	00	00	00	00	00	00	00
F02	00	00	00	00	969	970	967
F03	-10	- 9	+ 1	+ 7	999	001	989
F04	-12	-11	00	+ 7	966	973	962
F05	-19	-10	+ 1	+11	006	999	986
F06	-18	-11	+ 1	+11	969	963	956
F07	- 3	-10	00	+19	983	993	978
F08	- 3	-12	+ 1	+19	947	956	943
F09	- 7	- 3	+ 1	+ 1	005	002	996
F10	- 7	- 5	+ 1	+ 1	974	970	963
F11	-13	- 7	00	00	009	006	00
F12	-12	- 9	00	00	972	971	966
F13 to F30	00	00	00	00	00	00	00

The film offset values can be called up as follows:

- Select mode Film offset.
- Then do the same steps as described in Cal mode.

* The film measure values can be called up by pressing the keys "exp. time" and "ref. value".

Calibration values for Pos. mode

		Y	M	C	D
Cal.	P01-P30	385	373	395	296
X. COMP	P01-P30	108	112	114	---
Film offset	F01	00	00	00	00
	F02	00	00	00	00
	F03-F30	00	00	00	00
Film m. values	F01	00	00	00	--
	F02	932	938	945	---
	F03-F30	00	00	00	--

Calibration values for BW mode

		Y	M	C	D
Cal.	P01-P30	---	---	---	281
Film m. value *		---	---	398	---
X. COMP	P01-P30	---	---	108	---

b) Initialisation RAM memory

On eventual loss of the calibration values the memory can be loaded as follows:

- Press and hold the keys "function", "ref. value" and "channel" simultaneously
- Power on the unit thru the main switch.
- Wait until the display shows 10.0 sec.

c) Entry to the test program

Press and hold the keys "mode" and "zero" simultaneously.

Power on and hold for 2 seconds.

The display shows: MICRO MEM

Display dark.

The leds for function, mode, zero and measure lit up one after one.

The leds for timer, neg. and multipoint lit.

The color display stays dark and starts with:

222	222	222	222
555	555	555	555
888	888	888	888
HHH	HHH	HHH	HHH
333	345	394	278

Test program

222	222	222	222
555	555	555	555
888	888	888	888
HHH	HHH	HHH	HHH
333	345	394	278
113	104	105	---
000	000	000	---

dark and a new cycle is started.

To continue the test program go to page 6.1 (key check).

NEW EPROM VERSION

Attention:

Starting from now, we describe the new Eprom version.
For the old Eprom version, go to page 11.3.1.

Enlarger light on (key "light")

The display goes to UL ref X and exp.time shows 274.

X = any value

Adjust the value to exp.time 274 by opening or closing the F.stop or by turning the D shutter.

Press and hold the keys "channel" and "timer" until the timer led (green) stops blinking (WL REF 274 - to exp.time 274).

Select function Cal.

Adjust P03 while keeping pressed the "channel" and "+" or "-" keys.

PAP Er ret P03

Turn out the Y, M, C filters (turning knobs on the color head)

Light on.

With the filters out, press key "measure".

Swing in the filters and press "timer".

The display shows: 400 400 400 270

Press and hold the "channel" and "timer" keys until the timer led (green) stops blinking).

The display returns to Y, M, C 000 and exp. time 5 sec.

CHECK X.COMP MODE

Select X.comp

(Insert a ND1.0 filter into the negative carrier).

Set exp.time to 50 sec. and press "channel" (P03 must stay the same).

Display P.5LP REF P03

Light on.

Swing out the filters and press "measure".
Swing in the filters and press the keys "timer".

The display goes to:

Y 085 M 095 C 100 ±5 exp.time 50

Change the magnification factor and repeat the above working cycle.

The displayed filter value changes according the magnification scale.

Press "channel" and "timer" for 2 sec. and hold them until the timer led (green) stops blinking.

CHECK FUNCTION FILM OFFSET

Select function film offset.

(Remove the ND1.0 filter from the negative carrier).

Set F03 by pressing the key "channel" (before doing so, there is F0.1).

Swing out filters and press the keys "measure".
Swing in the filter and press "timer".

The display goes to:

Y 000 M 000 C 000 exp.time 05.5 sec.
±2 digit

Press the keys "channel" and "timer" for 2 seconds.

The display shows 000 and exp. time 50.0 sec.

CHECK FUNCTION INTEGRAL

Select function Integral.

Light on.

Swing out filter and press "measure".

Adjsut F.stop or density slide until on the display the cyan channel is blinking for 2 seconds and the display shows:

Y XXX M XXX C 000

exp. time 50.0 sec. ±3

X = any value

Swing in filter and set the displays manually to 000 for Y, M.

Press the keys "timer" and the displayed values are confirmed in the memory.

Exp.time shows 50 sec ±3

Stay in the function integral, swing out filter, press "measure".

Swing in filter and set the display manually to 000 for Y, M and set 5 sec. exp.time with the F.stop

Press "timer" to store the displayed values in the memory.

Exp.time shows 5 sec. ±3

Swing in filter and set the display manually to 000 for Y, M.

Insert the ND1.0 filter in the negative carrier.

Swing out the filter and press "measure". Swing in the filter and set the display menaually to 000 for Y, M.

Exp.time shows 50 sec. ±3

The more exacter the ND gelatine filter is the more exacter is the time.
Confirm with the key "timer".

Initialise the unit.

c) CHECK OF THE TABLE OF CALIBRATION VALUES

CHECK OF THE CAL. REF.

Select cal. ref. (key "function" and "+" and "-").

Press and hold the keys "ref. value" and "exp. time". The color displays go to:

Y 300 M 300 C 300

exp. time 274 neg. and
305 pos.

Press "clear".

The cal. value on the mode B/H is not important.

The display shows: no ref CH.

CAL. CHECK

Select function Cal. (key "function" and "+" or "-").

Press key "channel".

The displays shows:

PAP Er ref P01÷30

(see paper channel on page 12.3).

Press key "ref. value".

The display shows:

Y 333 M 345 C 394 exp. time 278

Press "clear".

X. COMP CHECK

Select function X. Comp (key "function" and "+" or "-").

Press the key "channel".

The displays show:

P. SLP rEF P01÷P30

(see paper channel on page 12.3).

Press key "value".

The display shows:

Y 113 M 104 C 105 exp.time ...

CHECK OF THE FILM OFFSET

Select function film offset (key "function" and "+" or "-").

Press key "function".

The display shows:

FIL M rEF F01÷30

(see paper channels on page 12.4).

F0.1 can be modified from F01÷F30 by pressing the key "channel" and "+" or "-". Should it not be possible, close dip switch S1 (see page 9.4).

Press "ref.value".

The display shows:

Y 000 M 000 C 000 exp.time 000

Press "clear".

CHECK FUNCTION INTEGRAL ON NEG. AND POS.

Select mode Neg.

Press and hold "function" and "ref.value" and "+" or "-" simultaneously.

Select function integral (key "function" and "+" or "-").

Press the keys "ref.value" and "exp.time" simultaneously.

The display shows: nEG Int. LC 050

Press "clear".

Select mode Pos.

Press and hold "function" and "ref.value" and "+" or "-" simultaneously.

Press and hold the keys "ref. value" and "exp. time" simultaneously.

The display shows: POS Int. LC 010

Press "clear".

CHECK FUNCTION MULTIPOINT ON NEG. AND POS.

Select mode Neg.

Select function multipoint ("function" pressed and "+" or "-").

Press and "ref. value" and "exp. time" simultaneously.

The display shows: nEG MPt LC 100

Press "clear".

Select mode Pos. (press and hold "function" and "ref. value" and "+" or "-")

Press "ref. value" and "exp. time" simultaneously.

The display shows: POS MPt LC 020

Press "clear".

These values are only used to control. They are entered by the manufacturer. (see the additional explanation in the operating manual Modular 70/Micro, page 17).

The values can be changed by pressing the keys "+" or "-" or "ref. value".

By pressing the keys "channel" and "timer" eventual changes in the memory can be done.

On each initialising these entered values are displayed.

Should these values be incorrect, check Eprom V8 and if necessary replace it.

13. MICRO T TO MODULAR 70 MICRO

ADDITION TO THE DIAGRAMS AND
PRINTED CIRCUIT BOARDS

See page 2.1

14. TECHNICAL DATA

Main trafo with switch	220 V / 110 V
Voltage tolerance	- 15 / + 20 %
Switching capacity	1000 W
Connection for roll paper easel	8 pin DIN plug

Serial interface RS232C with the following possibilities:

Print of data without text

Calibrating data exchange between 2 Micro T

Data transfer to PC (no SW for PC from Durst)

Specification serial interface for printer

Baudrate:	2400
Word length:	8 data bits
Parity bit:	none

15. CONNECTIONS MICRO T (AB63202)

Mains connection (X9) for 100 V≈ / 200 V≈

Fuse F1 T8A

Switch S1 (Power on/off)

Switching connection (X11) for enlarger

Interference capacitors C1 and C2 with spool L1

Interference filter Z1 and Z2

Connection plug (X5) for Micro T / PC interface

Connection plug (X7) for the roll paper easel

Connection plug (X8) for the probe

16. INTERFACE PCB (AB63201)

The mains voltage reaches the trafo T1 over the plug connection X6 (pin 2 and 6)

Mains trafo - switching with switch S1 from 110 V / 220 V.

The power output is looped over the ralais contact (KL1-B) and the connecting plugs X6 (pin 5, pin 1) and X6 (pin 6a and 6b) power PCB.

On the plug X6 (pin 9, pin 10) are 15 VAC, which are delivered to the rectifier V3 on the Power PCB.

The V3 (TCL232CPE) is a + 5 V POWERED RS-232 DRIVER/RECEIVER, which delivers the communication signal from the micro processor V1 to the serial interface outputs

The signals for READY (pin 8) FOC ON (pin 7) and Exp. start (pin 6) on the plug bar (X4) reach the EPROM (V4) and the micro processor (V1) over the pull up resistors and protection diodes and are (controlled) directed (??) there.

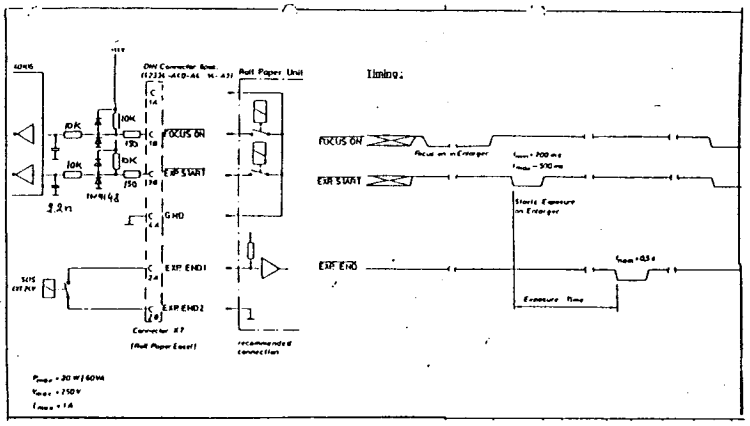
The exp. end pulse (0.5 sec.) is activated by the micro processor V1 after the end of each exposure and it activates the transistor V10 (BSS100).

V10 activates the relais K1-A and the relais contacts K1-B are closed.

With switch S2 (Dip Fix) the Baud rate of the serial data transfer can be changed (s. connection possibilities).

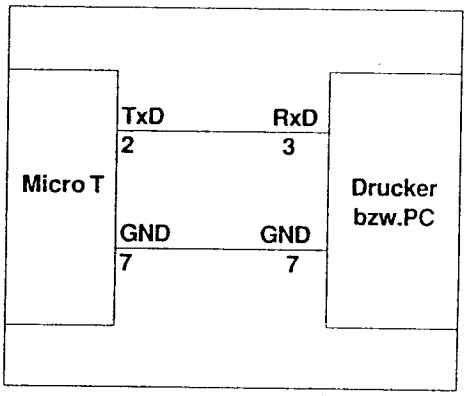
17. CONNECTION POSSIBILITIES

Connection for roll paper easel



Serial interface RS-232C for printer or PC.

Before powering on the units, connect the cable to the plugs of the serial interfaces.



Print of the display data by pressing the keys "-" and "light".

Letters are not taken into account.

SPECIFICATION SERIAL INTERFACE FOR PRINTER

Data transfer in ASCII

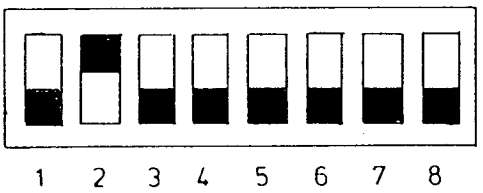
Baud rate:	2400
Transfer parameter:	1 start bit
Word length:	8 data bits, 1 stop bit

Insert serial interface from printer CITIZEN 120-D

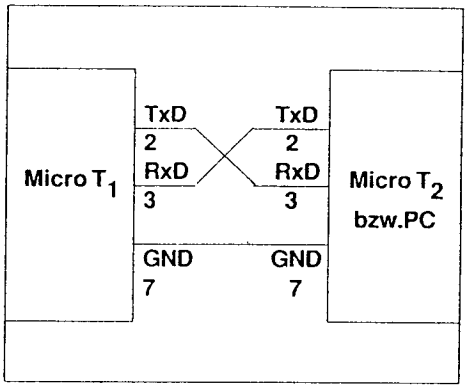
Switch position of SW2.

Connection possibilities of different products

SW2



17. TRANSFER OF THE CALIBRATION VALUES (RAM-MEMORY) FROM ONE MICRO T TO A SECOND MICRO T RESP. TO A PC



1. Before powering on the units, connect the cable to the plugs of the serial interfaces.

2. Power on the first (tranceiver) unit and while keeping pressed the keys "+" and "light" until the Y display shows SS (Sender)

3. Power on the "transreceiver" unit while keeping pressed the keys "-" and "dens. corr." until the Y display shows: rr (receiver)

4. Activate the data transfer by pressing the key "exp. time" on the tranceiver Micro. Within 30 seconds all 2.000 Byte of the RAM memory are transferred.

5. After the data transfer the units must be powered off for a moment.

TRANSFER SPECIFICATIONS:

- Transfer parameter: 1 start bit, 8 data bits, 1 stop bit
- Data transfer in binary (not ASCII)
- No parity

18. CHECK OF THE TRANSFERRED RAM MEMORY

Select mode Neg.

Select function Cal.

Press "channel".

The display shows: PAP Er rEF P01

Press key "ref. value"

The display shows: 310 311 312 313

Press key "ref. value"

The display shows: 000

In this step the values in the memory can be checked and if necessary they can be changed:

Press "+" or "-" to enter a value for Y, M, C; before doing this press each time the key "ref. value".

By pressing the keys "channel" and "timer" simultaneously these values are stored.

Repeat the above mentioned working cycle to check the values in the display.

By pressing the key "clear" you can cancel the entered values.