

tan δ normierter til C1H1.

100p	1.0×10^{-4}	
5 x 1n0	1.0×10^{-4}	
5 x 5n6	1.9×10^{-4}	
33n	6.7×10^{-4}	
1μ	$7.5 - 8.0 \times 10^{-4}$	dos $5 \leq \lg \delta_{1\mu} \leq 11 \times 10^{-4}$
20μ	2.65 %	-11- $2.40\% \leq \lg \delta_{20\mu} \leq 2.91\%$
1n0/82ks	1.930 %	-11- $1.92\% \leq \lg \delta_{1n0} \leq 1.94\%$

30-6-1989

3.20 \rightarrow 3.10 ^{norm}

21μ 2.75 \rightarrow 2.65 ^{dos $\lg \delta_{21\mu} \leq 2.90\%$}

1μ $7.5 - 8.0 \times 10^{-4} / 5 \leq \lg \delta_{1\mu} \leq 11 \times 10^{-4}$

33n 6.7×10^{-4}

1n0 $1.7 \times 10^{-4} \rightarrow 1.0 \times 10^{-4}$

5n6 $1.9 \times 10^{-4} \rightarrow 1.9 \times 10^{-4}$

100p 1.0×10^{-4}

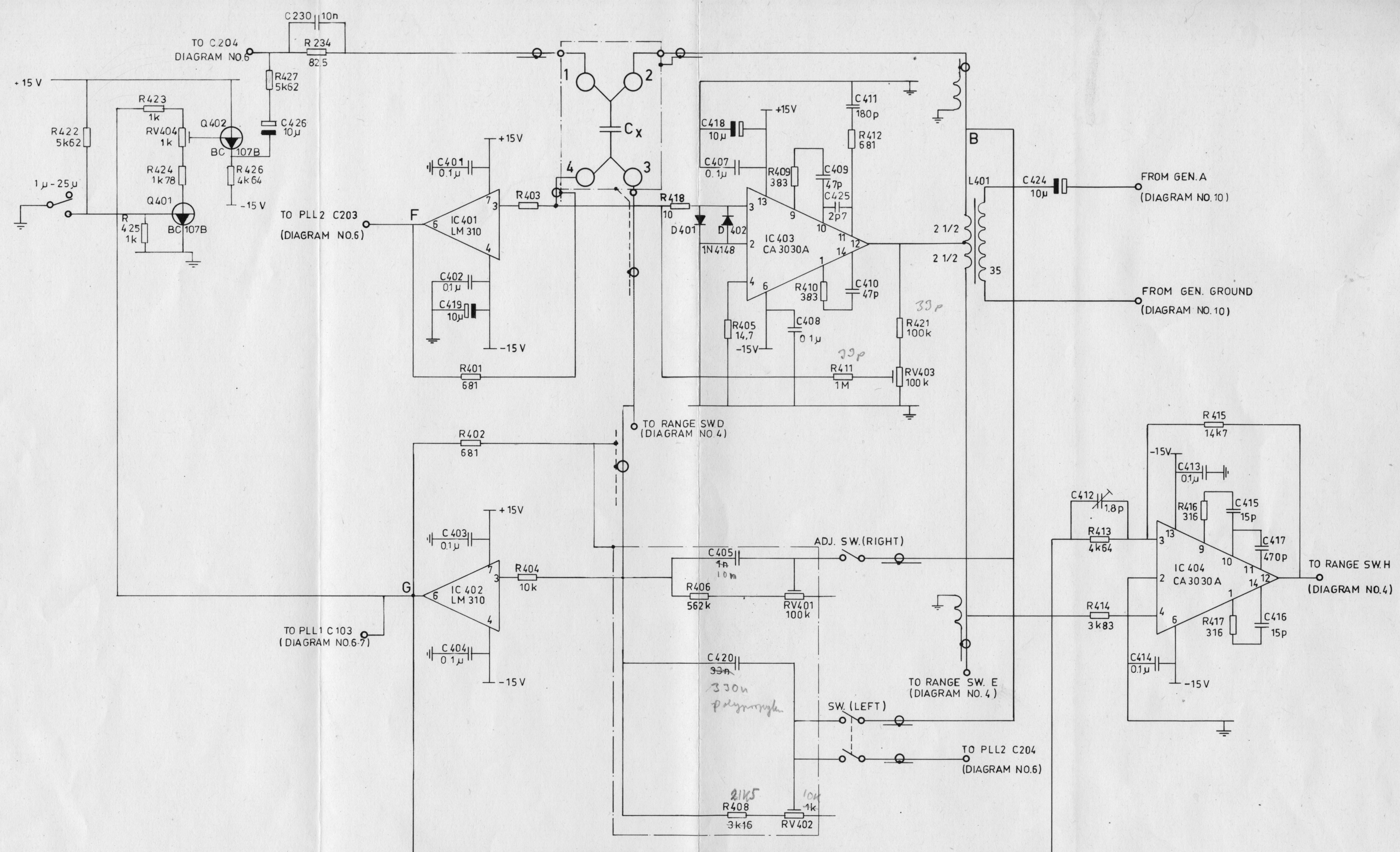
1n0/82ks 1.940

id 1.905 [%] \rightarrow 1.89 $\pm 10 \times 10^{-4}$ dos 1.88 \rightarrow 1.90

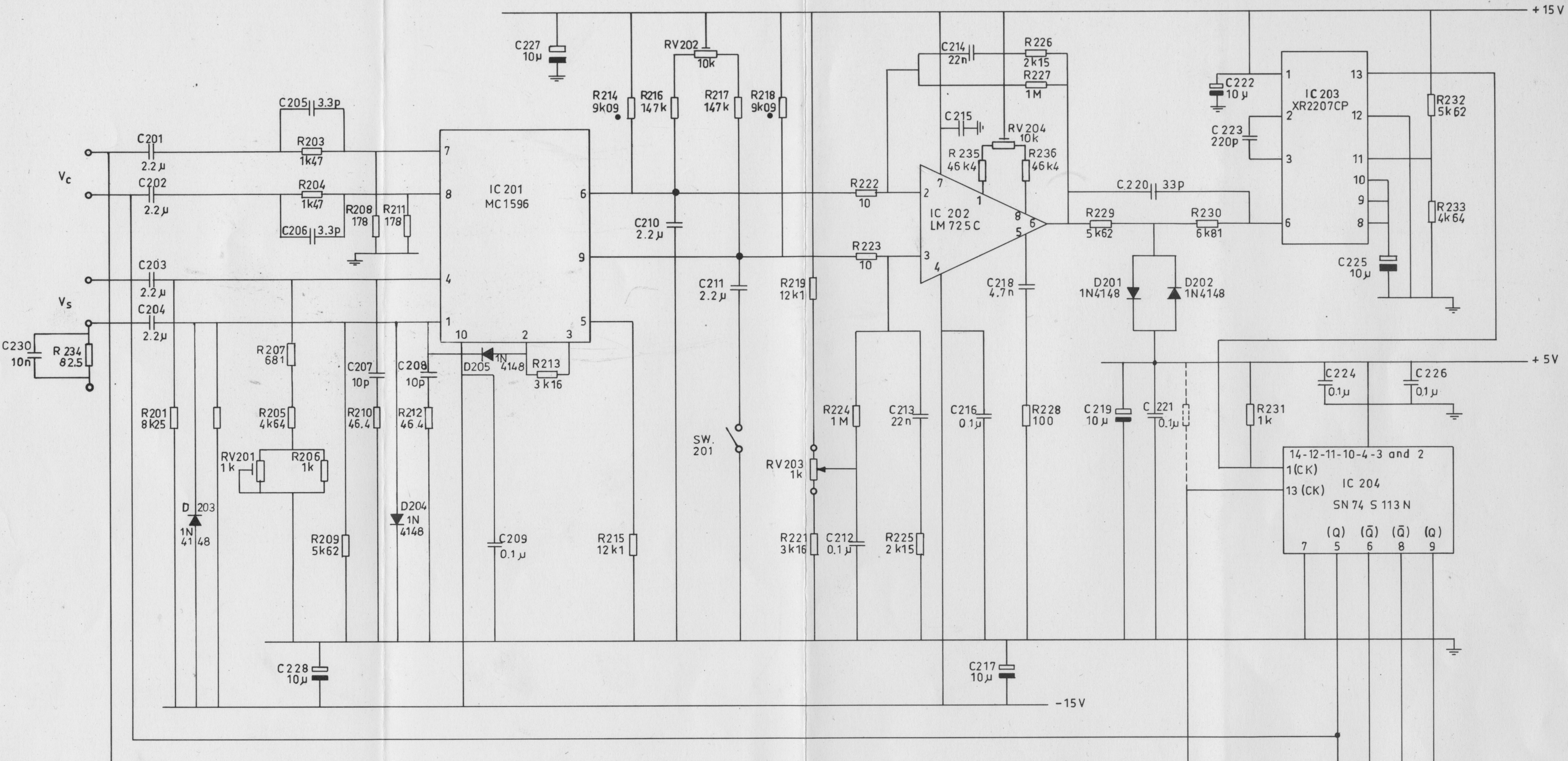
W. L. G. W.

Vi tilbyder gratis konsulent service

Wirtschaftsförderungsgesellschaft Schleswig-Holstein mbH
Sophienblatt 60 · D-2300 Kiel 1 · Tel.: 0431-66191



72550-3	CLM 1	DIAGRAM NO. 3	291276 BR	Shy		
			240876 BR	Shy		
A/S DAN BRIDGE	MEASURING CIRCUIT		RETTET	GODK.	170778 BR.	Shy
			TEGNET		180376 B. Ras.	
			KONSTRUERET		S. KOFOED OLSEN	
			GODKENDT		Shy	

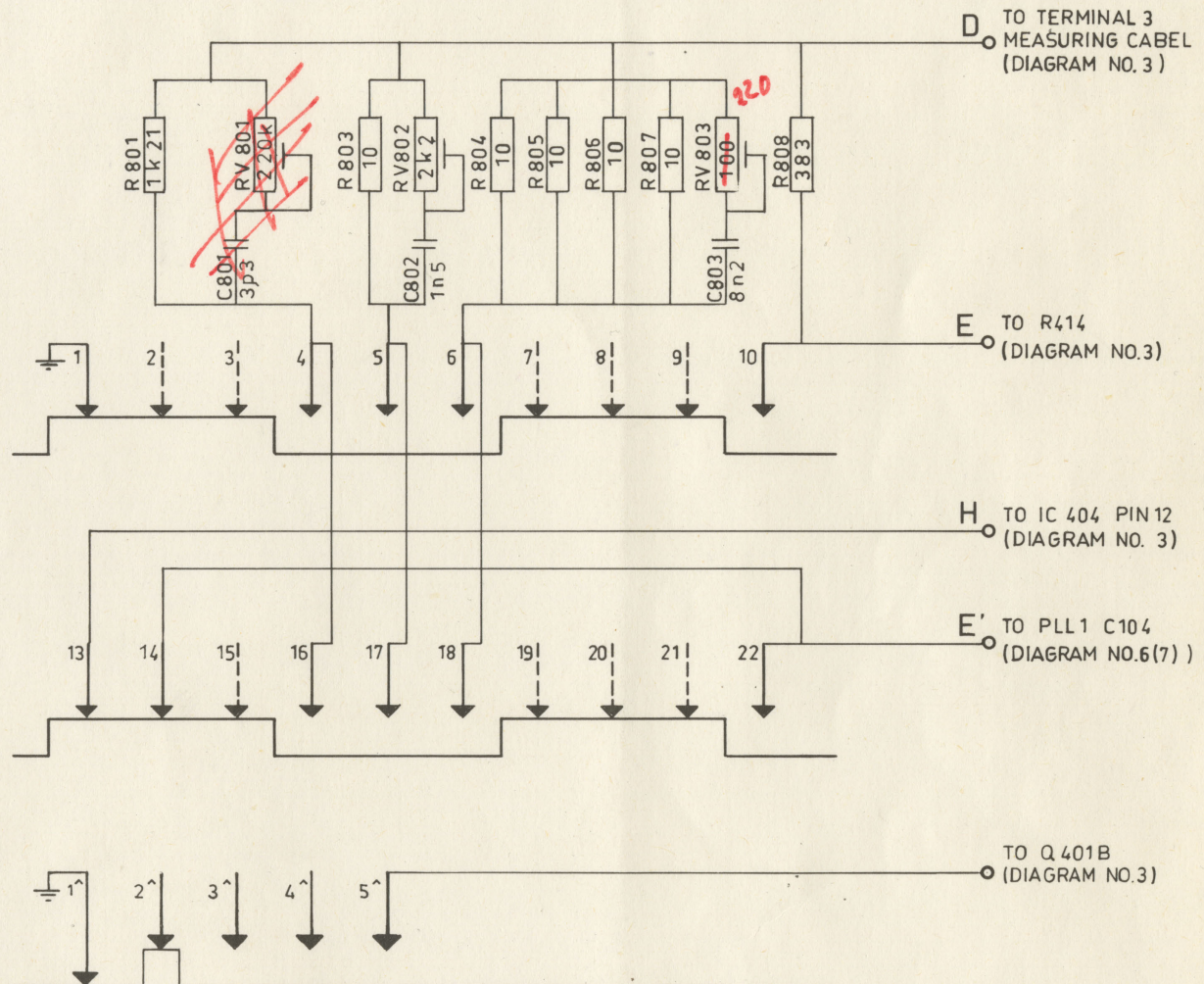


• MATCHED RESISTORS
 $\Delta R \leq 0.1\%$
 $\Delta TC \leq 5pp\ M/^{\circ}C$

FOR PLL 1 REPLACE x2xx WITH x1xx EXEPT FOR IC204 - C224 AND C226 WHICH ARE IN COMMON.

72550-6(7)	CLM 1 DIAGRAM NO.6(7)	180778 B.R.	Skj		
		291276 BR	Skj		
		RETTET	GODK.		
		TEGNET:		150676 B.Ras.	
		KONSTRUERET :		S.KOFØED OLSEN.	
		GODK.:		Skj	
A/SDANBRIDGE.	PHASE LOCK LOOP 2.(&1)				

CAP RANGE F



RANGE

100p - 1n	R_{N1}	=	R 808	=	383 Ω
1n - 30n	R_{N2}	=	R808 // R801	=	291 Ω
30n - 1 μ	R_{N3}	=	R_{N2} // R803	=	9.66 Ω
1 μ - 25 μ	R_{N4}	=	R_{N3} // R804 // R805 // R806 // R807	=	2.00 Ω

72550-4

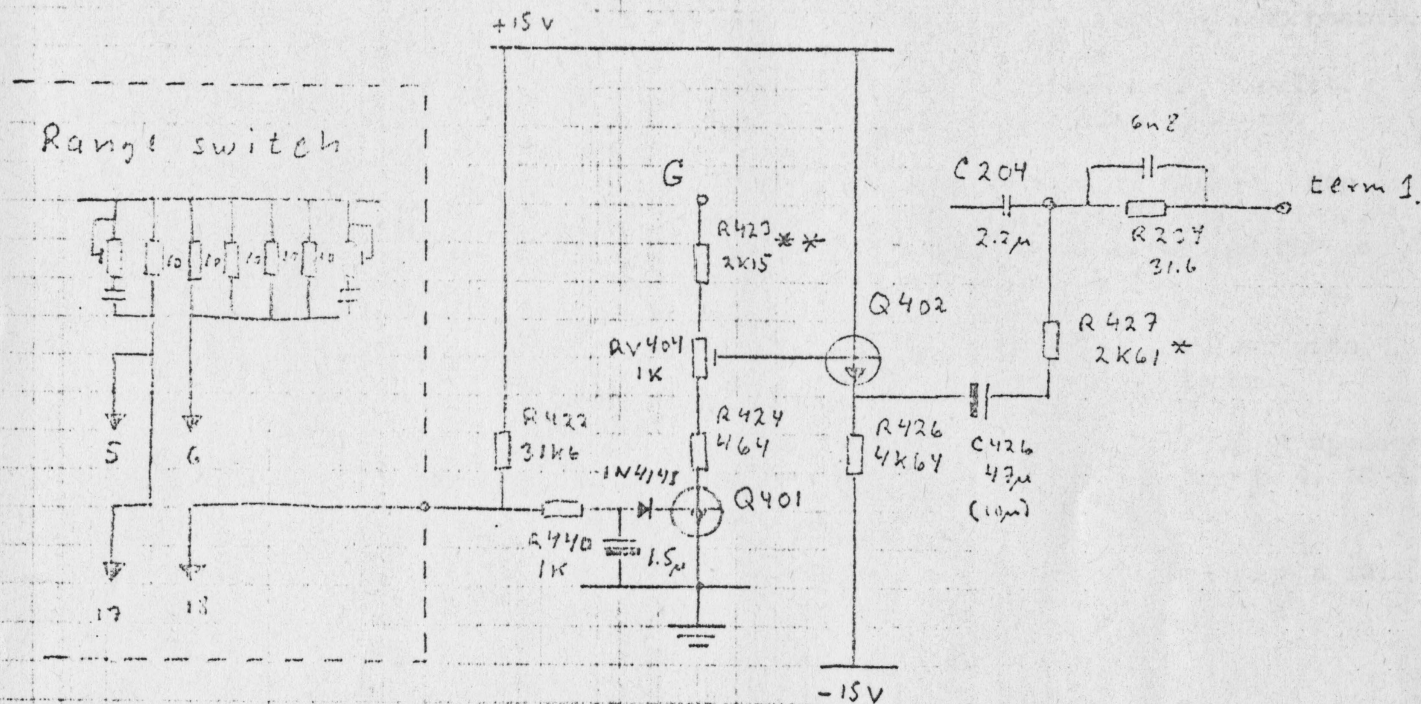
CLM1 DIAGRAM NO.4
RANGE SWITCH

A/S DANBRIDGE.

170778 BR	<i>Sh</i>		<i>K</i>
070277Br	<i>Sh</i>		
RETTET	GODK.		
TEGNET :		190376 B.Ras.	
KONSTRUERET :		S.KOFOED OLSEN.	
GODKENDT :		<i>Sh</i>	

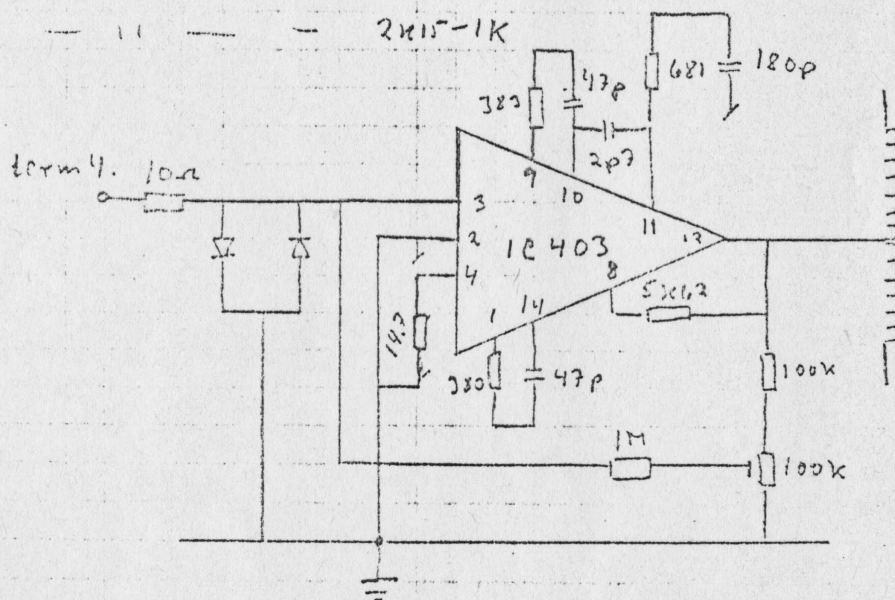
Modification af 41849-68 samt 48849-68

Med henblik på at opnå en korrekt talevisning
i 1μ - 25μ området.



Q401 og Q402 BC107B eller tilsvarende

- * — Kan variere fra 3K16 - 1K78
- * * — " — " — 2K15 - 1K



21-9-78 ghy.

1. Check the Power Supply (in the rear end of the Main PC board).
2. Check the Generator output (TP2 in the Generator circuit).
Pure sin. wave., frequency 100.00kHz, amplitude 7V rms.
3. Check that PLL2 is locked on the Generator frequency. Use a 2-channel oscilloscope: Display mode alternating, trigger source CH1. Connect CH1 to TP2 in the Generator and CH2 to TP2 (or TP3) in PLL1 and PLL2 via a 10:1 probe.

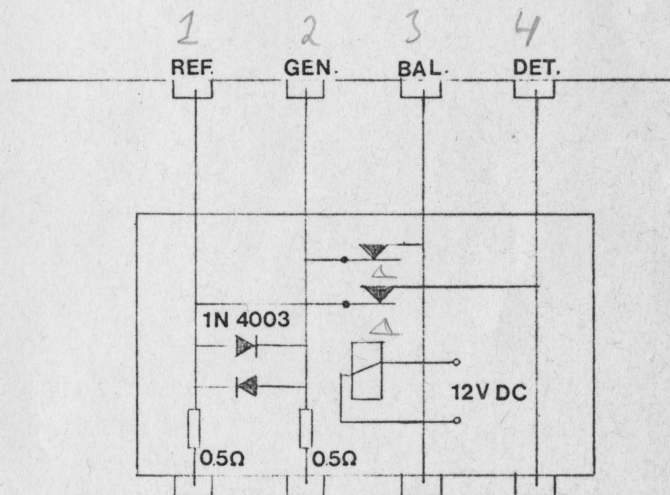
If the display shows a 3Vpp squarewave and no movement with respect to the Generator signal, the PLL's are locked.

4. Check with the oscilloscope that the PLL output signal appears on the Main Detector: 3Vpp squarewave - pin 1 and pin 4, IC 301
300mVpp squarewave pin 7 and pin 8, IC 301.
5. Check the measuring circuit with the oscilloscope (use a 10:1 probe).
 TP1: 1V rms sin.wave.
 TP2: ~4V rms sin.wave.
 TP3: $\leq 5\text{mVpp}$ sin.wave. (if $> 5\text{mV}$ check IC 403).
 TP4: $\leq 5\text{mVpp}$ sin.wave.
 TP5: 0.2V rms sin.wave.
6. Check output of the Main Detector. Connect the oscilloscope to TP2 in Main Detector circuit. If the output noise is $> 10\text{mVpp}$, check PLL2. Change the Range Switch to 30nF-1 μ F. If the output noise is $> 10\text{mVpp}$, check PLL1.

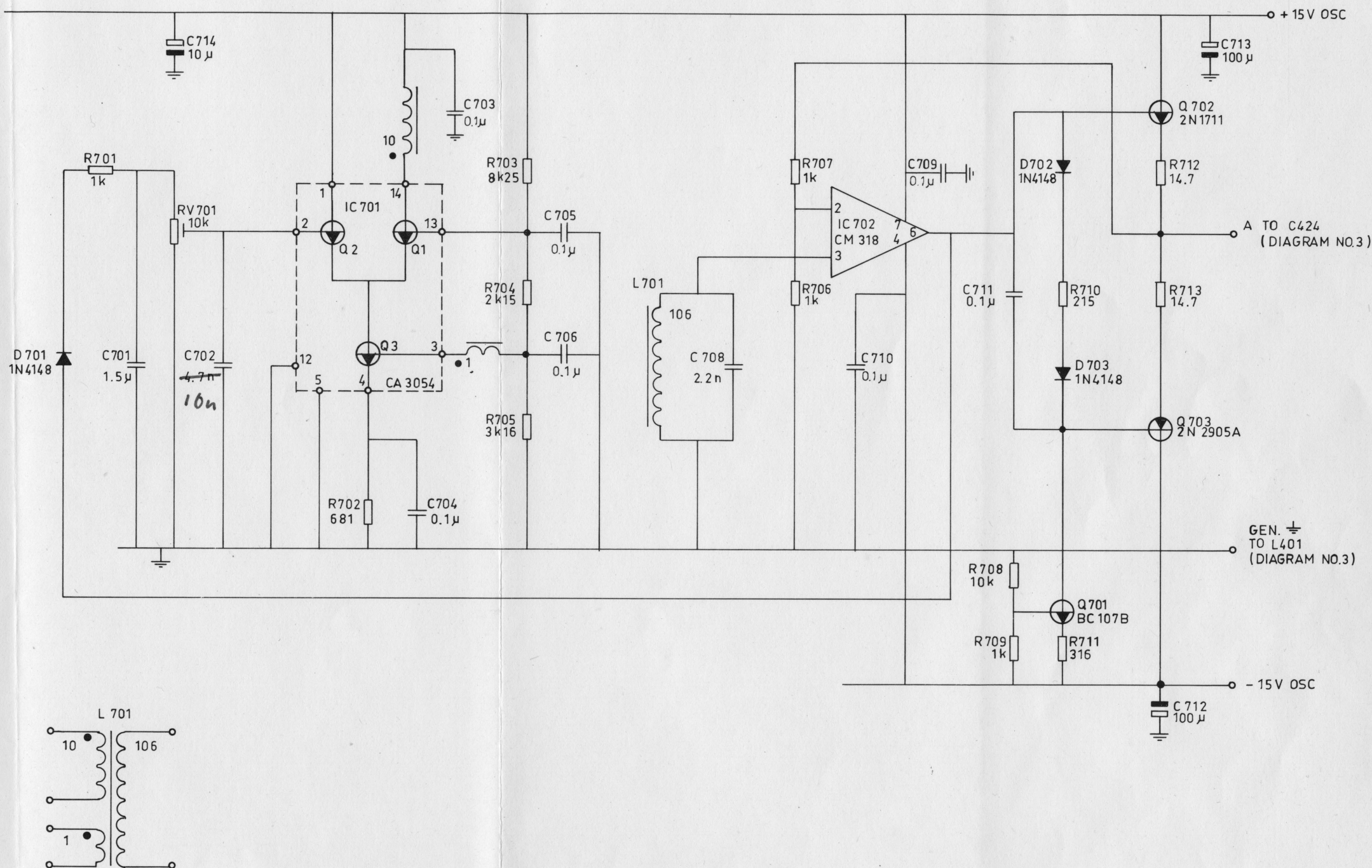
If one of the individual circuits fails, check the bias voltage and try to readjust the circuit (see Maintenance Instructions).

5. Discharge Box, type DB 1

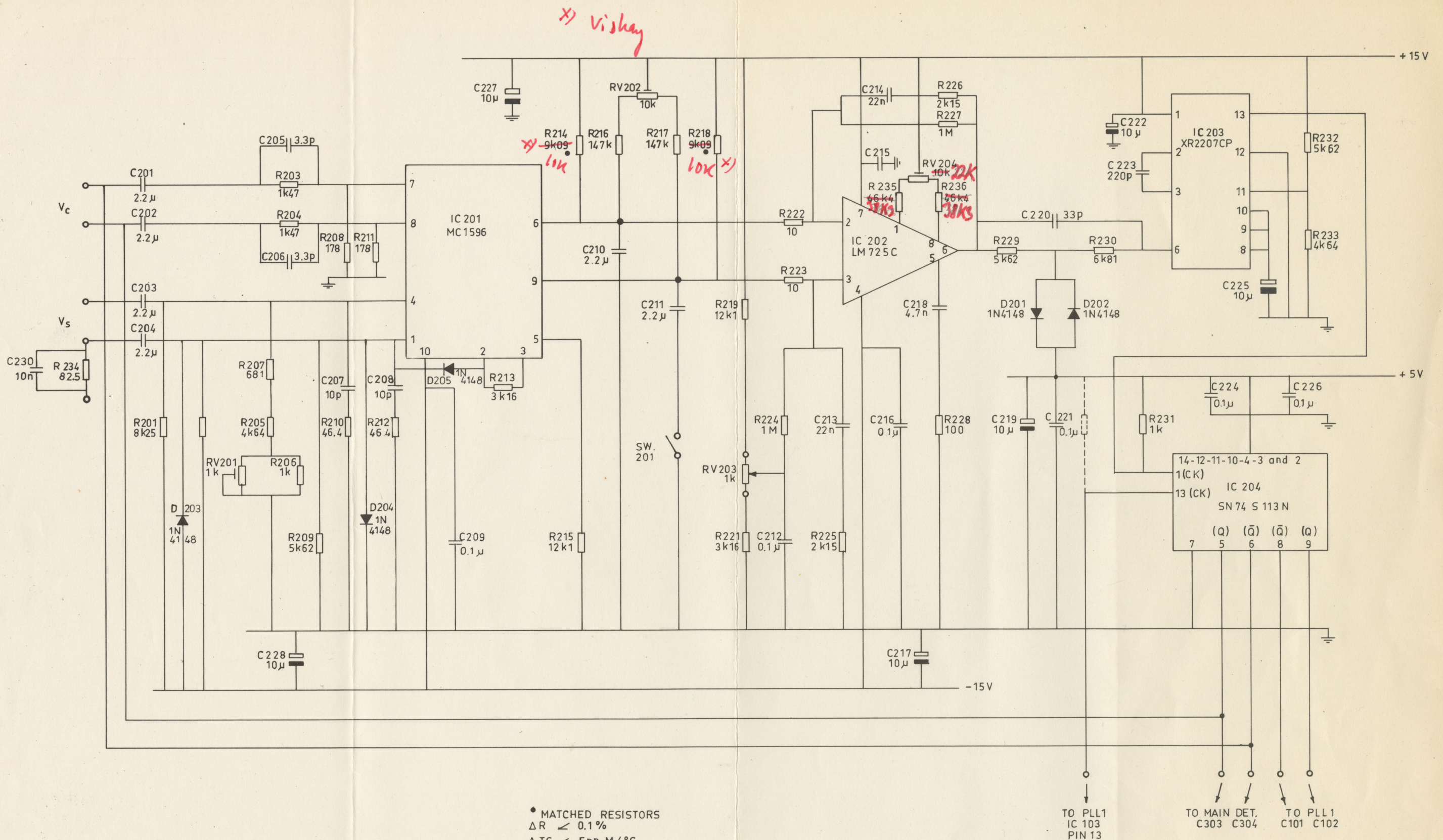
RELAY: SIEMENS 23154 DO 717 F104
(OR EQUIVALENT)



The DB 1 discharge box is intended for use with the CLM 1 in applications where capacitors with potentially damaging DC charges may reach the measuring jig.



72550 - 10	CLM 1	DIAGRAM NO.10				
			190778 BR.	SKZ		SKZ
RETTET			GODK.			
TEGNET			170676. B.Ras.			
KONSTRUERET :			S. KOFOED OLSEN .			
A/S DANBRIDGE	GENERATOR		GODK.		SKZ	



72550-6(7)	CLM 1 DIAGRAM NO.6(7)	180778 B.R.	<i>Skj</i>		<i>K</i>
		291276 BR	<i>Skj</i>		
A/SDANBRIDGE.	PHASE LOCK LOOP 2.&1)	RETTET	GODK.		
		TEGNET:		150676 B.Ras.	
		KONSTRUERET:		S.KOFOED OLSEN.	
		GODK.:		<i>Skj</i>	

Problem med fejlfinding på 38243.

Fejl: selv med 1k78 lå tabet på 22μ på 4.3%

Undersøgelse: ~~Med~~ kompensering kredsløbet virkede som det skulle.

Ingen monterings fejl at finde (kabler vurdningerne).

Ingen komponent fejl i meas. circuit (Ic m.m.)

Det virkede som om der var en fase fejl på indgangen af P112, men ved alle kontrolles (rippede på

udgangen af 725 støj på udgangen af main det med 20n skiftet mellem 1μ20n og 20n-1μ20n.

spændinger m.m.) så alt normalt ud.

Fejl: Offset justeringen på 1586 i P112 indgang

(RV201) var helt gal. (Når C211 blev fjernet

var der store beregninger på udgangen af Ic 202)

Afhjælpning: Efter at begge P11 kredsløb blev justeret nøjagtig

op viste det sig at alt var ok og 22μ

viske 2.7% tab med 1k78. Med den mere normale

2k15 var tabet 3.17% hvilket er ok.

1-3-79 Hg.

	model	38245
V_{AC}	21.5 Vpp	21.5 Vpp
V_{komp} 10 μ F	280 \sim Vpp	275 \sim Vpp
V_C	160 \sim Vpp	160 \sim Vpp
$V_{e_{in}}$ V_F	5 -11-	5 -4-
V_G	275 -11-	275 \sim Vpp
V_R	2.60 Vpp	2.60 Vpp
V_C ^{eff} for 21.6 Ω	160 \sim Vpp 90°	160 \sim Vpp 90°
V_{adj} PLL1	3.146	3.402
V_{adj} PLL2	2.832	3.018
Nom 725 PLL1	3.038	3.057
-11- PLL2	3.035	3.028
meter V_{in} 22 μ	3.00%	4.43%
low γ modstand	3K16	1K78

med droping på vinkel

til 3% for med 22 μ

for +24 +156 med
5n6 5 * 5n6

through this
Vadj PLL2 +3.205

shift of
3030 A
IC 403
hjælper ikke.

W A R N I N G

The shields on the leads 2 and 3 should be connected together on the test jig.

They are grounded at just one point in the CLM 1 and should not be grounded anywhere else. The shields on test leads 1 and 4 must be isolated as they carry guard voltages.

If a shield is used at the test jig it can be connected to the shields of test leads 2 and 3 provided it is not connected to anything else.

N O T E:

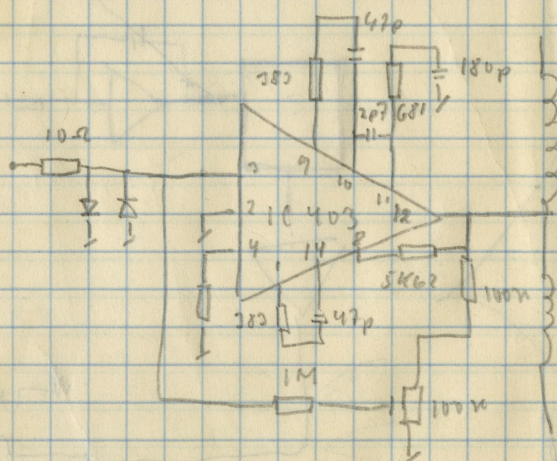
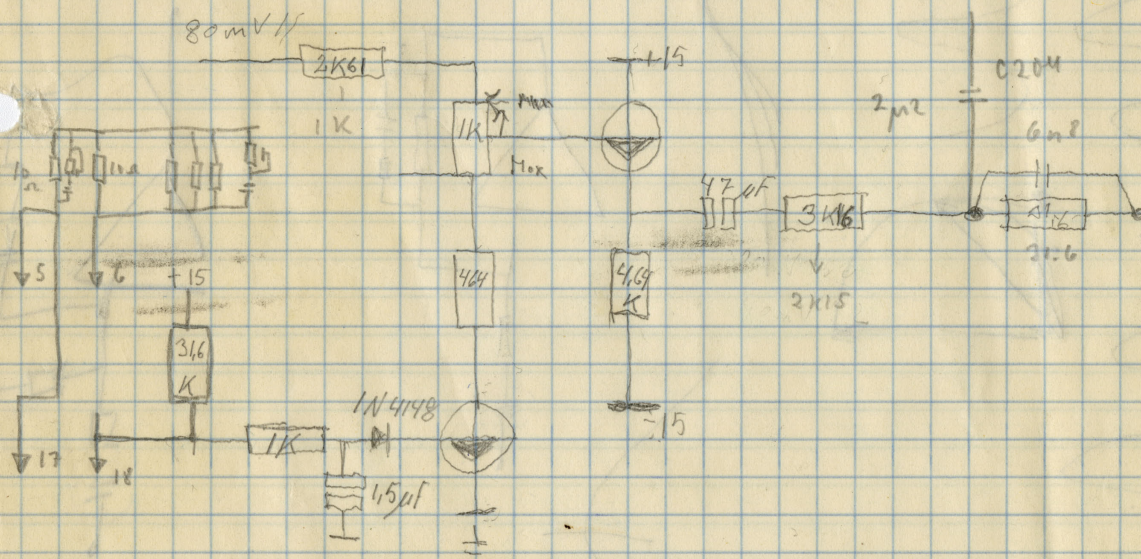
Owing to the modification of the CLM 1 to 100% full scale, the meter range selector reading's will have to be multiplied by ten, i.e. the lowest f.s. range will be 10 x 0.3%.

Modifikation af 48849 - 68

med henblik på at få korrekt laborvisning i 1st-25^{te} minuted.

31-10-77 82

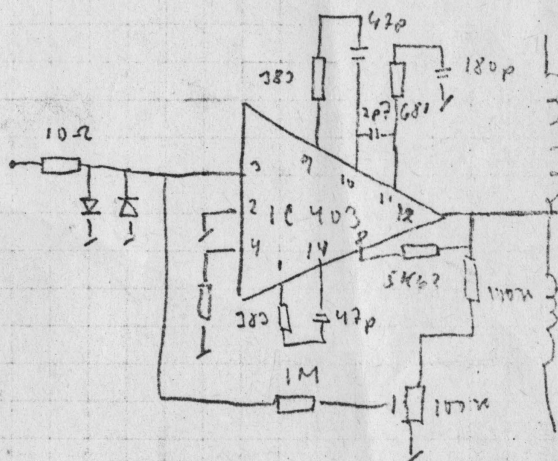
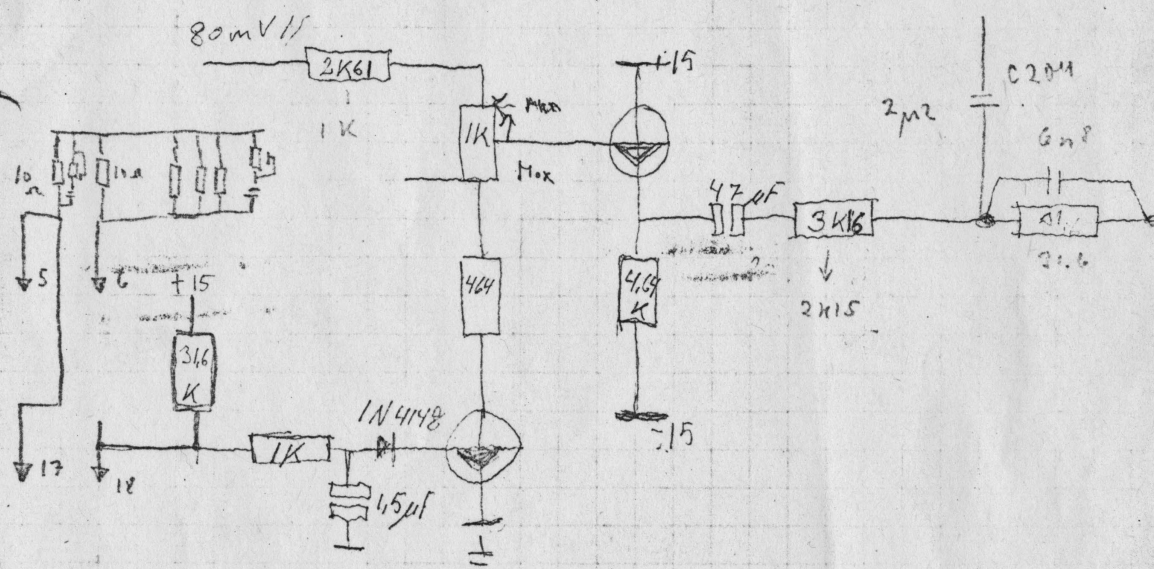
47 pF
3K15

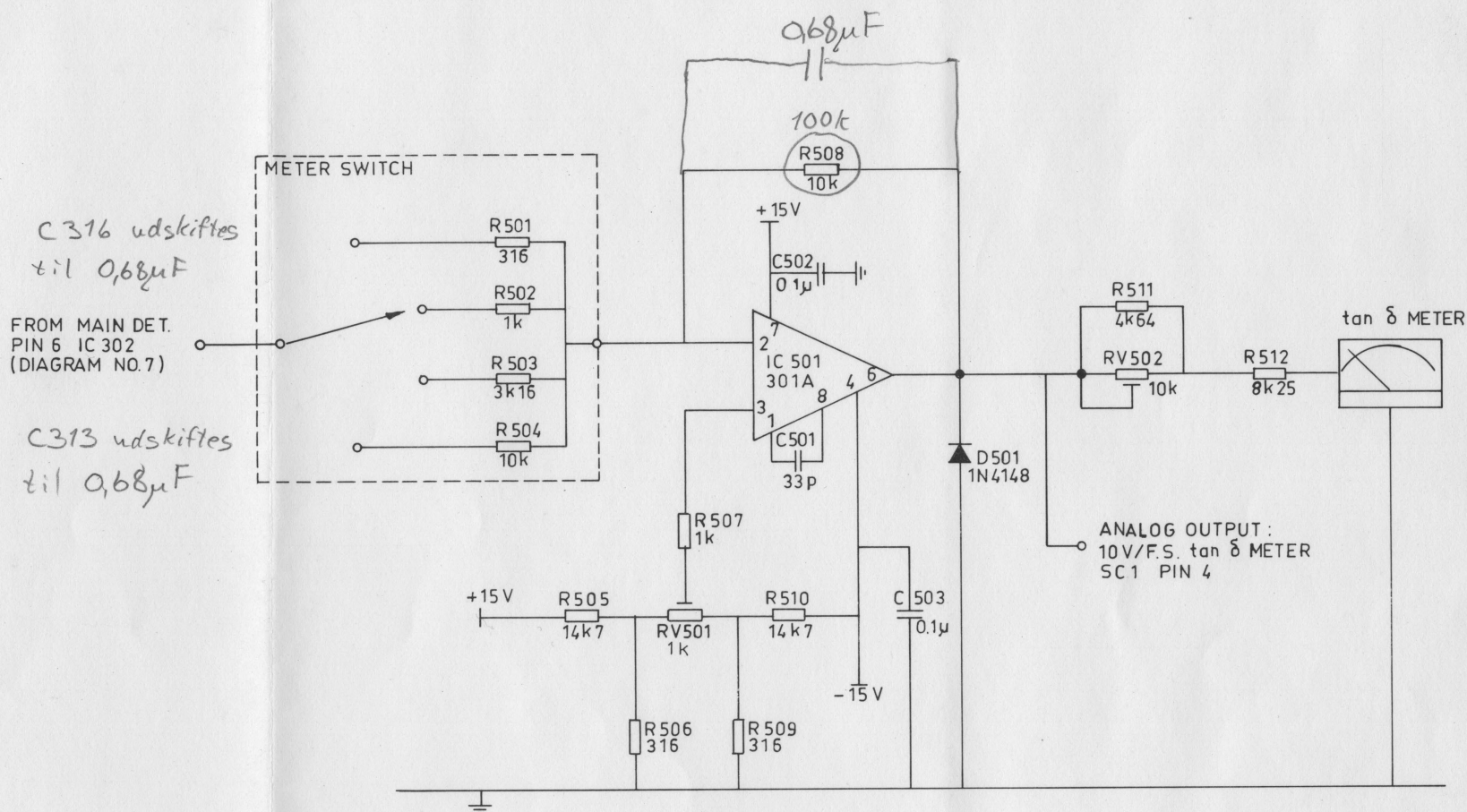


Modification of 48849 - 68

med henblik på at få korrekt belysning i $1\mu - 25\mu$ området.

31-10-77 Jky



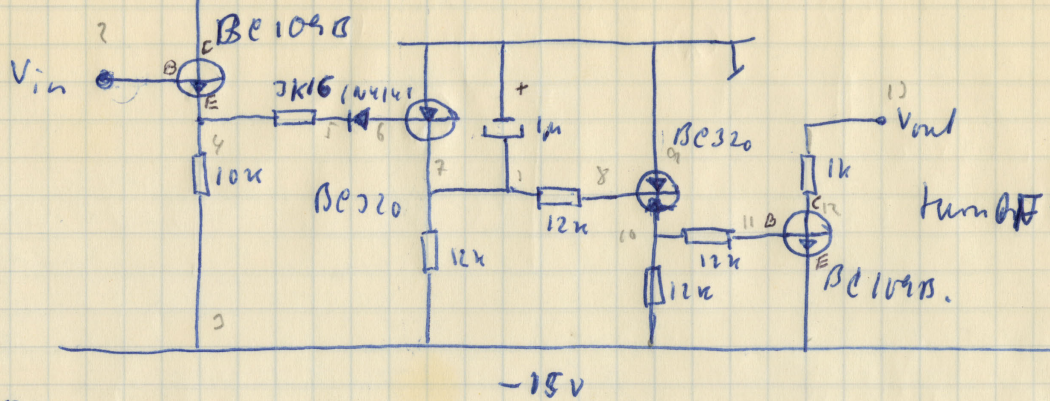


Modifikation til 0,03%

Se.no. 44968

72550-9	CLM 1	DIAGRAM NO.9			
			180778 BR. <i>Pl</i> 410		
			RETTET	GODK.	
			TEGNET		160676 B.Ras.
			KONSTRUERET:		S. KOFOED OLSEN
			GODK.:		<i>Pl</i>
A/S DANBRIDGE	METER AMPLIFIER				

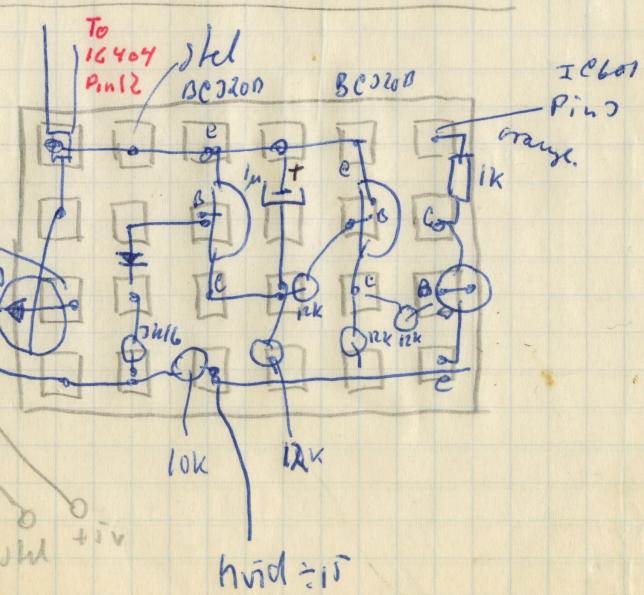
Open circuit Detector.



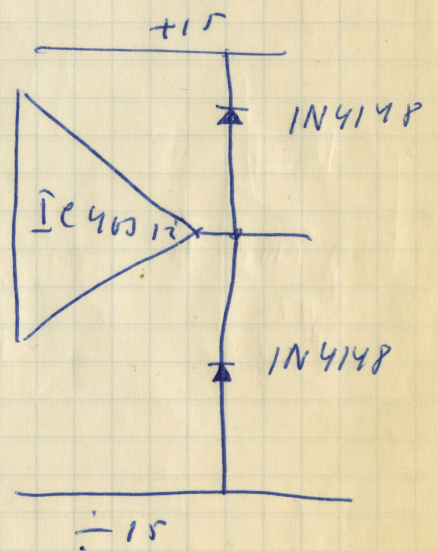
÷15V V_{dcl}
OFF C_x
need

turn OFF for $V_{in} \geq 1V_{pp}$

IC 701



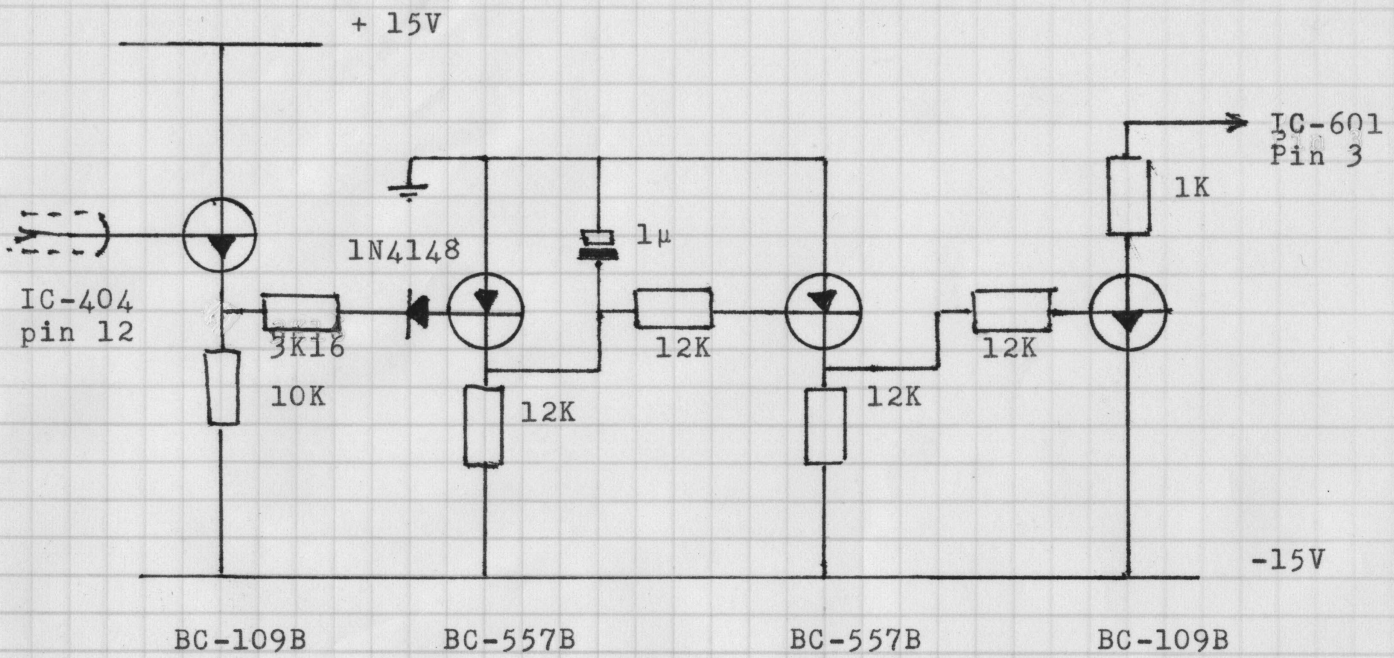
e kista beskytter af IC4012



Modification udgjort på 38242
ITI England

2-5-77

OPEN CIRCUIT DETECTOR



Af prøvnings forskrift for justering af t_g -visning
i $1\mu - 25\mu$ området:

Nødvendige t_g normaler:

C_4 : $1\mu F$, $t_g \leq 2 \times 10^{-3}$ tolerance $\pm 1 \times 10^{-4}$

C_5 : $15 - 20\mu F$, t_g ca 1-3% tolerance $\pm 5 \times 10^{-4}$

Efter at område $1nF - 30nF$, $100pF - 1nF$ og $30nF - 1\mu F$ er
justeret (som beskrevet i Instruction Manual):

1. Anbring C_4 i test jig.

Range switch i område $30n - 1\mu$.

Juster med RV 404 (1k pot sidder over Meas Circuit t_g -
skru på P.C. board) til korrekt visning

(Hvis justeringsområdet er for lille, skift R423).

2. Skift til område $1\mu F - 25\mu F$ med "Range switch"
og juster RV 803 til samme meter visning.

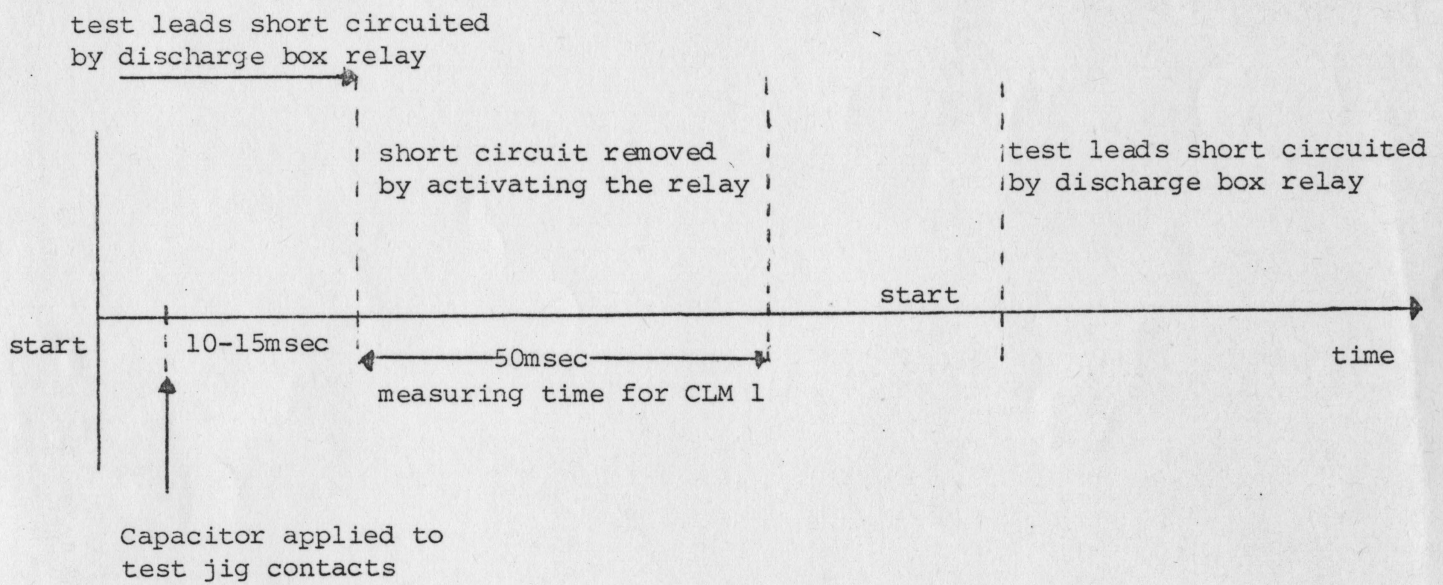
3. Anbring C_5 i test jig.

Hvis aflæsning afviger fra den korrekte værdi med mere
end den i manualen angivne tolerance, skift R427
(den sidder under printet ^{markert} i gult flex).

NB. Hvis R427 ændres skal hele Measuring Circuit justeres
op på ny se Instruction Manual samt ovennævnte
pkt 1-3! husk også de to "Adj. 0.2%" kontroller).

21-9-78 H₂

DIAGRAM FOR TIMING OF THE DISCHARGE BOX, CLM 1



5. DISCHARGE BOX, TYPE DB 1
FOR THE CAPACITANCE LOSS METER, CLM 1

The DB 1 discharge box is intended for use with the CLM 1 Capacitance Loss Meter in applications where capacitors with potentially damaging DC charges may reach the measuring jig.

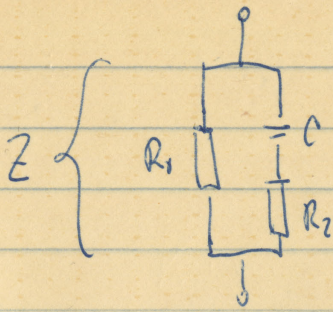
The CLM 1 is guaranteed to withstand discharge of 30 volt. It is not possible to increase this limit significantly without decreasing the sensitivity and thereby the accuracy of the instrument.

Anyway it is strongly recommended to discharge the capacitors thoroughly before applying them to the measuring jig. If total discharge cannot be guaranteed the DB 1 may be used to further decrease the probability of damage to the CLM 1.

The DB 1 is inserted between the jig and the CLM 1 and its relay breakcontacts keeps the jig shorted until the relay is activated by the user. The relay needs an external 12V supply to operate.

The relay should be inspected and/or replaced periodically if repeated high voltage discharging are experienced or suspected, owing to the possible degrading of the contacts.

The CLM 1 must be recalibrated using the procedure described in the manual when the DB 1 is applied.



$$\frac{1}{R} \times 10^3$$

$$\begin{aligned}
 & \text{Circuit diagram: } 1k \parallel 1\mu \\
 & = \frac{1000}{1 + j\omega 1000 \times 10^{-6}} \\
 & = \frac{1k}{1 + j \frac{f}{1000 \text{ Hz}}}
 \end{aligned}$$

$$Z = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2 + sC}} = \frac{1}{\frac{1}{R_1} + \frac{sC}{1 + sR_2C}} = \frac{R_1(1 + sR_2C)}{1 + sR_2C + sR_1C} = \frac{R_1(1 + sR_2C)}{1 + sC(R_1 + R_2)}$$

1.83

$$Z(\omega) = \frac{R_1(1 + j\omega R_2C)}{1 + j\omega C(R_1 + R_2)}$$

— 1k

$$R_1 = 10 \Omega$$

$$C = 1n5$$

for $R_2 = 0$ for $\frac{R_1}{1 + j\omega 1n5 \times 10} = \frac{R_1}{1 + j \frac{f}{10kHz}}$

for $R_2 = 10k$ for $\frac{R_1(1 + j\omega 10k \cdot 1n5)}{1 + j\omega 1n5 \times 10,01k} \sim R_1 \frac{(1 + j \frac{f}{10,05kHz})}{(1 + j \frac{f}{10,05kHz})}$

— 1k

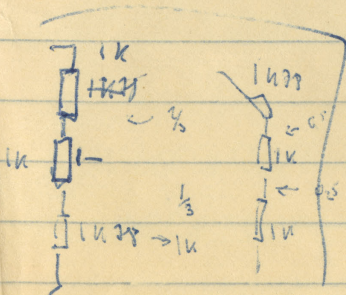
$$R_1 = 2 \Omega$$

$$C = 1p1$$

for $R_2 = 0$ for $\frac{R_1}{1 + j \frac{f}{43MHz}}$

for $R_2 = 1k$ for $\frac{R_1(1 + j\omega 1k \times 1p1)}{R_1(1 + j\omega 1k(1k + 2\Omega))} = R \frac{(1 + j \frac{f}{9kHz})}{(1 + j \frac{f}{9kHz})}$

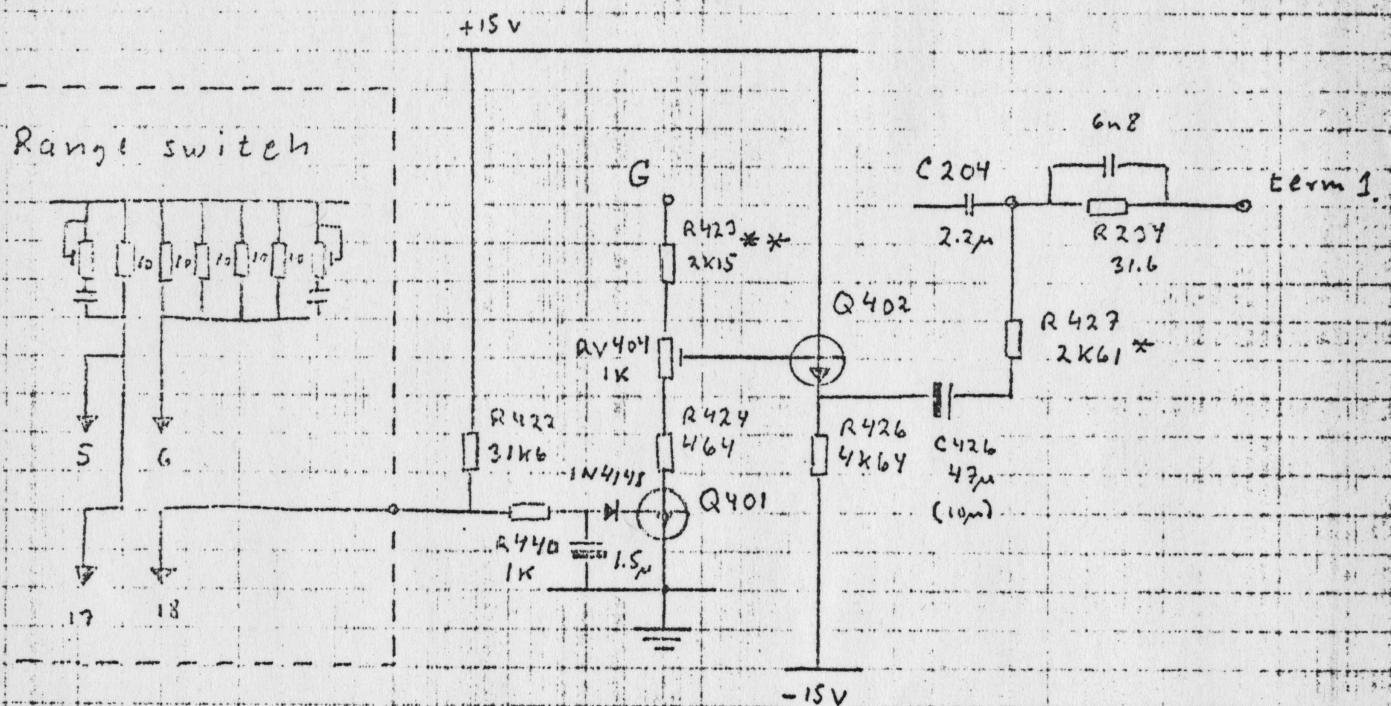
1,002



	100μ
2415	1.519
2461	

Modification af 41849-68 samt 48844-68

Med henblik på at opnå en korrekt tabsvisning
i $1\mu - 25\mu$ området.



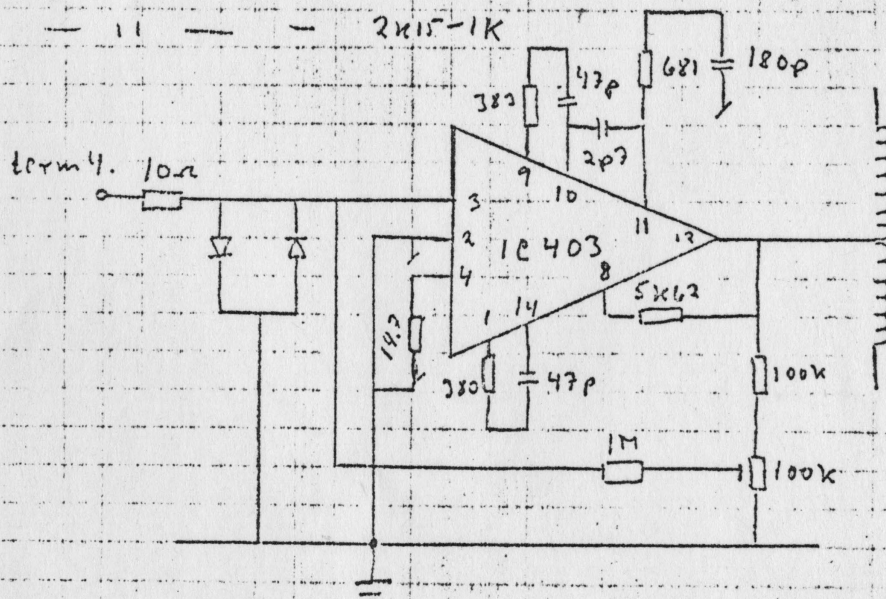
Q401 og Q402 BC107B eller tilsvarende

*

Kan variere fra 3k16 - 1K78

**

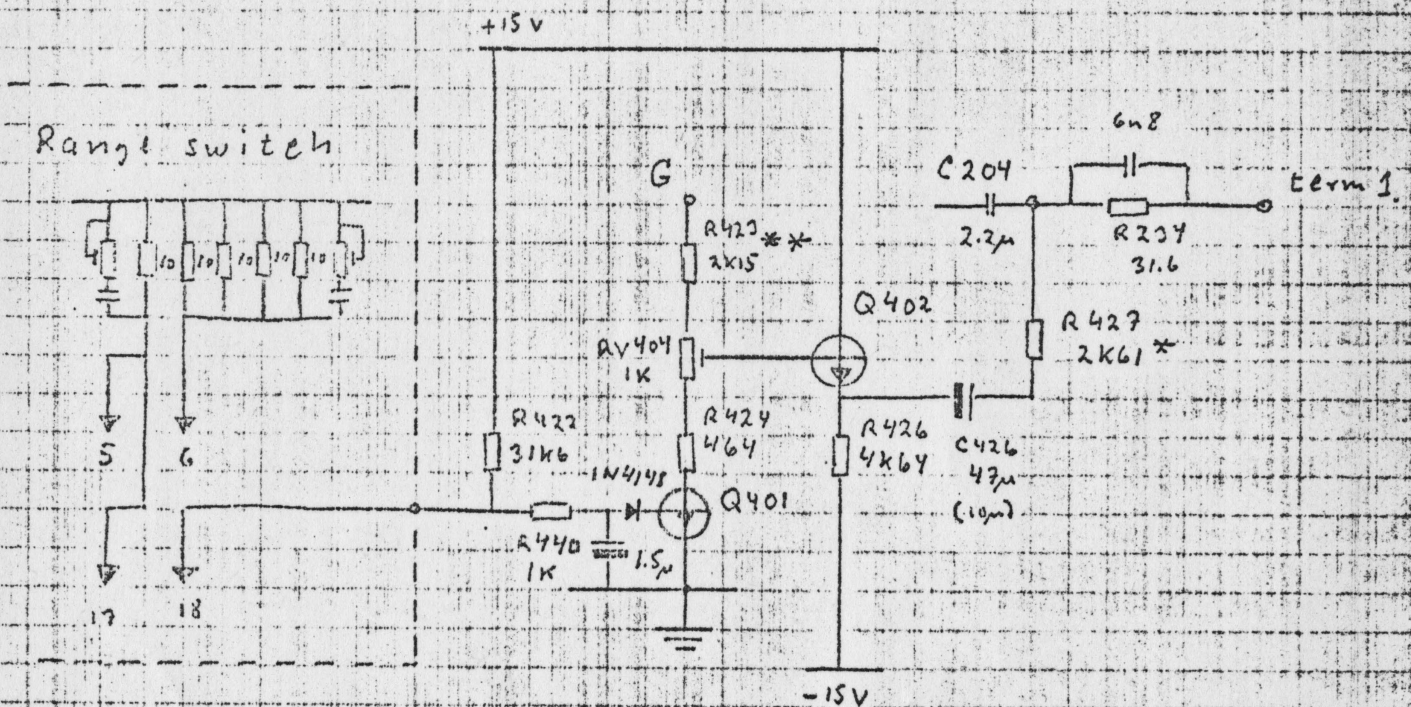
— 11 — — 2k15 - 1K



21-9-78 84.

Modification af 41849-68 samt 48844-68

Med henblik på at opnå en korrekt tabsvisning
i $1\mu - 25\mu$ området.



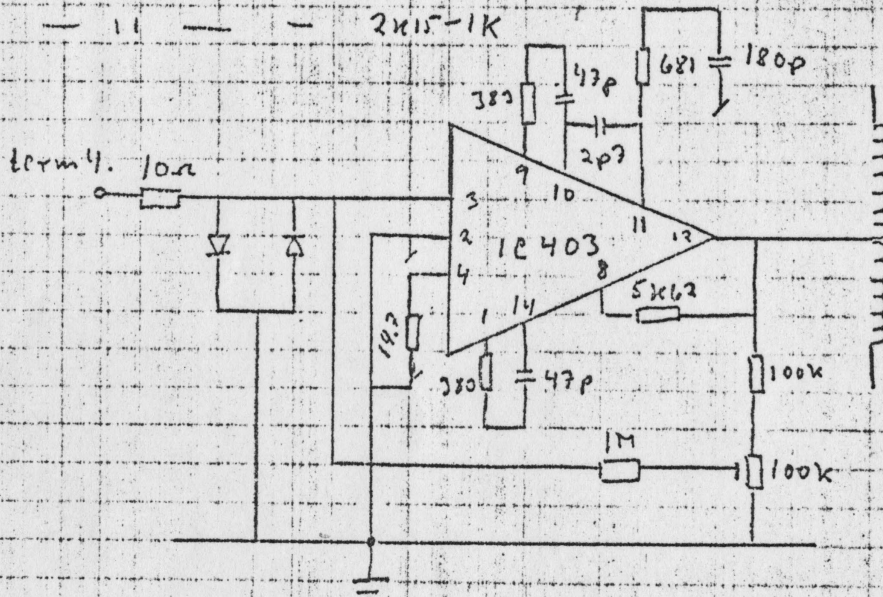
Q401 og Q402 BC107B eller tilsvarende

*

Kan variere fra 3k16 - 1K78

**

— 11 — — 2x15-1K



21-9-78 8h.

CLM 1

Afprøvnings forskrift for justering af $\text{tg}\delta$ -visning i $1\mu\text{-}25\mu$ området:

Nødvendige $\text{tg}\delta$ normaler:

C_4 : $1\mu\text{F}$, $\text{tg}\delta \leq 2 \times 10^{-3}$ tolerance $\pm 1 \times 10^{-4}$

C_5 : $15\text{-}20\mu\text{F}$, $\text{tg}\delta$ ca. 1-3% tolerance $\pm 5 \times 10^{-4}$

Efter at område $1\text{nF}\text{-}30\text{nF}$, $100\text{pF}\text{-}1\mu\text{F}$ og $30\text{nF}\text{-}1\mu\text{F}$ er justeret (som beskrevet i Instruction Manual):

1. Anbring C_4 i test jig.

Range switch i områder $30\text{n}\text{-}1\mu$

Juster med RV 404 (lk pot. sidder over Meas.Circuit teksten på P.C. Board) til korrekt visning.

(Hvis justeringsområdet er for lille, skift R423).

2. Skift til område $1\mu\text{F}\text{-}25\mu\text{F}$ med "Range Switch" og juster RV 803 til samme metervisning.

3. Anbring C_5 i test jig

Hvis aflæsning afviger fra den korrekte værdi med mere end den i manualen angivne tolerance, skift R427 (der sidder under printet monteret i gult flex).

NB! Hvis R427 ændres skal hele Measuring Circuit justeres op påny - Se Instruction Manual samt ovennævnte pkt. 1-3 (Husk også de to "ADJ. 0.2%" kontroller).

