

**VU/PPM LED Level Meter Modules**

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Diagrams	PCB No.	Diagram	Component Layout	Parts List
VU/PPM 30 LED with GRM	1.913.293.00	1.913.293.00	1.913.293.00	1.913.293.00
VU/PPM 30 LED	1.913.294.00			1.913.294.00
LED PPM Meter (10 LED)	1.913.291.00	1.913.291.00	1.913.291.00	1.913.291.00

**Scope of Validity**

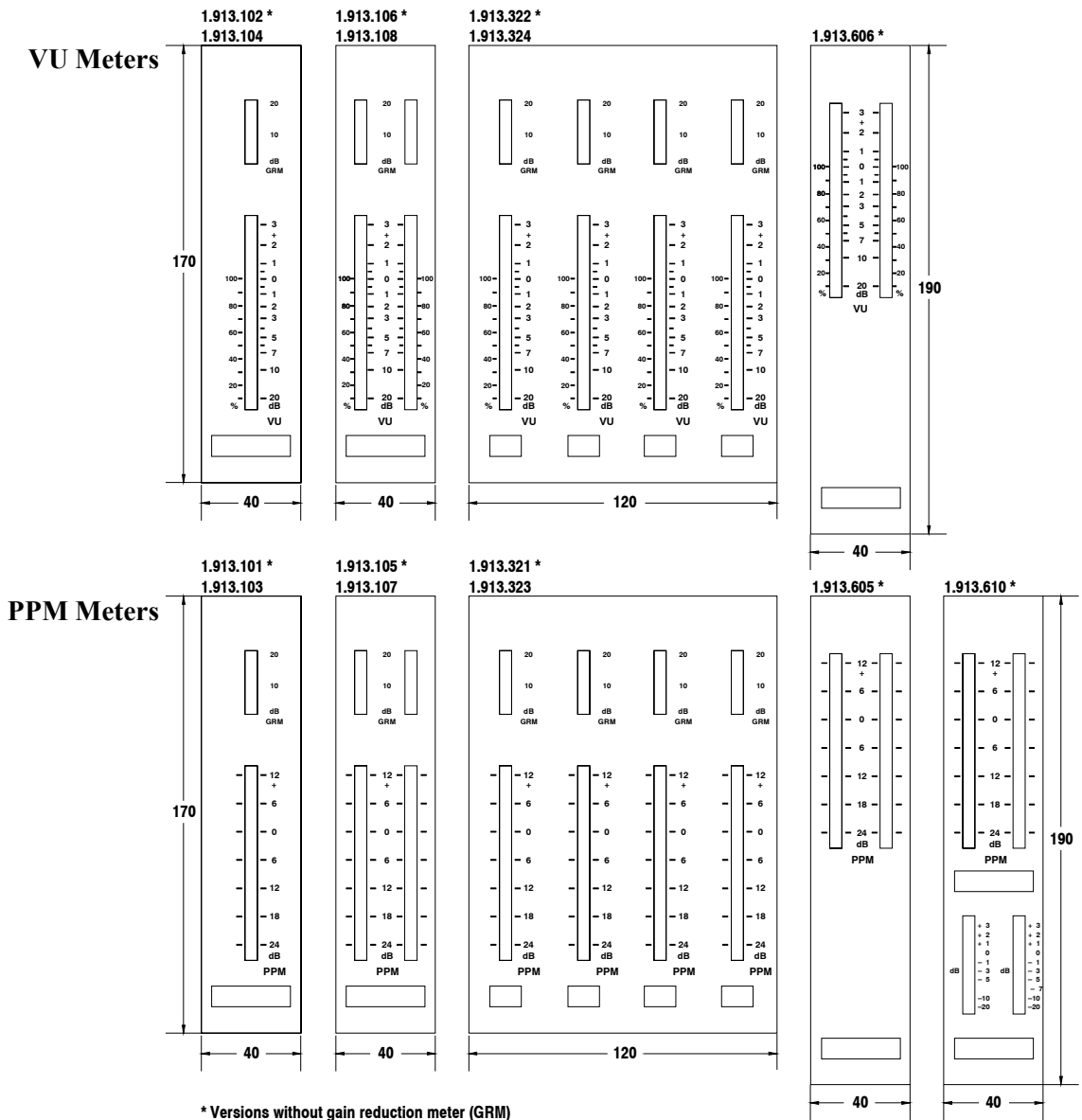
These instructions apply to the following assemblies:

Display	1 Channel, dark front panel	2 Channels, dark front panel	2 Channels, bright front panel	4 Channels, dark front panel	PCB No.
PPM	1.913.101	1.913.105	1.913.605	1.913.321	1.913.294
VU	1.913.102	1.913.106	1.913.606	1.913.322	1.913.294
PPM w. GRM	1.913.103	1.913.107	-	1.913.323	1.913.293
VU w. GRM	1.913.104	1.913.108	-	1.913.324	1.913.293
PPM w. additional small level meter	-	-	1.913.610	-	1.913.294, 1.913.291

**1 General**

The Level Meter units with 30 LEDs have been developed for installation in the display panel of Studer Mixing Consoles. Instruments with VU (volume unit) and PPM (peak program meter) characteristics, with or without gain reduction meter (GRM) are available. Instead of bar-graph indication, also dot indication is optionally available.

The instruments listed below are equipped with the PCBs 1.913.294 (VU or PPM) or 1.913.293 (VU or PPM with gain reduction meter) according to the table above. Please consult the circuit diagram relating to the corresponding assembly number.



**2 Functional Description**

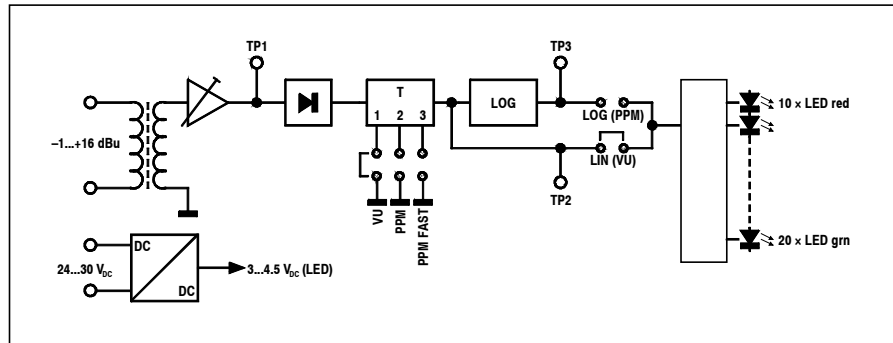
- PPM:** The peak program meter is a quasi-peak value instrument with long decay time. When a signal voltage corresponding to a level of 0 dB is applied for 10 ms, the resulting indication is -1 dB. Decay time (0 to -20 dB) is 1.7 s.
- VU Meter:** The VU meter indicates signals according to the standard defined by ANSI 1954. When a signal with a duration of 300 ms is applied, the indication is 99% of the reference value. Rise and decay times on a VU meter are identical. The factory-set lead is +6 dB.
- Gain Reduction Meter:** When the limiter/compressor is switched on, the GRM indicates the magnitude of the gain reduction.
- Small PPM:** The assembly 1.913.610 contains an additional small PPM meter with 10 LEDs, normally used for AUX level indication.
- Bar/Dot Display Selection:** On each of the PCBs, selection of bar or dot display mode is provided. All level meters are factory-set to bar display mode; dot display mode is unusual and recommended only if extra-low current consumption is required.

PCB No.	Bar Display Mode (Default Factory Setting)	Dot Display Mode
1.913.293.00 (VU/PPM 30 LED w. GRM)	insert: R3, R8, R10, R15 remove: R4, R9, R11, R14	insert: R4, R9, R11, R14 remove: R3, R8, R10, R15
1.913.294.00 (VU/PPM 30 LED)	insert: R3, R8, R10 remove: R4, R9, R11	insert: R4, R9, R11 remove: R3, R8, R10
1.913.291.00 (PPM 10 LED)	insert jumper JS201	remove jumper JS201

**3 Technical Specifications**

General:	0 dBu $\hat{=}$ 0.775 V <sub>rms</sub>			
	<b>Sensitivity for reference indication</b>	-1 dBu ... +16 dBu		
<b>Input impedance</b>	>10 k $\Omega$			
<b>Supply</b>		$\pm 15 V_{DC}$	+24 V <sub>DC</sub>	
<b>Current consumption without GRM (p. ch., bar display mode)</b>	Quiescent:	45 mA	35 mA	
	Full load:	80 mA	80 mA	
<b>Current consumption with GRM (p. ch., bar display mode)</b>	Quiescent:	55 mA	45 mA	
	Full load:	105 mA	105 mA	
<b>VU Meter (1.913.293):</b>	<b>Indication range</b>	-20 VU ... +3 VU		
	<b>Accuracy</b> (conditions: -10...+3 VU, 0...+50° C, 31.5 Hz...16 kHz)	$\pm 1$ segment		
	<b>Response time to -1 VU</b>	207 ms $\pm$ 30 ms		
<b>PPM (1.913.293):</b>	<b>Indication range</b>	-30 dBu ... +15 dBu		
	<b>Accuracy</b> (conditions: -30...+15 VU, 0...+50° C, 31.5 Hz...16 kHz)	$\pm 1$ segment		
	<b>Dynamic behavior</b>			
	Jumper "normal" 0 dB, 10 ms burst	Indication:	-1 dB $\pm$ 0.5 dB	
		Indication:	-4 dB $\pm$ 1 dB	
	Jumper "fast" 0 dB, 3 ms burst	Indication:	-1 dB	
<b>Decay time: 0...-20 dB</b>	1.7 s $\pm$ 0.3 s			
<b>GRM (1.913.294):</b>	<b>Input voltage range</b>	min. control: 0 V ... +2 V <sub>DC</sub>		
		max. control: 0 V ... +11 V <sub>DC</sub>		
<b>Dimensions:</b>	1- and 2-channel units, dark front panel (w x h x d)	40 x 170 x 97 mm		
	2-channel units, bright front panel (w x h x d)	40 x 190 x 97 mm		
	4-channel units, dark front panel (w x h x d)	120 x 170 x 97 mm		

## 4 VU/PPM Meter Block Diagram



**VU/PPM meter block diagram:** VU/PPM/PPM FAST and LIN/LOG settings are established with jumpers J2 and J3, respectively.

## 5 Alignment

**Required Instruments:** AC voltmeter,  $R_i \geq 20 \text{ k}\Omega$   
 DC voltmeter,  $R_i \geq 100 \text{ k}\Omega$   
 AF generator, 31.5 Hz ... 16 kHz, 0...16 dBu; attenuator with 10 dB increments.

**DC/DC Converter Check:** Connect DC voltmeter to TP5 (hot) and TP4 (ground). Feed generator output signal with line level (-1...+16 dBu) to the input (pins 5 and 7 of P1, or TP8 and TP9); all green LEDs are on.  
 DC voltmeter reading should be:  
 $3.1 \pm 0.1 \text{ V}_{\text{DC}}$  (supply: +24  $\text{V}_{\text{DC}}$ ),  
 $4.1 \pm 0.1 \text{ V}_{\text{DC}}$  (supply: +30  $\text{V}_{\text{DC}}$ ).

**Input Range:** Feed generator output signal with line level (1 kHz, -1...+16 dBu) to the input (pins 5 and 7 of P1, or TP8 and TP9).  
 Connect AC voltmeter to test points TP1 (hot) and TP4 (ground). Reading must be adjustable with RA3 to  $290 \pm 10 \text{ mV}_{\text{AC}}$  for the complete input level range.

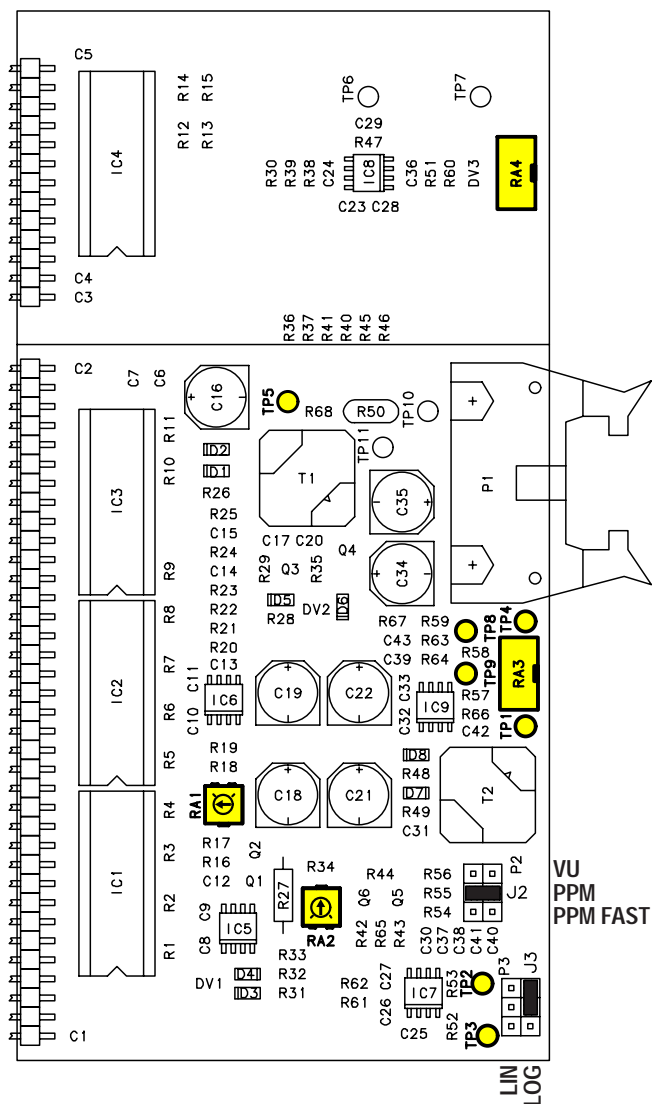
**Line Level:** Feed generator output signal with your line level (1 kHz, range: -1...+16 dBu) to the input (pins 5 and 7 of P1, or TP8 and TP9).  
 Adjust RA3 until all green LEDs are on. The red LEDs must be dark.  
 (TP3:  $2.5 \pm 0.1 \text{ V}_{\text{DC}}$ ).

**Rectifier and Indication:** Set J2 to VU, J3 to LIN.  
 Feed generator output signal with your line level (1 kHz, usually 0 dBu) to the input (pins 5 and 7 of P1, or TP8 and TP9).  
 Connect AC voltmeter to test points TP1 (hot) and TP4 (ground). Adjust with RA3 to  $290 \pm 10 \text{ mV}_{\text{AC}}$ . All green LEDs must be on.  
 Connect DC voltmeter to test points TP2 (hot) and TP4 (ground); the meter should read  $-380 \pm 15 \text{ mV}_{\text{DC}}$ .  
 Connect DC voltmeter to test points TP3 (hot) and TP4 (ground); the meter should read  $+2.575 \pm 0.100 \text{ V}_{\text{DC}}$ . All green LEDs must be on.  
*Check:* Set generator output for a DC voltmeter reading of  $3.8 \pm 0.1 \text{ V}_{\text{DC}}$ . All LEDs must be on. Set generator output for a DC voltmeter reading of  $170 \pm 20 \text{ mV}_{\text{DC}}$ . Only the lowest LED must be on.

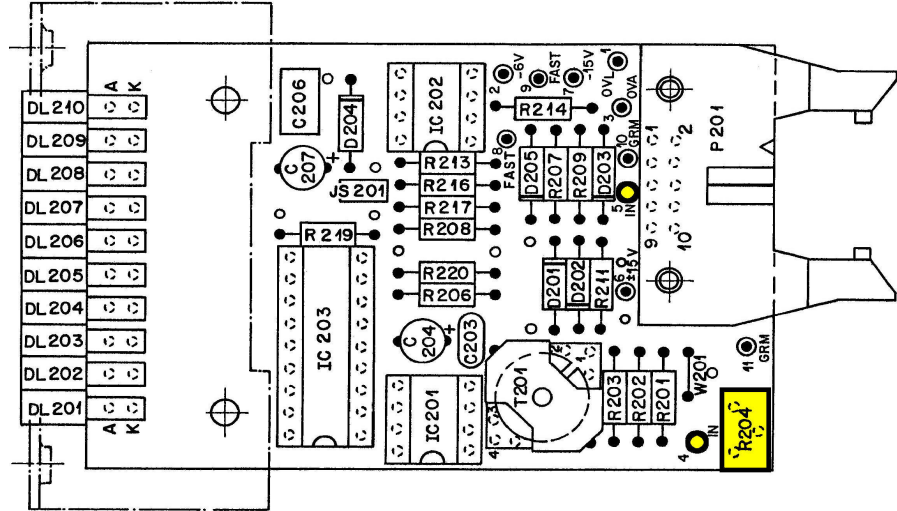
**Log Converter (PPM only):** Set J2 to PPM, J3 to LOG.  
 Feed generator output signal (1 kHz, +6 dBu) to the input (pins 5 and 7 of P1, or TP8 and TP9).  
 Connect DC voltmeter to test points TP2 (hot) and TP4 (ground). Adjust with RA3 to  $1.18 \pm 0.05 V_{DC}$ .  
 RA1 and RA2: Basic setting according to the arrows in the diagram below.  
 Procedure:

1. Upper value setting: Adjust with RA2 to  $3.06 \pm 0.10 V_{DC}$ . All green LEDs and four red LEDs must be on (+6 dB indication).
2. Set generator output to  $-24$  dBu (i.e., attenuate the +6 dBu setting from above by 30 dB).
3. Lower value setting: Adjust with RA1 to  $560 \pm 20 mV_{DC}$ . Only the four lowest green LEDs must be on ( $-24$  dB indication).
4. These two settings are interdependent, therefore repeat steps 1...3 several times.

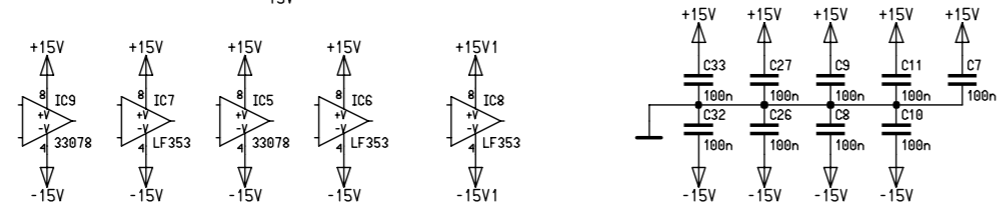
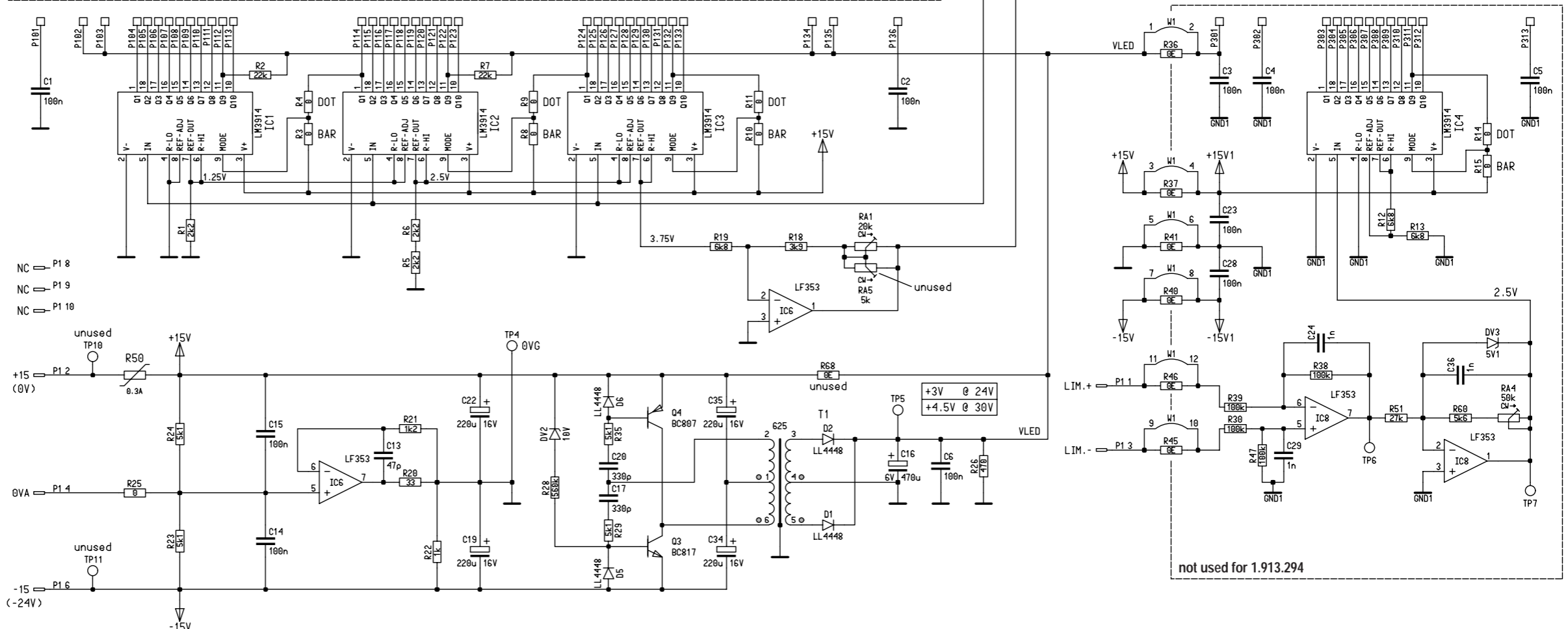
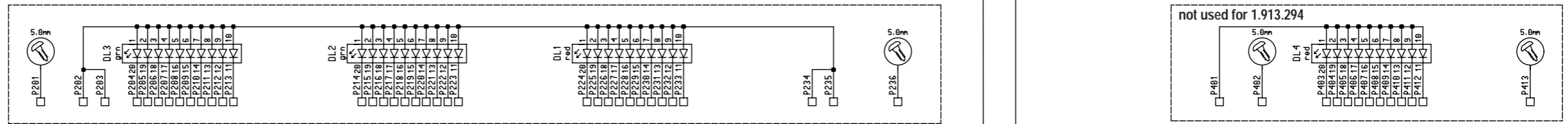
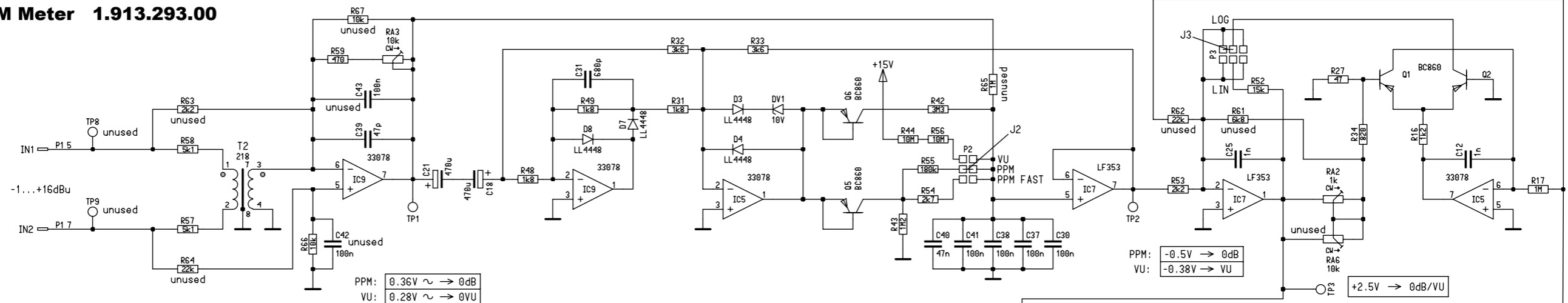
**GRM (if included):** Connect the Meter Unit to the console.  
 Feed a test signal via an input channel. Set the level on the master output to nominal level +20 dB.  
 Switch the limiter on.  
 Align with RA4 to a GRM indication of 20 dB.



**Line Level for 1.913.291:** Feed generator output signal with your line level (1 kHz, range: +6...+15 dBu) to the input (pins 5 and 7 of P201, or TP5 and TP4). Adjust R204 until all green LEDs are on. The red LEDs must be dark.

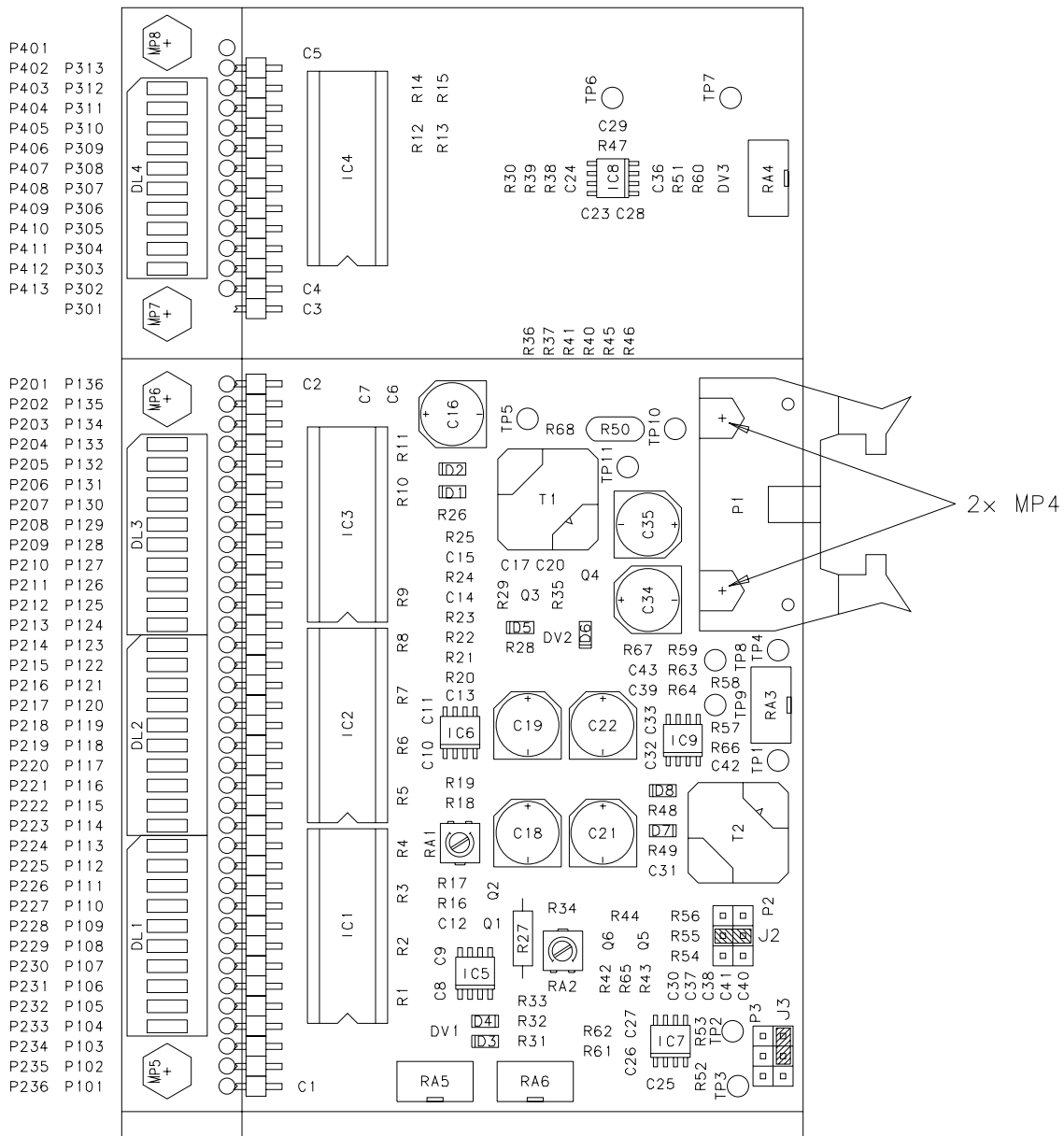
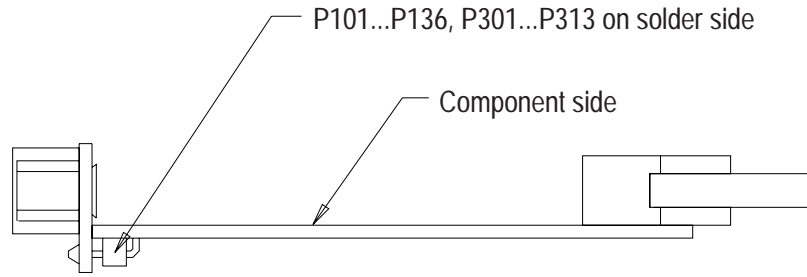


VU/PPM/GRM Meter 1.913.293.00



Erstellt	29.10.2001	ZT	29.01.2002	ZT					
STUDER									
VU/PPM/GRM METER					SC 1.913.293.00				
PAGE 1 OF 1									

**VU/PPM/GRM Meter 1.913.293.00**



Accompanying documents: Zugehörige Unterlagen: PL	General tolerance: Freimasstoleranz:	Scale: Masstab: 1:1	Edition Ausgabe 29.10.2001	ZT	ML	HW	⊙
Substitute for: Ersatz fuer:			Date Datum	Visa Gez.	Checked Gepr.	Seen Ges.	Index
<b>STUDER</b> REGENSDORF	Description: Benennung: VU/PPM/GRM METER , ESE	Z	Page: Seite: 1 / 1	Number: Number: 1.913.293.00			



VU/PPM/GRM METER 1.913.293.00 ( 1)

Table with 2 columns. Left column: Idx. Pos., Part No., Qty., Type/Val., Description. Right column: Idx. Pos., Part No., Qty., Type/Val., Description. Lists various electronic components and their specifications.

**VU/PPM/GRM METER 1.913.293.00 ( 1)**

Idx. Pos.	Part No.	Qty.	Type/Val.	Description	Idx. Pos.	Part No.	Qty.	Type/Val.	Description
0	R 42	57.60.1335	1 pce	3M3	MF, 1%, 0204, E24				
0	R 43	57.60.1125	1 pce	1M2	MF, 1%, 0204, E24				
0	R 44	57.60.1106	1 pce	10M	MF, 1%, 0204, E24				
0	R 45	57.60.1000	1 pce	0R0	MF, 0204				
0	R 46	57.60.1000	1 pce	0R0	MF, 0204				
0	R 47	57.60.1104	1 pce	100k	MF, 1%, 0204, E24				
0	R 48	57.60.1182	1 pce	1k8	MF, 1%, 0204, E24				
0	R 49	57.60.1182	1 pce	1k8	MF, 1%, 0204, E24				
0	R 50	57.92.7012	1 pce	0.3A	PTC 60V				
0	R 51	57.60.1273	1 pce	27k	MF, 1%, 0204, E24				
0	R 52	57.60.1153	1 pce	15k	MF, 1%, 0204, E24				
0	R 53	57.60.1222	1 pce	2k2	MF, 1%, 0204, E24				
0	R 54	57.60.1272	1 pce	2k7	MF, 1%, 0204, E24				
0	R 55	57.60.1184	1 pce	180k	MF, 1%, 0204, E24				
0	R 56	57.60.1106	1 pce	10M	MF, 1%, 0204, E24				
0	R 57	57.60.1512	1 pce	5k1	MF, 1%, 0204, E24				
0	R 58	57.60.1512	1 pce	5k1	MF, 1%, 0204, E24				
0	R 59	57.60.1471	1 pce	470R	MF, 1%, 0204, E24				
0	R 60	57.60.1562	1 pce	5k6	MF, 1%, 0204, E24				
0	R 66	57.60.1103	1 pce	10k	MF, 1%, 0204, E24				
0	RA 1	58.60.0121	1 pce	20k	SMD 20%, 0.25W, Cermet				
0	RA 2	58.60.0113	1 pce	1k0	SMD 20%, 0.25W, Cermet				
0	RA 3	58.01.9103	1 pce	10k	Cermet, 10%, 0.5W, vertical				
0	RA 4	58.01.9503	1 pce	50k	Cermet, 10%, 0.5W, vertical				
0	T 1	1.022.625.00	1 pce		SCHALTTRAFO 3:1				
0	T 2	1.022.218.00	1 pce		EINGANGSTRAFO 1 : 1				
0	TP 1	54.02.0471	1 pce		Stift d 1.5 * 5.5 löf				
0	TP 2	54.02.0471	1 pce		Stift d 1.5 * 5.5 löf				
0	TP 3	54.02.0471	1 pce		Stift d 1.5 * 5.5 löf				
0	TP 4	54.02.0471	1 pce		Stift d 1.5 * 5.5 löf				
0	TP 5	54.02.0471	1 pce		Stift d 1.5 * 5.5 löf				
0	TP 6	not used	1 pce		Stift d 1.5 * 5.5 löf				
0	TP 7	not used	1 pce		Stift d 1.5 * 5.5 löf				

End of List

(01) Offset-voltage of IC 9 LF 353 too large  
->replaced by MC 33078

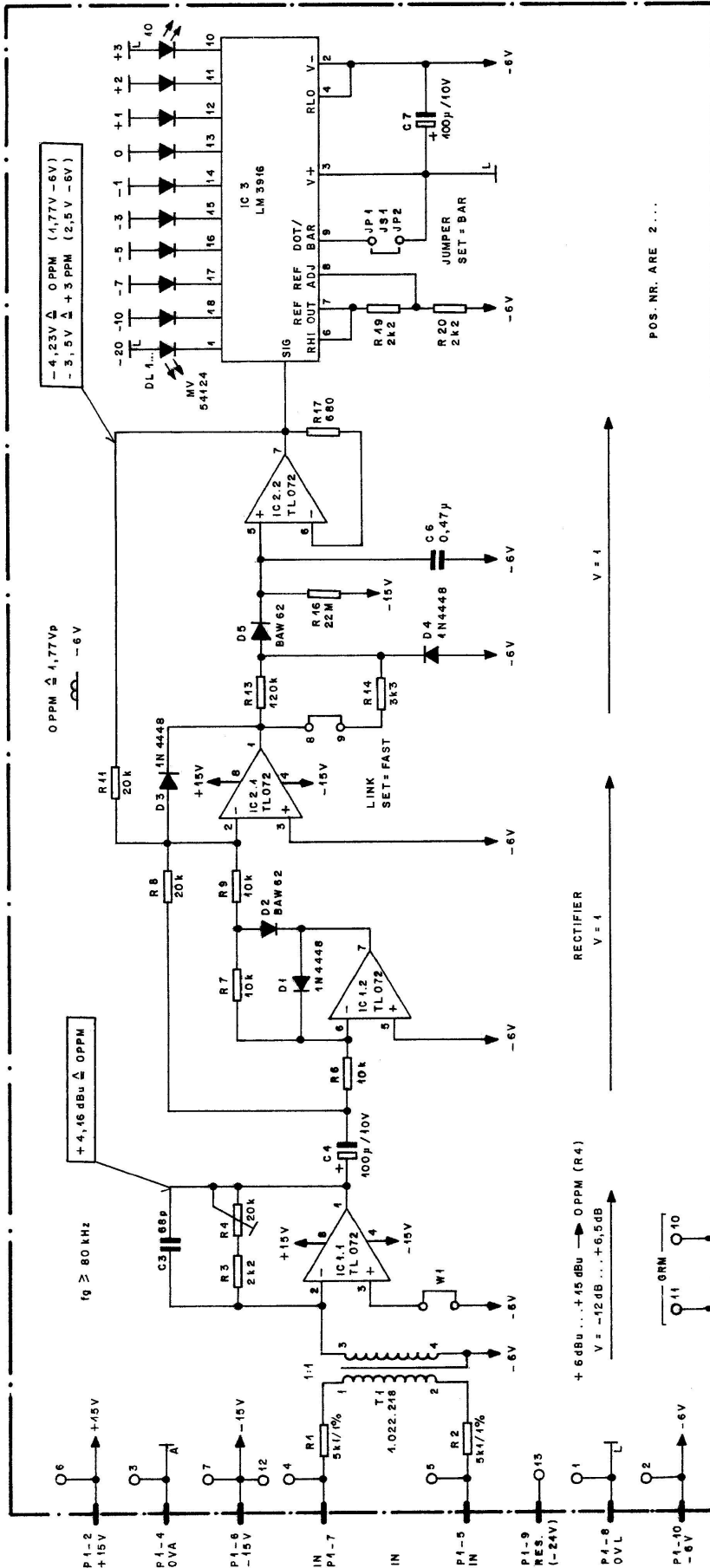
VU/PPM METER mod 1.913.294.00 ( 1)

Idx. Pos.	Part No.	Qty.	Type/Val.	Description	Idx. Pos.	Part No.	Qty.	Type/Val.	Description
0 C 1	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 P 123	54.11.0125	1 pce	1p	Pin, 1reihig, winkel
0 C 2	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 P 124	54.11.0125	1 pce	1p	Pin, 1reihig, winkel
0 C 6	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 P 125	54.11.0125	1 pce	1p	Pin, 1reihig, winkel
0 C 7	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 P 126	54.11.0125	1 pce	1p	Pin, 1reihig, winkel
0 C 8	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 P 127	54.11.0125	1 pce	1p	Pin, 1reihig, winkel
0 C 9	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 P 128	54.11.0125	1 pce	1p	Pin, 1reihig, winkel
0 C 10	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 P 129	54.11.0125	1 pce	1p	Pin, 1reihig, winkel
0 C 11	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 P 130	54.11.0125	1 pce	1p	Pin, 1reihig, winkel
0 C 12	59.60.2373	1 pce	1n0	CER 50V, 5%, COG, 0805	0 P 131	54.11.0125	1 pce	1p	Pin, 1reihig, winkel
0 C 13	59.60.2241	1 pce	47p	CER 50V, 5%, COG, 0603	0 P 132	54.11.0125	1 pce	1p	Pin, 1reihig, winkel
0 C 14	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 P 133	54.11.0125	1 pce	1p	Pin, 1reihig, winkel
0 C 15	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 P 134	54.11.0125	1 pce	1p	Pin, 1reihig, winkel
0 C 16	59.68.0033	1 pce	470u	EL 6V, 8.0*10.7	0 P 135	54.11.0125	1 pce	1p	Pin, 1reihig, winkel
0 C 17	59.60.2361	1 pce	330p	CER 50V, 5%, COG, 0805	0 P 136	54.11.0125	1 pce	1p	Pin, 1reihig, winkel
0 C 18	59.68.0033	1 pce	470u	EL 6V, 8.0*10.7	0 Q 1	50.60.1002	1 pce	BC860C	PNP 45V 100mA SOT 23
0 C 19	59.68.0073	1 pce	220u	EL 16V, 8.0*10.7	0 Q 2	50.60.1002	1 pce	BC860C	PNP 45V 100mA SOT 23
0 C 20	59.60.2361	1 pce	330p	CER 50V, 5%, COG, 0805	0 Q 3	50.60.0050	1 pce	BC817-25	NPN 45V 800mA SOT 23
0 C 21	59.68.0033	1 pce	470u	EL 6V, 8.0*10.7	0 Q 4	50.60.1050	1 pce	BC807-25	PNP 45V 800mA SOT 23
0 C 22	59.68.0073	1 pce	220u	EL 16V, 8.0*10.7	0 Q 5	50.60.1002	1 pce	BC860C	PNP 45V 100mA SOT 23
0 C 25	59.60.2373	1 pce	1n0	CER 50V, 5%, COG, 0805	0 Q 6	50.60.1002	1 pce	BC860C	PNP 45V 100mA SOT 23
0 C 26	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 R 1	57.60.1222	1 pce	2k2	MF, 1%, 0204, E24
0 C 27	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 R 2	57.60.1223	1 pce	22k	MF, 1%, 0204, E24
0 C 30	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 R 3	57.60.1000	1 pce	0R0	MF, 0204
0 C 31	59.60.2369	1 pce	680p	CER 50V, 5%, COG, 0805	0 R 4	not used	1 pce	0R0	MF, 0204
0 C 32	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 R 5	57.60.1222	1 pce	2k2	MF, 1%, 0204, E24
0 C 33	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 R 6	57.60.1222	1 pce	2k2	MF, 1%, 0204, E24
0 C 34	59.68.0073	1 pce	220u	EL 16V, 8.0*10.7	0 R 7	57.60.1223	1 pce	22k	MF, 1%, 0204, E24
0 C 35	59.68.0073	1 pce	220u	EL 16V, 8.0*10.7	0 R 8	57.60.1000	1 pce	0R0	MF, 0204
0 C 37	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 R 9	not used	1 pce	0R0	MF, 0204
0 C 38	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 R 10	57.60.1000	1 pce	0R0	MF, 0204
0 C 39	59.60.2241	1 pce	47p	CER 50V, 5%, COG, 0603	0 R 11	not used	1 pce	0R0	MF, 0204
0 C 40	59.60.3333	1 pce	47n	CER 50V, 10%, X7R, 0805	0 R 16	57.60.1122	1 pce	1k2	MF, 1%, 0204, E24
0 C 41	59.60.3337	1 pce	100n	CER 50V, 10%, X7R, 0805	0 R 17	57.60.1105	1 pce	1M	MF, 1%, 0204, E24
0 D 1	50.60.8001	1 pce	4448	200mA 75V 4ns SOD 80	0 R 18	57.60.1392	1 pce	3k9	MF, 1%, 0204, E24
0 D 2	50.60.8001	1 pce	4448	200mA 75V 4ns SOD 80	0 R 19	57.60.1682	1 pce	6k8	MF, 1%, 0204, E24
0 D 3	50.60.8001	1 pce	4448	200mA 75V 4ns SOD 80	0 R 20	57.60.1330	1 pce	33R	MF, 1%, 0204, E24
0 D 4	50.60.8001	1 pce	4448	200mA 75V 4ns SOD 80	0 R 21	57.60.1122	1 pce	1k2	MF, 1%, 0204, E24
0 D 5	50.60.8001	1 pce	4448	200mA 75V 4ns SOD 80	0 R 22	57.60.1102	1 pce	1k0	MF, 1%, 0204, E24
0 D 6	50.60.8001	1 pce	4448	200mA 75V 4ns SOD 80	0 R 23	57.60.1512	1 pce	5k1	MF, 1%, 0204, E24
0 D 7	50.60.8001	1 pce	4448	200mA 75V 4ns SOD 80	0 R 24	57.60.1512	1 pce	5k1	MF, 1%, 0204, E24
0 D 8	50.60.8001	1 pce	4448	200mA 75V 4ns SOD 80	0 R 25	57.60.1000	1 pce	0R0	MF, 0204
0 DL 1	50.04.2150	1 pce	MV57164	10*LED-Bargraf rot diffus	0 R 26	57.60.1471	1 pce	470R	MF, 1%, 0204, E24
0 DL 2	50.04.2161	1 pce	GRN	DLZ MV 54 164,LTA1000G 10*D GN	0 R 27	57.99.0252	1 pce	47	MF 10%, +4500ppm
0 DL 3	50.04.2161	1 pce	GRN	DLZ MV 54 164,LTA1000G 10*D GN	0 R 28	57.60.1564	1 pce	560k	MF, 1%, 0204, E24
0 DV 1	50.60.9017	1 pce	10V	5%, 0.2W, SOT 23	0 R 29	57.60.1512	1 pce	5k1	MF, 1%, 0204, E24
0 DV 2	50.60.9017	1 pce	10V	5%, 0.2W, SOT 23	0 R 31	57.60.1182	1 pce	1k8	MF, 1%, 0204, E24
0 IC 1	50.11.0119	1 pce	LM3914	IC LM 3914 N,	0 R 32	57.60.1362	1 pce	3k6	MF, 1%, 0204, E24
0 IC 2	50.11.0119	1 pce	LM3914	IC LM 3914 N,	0 R 33	57.60.1362	1 pce	3k6	MF, 1%, 0204, E24
0 IC 3	50.11.0119	1 pce	LM3914	IC LM 3914 N,	0 R 34	57.60.1821	1 pce	820R	MF, 1%, 0204, E24
0 IC 5	50.61.0204	1 pce	MC33078	Dual Op-Amp low noise	0 R 35	57.60.1512	1 pce	5k1	MF, 1%, 0204, E24
0 IC 6	50.61.0207	1 pce	LF353	Dual Op-Amp JFET SO 8	0 R 42	57.60.1335	1 pce	3M3	MF, 1%, 0204, E24
0 IC 7	50.61.0207	1 pce	LF353	Dual Op-Amp JFET SO 8	0 R 43	57.60.1125	1 pce	1M2	MF, 1%, 0204, E24
1 IC 9	50.61.0204	1 pce	MC33078	Dual Op-Amp low noise	0 R 44	57.60.1106	1 pce	10M	MF, 1%, 0204, E24
0 J 2	54.01.0021	1 pce	Jumper	0.63*0.63mm, Au	0 R 48	57.60.1182	1 pce	1k8	MF, 1%, 0204, E24
0 J 3	54.01.0021	1 pce	Jumper	0.63*0.63mm, Au	0 R 49	57.60.1182	1 pce	1k8	MF, 1%, 0204, E24
0 MP 1	1.913.293.11	1 pce		VU/PPM/GRM METER PCB	0 R 50	57.92.7012	1 pce	0.3A	PTC 60V
0 MP 2	1.913.294.10	1 pce		NR.-ETIKETTE 5 * 20	0 R 52	57.60.1153	1 pce	15k	MF, 1%, 0204, E24
0 MP 3	43.01.0108	1 pce	Label	ESE-WARNSCHILD	0 R 53	57.60.1222	1 pce	2k2	MF, 1%, 0204, E24
0 MP 4	28.99.0119	2 pcs		ROHRNIETE D 2.5*0.15' 9	0 R 54	57.60.1272	1 pce	2k7	MF, 1%, 0204, E24
0 MP 5	1.010.057.22	1 pce	M3*7.4	Nietmutter sw 6	0 R 55	57.60.1184	1 pce	180k	MF, 1%, 0204, E24
0 MP 6	1.010.057.22	1 pce	M3*7.4	Nietmutter sw 6	0 R 56	57.60.1106	1 pce	10M	MF, 1%, 0204, E24
1 MP 7	43.10.0110	1 pce	A	Revisions-Etikette 5mm h/blau	0 R 57	57.60.1512	1 pce	5k1	MF, 1%, 0204, E24
0 P 1	54.14.2011	1 pce	10p	Winkelstecker Au	0 R 58	57.60.1512	1 pce	5k1	MF, 1%, 0204, E24
0 P 2	54.11.0136	1 pce	2*3p	Pin 0.63*0.63, RM2.54	0 R 59	57.60.1471	1 pce	470R	MF, 1%, 0204, E24
0 P 3	54.11.0136	1 pce	2*3p	Pin 0.63*0.63, RM2.54	0 R 66	57.60.1103	1 pce	10k	MF, 1%, 0204, E24
0 P 101	54.11.0125	1 pce	1p	Pin, 1reihig, winkel	0 RA 1	58.60.0121	1 pce	20k	SMD 20%, 0.25W, Cermet
0 P 102	54.11.0125	1 pce	1p	Pin, 1reihig, winkel	0 RA 2	58.60.0113	1 pce	1k0	SMD 20%, 0.25W, Cermet
0 P 103	54.11.0125	1 pce	1p	Pin, 1reihig, winkel	0 RA 3	58.01.9103	1 pce	10k	Cermet, 10%, 0.5W, vertical
0 P 104	54.11.0125	1 pce	1p	Pin, 1reihig, winkel	0 T 1	1.022.625.00	1 pce		SCHALTTRAFO 3:1
0 P 105	54.11.0125	1 pce	1p	Pin, 1reihig, winkel	0 T 2	1.022.218.00	1 pce		EINGANGSTRAFO 1 : 1
0 P 106	54.11.0125	1 pce	1p	Pin, 1reihig, winkel	0 TP 1	54.02.0471	1 pce		Stift d 1.5 * 5.5 löt
0 P 107	54.11.0125	1 pce	1p	Pin, 1reihig, winkel	0 TP 2	54.02.0471	1 pce		Stift d 1.5 * 5.5 löt
0 P 108	54.11.0125	1 pce	1p	Pin, 1reihig, winkel	0 TP 3	54.02.0471	1 pce		Stift d 1.5 * 5.5 löt
0 P 109	54.11.0125	1 pce	1p	Pin, 1reihig, winkel	0 TP 4	54.02.0471	1 pce		Stift d 1.5 * 5.5 löt
0 P 110	54.11.0125	1 pce	1p	Pin, 1reihig, winkel	0 TP 5	54.02.0471	1 pce		Stift d 1.5 * 5.5 löt
0 P 111	54.11.0125	1 pce	1p	Pin, 1reihig, winkel					
0 P 112	54.11.0125	1 pce	1p	Pin, 1reihig, winkel					
0 P 113	54.11.0125	1 pce	1p	Pin, 1reihig, winkel					
0 P 114	54.11.0125	1 pce	1p	Pin, 1reihig, winkel					
0 P 115	54.11.0125	1 pce	1p	Pin, 1reihig, winkel					
0 P 116	54.11.0125	1 pce	1p	Pin, 1reihig, winkel					
0 P 117	54.11.0125	1 pce	1p	Pin, 1reihig, winkel					
0 P 118	54.11.0125	1 pce	1p	Pin, 1reihig, winkel					
0 P 119	54.11.0125	1 pce	1p	Pin, 1reihig, winkel					
0 P 120	54.11.0125	1 pce	1p	Pin, 1reihig, winkel					
0 P 121	54.11.0125	1 pce	1p	Pin, 1reihig, winkel					
0 P 122	54.11.0125	1 pce	1p	Pin, 1reihig, winkel					

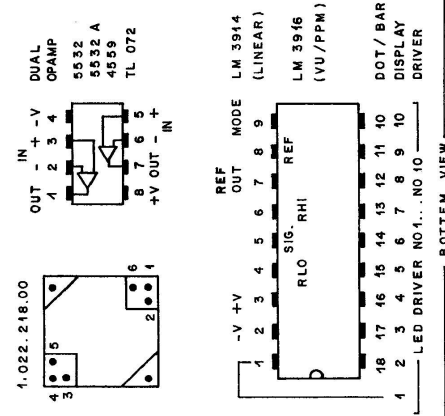
End of List

(01) Offset-voltage of IC 9 LF 353 too large  
->replaced by MC 33078

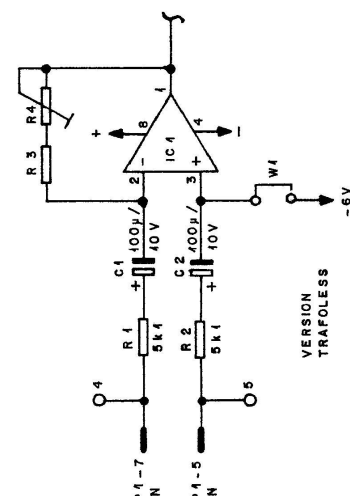
LED PPM Meter (10 LED) 1.913.291.00



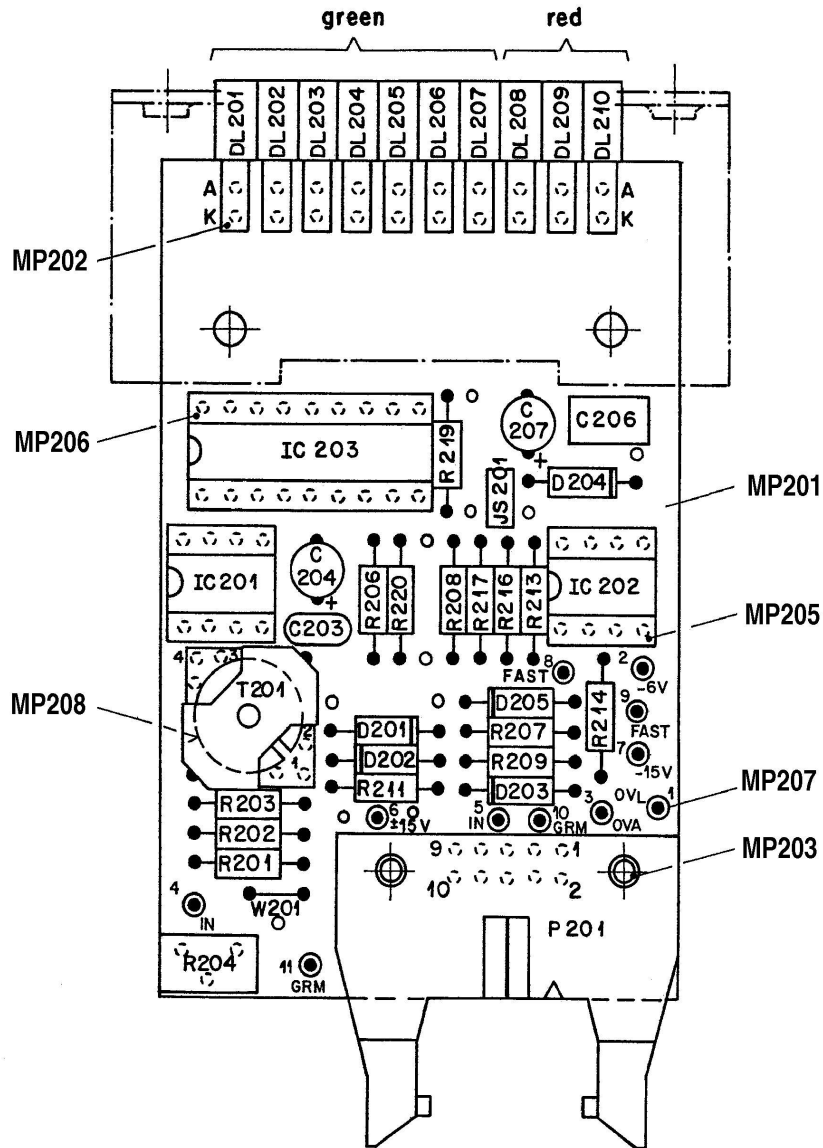
POS. NR. ARE 2...



P	NO NAME	REMARK (PCB CONNECTOR)
P..1	1 GRM	INPUT GRM
P..1	2 +10V	+ SUPPLY
P..1	3 GRM	INPUT GRM
P..1	4 OV-A	GROUND AUDIO
P..1	5 IN	INPUT AUDIO
P..1	6 -45V	- SUPPLY
P..1	7 IN	INPUT AUDIO
P..1	8 OV-L	GROUND SIGN. (LOGIC)
P..1	9 RES.	RESERVE (-24V)
P..1	10 -6V	- SUPPLY



**LED PPM Meter (10 LED) 1.913.291.00**



Werkstoff	Norm-Nr.:	Oberfläche	Güte:						③	
	DIN-Bez.:		Beh.:							②
	Abmessung:									①
Zugehörige Unterlagen:		Freimasstoleranz:	Maßstab:	Ausgabe	22.10.87	A.Ho	Zin	Ja	④	
<b>PL</b>		±		Datum	Gez.	Gepr.	Ges.	Index		
Ersatz für:		Ersetzt durch:		Kopie für:						
<b>STUDER</b> REGENSDORF ZÜRICH		Benennung: <b>LED PPM METER ESE</b>			Nummer: <b>1.913.291-00</b>					

**LED PPM METER (10 LED) 1.913.291.00 ( 1)**

Idx. Pos.	Part No.	Qty.	Type/Val.	Description	Idx. Pos.	Part No.	Qty.	Type/Val.	Description
0	C 201		not used	not used					
0	C 202		not used	not used					
0	C 203	59.34.2680		68p					CER 63V, 5%, N150
0	C 204	59.22.3101		100u					EL 10V 20% RM5
0	C 205		not used	not used					not used
0	C 206	59.06.5474		470n					PETP, 63V, 5%, RM5
0	C 207	59.22.3101		100u					EL 10V 20% RM5
0	D 201	50.04.0125		1N4448					75V, 150mA, 4ns, DO-35
0	D 202	50.04.0132		BAW62					D BAW 62
1	D 203	50.04.0125		1N4448					75V, 150mA, 4ns, DO-35
1	D 204	50.04.0125		1N4448					75V, 150mA, 4ns, DO-35
1	D 205	50.04.0132		BAW62					D BAW 62
0	D 206		not used	not used					not used
0	DL 201	50.04.2146		MV54124A					DL MV 54124 A, GN
0	DL 202	50.04.2146		MV54124A					DL MV 54124 A, GN
0	DL 203	50.04.2146		MV54124A					DL MV 54124 A, GN
0	DL 204	50.04.2146		MV54124A					DL MV 54124 A, GN
0	DL 205	50.04.2146		MV54124A					DL MV 54124 A, GN
0	DL 206	50.04.2146		MV54124A					DL MV 54124 A, GN
0	DL 207	50.04.2146		MV54124A					DL MV 54124 A, GN
0	DL 208	50.04.2119		MV57124A					DL MV 57124 A, RT
0	DL 209	50.04.2119		MV57124A					DL MV 57124 A, RT
0	DL 210	50.04.2119		MV57124A					DL MV 57124 A, RT
0	IC 201	50.09.0101		072					IC TL 072 CN ,A
0	IC 202	50.09.0101		072					IC TL 072 CN ,A
0	IC 203	50.11.0144							IC LM 3916 N,
0	JP 201	54.01.0020		1p					Pin, 1reihig, gerade
0	JP 202	54.01.0020		1p					Pin, 1reihig, gerade
0	JS 201	54.01.0021		Jumper					0.63*0.63mm, Au
0	MP 201	1.913.290.11	1 pce						LED METER PCB
0	MP 202	1.010.012.50	10 pcs						LED-Halter gerade/winkel
0	MP 203	28.99.0119	2 pcs						ROHRNIETE D 2.5*0.15* 9
0	MP 204		not used	not used					not used
0	MP 205	53.03.0166	2 pcs	8p					DIL 0.3", löt, gerade
0	MP 206	53.03.0175	1 pce	18p					DIL 0.3", löt, gerade
0	MP 207	54.02.0471	11 pcs						Stift d 1.5 * 5.5 löt
0	MP 208	1.010.004.61	1 pce	RM5					Isolierscheibe d=10
0	P 201	54.14.2011		10p					Winkelstecker Au
0	R 201	57.11.3512		5k1					MF, 1%, 0207
0	R 202	57.11.3512		5k1					MF, 1%, 0207
0	R 203	57.11.4222		2k2					MF, 2%, 0207
0	R 204	58.01.9203		20k					Cermet, 10%, 0.5W, vertical
0	R 205		not used	not used					not used
				<i>replaced by W 201</i>					
0	R 206	57.11.4103		10k					MF, 2%, 0207
0	R 207	57.11.4103		10k					MF, 2%, 0207
0	R 208	57.11.3203		20k					MF, 1%, 0207
0	R 209	57.11.4103		10k					MF, 2%, 0207
0	R 210		not used	not used					not used
0	R 211	57.11.3203		20k					MF, 1%, 0207
0	R 212		not used	not used					not used
				<i>replaced by D 203</i>					
0	R 213	57.11.4823		82k					MF, 2%, 0207
0	R 214	57.11.4332		3k3					MF, 2%, 0207
0	R 215		not used	not used					not used
				<i>replaced by D 205</i>					
0	R 216	57.11.6226		22M					MF, 10%, 0207
0	R 217	57.11.4681		680R					MF, 2%, 0207
0	R 218		not used	not used					not used
0	R 219	57.11.4222		2k2					MF, 2%, 0207
0	R 220	57.11.4222		2k2					MF, 2%, 0207
0	R 221		not used	not used					not used
0	T 201	1.022.218.00							EINGANGSTRAFO 1 : 1
0	W 201	1.010.321.64		Wire					DRAHTBRUECKE U, 4.3* 5.0, 0.6

End of List