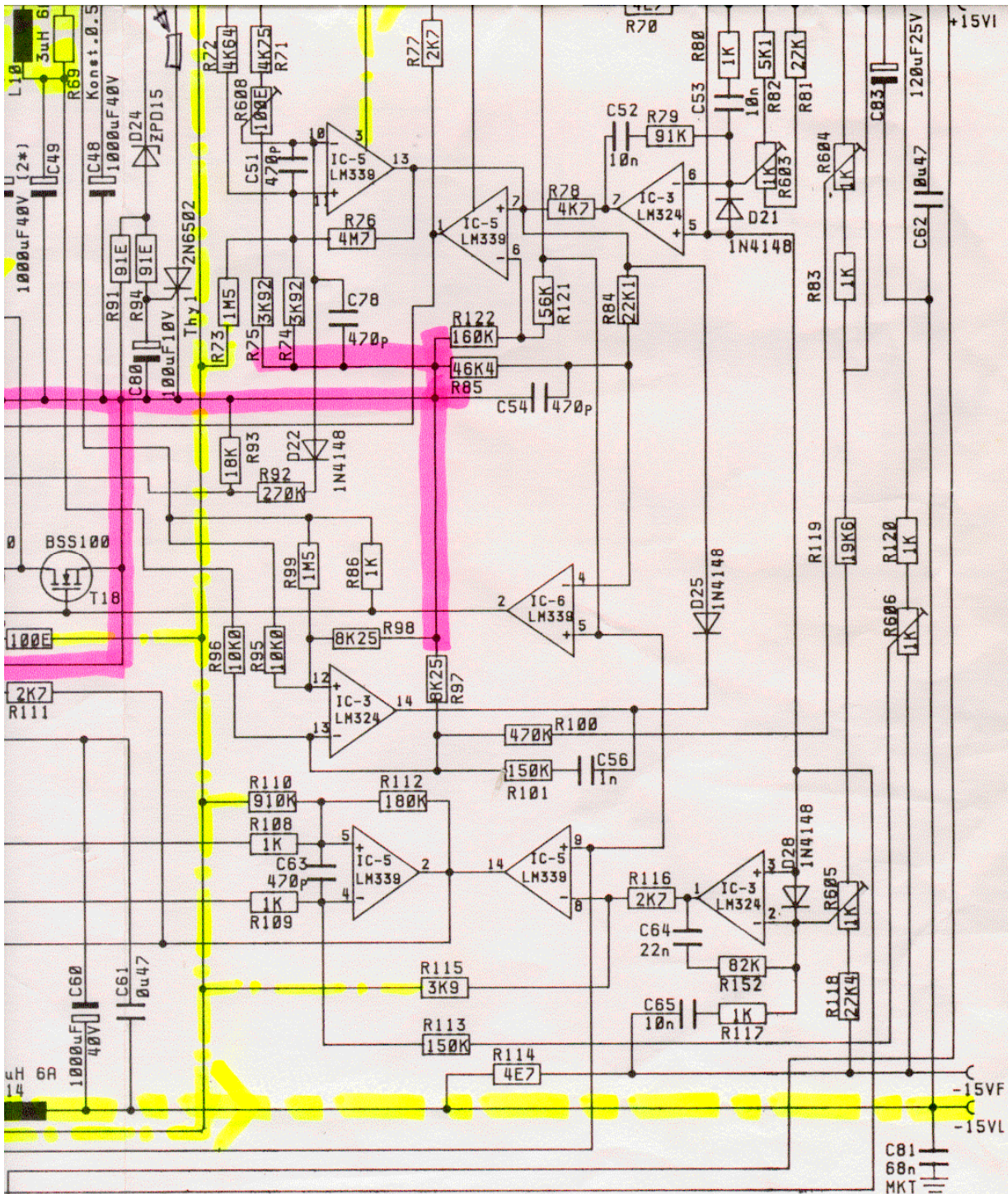


LUCAL REF. SUPPLY

SMG-4

| | |
|-------|------------------------------|
| A | D30 UND R150 D R175 korr. |
| | |
| | |
| | |
| | |
| ZUST. | ÄNDERUNG |



SMG-4031

MASSTAB

Z.Nr. 551200A

| A | D30 UND R150 DAZU | 27.05.00 | Se. | DATUM | NAME | | | |
|-------|-------------------|----------|------|-----------------------------|---------|-------|-------|--|
| | R115 Kerr. | | | BEARB. 24.03.00 | Janssen | +5.2V | 8A | |
| | | | | GEPR. | | +15V | 3.5A | |
| | | | | NORM | | -15V | 1.5A | |
| | | | | | | | BLATT | |
| | | | | | | | B1. | |
| ZUST. | ÄNDERUNG | DATUM | NAME | 4031 POWER SUPPLY 204 031 S | | | | |

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| Nr. | Stück | Benennung | Wert | Pos. | Sachnummer |
|-----|-------|------------------|---------------|-------|-----------------|
| 1 | 2 | Widerstand 5% | 270K R1,2 | RH10 | 55.2700.522.021 |
| 2 | 3 | | 1K R18,27,28 | RH10 | 55.1000.322.021 |
| 3 | 1 | | 680E R20 | RH10 | 55.6800.222.021 |
| 4 | 2 | | 390K R155,154 | RH10 | 55.3900.522.021 |
| 5 | 1 | | 27K R19 | RH10 | 55.2700.422.021 |
| 6 | 2 | | 100E R23,M | RH10 | 55.1000.222.021 |
| 7 | 1 | | 8K2 R22 | RH10 | 55.8200.322.021 |
| 8 | 1 | | 7K5 R24 | RH10 | 55.7500.322.021 |
| 9 | 1 | | 1M R29 | RH10 | 55.1000.622.021 |
| 10 | 1 | | 1M5 R25 | RH10 | 55.1500.622.021 |
| 11 | 1 | | 10K R3 | RH10 | 55.1000.422.021 |
| 12 | 3 | | 2E2 R9,17,10 | RH10 | 55.2200.022.021 |
| 13 | 1 | | 56K R26 | RH10 | 55.5600.422.021 |
| 14 | 1 | | 2K7 R6 | RH10 | 55.2700.322.021 |
| 15 | 1 | | 1K8 R5 | RH10 | 55.1800.322.021 |
| 16 | 1 | | 35 K R7 | RH10 | 55.7500.422.021 |
| 17 | 1 | | 2M2 R150 | RH10 | 55.2200.622.021 |
| 18 | 2 | | 470E R14,15 | RH10 | 55.4700.222.021 |
| 19 | 1 | | 47E R12 | RH10 | 55.4700.122.021 |
| 20 | 1 | | 4K7 R21 | RH10 | 55.4700.322.021 |
| 21 | 1 | | 4E7 R ,4 | RH10 | 55.4700.022.021 |
| 22 | 3 | | 0E | RH10 | 55.0000.122.021 |
| 23 | 1 | | 6E8 R4 | 10,16 | 55.6800.022.021 |
| 24 | 1 | | 47K R8 | 10,16 | 55.4700.422.021 |
| 25 | 1 | Konstantenbrücke | Ø 1mm R13 | RH10 | 59.0000.010.002 |

Ersatztypen am: bestätigt durch:


| | | | |
|--------|----------|--|------------|
| Datum | 18.12.87 | SMG - 4031 Kleine LP HV-LP Sonderliste | 2 |
| Bearb. | Q | | |
| Gepr. | | | |
| Norm. | | | |
| | | ZNr. 551.401 F | Blatt 1 |

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| Nr. | Stück | Benennung | Wert | Pos. | Sachnummer |
|-----|-------|------------------|----------------------------|-------|------------------|
| 26 | 2 | Diode | AN4148 $\varnothing 12,10$ | RH10 | 44.00041.080.010 |
| 27 | 1 | | BA 159 $\varnothing 9$ | RH10 | 44.0001.590.510 |
| 28 | 3 | | AN4934 E100 SRP100K | RH10 | 44.0001.000.790 |
| | | | $\varnothing 8,2,5$ | | — |
| 30 | 1 | | SRP 100K 33 | 10,16 | |
| 31 | | | | | |
| 32 | 2 | Kondensator | 2n2 C16,15 | RH5 | 52.1220.909.200 |
| 33 | 2 | | 4n7 C14,10 | RH5 | 52.1470.909.200 |
| 34 | | | | RH5 | |
| 35 | | | | RH5 | |
| 36 | 3 | | Op1 C8,17,75 | RH5 | 52.1100.708.200 |
| 37 | 1 | | 1nF C18 | RH5 | 52.1100.909.200 |
| 38 | 2 | | 470pF C19,20 | RH5 | 52.1471.009.200 |
| 39 | 1 | | Op47 C11 | RH5 | 52.1470.708.211 |
| 40 | | | | | |
| 41 | | | | | |
| 42 | 1 | Blankdrahtbrücke | $\varnothing 1mm$ | 15,24 | 38.6100.100.035 |
| 43 | | | | | |
| 44 | 1 | Widerstand 5% | 1K R18 stehend | | 55.1000.322.021 |
| 45 | 1 | | 750K R58 | | 55.7500.522.021 |

Ersatztypen am: bestätigt durch:


| | | | |
|---|----------|--|------------|
| Datum | 18.12.87 | SMGR - 4031 Kleine LP, HV-LP sauberste | 2 |
| Bearb. | A | | |
| Gepr. | | | |
| Norm. | | | |
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| Nr. | Stück | Benennung | Wert | Pos. | Sachnummer |
|-----|-------|---------------|-------------------------------------|------|------------------|
| 1 | 1 | Leiterplatte | 55A.301 C | | 71.5513.010.421 |
| 2 | 1 | Diode | ZPD 8,2 D11 | RH10 | 44.0000.820.810 |
| 3 | 1 | | ZPD 27 D37 | RH10 | 44.0000.270.810 |
| 4 | 3 | | ZY 100 D1,10,38 | RH10 | 44.0010.000.820 |
| 5 | 1 | | BE 102/1,4 Ersatz D35 3ZW 46/1,5 | RH10 | 44.0000.460.570 |
| 6 | 1 | | A9903 D4 | RH10 | 44.0099.030.480 |
| 7 | 2 | | UF 4007 D6,7 | RH10 | 44.0040.070.740 |
| 8 | 1 | skrand | ZPD 2,7 D | | 44.0000.270.810 |
| 9 | 1 | IC | TL495 IC1 | | 41.0047.180.070 |
| 10 | 1 | | 6N136 B101 | | 41.0001.360.040 |
| 11 | 1 | | CNY-21 B100 | | 41.0000.210.130 |
| 12 | | | | | |
| 13 | 1 | Kühlkörper | 65 B 330 | | 48.3000.0000.190 |
| 14 | 3 | Transistor | BSS100 T8,7,6 | | 42.9001.0000.251 |
| 15 | 1 | | BC307 Ersatz BC557 F4 | | 42.0005.470.190 |
| 16 | 1 | | 3C161-16 F1 | | 42.0001.610.180 |
| 17 | 1 | | BD 785 T5 | | 42.0007.850.220 |
| 18 | 1 | Widerstand 5% | 27K 2W R16 | | 55.2700.425.700 |
| 19 | | | | | |
| 20 | 1 | Res | 500K 3386X R600 | | 56.5000.533.541 |
| 21 | 1 | Res | 50K R609 | | 56.5000.432.511 |
| 22 | | | | | |
| 23 | 1 | Schalter | CuK 1101 S1 | | 38.7001.002.000 |
| 24 | 1 | WR | S14 K275 R900 | | 57.1142.750.610 |
| 25 | 1 | NTC | SG 27 R.800 | | 57.1000.270.610 |

Ersatztypen am: bestätigt durch:

| | | | |
|---|--------|-----------------------------------|------------|
| Datum | 4.1.88 | SMG - 4031 HV-LP Bestückung | 2 |
| Bearb. | ca | | |
| Gepr. | | | |
| Norm. | | | |
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| Nr. | Stück | Benennung | Wert | Pos | Sachnummer |
|-----|-------|-------------------|---------------------|-----|--------------------|
| 26 | 1 | Blindbohrer | B 500 C 1400 D 500 | | 44. 0100. 001. 181 |
| 27 | 1 | Si-Halter u. Keye | FAB 00313551 F100 | | 38. 7004. 003. 000 |
| 28 | 1 | Si-Dorierung | AT 1,6 bei 220V FA | | 38. 7040. 160. 040 |
| 29 | | | | | |
| 30 | | | | | |
| 31 | 2 | Kondensator | Qm 33 250V FA 72 C1 | | 52. 1330. 712. 200 |
| 32 | 2 | Kondensator | RY 2n5 C34 | | 52. 1250. 912. 401 |
| 33 | 1 | | RY 1n C12 | | 52. 1100. 912. 400 |
| 34 | 1 | Elko sterend | 470µF 25V SXE C9 | | 53. 1470. 404. 611 |
| 35 | 1 | | 10µF 35V C13 | | 53. 1100. 505. 600 |
| 36 | 2 | | 220µF 250V KHE C5,6 | | 53. 1220. 412. 612 |
| 37 | 1 | | 100µF 350V KHE C7 | | 53. 1100. 413. 600 |
| 38 | | | | | |
| 39 | | | | | |
| 40 | 1 | Spule | 532.104 Ø L1 | | 66. 2532. 104. 010 |
| 41 | 1 | | 6,8µH 0,8A L3 | | 66. 1680. 508. 000 |
| 42 | 1 | | 120µH 3V 2060 L2 | | 66. 1120. 710. 000 |
| 43 | 1 | Schlauch | Ø 12,1mm 35mm | | 38. 6312. 158. 035 |
| 44 | 1 | Kabelbinder | SSI 1,5 | | 38. 6000. 002. 000 |
| 45 | 1 | Empressmutter | M3 | | 38. 2130. 000. 060 |
| 46 | | | | | |
| 47 | 1 | Kaltgefäßdose | 4300. 0071 x1 | | 38. 8003. 005. 000 |
| 48 | 1 | Schraube | M3x10 DIN 7985 | | 38. 2130. 010. 100 |
| 49 | 1 | | M3x8 DIN 7985 | | 38. 2130. 008. 100 |
| 50 | 2 | Federscheibe | A3 DIN 137 | | 38. 2230. 000. 270 |
| 51 | 1 | Mutter | M3 DIN 934 | | 38. 2130. 000. 010 |

Ersatztypen am:

bestätigt durch:

| | |
|--------|--------|
| Datum | 4.1.88 |
| Bearb. | Qr |
| Gepr. | |
| Norm. | |

SMA - 4031
 HU - LP
 Bestückung

2



ZNr. 551. 401 F


Blatt
2

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| Nr. | Stück | Benennung | Wert | Pos. | Sachnummer |
|-----|-------|---------------|--------------------------|------|-------------------|
| 1 | 13 | Widerstand 5% | 1K R67,43,35,86,108, | RH10 | 55. 1000. 322.021 |
| 2 | | | 109,48,49,80,83,117,120 | | — |
| 3 | | | 58, | | — |
| 4 | 6 | | 4K7 R150,78,55,56,57,90 | RH10 | 55.4700. 322.021 |
| 5 | 3 | | 180E R60,104,42, | RH10 | 55. 1800. 222.021 |
| 6 | 4 | | 2E 2 R64,65,103,41, | RH10 | 55. 2200. 022.021 |
| 7 | 2 | | 39E R62,38, | RH10 | 55. 3900. 122.021 |
| 8 | 6 | | 4E7 R88,61,70,114,60 | RH10 | 55. 4700. 022.021 |
| 9 | 7 | | 91E R63,102,39,44,47,94, | RH10 | 55. 9100. 122.021 |
| 10 | 1 | | 270E R105, | RH10 | 55. 2700. 222.021 |
| 11 | 2 | | 100E R106,87, | RH10 | 55. 1000. 222.021 |
| 12 | 3 | | 8K2 R146, 127,115, | RH10 | 55. 8200. 322.021 |
| 13 | 3 | | 18K R144,93,129, | RH10 | 55. 1800. 422.021 |
| 14 | 5 | | 27K R147,142,138,81,148 | RH10 | 55. 2700. 422.021 |
| 15 | 1 | | 24K R149, | RH10 | 55. 2400. 422.021 |
| 16 | | | | | |
| 17 | 2 | | 10K R37,139, | RH10 | 55. 1000. 422.021 |
| 18 | 2 | | 33K R143,133, | RH10 | 55. 3300. 422.021 |
| 19 | 5 | | 2K7 R 52,77,111,116, | RH10 | 55. 2700. 322.021 |
| 20 | | | 59, | | — |
| 21 | 1 | | 68E R30, | RH10 | 55. 6800. 22.021 |
| 22 | 1 | | 330E R33, | RH10 | 55. 3300. 222.021 |
| 23 | 1 | | 75K R141, | RH10 | 55. 7500. 422.021 |
| 24 | 2 | | 15K R153,134, | RH10 | 55. 1500. 422.021 |
| 25 | 3 | | 270K R92,137,136 | RH10 | 55. 2700. 522.021 |

Ersatztypen am: bestätigt durch:

| | | | |
|---|--------------------|--------------------------------------|---------|
| Datum | 18.12.87 | SMA-4031 Sieder LP Sonderliste | 4 |
| Bearb. | <i>[Signature]</i> | | |
| Gepr. | | | |
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| Nr. | Stück | Benennung | Wert | Pos. | Sachnummer |
|-----|-------|---------------|------------------|------|-----------------|
| 26 | 2 | Widerstand 5% | 470K R140,100 | PH10 | 55.4700.522.021 |
| 27 | 1 | | 180K R1R, | PH10 | 55.1800.522.021 |
| 28 | 1 | | 910K R110, | PH10 | 55.9100.522.021 |
| 29 | 2 | | 150K R113,101,54 | PH10 | 55.1500.522.021 |
| 30 | 1 | | 4M7 R76, | PH10 | 55.4700.622.021 |
| 31 | 2 | | 1M5 R73,94 | PH10 | 55.1500.622.021 |
| 32 | 1 | | 160K R102, | PH10 | 55.1600.522.021 |
| 33 | 1 | | 56K R121, | PH10 | 55.5600.422.021 |
| 34 | 1 | | 91K R79, | PH10 | 55.9100.422.021 |
| 35 | 2 | | 6K8 R131,130 | PH10 | 55.6800.322.021 |
| 36 | 1 | | 680K R 50, | PH10 | 55.6800.522.021 |
| 37 | 2 | | 82K R152,53 | PH10 | 55.8200.422.021 |
| 38 | 1 | | 680E R135, | PH10 | 55.6800.222.021 |
| 39 | 1 | | 330K R132, | PH10 | 55.3300.522.021 |
| 40 | 1 | | 36K R103, | PH10 | 55.3600.422.021 |
| 41 | 3 | | 47K R125,124,106 | PH10 | 55.4700.422.021 |
| 42 | 1 | | 5K1 R82, | PH10 | 55.5100.322.021 |
| 43 | 2 | | 220K R51,34 | PH10 | 55.2200.522.021 |
| 44 | 1 | | 510E R36 | PH10 | 55.5100.222.021 |
| 45 | | | | | |
| 46 | | | | | |
| 47 | | | | | |
| 48 | | | | | |
| 49 | | | | | |
| 50 | | | | | |

Ersatztypen am: bestätigt durch:

| | | | |
|--------|----------|---|-------|
| Datum | 18.12.87 | SMR - 4031 Stecker LP Sonderliste | 4 |
| Bearb. | | | |
| Gepr. | | | |
| Norm. | | | |
| | | ZNr. 551.400 | Blatt |
| | | | 2 |

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| 1 | 2 | 3 | 4 | 5 |
|-----|-------|---------------|--------------------------|----------------------|
| Nr. | Stück | Benennung | Wert | Pos. Sachnummer |
| 51 | 1 | Widerstand 1% | 4K75 R 71 | RH10 55.4750.313.021 |
| 52 | 1 | | 6K81 R 32 | RH10 55.6810.313.021 |
| 53 | 1 | | 4K64 R 72, | RH10 55.4640.313.021 |
| 54 | 2 | | 3K92 R 74,75, | RH10 55.3920.313.021 |
| 55 | 1 | | 4K4 285, | RH10 55.4640.413.021 |
| 56 | 1 | | 22K1 R 84, | RH10 55.2210.413.021 |
| 57 | 2 | | 10K0 R 95,96 | RH10 55.1000.413.021 |
| 58 | 2 | | 8K25 R 97,98 | RH10 55.8250.313.021 |
| 59 | 1 | | 19K6 R 119, | RH10 55.1960.413.021 |
| 60 | 1 | | 27K4 R 118,31 | RH10 55.2740.413.021 |
| 61 | | | | |
| 62 | 1 | | 0E | RH10 55.0009.127.021 |
| 63 | | | | |
| 64 | | | | |
| 65 | 7 | Diode | 1N4148 D32,33,22,30 | RH10 44.0041.480.010 |
| 66 | | | 25,28,21 | — |
| 67 | 1 | | 1N4934 Elode SRP100K D36 | RH10 44.0001.000.790 |
| 68 | | | | |
| 69 | | | | |
| 70 | 9 | Kondensator | 0,47 C77,45,46,32,33, | RH5 52.1470.708.211 |
| 71 | | | 38,50,62,61, | — |
| 72 | 6 | | 10nF C30,52,53,65,72,40 | RH5 52.1100.809.200 |
| 73 | 3 | | 4n7 C58,79,43, | RH5 52.1470.909.200 |
| 74 | | | | |
| 75 | 6 | | 470pF C78,51,54,69,53,41 | RH5 52.1471.009.200 |

Ersatztypen am: bestätigt durch:

| | | | |
|-------|-------------|-------------------------------------|---------|
| Datum | 18.12.87 | SMQ - 4031 Stecker LP Sauchliste | 4 |
| Bearb | (Signature) | | |
| Gepr. | | | |
| Norm. | | | |
| | | 2 Nr. 551.400 E | Blatt 3 |


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| Nr. | Stück | Benennung | Wert | Pos. | Sachnummer |
|-----|-------|---------------|---------------------------------------|------|-----------------|
| 1 | 1 | Leiterplatte | 551.300 C | | 71.5513.000.421 |
| 2 | 1 | Diode | ZPD 27 D34 | 2H10 | 44.0000.270.810 |
| 3 | 2 | | BZ102/1,4 Ersatz BZW 46/1,5 D18,15 | 2H10 | 44.0000.460.570 |
| 4 | 1 | | 1N823 IC8 | 2H10 | 44.0008.230.040 |
| 5 | 1 | | ZPD 5,1 D17 | 2H10 | 44.0000.510.810 |
| 6 | 1 | | ZPD 15 D24 | 2H10 | 44.0001.500.810 |
| 7 | 1 | | ZPD 6,8 D31 | 2H10 | 44.0000.680.810 |
| 8 | 1 | | ZPD 13 D23 | 2H10 | 44.0001.300.810 |
| 9 | 1 | | ZPD 9,1 D29 | 2H10 | 44.0000.910.810 |
| 10 | 1 | | SB 140 D26 | 2H10 | 44.0001.400.730 |
| 11 | | | | | |
| 12 | 2 | IC | LM324 IC4,3 | | 41.0003.240.070 |
| 13 | 3 | | LM339 IC6,5,2 | | 41.0007.390.060 |
| 14 | 2 | | TL 431 IC9,7 | | 41.0004.310.150 |
| 15 | 1 | Widerstand 5% | 10E 1W NK4 R151 | | 55.1000.134.400 |
| 16 | 1 | | 1K 1W NK4 R128 | | 55.1000.324.400 |
| 17 | | | | | |
| 18 | 3 | Spule | 6,8µH 0,7A L8,6,12 | | 66.1680.508.000 |
| 19 | 3 | | 3µH 0,1A L11,10,14 | | 66.1030.660.000 |
| 20 | | | | | |
| 21 | 1 | Transistor | BSS 110 T19 | | 42.9001.100.250 |
| 22 | 2 | Transistor | BSS 100 T18, 126 | | 42.9001.000.251 |
| 23 | 4 | | BC237 Ersatz BC547 | | 42.0005.470.190 |
| 24 | | | T 16,23,12,25 | | — |
| 25 | 3 | | Ersatz ZTX552 ZTX 551 T15,1,22 | | 42.0005.520.470 |

Ersatztypen am:

bestätigt durch:

| | | | |
|---|--------|--|------------|
| Datum | 4.1.88 | SMG - 4031 Stecker - LP Bestückung | 3 |
| Bearb. | Q | | |
| Gepr. | | | |
| Norm. | | | |
|  | | ZNr. 551.400 E | Blatt 1 |

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| Nr. | Stück | Benennung | Wert | Pos. | Sachnummer |
|-----|-------|---------------|----------------|------|-----------------|
| 51 | 3 | Elbro Stehend | 2200µF 16V EKR | | 53.1220.302.600 |
| 52 | | | C35,36,37 | | — |
| 53 | | | | | |
| 54 | | | | | |
| 55 | 1 | Si-Halter | 19782 F101 | | 38.7004.012.000 |
| 56 | 1 | Sicherung | H120 F2 | | 38.7042.000.040 |
| 57 | 1 | St-Kappe | 19785 F102 | | 38.7004.013.000 |
| 58 | 1 | Stecker | 2,5 MSF 03 X 2 | | 38.8003.025.000 |
| 59 | 2 | Steckzunge | 6,3 X3,4 | | 38.8003.023.000 |
| 60 | | | | | |

Ersatztypen am: bestätigt durch:

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| Datum | 4.1.88 |
| Bearb. | R |
| Gepr. | |
| Norm. | |

SMQ - 4031
Stecker LP
Bestückung

3



2Nr. 551.400 E

Blatt
3

| TR | Ausg | Anderung/Mitteilung | Datum | Name |
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| Nr. | Stück | Benennung | Wert | Pos. | Sachnummer |
|-----|-------|----------------------|-------------------|------|-----------------|
| 1 | 1 | Drossel | 55A.100 Ø L5 | | 62.255A.100.010 |
| 2 | 1 | Ringkern | 55A.101 Ø L9 | | 62.255A.101.010 |
| 3 | 1 | | 55A.102 A L13 | | 62.255A.102.020 |
| 4 | 1 | | 55A.104 Ø L4 | | 62.255A.104.010 |
| 5 | 1 | | 524.025 BCL 7 | | 62.2524.025.030 |
| 6 | 3 | Schraube | M 3x10 DIN 84 H5 | | 38.2130.010.131 |
| 7 | 1 | | M 3x35 DIN 84 H5 | | 38.2130.035.131 |
| 8 | 1 | | M 3x18 DIN 84 H5 | | 38.2130.018.131 |
| 9 | 4 | Beilagendeibe | A 4,2 DIN 125 | | 38.2243.000.250 |
| 10 | 3 | Haltemung | 74 D 254 | | 65.1000.004.000 |
| 11 | 1 | | 74 D 258 | | 65.1000.002.000 |
| 12 | 4 | Isolierschleife | 524.005 Ø | | 65.2524.005.011 |
| 13 | 2 | Federschleife | A 3,2 DIN 137 | | 38.2232.000.270 |
| 14 | 1 | Isoliermuffel | 613550 | | 48.2313.947.153 |
| 15 | 2 | Schraube | M 2,5x5 DIN 84 | | 38.2125.005.130 |
| 16 | 1 | Stecker | 32 pol 416120 X 6 | | 38.8003.021.000 |
| 17 | 2 | Nieße Auedel | M 3A - 0310 | | 38.4009.002.000 |
| 18 | 7 | Gewindebohrer Auedel | 2,5x8 M17-6580 | | 38.3040.100.801 |
| 19 | 7 | Beilagendeibe | A 2,7 DIN 125 | | 38.2227.000.250 |
| 20 | 1 | Schraube | M 3x8 DIN 7985 | | 38.2130.008.100 |
| 21 | 2 | Festperle | | | 38.4400.001.000 |
| 22 | 2 | Konstantenbrücke | Ø 0,5 mm R 107,69 | EM10 | 59.0000.005.001 |
| 23 | 3 | | Ø 1 mm R 44,45,68 | RM10 | 59.0000.010.002 |
| 24 | 1 | Flachbandkabel | 4 pol. 90 mm | | 38.6404.050.090 |
| 25 | | | | | |

Ersatztypen am: bestätigt durch:

| | |
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| Datum | 4.1.88 |
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| Norm. | |

SMB - 4031
 Fertigung Stecker-LP 2



ZNr. 55A.400 E Blatt 1

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| Nr. | Stück | Benennung | Wert | Pos. | Sachnummer |
|-----|-------|-----------------|-----------------|------|-----------------|
| 1 | 1 | Frontplatte | 551.000 BAC | | 33.2551.000.042 |
| 2 | 1 | Lüfter | Papst 8312 | | 38.7003.005.000 |
| 3 | 4 | Schraube | M4x12 DIN 966 | | 38.2140.012.124 |
| 4 | 4 | Unterlegscheibe | A4,3 DIN 125 B | | 38.2243.000.250 |
| 5 | 4 | Federung | A4,3 DIN 127 B | | 38.2240.000.260 |
| 6 | 4 | Mutter | M 4 DIN 934 | | 38.2140.000.010 |
| 7 | 1 | Buchse | 2,5 M3C - 03 | | 38.8001.001.000 |
| 8 | 2 | Grünfeder | FC 01 L | | 38.8000.002.000 |
| 9 | 1 | Schleppschleund | Ø 4 mm 100 mm | | 38.6311.040.100 |
| 10 | 1 | Kabel sw | Ø 1,5 mm 90 mm | | 38.6200.150.090 |
| 11 | 1 | ft | Ø 1,5 mm 90 mm | | 38.6202.150.090 |
| 12 | 2 | Kabelschuh | 12 H 814 rt x 7 | | 38.8006.002.000 |
| 13 | 1 | Buchse | 09-0457-25-03 | | 38.8001.024.000 |
| 14 | 2 | Schleppschleund | Ø 4 mm 15 mm | | 38.6312.040.015 |
| 15 | 1 | FP-Griff | 551.011 Ø | | 33.3551.011.011 |
| 16 | 1 | Abdeckung | 551.012 Ø | | 33.3551.012.011 |
| 17 | 2 | Schraube | M2,5x10 DIN 934 | | 38.2125.010.130 |
| 18 | 2 | | M3x8 DIN 9135 | | 38.2130.008.100 |
| 19 | 6 | Halsschraube | 2,1100-379 | | 38.2925.010.984 |
| 20 | 2 | Kontakt | 12 H 686 | | 38.4001.015.000 |
| 21 | | | | | |

Ersatztypen am:

bestätigt durch:

Datum 5.1.88
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 Gepr.
 Norm.

SMG-4031

Frontplattenvornmontage 1



ZNr. 551.400 E Blatt 7

TR Ausg. Änderung/Mitteilung Datum Name

4031 POWER SUPPLY 204 031 Sa Bl. 17/18

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| Nr. | Stück | Benennung | Wert | Pos. | Sachnummer |
|-----|-------|--------------|----------------|------|-----------------|
| 1 | 1 | U-Wand | 551.001 A | | 33.5551.001.021 |
| 2 | 1 | Grassio | 551.002 & D | | 33.5551.002.051 |
| 3 | 1 | Haltebohrung | 551.008 Ø | | 35.8551.008.011 |
| 4 | 1 | Isolierung | 551.009 A | | 36.7551.009.021 |
| 5 | 1 | Schraube | M3x6 DIN 965 | | 38.2130.006.110 |
| 6 | 1 | Lotfahne | M3 Kupfer | | 38.4070.032.174 |
| 7 | 1 | Mutter | M3 DIN 934 | | 38.2130.000.010 |
| 8 | | | | | |
| 9 | 8 | Schraube | M3x6 DIN 966 | | 38.2130.006.124 |
| 10 | 1 | Abdeckkappe | 551.010 Ø | | 33.3551.010.011 |
| 11 | 1 | Mutter | M6 MS DIN 934 | | 38.2160.000.010 |
| 12 | 18 | Schraube | M2,5x5 DIN 965 | | 38.2125.005.110 |
| 13 | | | | | |
| 14 | | | | | |
| 15 | 1 | Federling | A6 DIN 127 | | 38.2260.000.260 |

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bestätigt durch:

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 Gepr.
 Norm.

SMG - 4031

Endmontage

1



ZNr. 551.400 E

Blatt

1

On the circuit board of modulation generator A there is AF generator A, the summing and output amplifier for the TX mode, the summing amplifier for the RX mode, the AM RF level control, the preemphasis network and the deviation compensation stage. The signals of generator A, generator B and an external signal can be superimposed on the summing amplifiers.

1. Modulation generator A (sinewave generator)

Modulation generator A consists of a digital synthesizer (gate array) in which the signal is first conditioned digitally and with crystal-based accuracy. An arithmetic unit determines the binary sample values for the sinewave time function that is to be generated.

A sinusoidal oscillation is then produced from the binary sample values by a digital/analog converter. A subsequent, switchable lowpass filter smooths the signal so that a frequency-stable oscillation of high signal quality is produced which can be set in discrete increments.

Gate array GA1 on the circuit board includes a phase accumulator, latches (μ P-compatible 8-bit bus) and a switchable frequency divider for the system clock.

1.1 Phase accumulator

The numeric value of the frequency setting is fed to the phase accumulator as the increment δ . The output is incremented by the value δ with each clock pulse from the divided oscillator frequency. When the range of values of the accumulator is exhausted, the output jumps back to $0 \dots \delta$ and the process commences again. In this way a numeric sequence is produced with a sawtooth-shaped characteristic. The slope of the sawtooth and thus its frequency is given by the increment δ from the μ P and by the switchable frequency divider, which divides the frequency of the step sequence by 4 or 40.

| | | |
|--------------------------------|------------------------------------|------------------------|
| Ref.No. 208 029 F Type 4031 | Sub Modulation Generator A Unit | Date Sheet 1/6 |
| Schlumberger | | Functional Description |

1.2 D/A conversion (sine table, D/A converter)

The digital sawtooth generated in the phase accumulator is converted into a digital sinewave equivalent by EPROM P1. This includes a sine table for the range 0 to 360° with 8-bit amplitude resolution. The data are applied to a digital/analog converter on whose output a finely graded, staircase-shaped sinewave voltage of the required voltage and of constant amplitude appears (approx. 10 V_{pp}).

1.3 Electronic attenuator (level control)

The voltage on the interface between the generator and attenuator is approx. 10 V_{pp}. This attenuator consists of a fine divider 0-1000 and a rough divider x1/x0.2/x0.02/x0.002. The fine divider is configured as a multiplying binary 10-bit DAC in which only 1000 increments are weighted in order to produce an integral division of 0-1000. The following rough divider works in decades and in this way high resolution is achieved at small voltages.

1.4 Lowpass filter

A lowpass filter follows that can be switch-selected in its cutoff frequency to reject interference through amplitude and phase instability.

1.5 Frequency ranges

The generator has two frequency ranges:

30.0 Hz to 2.999 kHz
3.00 kHz to 29.99 kHz

These are produced by the switch-selected division of the crystal clock frequency. Fine division of the frequency in the ranges is by different increments:

$$f = 4 \times \frac{\text{Increment}}{\text{Division factor}}$$

| Range | Division factor | Increment |
|----------------------|-----------------|--------------------|
| 30.0 Hz to 2.999 kHz | 40 | Set frequency x 10 |
| 3 kHz to 29.99 kHz | 4 | Set frequency x 1 |

Ref.No. 208 029 F
Type 4031

Sub Modulation Generator A
Unit

Date
Sheet 2/6

Schlumberger

Functional Description

The clock oscillator can be switched off by a control line to keep interference in the unit as low as possible.

Examples:

a) $f = 512 \text{ Hz}$

1. The frequency is in the range 30.0 Hz through 2.999 kHz.
The oscillator frequency of 2.097152 MHz is divided by 40
--> $52.429 \text{ kHz} = 2^{19} \text{ Hz}/10$.
2. The increment is $5120 = 2^9 \times 10$.
3. Because the phase accumulator has a length of 2^{19} bits, it is full after

$$\frac{2^{19}}{2^9 \times 10} = \frac{2^{10}}{10} = 102.4 \text{ increments.}$$

The sawtooth frequency and thus the output frequency are

$$\frac{52.429 \text{ kHz}}{102.4} = 512 \text{ Hz.}$$

b) $f = 4096 \text{ Hz}$

1. The frequency is in the range 3 kHz to 29.99 kHz.
Division factor: 4 --> $f_{\text{clock}} = 524.288 \text{ kHz}$
2. The increment is 4096.

$$3. f_{\text{out}} = 4 \times \frac{\text{Increment}}{\text{Division factor}} = 4 \times \frac{4096}{4} = 4096 \text{ Hz}$$

| | | |
|--------------------------------|------------------------------------|------------------------|
| Ref.No. 208 029 F Type 4031 | Sub Modulation Generator A Unit | Date |
| | | Sheet 3/6 |
| Schlumberger | | Functional Description |

2. Output amplifiers

There are separate output amplifiers for the RX and TX modes.

2.1 TX mode: TX amplifier

The voltages of the two modulation generators A and B and an external modulation voltage can be added by op-amp A12. In this way dual modulation is possible. Transistors T11 and T12 serve as a booster for high output currents, T10 and T13 limit the output current to admissible values in the event of a shortcircuit. An output transformer on the motherboard (361 136) between the amplifier and output socket balances the output voltage. The transformer can be switched between 1:1 and 1:10. The output voltage is max. $5 V_{rms}$ into max. 200Ω .

2.2 TX DC amplifier

The TX DC amplifier (A11) supplies the same output signal DC-coupled to the DC OUT socket (Bu29) as the TX amplifier to the MOD GEN socket on the front panel. If the output transformer is switched to 1:10, the TX DC amplifier is also switched to 1:10.

2.3 RX mode: RX amplifier

The voltages of the two modulation generators A and B and an external modulation voltage can be added by op-amp A10. In this way dual modulation is possible. The summed signal appears on the RX MOD socket (Bu27) on the circuit-board backplane. Modulation is defined as a peak value, so the amplifier produces max. $2 V_p$ for 100% AM and $2 V_p$ for 40-kHz FM deviation into 600Ω .

Ref.No. 208 029 F
Type 4031

Sub Modulation Generator A
Unit

Date
Sheet 4/6

2.4 AM modulation

The RX voltage, added to a DC voltage (5-V reference), produces the signal for amplitude modulation. The electronic AM attenuator also sets the RF level when there is no modulation.

2.5 FM modulation

The compensation of FM deviation is necessary at different carrier frequencies. Finely graded division of the RX FM signal is produced with a multiplying D/A converter.

2.6 PM modulation

The preemphasis network makes it possible to generate phase modulation by means of the FM modulator.

| | | |
|--------------------------------|------------------------------------|-------------------|
| Ref.No. 208 029 F Type 4031 | Sub Modulation Generator A Unit | Date Sheet 5/6 |
| Schlumberger | Functional Description | |