1102	D1
1103	G2
1110	D4
1121	C21
1124	F21
1126	E20
2102	C2
2106	J4
2107	J6
2108	L2
2109	L3
2120	K7
2122	M7
2123	L7
2125	L7
2127	H16
2128	I13
2129	I8
2130	J20
2131	I17
2132	I17
2133	G18
2134	G19
2135	F19
2136	H19
2137	G19
2138	H18
2139	I7
2140	C14
2141	H15
2142	K19
2143	K20
2144	K20
2145	E19
2147	E19
2148	E19
2150	C6
2151	H12
2152	I11
2158	L18
2160	I15
2161	I15
2162	H20
3103	G3
3104	G4
3107	C6
3108	J1
3109	K1
3120	H5
3123	I6
3124	K7
3125	L11
3128	L9
3129	K8
3130	K8
3131	M10
3132	J7
3134	L6
3137	L5
3140	F7
3141	I16
3142	I16
3143	K17
3144	K17
3145	I17
3146	L20
3147	N20
3150	H19
3151	I20
3152	F20
3153	G20
3154	J20
3155	J20
3158	E19
3159	E19
3160	D19
3161	D19
3162	I15
3163	J8
3164	I20
3167	I20
3169	L5
3172	B6
3173	B6
3177	M10
3178	N20
3181	C7
3183	I13
3184	I8
3185	I13
3186	K16
3188	M20
3192	C12
3197	L11
5102	I3
5103	L4
5107	J12
5109	B6
5110	C9
5111	C11
5112	C12
5114	C13
5115	J15
5121	I15
5122	L7
5123	K7
6105a	I5
6105b	I6
6106	H5
6107	K20
6120	E17
7101	C15
7103	K17
7104	J2
7105	K2
7109	L10
7110	I19
7122	L9
7124	L6

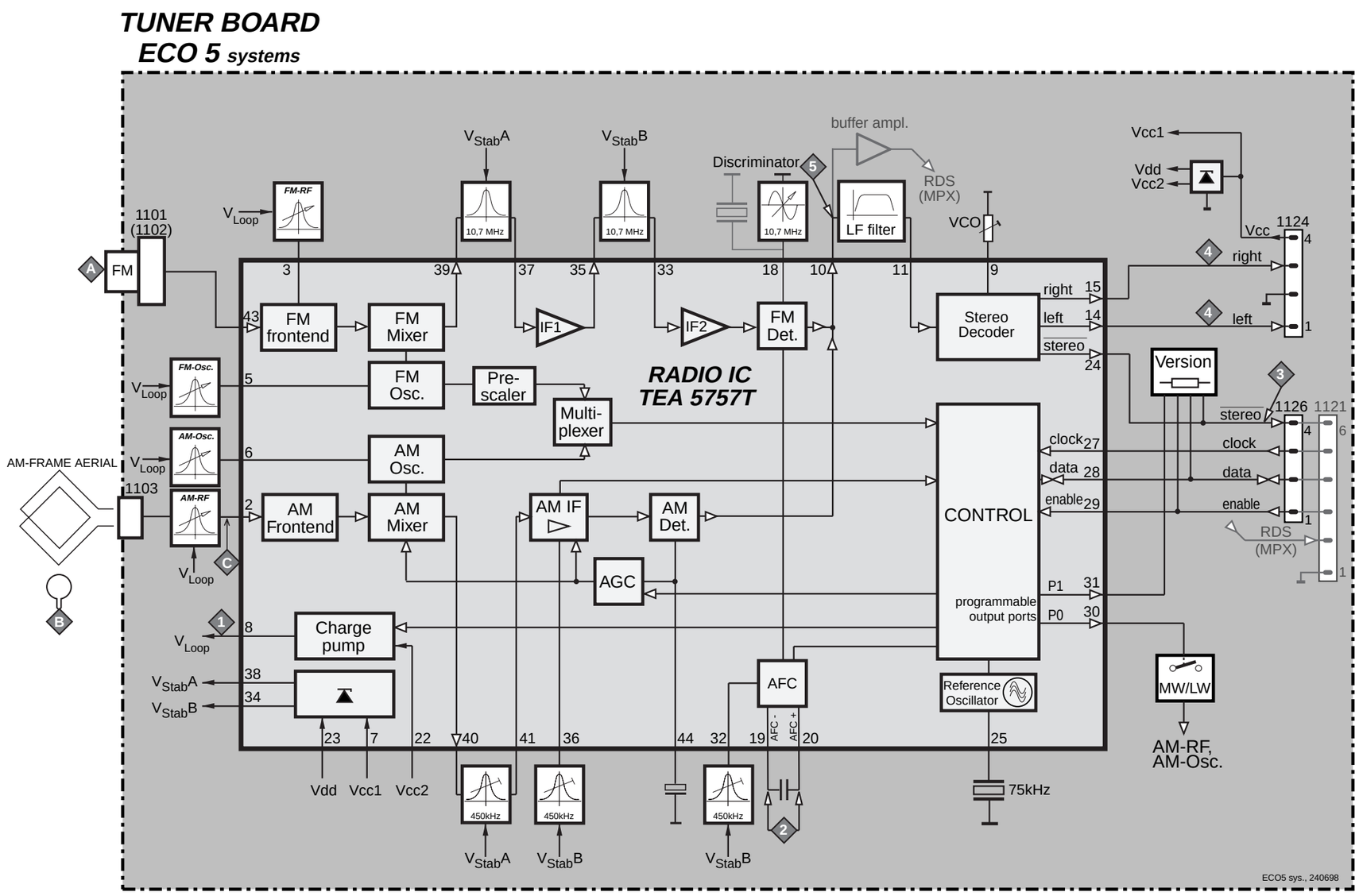
TUNER 95

3104 217 04120 bl. 130 - 01
3104 217 04121/04341 bl. 130 - 01

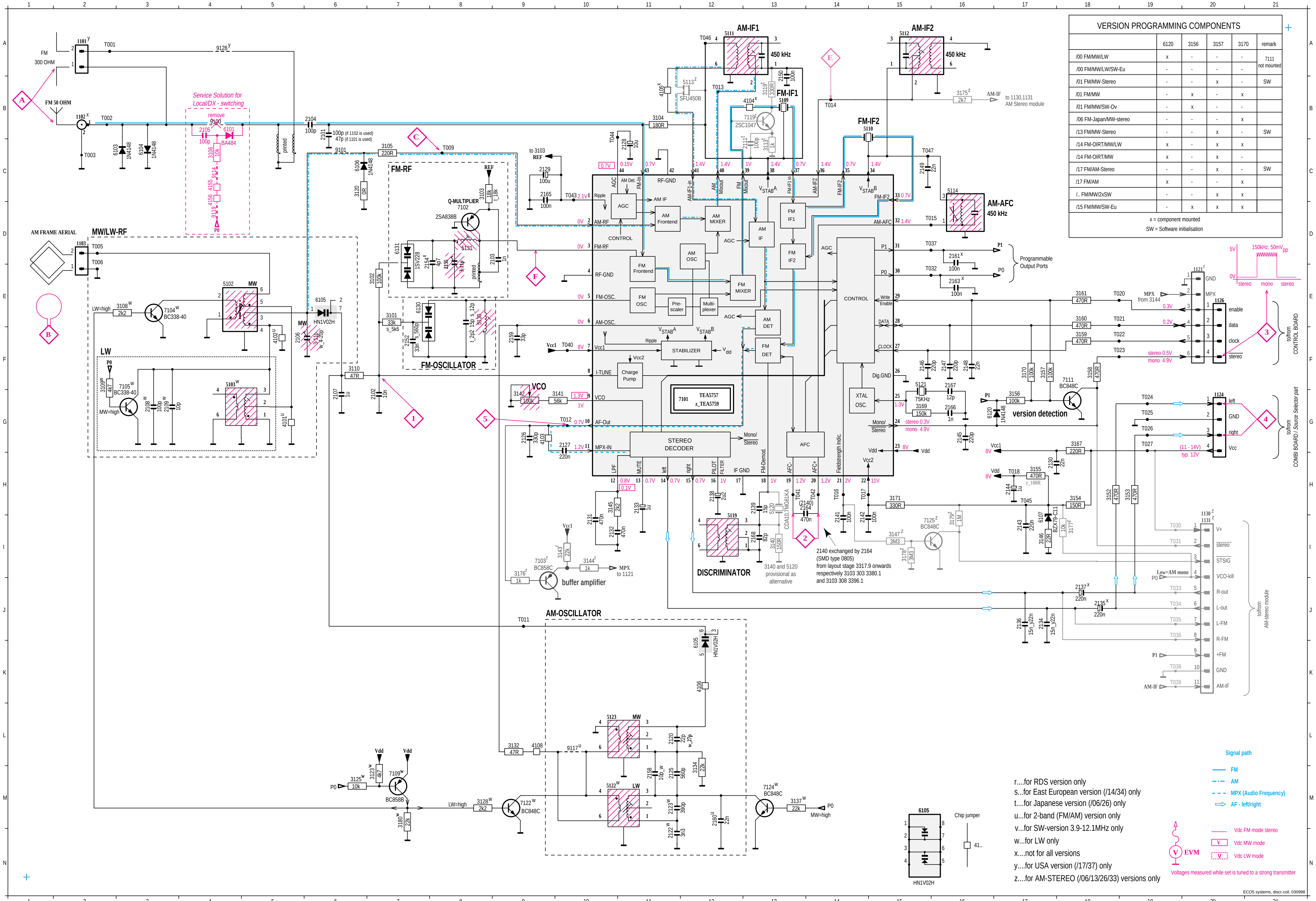
LEU0150
ITCL/9851-9813

7B-3

BLOCK DIAGRAM TUNER ECO5



TUNER BOARD ECO5 / Systems



VERSION PROGRAMMING COMPONENTS

	6120	3156	3157	3170	remark
/00 FM/MW/LW	x	-	-	-	7111 not mounted
/00 FM/MW/LW/SW-Eu	-	-	-	-	
/01 FM/MW-Stereo	-	-	x	-	SW
/01 FM/MW	-	x	-	x	
/01 FM/MW/SW-Ov	-	x	-	-	
/06 FM-Japan/MW-stereo	-	-	-	x	
/13 FM/MW-Stereo	-	-	x	-	SW
/14 FM-OIRT/MW/LW	x	-	x	x	
/14 FM-OIRT/MW	x	-	x	-	
/17 FM/AM-Stereo	-	-	x	-	SW
/17 FM/AM	x	-	-	x	
/.. FM/MW/2xSW	-	-	x	x	
/15 FM/MW/SW-Eu	-	x	x	x	

x = component mounted
SW = Software initialisation

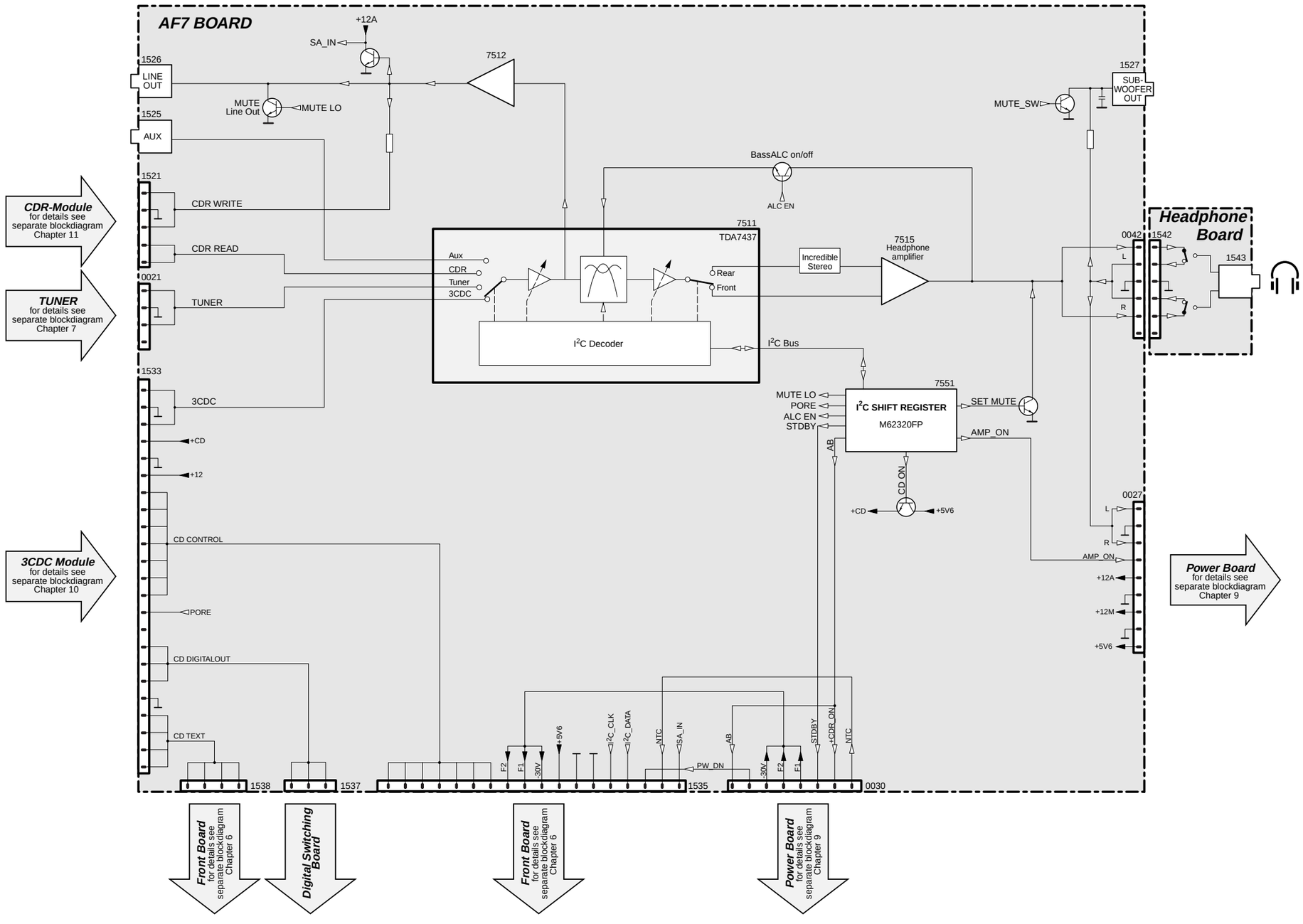
r....for RDS version only
s...for East European version (/14/34) only
t....for Japanese version (/06/26) only
u...for 2-band (FM/AM) version only
v...for SW-version 3.9-12.1MHz only
w...for LW only
x....not for all versions
y....for USA version (/17/37) only
z....for AM-STEREO (/06/13/26/33) versions only

ECO5 systems, discr.coil, 030998

1101 A 1
1102 B 2
1103 D 2
1121 E20
1124 G20
1126 E20
1130 I20
1131 I20
2101 C 6
2102 G 7
2103 D 9
2104 B 6
2106 F 5
2107 G 6
2108 G 3
2109 G 3
2111 C13
2120 L11
2122 N11
2123 M11
2125 M11
2126 G 9
2127 G10
2128 C11
2129 C 9
2130 H17
2131 I10
2132 I10
2133 H11
2134 J17
2135 J18
2136 J17
2137 J18
2138 H12
2139 H13
2140 H14
2141 H14
2142 H14
2143 I17
2144 H17
2145 G16
2146 F15
2147 F16
2148 F16
2149 C15
2150 B13
2152 F 7
2153 E 8
2154 E 7
2155 D 8
2158 M11
2159 F 9
2160 M12
2161 D16
2163 E16
2164 H14
2165 C 9
2166 G16
2167 F16
2168 I 13
3101 E 7
3102 E 7
3103 C 8
3104 B11
3105 C 7
3108 E 3
3109 F 2
3110 F 6
3113 C13
3119 B13
3120 C 6
3123 M 7
3125 M 6
3128 M 8
3132 L 9
3134 M12
3137 M13
3140 I13
3141 G10
3142 G 9
3143 I10
3144 I10
3145 H10
3146 I17
3147 I15
3152 H18
3153 H19
3154 H18
3155 H17
3156 G17
3157 F17
3158 F18
3159 F18
3160 E18
3161 E18
3167 G18
3169 G15
3170 F17
3171 H15
3175 B16
3176 J 9
3177 I18
3178 I15
3179 I16
3180 M7
4101 G 5
4102 F 5
4103 G 9
4104 B13
4105 B11
4106 K12
4108 L 9
5102 E 4
5103 F 4
5109 B13
5110 B14
5111 A13
5112 A15
5113 B12
5114 C16
5119 I 12
5120 H13
5121 F15
5122 M11
5123 L11
5130 E 8
5131 D 8
6103 C 2
6104 C 3
6105 K12
6105 E 6
6106 C 6
6107 H17
6120 G16
6130 E 7
6131 D 7
7101 G11
7102 D 8
7103 I 9
7104 E 3
7105 F 2
7109 M 7
7111 F18
7119 B13
7122 M 9
7124 M13
7125 I16
9100 B 4
9101 C 6
9117 L10
9128 A 4

8-2

Blockdiagram AF7 Board



8-4

Circuit Diagram AF7 Board

To and from CDR Module

To and from Tuner Board

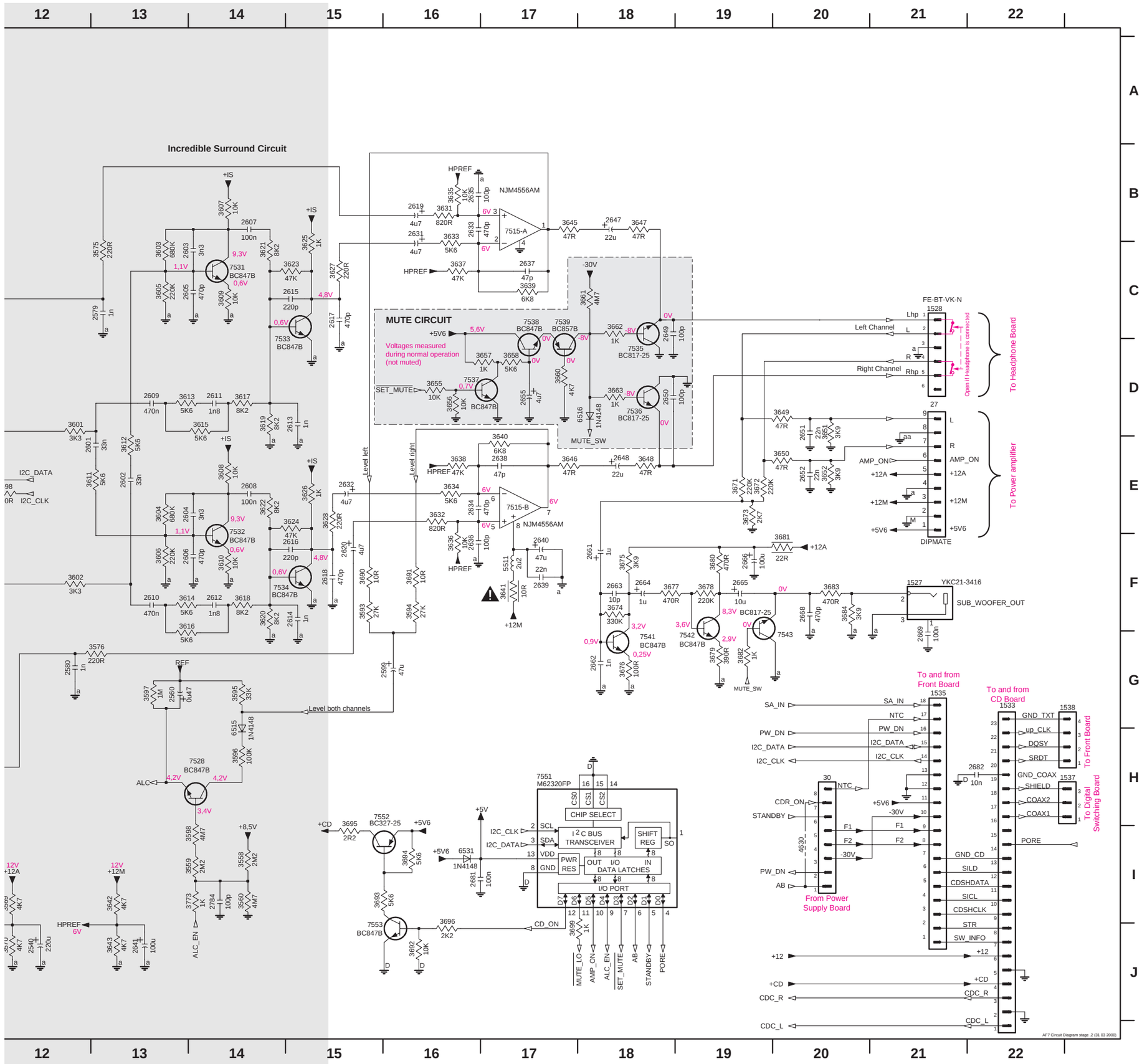
To and from Microphone Board

Bass ALC Circuit

Incredible Surround Circuit

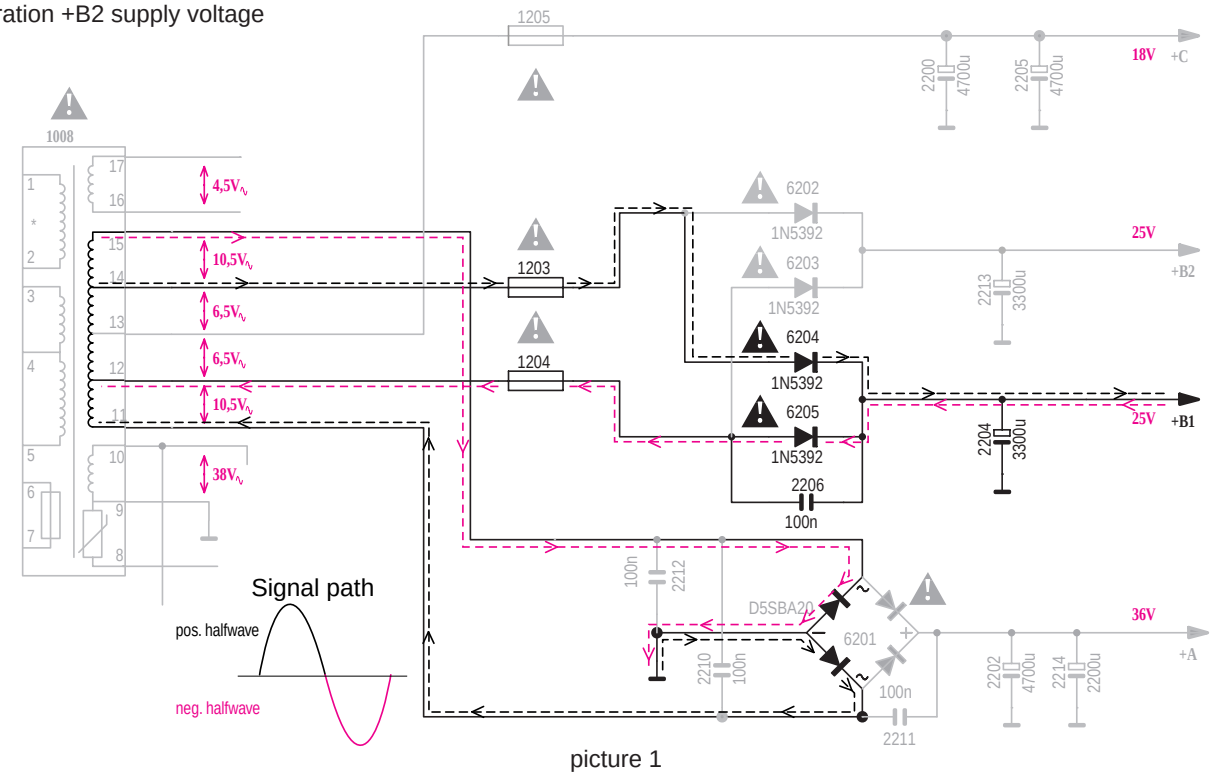
Bass ALC Circuit

8-5



0021	E1	2617	C15	3552	J2	3651	E20
0026	H1	2618	F15	3553	J3	3652	E20
0027	D21	2619	B16	3554	I3	3655	D16
0030	H20	2620	F15	3555	I3	3656	D16
1521	A1	2621	J10	3556	J3	3657	D17
1525	C1	2623	C3	3557	J3	3658	D17
1526	H1	2624	C3	3558	I14	3660	D17
1527	F21	2625	C6	3559	I14	3661	C18
1528	C21	2626	I7	3560	I14	3662	D18
1533	G22	2631	C16	3563	B6	3663	D18
1535	G21	2632	E15	3564	J7	3667	C3
1537	H22	2633	C16	3565	C8	3668	C3
1538	G22	2634	E16	3566	G8	3671	E19
2216	F15	2635	B16	3569	I12	3672	E19
2355	D17	2636	F16	3570	J12	3673	E19
2511	E2	2637	C17	3571	B10	3674	F18
2512	E2	2638	E17	3572	I8	3675	F18
2513	D3	2639	F17	3573	B10	3676	G18
2514	F3	2640	F17	3574	I9	3677	F18
2515	D4	2641	J13	3575	C13	3678	F19
2516	F4	2647	B18	3576	G13	3679	G19
2517	F11	2648	E18	3577	E11	3680	F19
2519	E4	2649	D18	3578	E11	3681	F20
2520	F4	2650	D18	3579	H1	3682	G19
2521	E3	2651	E20	3580	G11	3683	F20
2522	F3	2652	E20	3581	C9	3684	F20
2523	C4	2661	F18	3582	H9	3686	E1
2524	C4	2662	G18	3583	C9	3687	F1
2527	C2	2663	F18	3584	H9	3688	F3
2528	D2	2664	F18	3585	A10	3689	E3
2531	G11	2665	F19	3586	H9	3690	F15
2532	G11	2666	F19	3587	A10	3691	F16
2533	C6	2668	F20	3588	J9	3692	J16
2534	H6	2669	G21	3589	B9	3693	I15
2535	C6	2670	D10	3590	I8	3694	I16
2536	I6	2671	C8	3591	B9	3695	I15
2537	B6	2672	G8	3592	I7	3696	J16
2539	I6	2673	C8	3593	F15	3697	E11
2540	J12	2674	G8	3594	F16	3698	E12
2541	C5	2675	D7	3595	G14	3699	J17
2542	I5	2676	G7	3596	H14	3773	I14
2543	G2	2677	E5	3597	G13	3929	J10
2544	H2	2681	I16	3598	I14	4517	E5
2545	H1	2682	H22	3599	C10	4518	F5
2547	G4	2784	I14	3601	D12	4535	C2
2548	H3	2868	C10	3602	F12	4536	C2
2549	A5	2869	C9	3603	C13	4578	H6
2550	I5	2870	G9	3604	E13	4618	B2
2551	J2	2871	C8	3605	C13	4619	B2
2552	I3	2872	G8	3606	F13	4630	I20
2553	J2	2873	C8	3607	B14	5511	F17
2560	G13	2874	G8	3608	E14	5734	F15
2563	D7	2876	I10	3609	C14	6512	H10
2564	G7	3511	E1	3610	F14	6514	I10
2571	B10	3512	E1	3611	E13	6515	H14
2572	H8	3513	D3	3612	E13	6516	D18
2573	B10	3514	F3	3613	D13	6531	I16
2574	H9	3515	D3	3614	F13	7511	D6
2575	B10	3516	F3	3615	D14	7512-AC6	
2576	H9	3517	E3	3616	G13	7512-BI6	
2577	C8	3518	F3	3617	D14	7513-AA9	
2578	G8	3519	J1	3618	F14	7513-BH8	
2579	C13	3520	J1	3619	D14	7515-AB17	
2580	G12	3521	C3	3620	F14	7515-BE17	
2581	H11	3522	C3	3621	C14	7521	G3
2582	H11	3525	C2	3622	E14	7522	H3
2583	H10	3526	C2	3623	C15	7523	A10
2591	C10	3527	G2	3624	E15	7524	I9
2592	H9	3528	H2	3625	C15	7525	G10
2593	B9	3529	H4	3626	E15	7526	J3
2594	I8	3530	H3	3627	C15	7527	J3
2595	A9	3531	C6	3628	E15	7528	H14
2596	H8	3532	H6	3631	B16	7529	H4
2597	B9	3533	C6	3632	E16	7531	C14
2598	I7	3534	I6	3633	C16	7532	F14
2599	G16	3535	B6	3634	E16	7533	D15
2601	E13	3536	H6	3635	B16	7535	D18
2602	E13	3537	B6	3636	F16	7536	D18
2603	C14	3538	H6	3637	C16	7537	D17
2604	E14	3539	I6	3638	E16	7538	D17
2605	C14	3540	H4	3639	C17	7539	D17
2606	F14	3541	C5	3640	E17	7541	G18
2607	B14	3542	I5	3641	F17	7542	F19
2608	E14	3543	A6	3642	I13	7543	F19
2609	D13	3544	J6	3643	J13	7551	H17
2610	F13	3545	B1	3645	B17	7552	I15
2611	D14	3546	B1	3646	E17	7553	J16
2612	F14	3547	B1	3647	B18		
2613	D15	3548	B1	3648	E18		
2614	F15	3550	H4	3649	D20		
2615	C15	3551	J2	3650	E20		

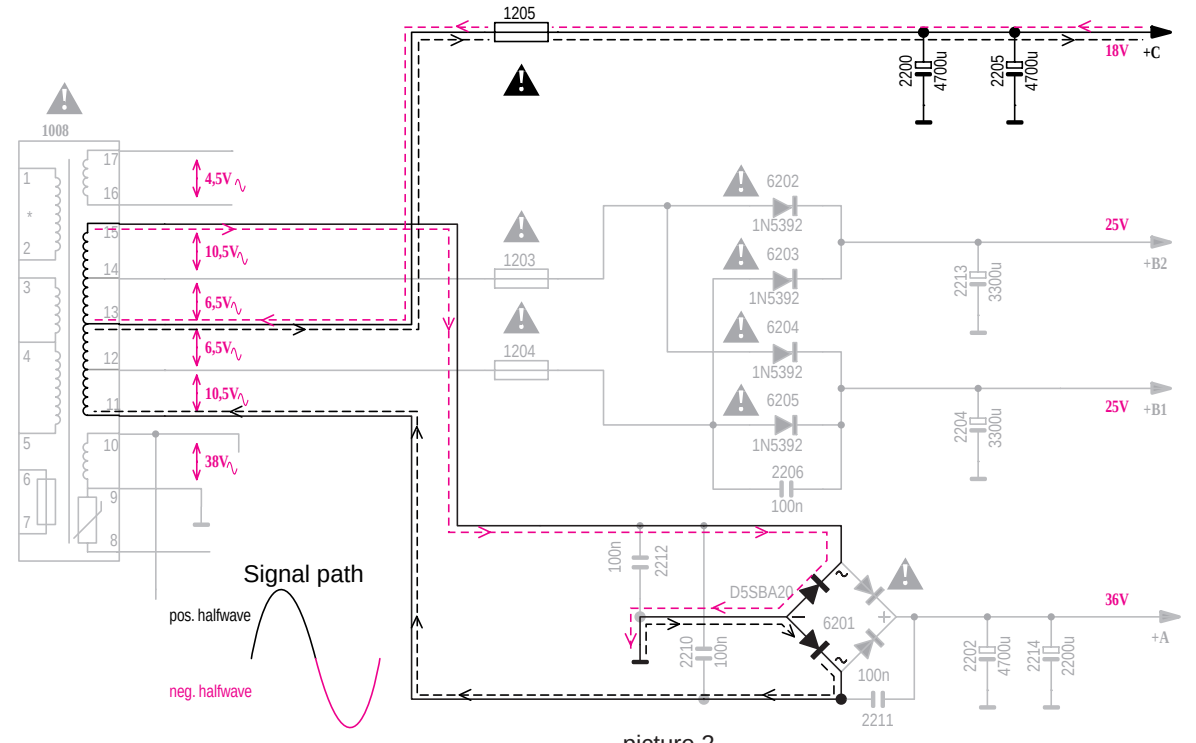
Generation +B2 supply voltage



picture 1

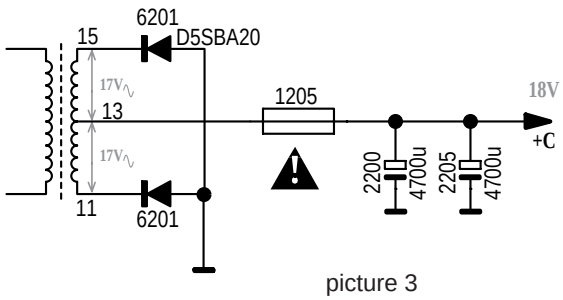
Generation of +C

Full wave rectifying with 2 diodes of bridge rectifier 6201, using 50% secondary winding of mains transformer (pin 13-15/13-11). See pictures 2 and 3 below.



picture 2

Simplified



picture 3

9-7

SUPPLY PART

MAINS SOCKET
1209
110-127 VAC
220-240 VAC
5201
not for /37
1210
only /21
1201
T1A IEC
T2,5A UL
1008
3201 10M for /37 ONLY
not for /21
9294
T1A IEC
1200 only for /21
9292
not for /22
4,5V~
10,5V~
6,5V~
6,5V~
10,5V~
38V~
1205
T2,5A IEC
T3,15A UL
18V +C
2200 4700u
1203
T2,5A IEC
T3,15A UL
1204
T2,5A IEC
T3,15A UL
6202 1N5392
6203 1N5392
PROVISIONAL
2213 3300u
25V +B2
6204 1N5392
6205 1N5392
2206 100n
2204 3300u
25V +B1
9293
100n 2212
D5SBA20
6201
2210 100n
100n 2211
2202 4700u
2214
2203
PROVISIONAL
36V +A
0225
+C 18V
+A 36V
+5V6 5,6V
+B2 25V
+B1 25V
TO AMPLIFIER PART CONNECTOR 1207

LOW POWER STANDBY CIRCUIT
not for /21
Relay drawn active = Power on
1208 STBY-REL
18V
4V .. 6V
6213 1N4148
5211 STANDBY TRANSFORMER
6209 1N4148
6210 1N4148
6211 1N4148
6212 1N4148
+C
3R3 3204
9297 if 1299 is stuffed
9295 not for /22
6214 1N4002
6242 1N4148
2215 220u
3242 4k7
+C IN POWER ON
+C IN STANDBY
6253 1N4003
6254 1N4002
-42V
2251 100u
6239 1N4148
3239 4k7
T500mA IEC
T630mA UL
T1A for VCD
1299
PROVISIONAL

5,6V REGULATOR
7201
L7805CV
17,2V
5,6V +5V6
2298 1u
2299 100n
3202 10k
2216 100n
BZX79-C6V8 6207
Overvoltage protection
0V
7202 BC368
6206 1N4148
6208 1N4002
3203 270
2217 100n

EVM .....V DC-voltages measured with low output power

1214
4-6V
4,5V~
-42V
1 ECO
2 4,5V
3 4,5V
4 NTC
5 -35V
6 PWDN
TO AMPLIFIER PART CONNECTOR 1222

P4-99 Supply (1999 09 21)

0225 A11
1008 A 4
1200 B 3
1201 A 3
1202 A 3
1203 B 6
1204 B 6
1205 A 6
1208 D 2
1209 B 1
1210 A 2
1214 I11
2200 A 8
2202 D 9
2203 D 9
2204 B 9
2206 C 8
2210 D 7
2211 D 8
2212 C 7
2213 B 9
2214 D 9
2215 G 2
2216 G 7
2217 H 8
2251 E 4
2298 G 5
2299 G 6
3201 C 1
3202 G 7
3203 H 8
3204 G 1
3239 D 5
3242 H 1
5201 A 1
5211 E 1
6201 C 8
6202 A 8
6203 A 8
6204 B 8
6205 B 8
6206 H 6
6207 G 8
6208 H 7
6209 F 2
6210 F 2
6211 F 2
6212 F 2
6213 E 2
6214 G 1
6239 D 5
6242 G 1
6253 D 4
6254 D 4
7201 F 6
7202 G 9
9292 C 2
9293 B 9
9294 B 3
9295 F 4

9-9

AMPLIFIER PART LEFT/RIGHT

+12V REGULATOR

-30V REGULATOR

LEFT AMPLIFIER

AN7591
7301

RIGHT AMPLIFIER

AN7591
7302

SUPER CLASS-G CIRCUIT

only for matrix surround versions

TO/FROM FRONT (CONTROL) BOARD

TO/FROM AF-BOARD

FROM SUPPLY PART CONNECTOR 0227

FROM SUPPLY PART CONNECTOR 1214

TO POWER SUPPLY CDR

EVM ...V DC-voltages measured with low output power

P4-CDR Amplifier part (2000 02 16)

9-10

POWER SUPPLY CDR

from P4
CDR Transformer
11V AC

1351
1350
T2A5
1353
T315mA

6350 1N5392
6351 1N5392
6352 1N5392
6353 1N5392
GND_P

+CDR
12.9V
2352 6m8
GND_P

VOLTAGE DOUBLER

2354 470u
1N4003 6357
1N4003 6358
2355 470u

-8.4V REGULATOR

1N4003 6360
1N4003 6361
BC327-40 7357
-13.8V
-8.4V
-8V
-8.9V
1m 2358
3363 560R
3364 470R
47u 2359
6362 BZX79-C4V7
6363 BZX79-C3V9
100u 2360
GND_P

+5V REGULATOR

Regulator
BD438 7351
5.2V
12.3V
3354 100K
Overvoltage Protection
3352 1K
BZX79-C5V6 6355
3376 150R
3358 150R
100n 2356
3353 1K
BZX79-C3V3 6356
3360 1K
7355 BC337-40
0.6V
3361 10K

Overcurrent Sensor
0.5V
7350 BC557C
10u 2350
3350 3K3
Switching transistor
BD438 7352
5.2V
4.4V
+CDR
3355 4K7
3351 100R
3356 100R
1V
7353 BC547C
1.8V
0.2V
7354 BC547C
0.9V
1N4148 6359
100n 2357
3362 22K
7356 BC547C
0.6V

2353 4u7
BZX79-F3V9 6354
3357 120R
3359 110R
2351 47u
GND_D

+5V
012
5.2V
12.2V
+12M
-8.4V
-8V
DIPMATE
to CDR Module

CDR-ON
011
GND_P
+12M
12.2V
DIPMATE
from Power-Supply part

+5V SWITCHING PART

CDR-ON
3369 560R
BZX79-C5V1 6364
3370 1K8
10.5V
5.3V
3371 100K
5V
BC557C 7359
0V
3373 10K
7360 BC547C
3374 39K
3375 10K

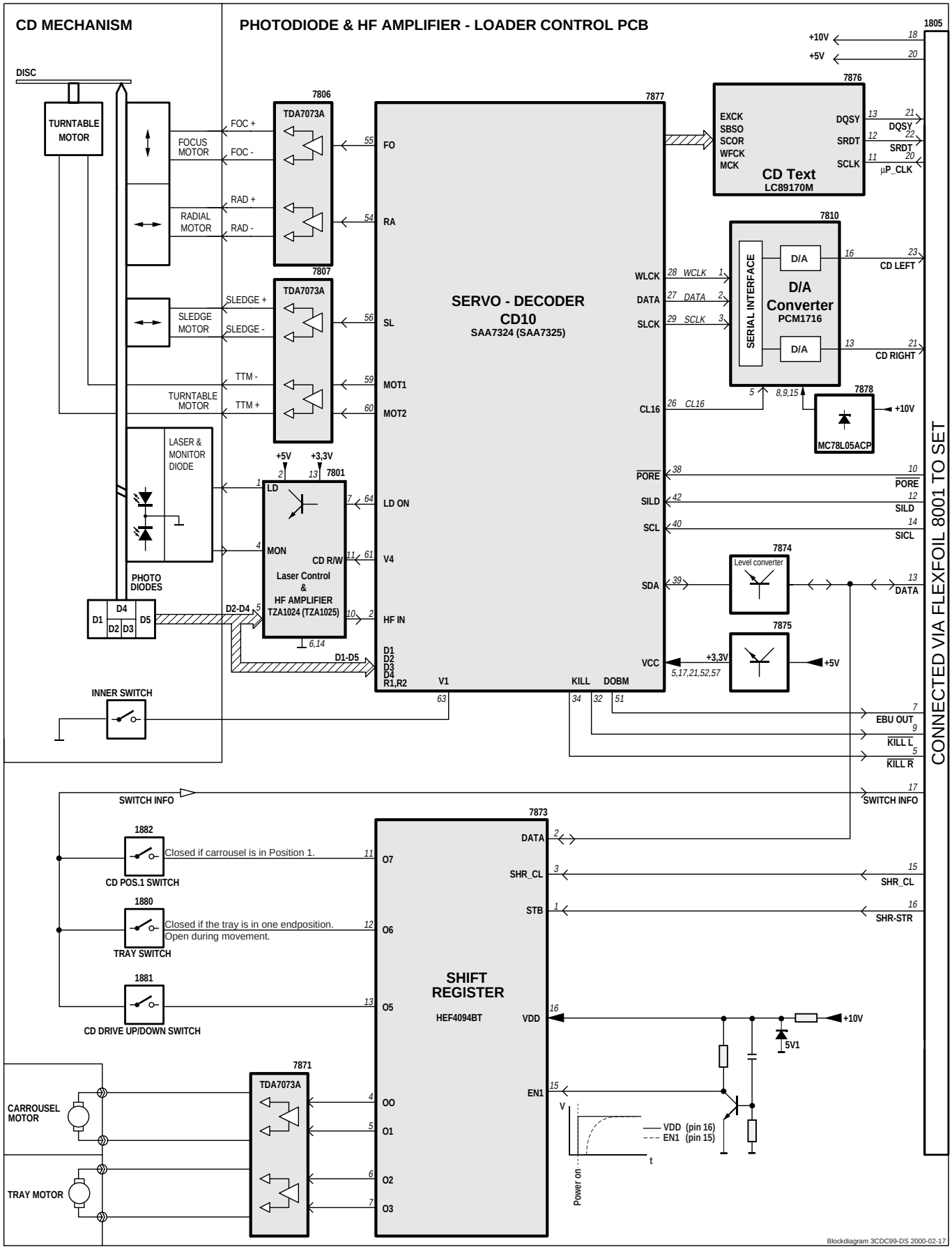
FAN CONTROL

+12M
3365 220R
3366 5R6
12.2V
11.8V
BC327-25 7358
7.9V
6365 BZX79-C3V9
3372 1K
2361 100u
2362
2363 100u
1354
FAN +
EH-B

Circuit Diagram PowerSupply CDR (15.02.2000)

011 C9
012 A9
1350 A2
1351 A1
1353 B2
1354 E9
1355 A1
2350 A7
2351 B8
2352 B4
2353 B8
2354 C1
2355 C2
2356 C5
2357 D6
2358 D2
2359 D3
2360 E2
2361 F6
2362 F6
2363 F8
3350 A7
3351 B7
3352 B5
3353 B6
3354 B4
3355 B6
3356 B7
3357 B8
3358 C5
3359 C8
3360 C6
3361 D5
3362 D7
3363 D2
3364 D3
3365 E6
3366 E7
3369 E5
3370 E5
3371 E3
3372 E6
3373 F5
3374 F3
3375 F4
3376 C4
6350 A3
6351 A3
6352 B3
6353 B3
6354 B8
6355 B5
6356 B6
6357 C2
6358 C2
6359 C7
6360 C2
6361 C2
6362 D3
6363 E3
6364 E4
6365 F7
7350 A6
7351 A5
7352 A7
7353 B7
7354 C6
7355 C5
7356 C7
7357 C3
7358 E7
7359 E4
7360 F5

Blockdiagram



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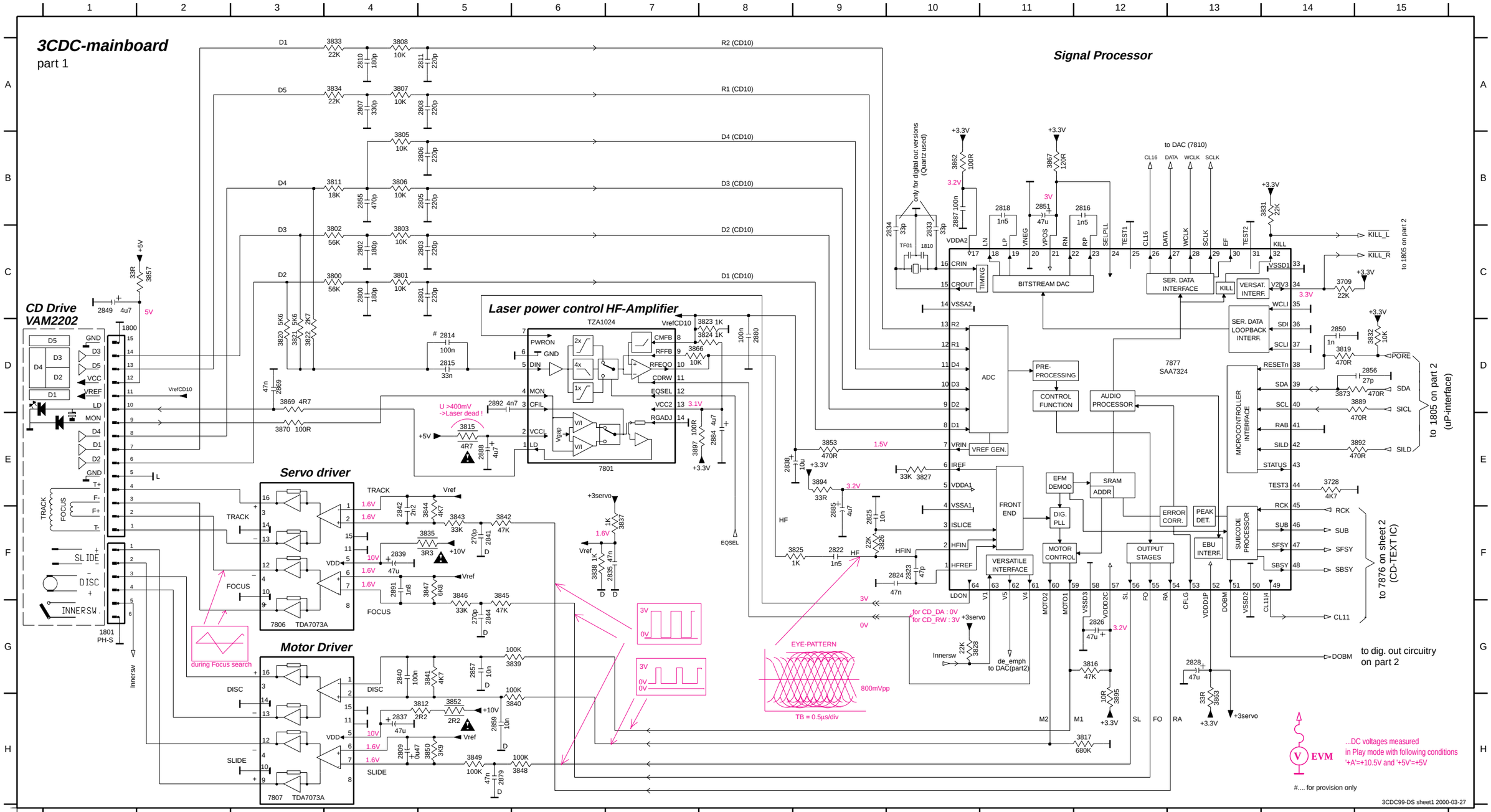
1800 D2	2803 C5	2810 A4	2822 F9	2833 C10	2840 G4	2851 B11	2879 H5	2891 F4	3802 C4	3811 B4	3820 D3	3826 F9	3834 A4	3841 G5	3847 F5	3857 C2	3870 E3	3897 E7
1801 G1	2805 B5	2811 A5	2823 F10	2834 C10	2841 F5	2855 B4	2880 D8	2892 D5	3803 C4	3812 H5	3821 D3	3827 E10	3835 F5	3842 F5	3848 H6	3862 B10	3873 D14	7801 E7
1810 C10	2806 B5	2814 D5	2824 F10	2835 F7	2842 F4	2856 D15	2884 E8	3709 C14	3805 B4	3815 E5	3822 D3	3828 G10	3837 F7	3843 F5	3849 H5	3863 H13	3889 D15	7806 G3
2800 C4	2807 A4	2815 D5	2825 F9	2837 H4	2844 G5	2857 G5	2885 F9	3728 E14	3806 B4	3816 G12	3823 D8	3831 B14	3838 F6	3844 F5	3850 H5	3866 D7	3892 E15	7807 H3
2801 C5	2808 A5	2816 B12	2826 G12	2838 E8	2849 C1	2859 H5	2887 B10	3800 C4	3807 A4	3817 H12	3824 D8	3832 D15	3839 G6	3845 F5	3852 H5	3867 B11	3894 E9	7877 D12
2802 C4	2809 H4	2818 B11	2828 G13	2839 F4	2850 D14	2869 D3	2888 E5	3801 C4	3808 A4	3819 D14	3825 F9	3833 A4	3840 H6	3846 F5	3853 E9	3869 D3	3895 H12	



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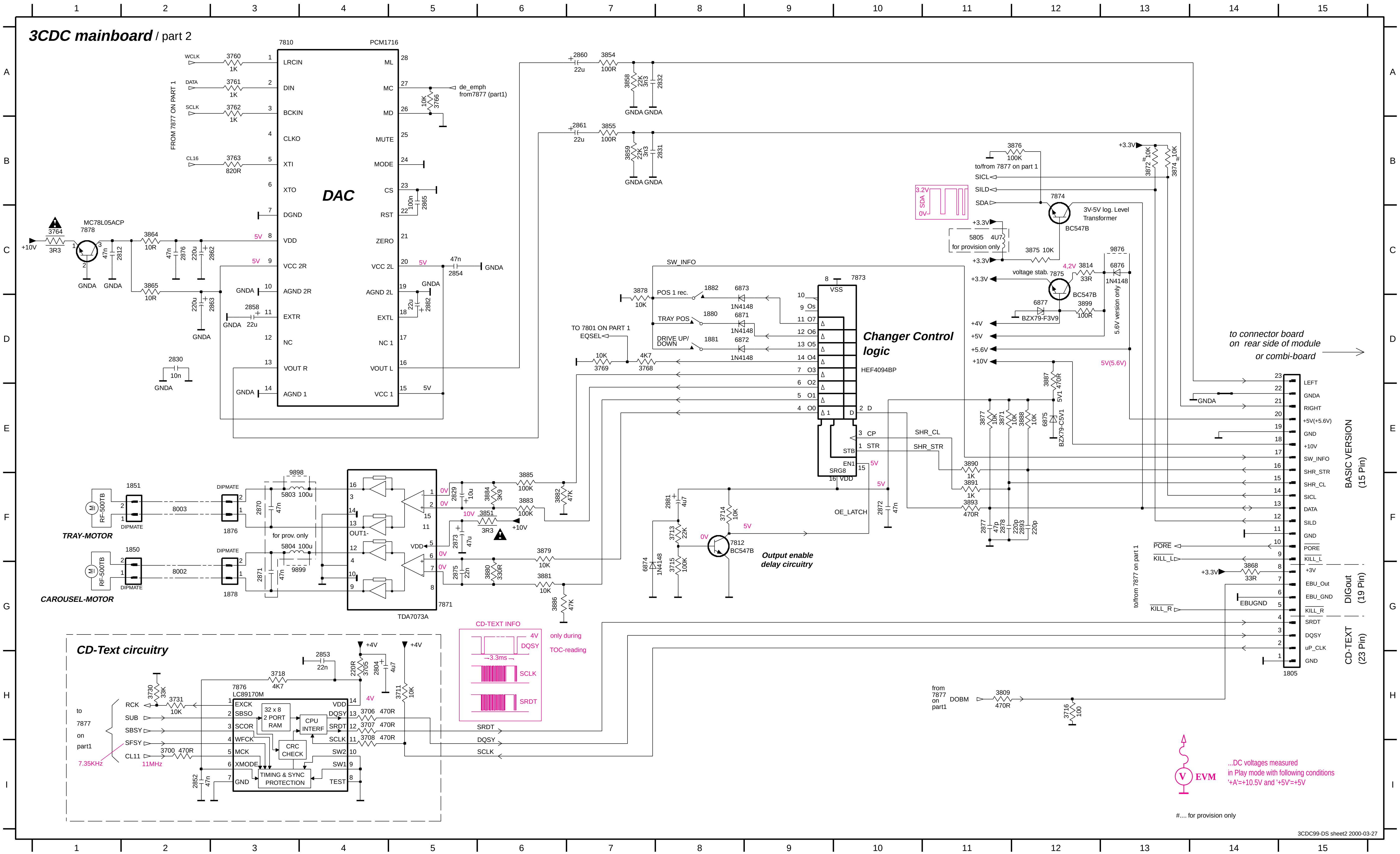
1876 F3	2812 C1	2853 H4	2863 D2	2873 F5	2882 D5	3708 H4	3718 H3	3763 B3	3814 C12	3864 C2	3875 C12	3881 G6	3887 D12	3899 D12	6873 C8	7812 F8	7878 C1	9876 C13
1878 G3	2829 F5	2854 C5	2864 H12	2875 G5	2893 F12	3711 H5	3730 H2	3764 C1	3851 F6	3865 C2	3876 B12	3882 F6	3888 E12	5803 F3	6874 G7	7871 G5	9826 H14	9898 E3
1880 D8	2830 D2	2858 D3	2865 B5	2876 C2	3700 I2	3713 F8	3731 H2	3766 A5	3854 A7	3868 G14	3877 E11	3883 F6	3890 E11	5804 F3	6875 E12	7873 C10	9834 F10	9899 G3
1881 D8	2831 B8	2860 A7	2870 F3	2877 F11	3705 H4	3714 F8	3760 A3	3768 D7	3855 B7	3871 E11	3878 C7	3884 F6	3891 F11	5805 C11	6876 C13	7874 B12	9835 G11	
1882 C8	2832 A8	2861 B7	2871 G3	2878 F11	3706 H4	3715 G8	3761 A3	3769 D7	3858 A7	3872 B13	3879 F6	3885 E6	3893 F11	6871 D8	6877 D12	7875 C12	9838 C14	



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BLOCK DIAGRAM CDR-MODULE