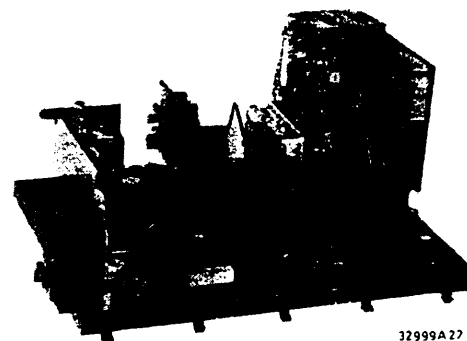


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Only applicable for sets with strokenumbers /50/51/57/59/79 (SV serial numbers)  
and sets with strokenumbers /65/66/67/68/70/94 (local production)

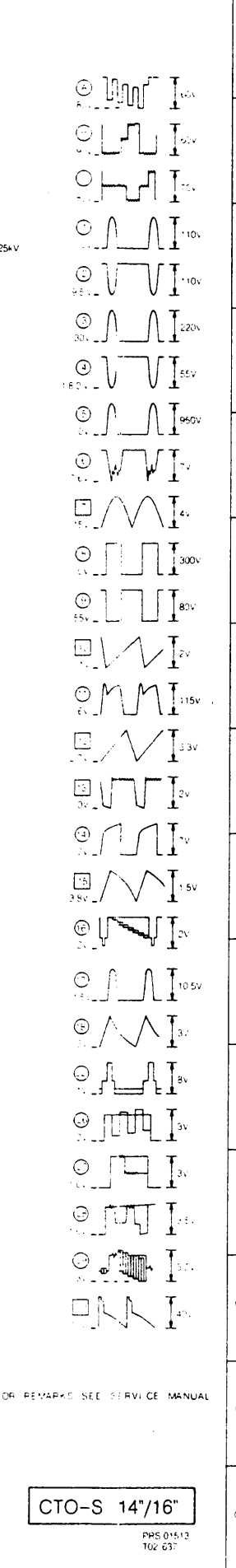
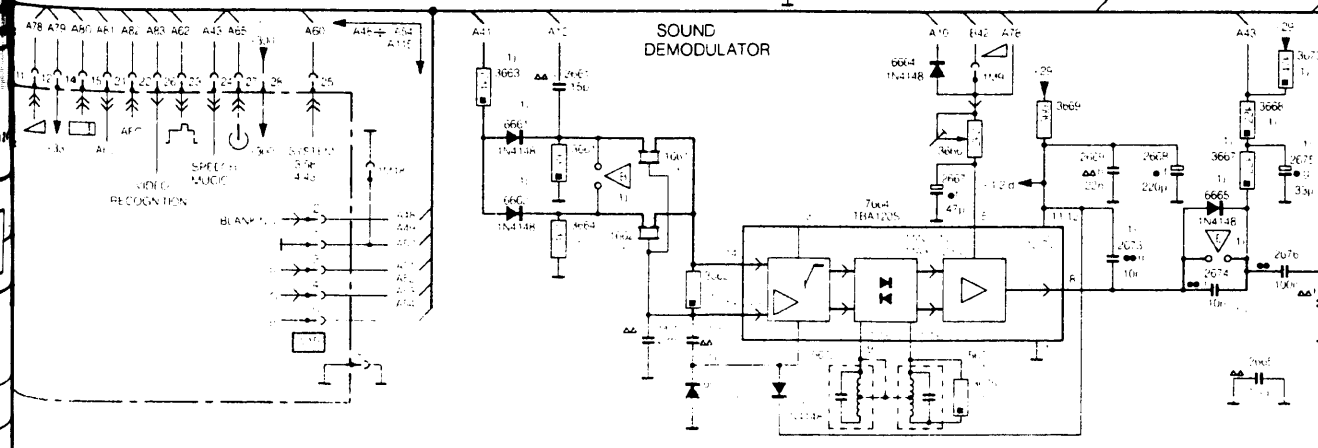
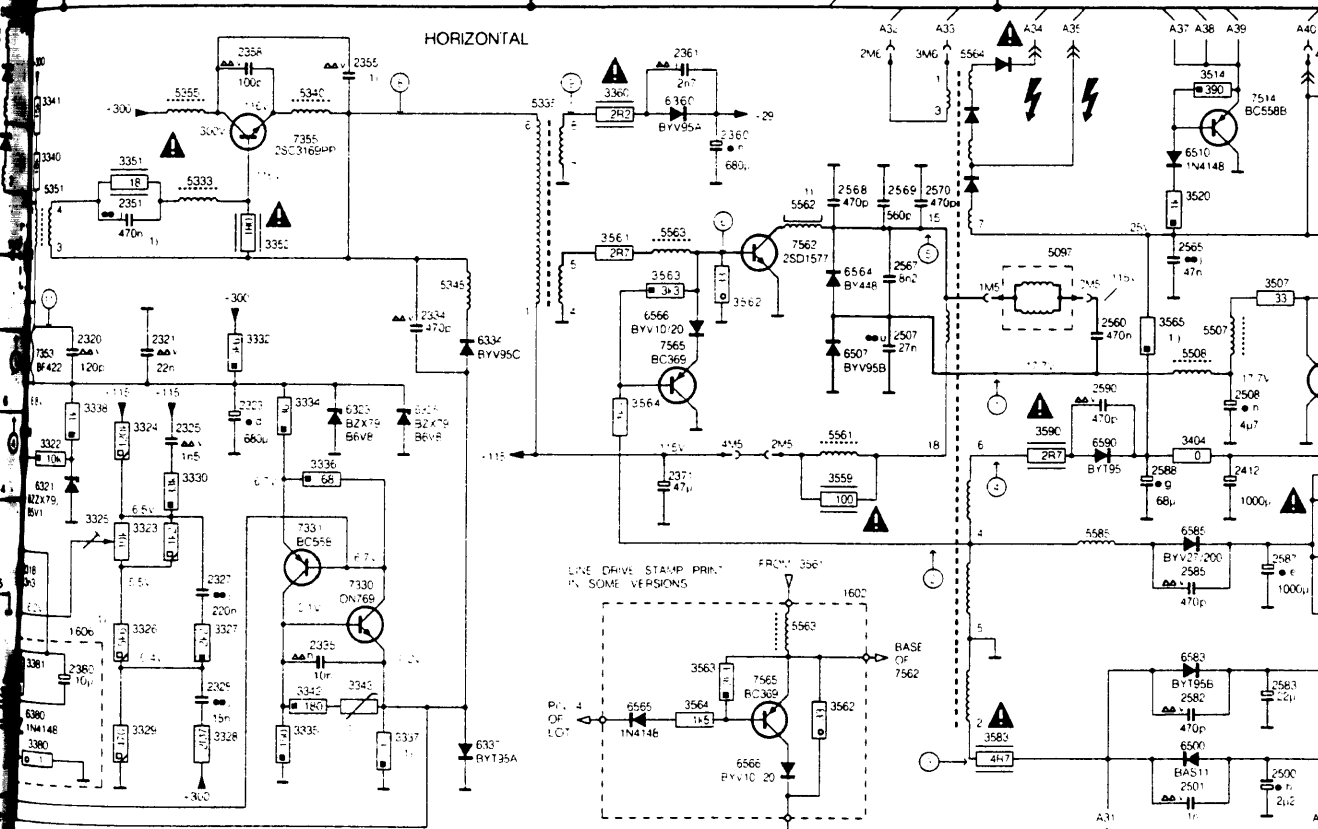
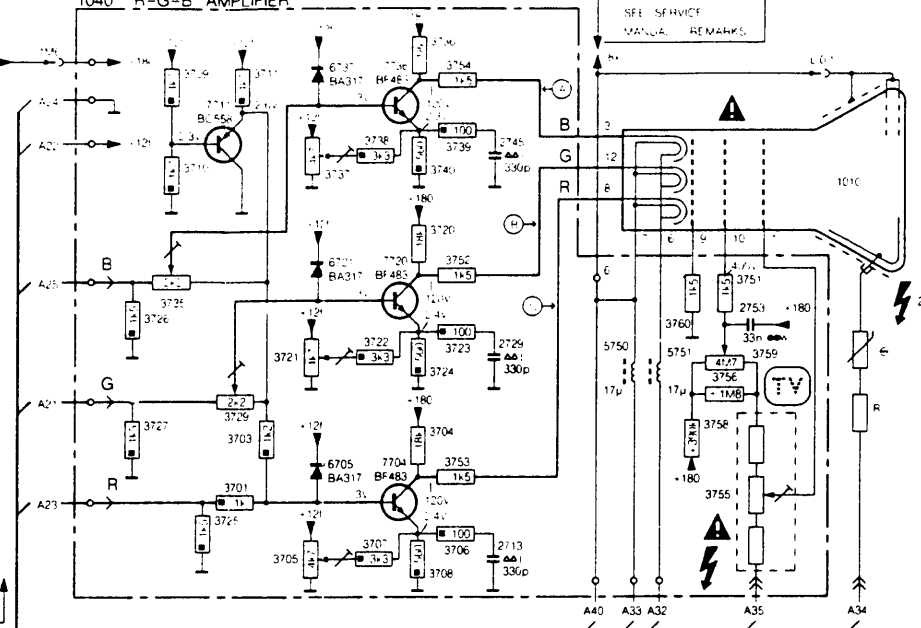
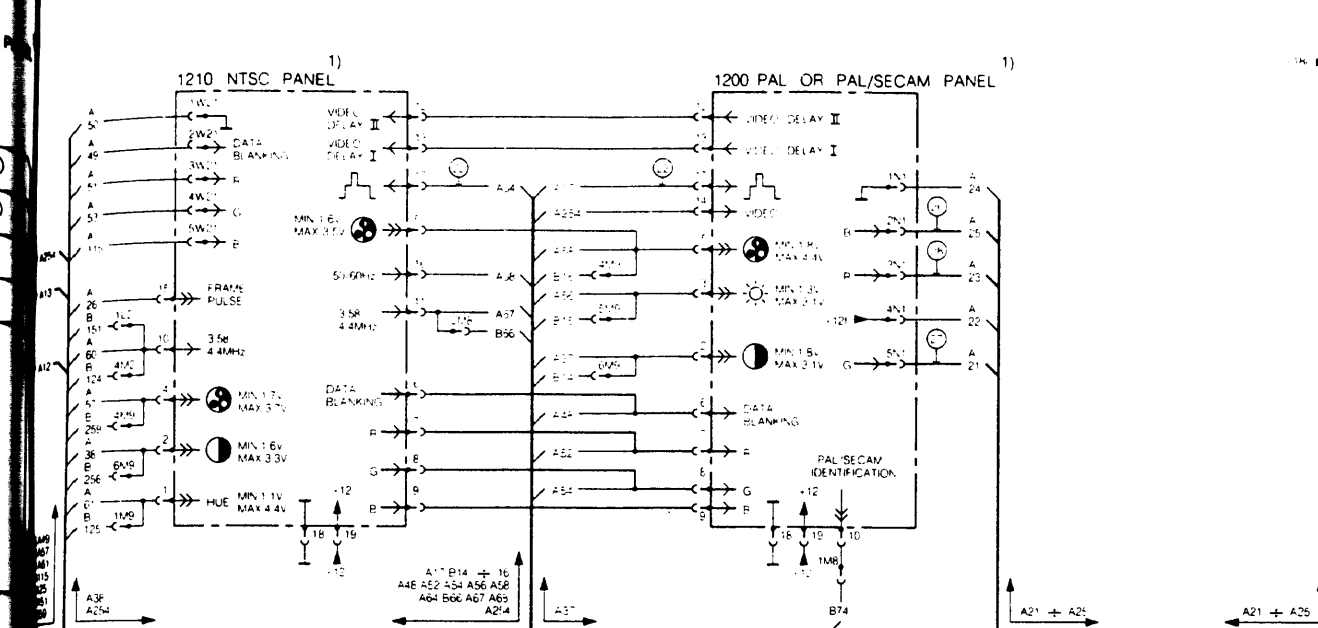
# Service Manual

## TECHNICAL DATA

Mains voltage	: 230 V~ +20%/-30%	Maximum aerial input	: 200 mV
Mains voltage range (multivoltage)	: 90 - 140 V~ 160 - 276 V~	Pull-in range colour sync.	: ± 300 Hz
Mains frequency	: 50/60 Hz ± 5%	Pull-in range horizontal sync.	: ± 600 Hz
Systems /50/65/66/67/68/70/79/94	: PAL B/G	Pull-in range vertical sync.	: ± 5 Hz
/57	PAL I	90° Picture tube	: 14", 16", 20", 21"
/59	PAL/SECAM	110° Picture tube	: 26"
/51	PAL/SECAM/NTSC	Automatic degaussing	
Aerial input impedance	: 75 Ω - coax	Adapted for video recorder	
Minimum aerial input VHF	: 30 μV		
Minimum aerial input UHF	: 40 μV		



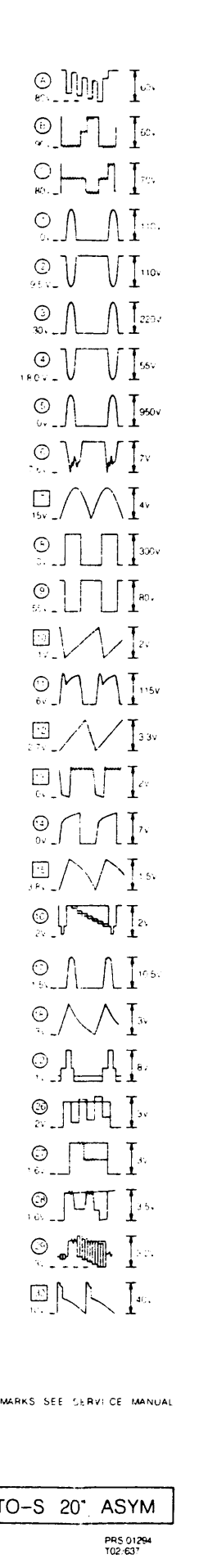
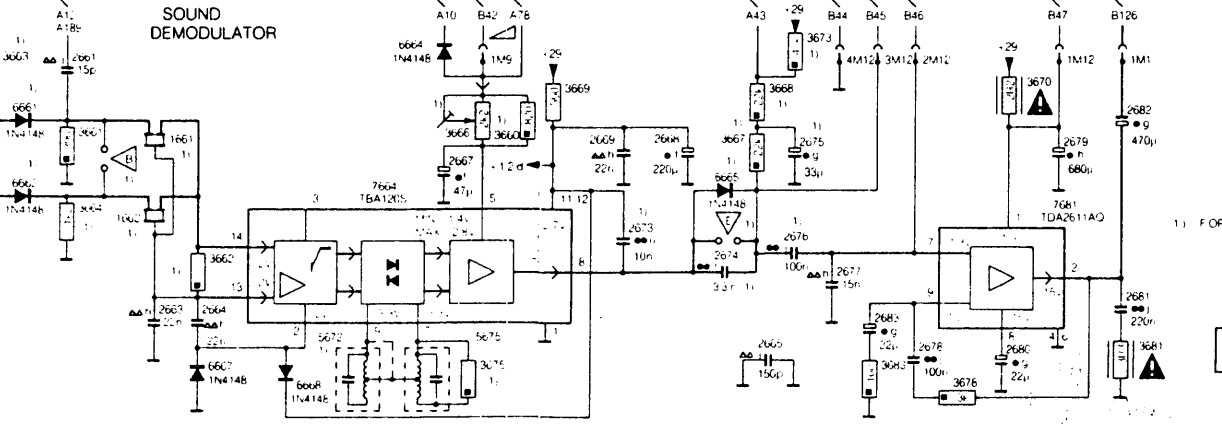
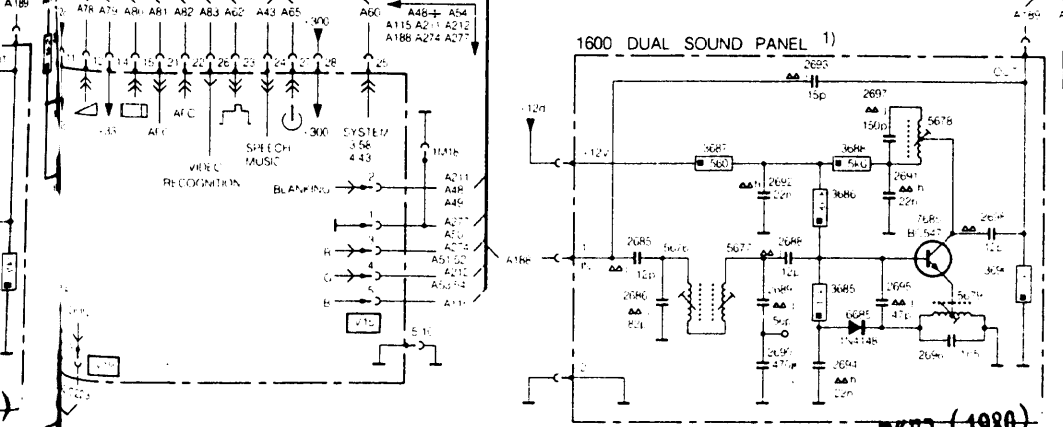
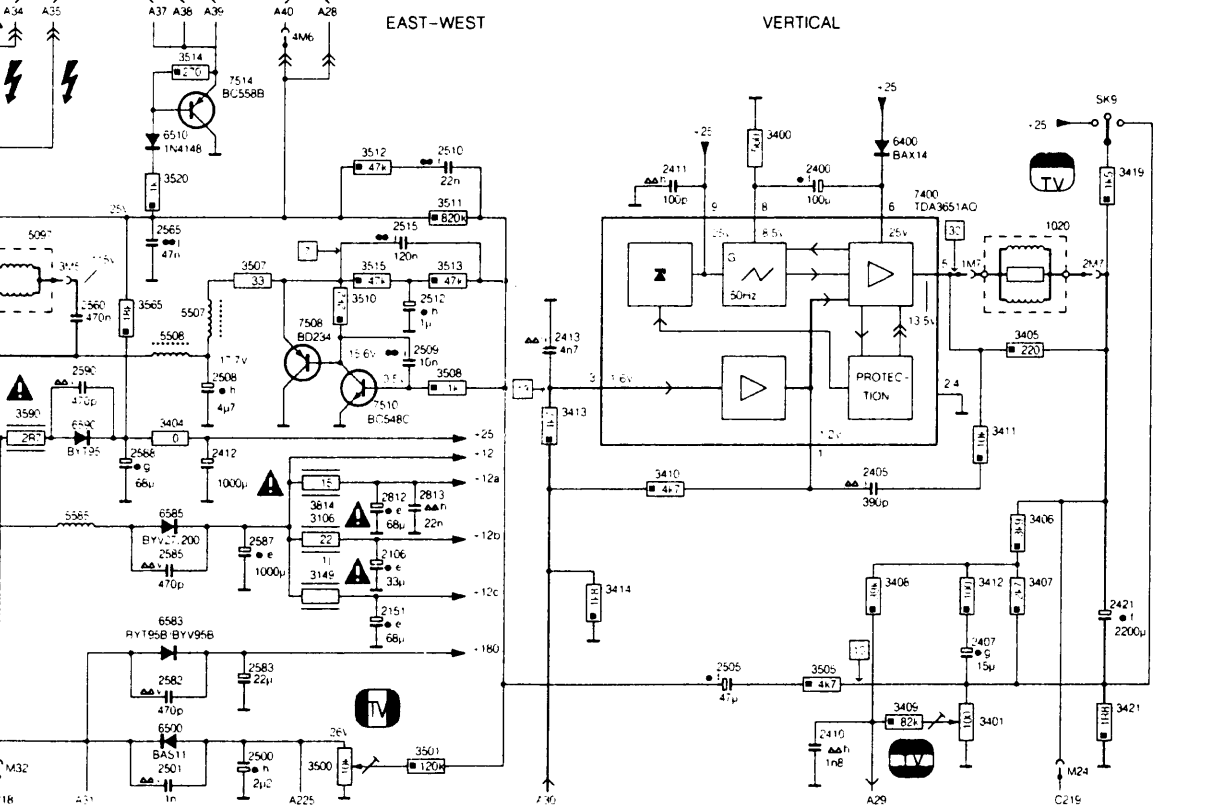
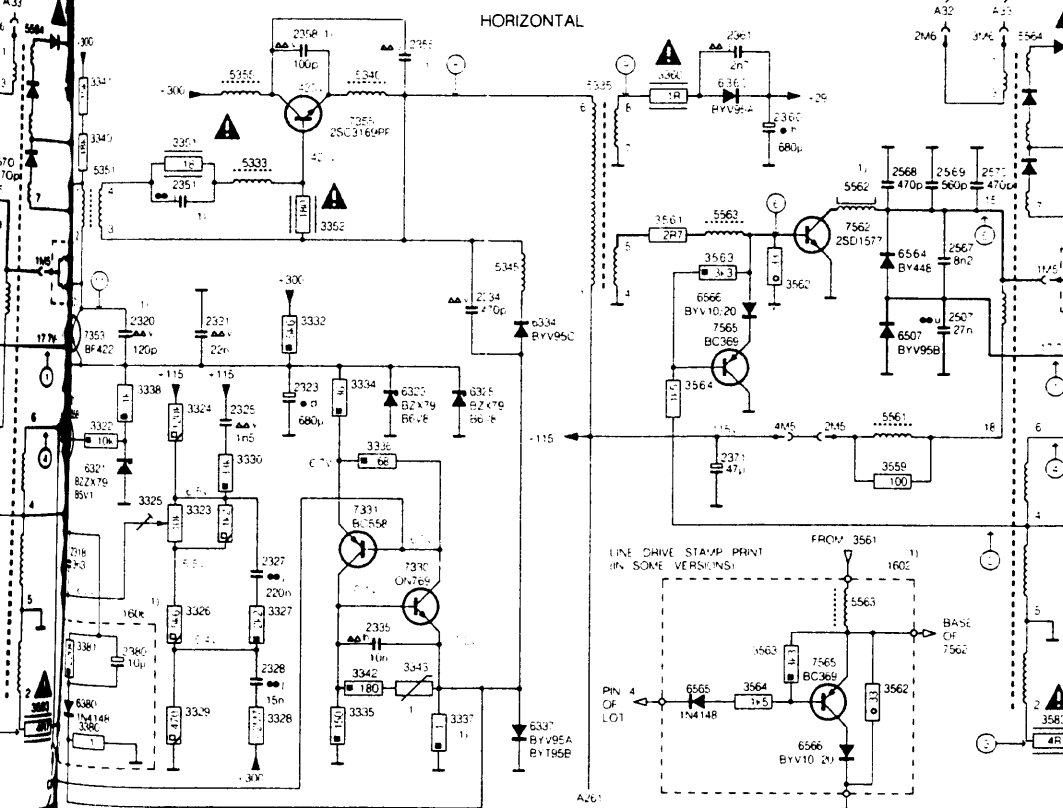
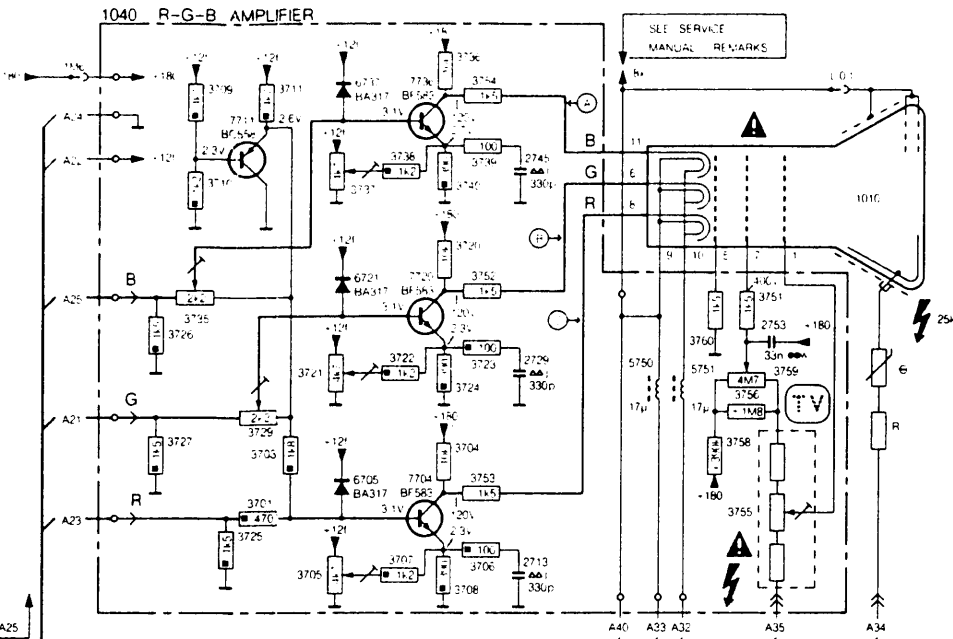
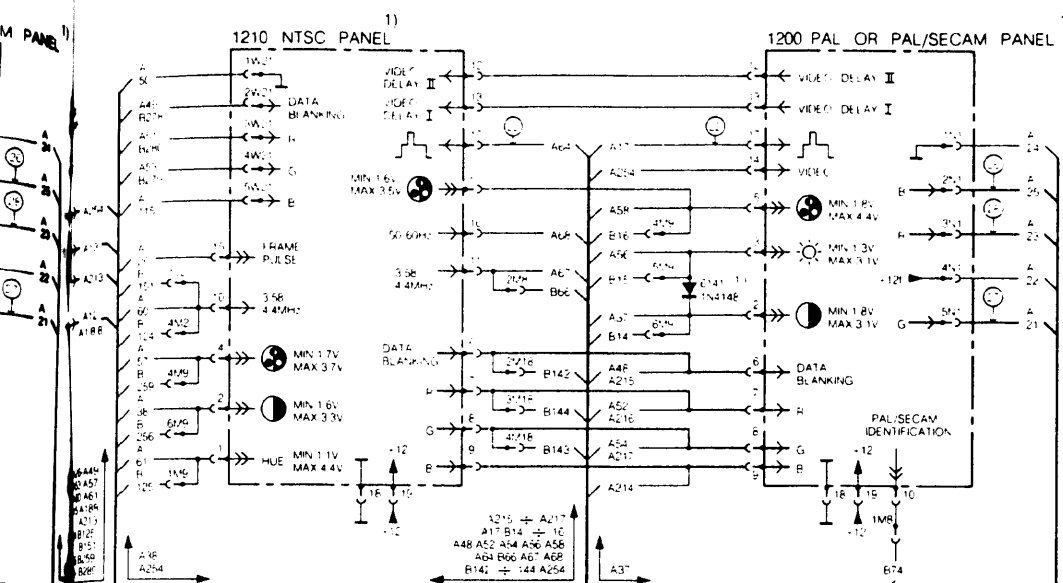
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1000	G 4	2812	I 28	3522	K 1	636	K 17
1010	B 4	2813	I 28	3523	K 1	637	K 17
1020	G 3	2814	G 3	3524	K 1	638	K 17
1030	A 6	2815	M 6	3525	K 5	639	F 6
1040	A 2	2816	M 2	3526	K 5	640	F 6
1050	A 2	2817	M 2	3527	K 5	641	F 6
1060	B 2	2818	B 2	3528	K 5	642	F 6
1070	M 3	2819	M 3	3529	K 5	643	F 6
1080	M 3	2820	M 3	3530	K 5	644	F 6
1090	M 3	2821	M 3	3531	K 5	645	F 6
1100	M 3	2822	M 3	3532	K 5	646	F 6
1110	M 3	2823	M 3	3533	K 5	647	F 6
1120	M 3	2824	M 3	3534	K 5	648	F 6
1130	M 3	2825	M 3	3535	K 5	649	F 6
1140	M 3	2826	M 3	3536	K 5	650	F 6
1150	M 3	2827	M 3	3537	K 5	651	F 6
1160	M 3	2828	M 3	3538	K 5	652	F 6
1170	M 3	2829	M 3	3539	K 5	653	F 6
1180	M 3	2830	M 3	3540	K 5	654	F 6
1190	M 3	2831	M 3	3541	K 5	655	F 6
1200	M 3	2832	M 3	3542	K 5	656	F 6
1210	M 3	2833	M 3	3543	K 5	657	F 6
1220	M 3	2834	M 3	3544	K 5	658	F 6
1230	M 3	2835	M 3	3545	K 5	659	F 6
1240	M 3	2836	M 3	3546	K 5	660	F 6
1250	M 3	2837	M 3	3547	K 5	661	F 6
1260	M 3	2838	M 3	3548	K 5	662	F 6
1270	M 3	2839	M 3	3549	K 5	663	F 6
1280	M 3	2840	M 3	3550	K 5	664	F 6
1290	M 3	2841	M 3	3551	K 5	665	F 6
1300	M 3	2842	M 3	3552	K 5	666	F 6
1310	M 3	2843	M 3	3553	K 5	667	F 6
1320	M 3	2844	M 3	3554	K 5	668	F 6
1330	M 3	2845	M 3	3555	K 5	669	F 6
1340	M 3	2846	M 3	3556	K 5	670	F 6
1350	M 3	2847	M 3	3557	K 5	671	F 6
1360	M 3	2848	M 3	3558	K 5	672	F 6
1370	M 3	2849	M 3	3559	K 5	673	F 6
1380	M 3	2850	M 3	3560	K 5	674	F 6
1390	M 3	2851	M 3	3561	K 5	675	F 6
1400	M 3	2852	M 3	3562	K 5	676	F 6
1410	M 3	2853	M 3	3563	K 5	677	F 6
1420	M 3	2854	M 3	3564	K 5	678	F 6
1430	M 3	2855	M 3	3565	K 5	679	F 6
1440	M 3	2856	M 3	3566	K 5	680	F 6
1450	M 3	2857	M 3	3567	K 5	681	F 6
1460	M 3	2858	M 3	3568	K 5	682	F 6
1470	M 3	2859	M 3	3569	K 5	683	F 6
1480	M 3	2860	M 3	3570	K 5	684	F 6
1490	M 3	2861	M 3	3571	K 5	685	F 6
1500	M 3	2862	M 3	3572	K 5	686	F 6
1510	M 3	2863	M 3	3573	K 5	687	F 6
1520	M 3	2864	M 3	3574	K 5	688	F 6
1530	M 3	2865	M 3	3575	K 5	689	F 6
1540	M 3	2866	M 3	3576	K 5	690	F 6
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1570	M 3	2869	M 3	3579	K 5	693	F 6
1580	M 3	2870	M 3	3580	K 5	694	F 6
1590	M 3	2871	M 3	3581	K 5	695	F 6
1600	M 3	2872	M 3	3582	K 5	696	F 6
1610	M 3	2873	M 3	3583	K 5	697	F 6
1620	M 3	2874	M 3	3584	K 5	698	F 6
1630	M 3	2875	M 3	3585	K 5	699	F 6
1640	M 3	2876	M 3	3586	K 5	700	F 6
1650	M 3	2877	M 3	3587	K 5	701	F 6
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1670	M 3	2879	M 3	3589	K 5	703	F 6
1680	M 3	2880	M 3	3590	K 5	704	F 6
1690	M 3	2881	M 3	3591	K 5	705	F 6
1700	M 3	2882	M 3	3592	K 5	706	F 6
1710	M 3	2883	M 3	3593	K 5	707	F 6
1720	M 3	2884	M 3	3594	K 5	708	F 6
1730	M 3	2885	M 3	3595	K 5	709	F 6
1740	M 3	2886	M 3	3596	K 5	710	F 6
1750	M 3	2887	M 3	3597	K 5	711	F 6
1760	M 3	2888	M 3	3598	K 5	712	F 6
1770	M 3	2889	M 3	3599	K 5	713	F 6
1780	M 3	2890	M 3	3600	K 5	714	F 6
1790	M 3	2891	M 3	3601	K 5	715	F 6
1800	M 3	2892	M 3	3602	K 5	716	F 6
1810	M 3	2893	M 3	3603	K 5	717	F 6
1820	M 3	2894	M 3	3604	K 5	718	F 6
1830	M 3	2895	M 3	3605	K 5	719	F 6
1840	M 3	2896	M 3	3606	K 5	720	F 6
1850	M 3	2897	M 3	3607	K 5	721	F 6
1860	M 3	2898	M 3	3608	K 5	722	F 6
1870	M 3	2899	M 3	3609	K 5	723	F 6
1880	M 3	2900	M 3	3610	K 5	724	F 6
1890	M 3	2901	M 3	3611	K 5	725	F 6
1900	M 3	2902	M 3	3612	K 5	726	F 6
1910	M 3	2903	M 3	3613	K 5	727	F 6
1920	M 3	2904	M 3	3614	K 5	728	F 6
1930	M 3	2905	M 3	3615	K 5	729	F 6
1940	M 3	2906	M 3	3616	K 5	730	F 6
1950	M 3	2907	M 3	3617	K 5	731	F 6
1960	M 3	2908	M 3	3618	K 5	732	F 6
1970	M 3	2909	M 3	3619	K 5	733	F 6
1980	M 3	2910	M 3	3620	K 5	734	F 6
1990	M 3	2911	M 3	3621	K 5	735	F 6
2000	M 3	2912	M 3	3622	K 5	736	F 6

CTO-S 14"/16"  
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1001	G 2	2689	N22	3412	J33	5672	G27
1011	G 2	2690	N22	3413	J33	5673	G28
1020	G33	2691	N23	3414	J30	5676	N21
1040	P28	2692	N22	3419	G34	5677	N22
1051	A 2	2693	M22	3421	K34	5678	M24
1055	A 3	2694	C23	3500	L27	5679	N24
1088	M 1	2695	N23	3501	N28	5703	C32
1102	B 2	2696	O23	3505	K31	5751	C32
1200	A22	2697	M23	3507	H27	6012	M10
1210	A18	2698	N24	3508	L28	6101	E 4
1210	M 7	2713	E 31	3510	H28	6102	C 5
1220	M12	2729	C31	3511	G28	6141	C22
1300	I 7	2745	B31	3512	G28	6159	D13
1391	G 3	2753	C33	3513	H28	6301	J 3
1600	M21	2810	K10	3514	F26	6302	I 3
1602	J23	2811	K10	3515	H28	6303	K 2
1605	L 4	2812	J28	3520	G26	6304	K 3
1606	J17	2813	J28	3529	L23	6305	J 6
1661	M26	2814	G13	3561	G21	6306	K 7
1662	N26	2820	F22	3562	H23	6307	J 6
2001	O 3	2831	N 2	3562	H22	6317	K14
2002	N 3	2832	N 4	3563	H22	6318	J16
2008	N 8	2860	F11	3563	H22	6320	G15
2101	E 5	2865	J 9	3564	L21	6321	I17
2103	B 3	2866	K12	3564	H22	6322	K15
2106	J28	2868	F10	3565	H26	6323	I19
2109	D 3	2869	F 9	3583	K24	6325	L20
2110	D 4	2870	F11	3590	L25	6334	H20
2111	D 3	2876	H 9	3560	H29	6336	K20
2112	D 1	2880	H 9	3681	M25	6360	F22
2113	D 2	2890	F11	3662	N26	6380	K17
2114	B 5	2891	F10	3663	M25	6392	G 5
2115	B 5	2895	H 7	3664	N25	6393	F 6
2122	B 5	3001	G 2	3666	M26	6392	K15
2124	B 6	3001	N10	3667	M20	6393	F 5
2127	B 7	3002	N10	3668	M21	6394	H 7
2130	B 8	3003	N 9	3669	M29	6395	F 6
2131	B 8	3004	O 8	3670	M29	6396	K26
2137	B 8	3005	O 8	3673	L31	6400	G32
2138	B 8	3006	N 8	3675	O29	6500	K26
2145	B 9	3008	M 8	3678	O32	6507	H23
2146	D 9	3101	D 5	3681	O34	6510	G26
2147	C 1	3103	A 3	3683	O33	6584	H23
2148	C10	3104	E 6	3685	N23	6565	K22
2150	A10	3105	E14	3686	N23	6566	L22
2151	J28	3106	J27	3687	M22	6566	H22
2152	E12	3108	D 2	3688	M23	6583	K26
2155	D13	3109	D 2	3690	N22	6705	O30
2154	E11	3110	E 4	3701	D29	6590	L25
2155	E14	3111	D 3	3703	D29	6661	M25
2156	E15	3112	D 6	3704	O30	6662	N25
2157	E 1	3113	D 6	3705	M29	6664	K26
2158	D13	3121	B 4	3706	E31	6665	N30
2160	C15	3122	B 5	3707	E30	6667	O26
2201	J 2	3123	C 7	3708	E30	6668	O27
2202	K 2	3127	B 6	3709	A28	6685	O23
2203	K 5	3129	K 6	3710	G28	6705	O30
2304	J 5	3143	D 8	3711	A29	6721	C30
2305	K 6	3145	M15	3720	B30	6737	A30
2306	K 6	3146	C 9	3721	C29	6873	J11
2307	K 7	3148	D18	3722	M29	6896	H 6
2317	I14	3148	C16	3723	C31	7001	N 9
2318	J16	3149	J27	3724	C30	7003	N 8
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2320	H17	3151	B16	3726	C28	7151	B14
2321	H17	3152	G12	3727	C28	7152	B15
2323	I18	3153	D11	3729	D29	7301	J 4
2325	I18	3154	E11	3735	C28	7302	K 5
2327	J18	3155	E14	3736	A30	7303	K 3
2328	J18	3156	D18	3737	B30	7321	I16
2330	H 5	3157	D10	3738	B30	7322	I15
2334	H20	3158	E10	3739	B31	7323	J16
2335	K19	3159	D12	3740	B30	7330	J19
2340	H16	3160	C15	3751	C33	7331	J19
2341	H16	3161	G12	3752	C33	7332	J19
2355	F19	3165	E12	3753	D31	7355	G19
2356	G15	3301	J 2	3754	A31	7368	H15
2358	F18	3302	K 2	3755	O33	7400	G32
2360	G22	3303	K 4	3756	O33	7508	H27
2361	G22	3304	K 4	3757	G32	7510	H28
2370	H 5	3305	J 5	3759	C33	7514	F27
2371	I22	3307	J 3	3760	C32	7562	G23
2380	K17	3308	K 3	3810	K10	7565	K23
2381	G 3	3309	J 6	3811	H11	7565	H22
2390	F 3	3310	J 3	3813	K10	7664	N28
2392	G 5	3311	J 4	3814	J27	7681	N33
2392	F 6	3312	K 4	3816	K 9	7685	N23
2393	G 5	3313	K 3	3817	K 9	7704	D30
2395	G 5	3314	K 3	3820	M11	7711	A29
2396	F 5	3315	K 3	3831	N 2	7720	C30
2400	G31	3316	J 6	3832	M 4	7736	A30
2405	I32	3316	H14	3860	I 9	7830	M 2
2407	K31	3317	I15	3862	I15	7831	M 4
2410	K31	3318	I15	3868	G10	7875	G13
2411	G30	3319	F16	3869	F10	7877	J 9
2412	I26	3320	K14	3870	G12	SK1	H 2
2413	H29	3321	J16	3871	F11	SK9	F33
2421	I34	3322	I17	3872	G 8		
2500	L27	3323	J18	3873	J11		
2501	L26	3324	I18	3874	K12		
2505	K30	3325	J17	3875	I 8		
2507	H24	3326	J18	3876	K13		
2508	I26	3327	J18	3877	J 8		
2509	H28	3328	K18	3878	K14		
2510	G28	3329	K18	3879	I 9		
2512	H28	3330	I18	3880	I 8		
2515	G28	3331	I16	3885	K13		
2560	H25	3332	H18	3890	F11		
2565	G26	3334	I19	3894	G 6		
2567	H24	3335	K19	3895	G 6		
2568	G23	3336	I19	3896	G 6		
2569	G24	3337	K20	5001	O 3		
2570	G24	3338	I17	5097	G25		
2582	K26	3340	G17	5098	F 2		
2583	K27	3341	F17	5121	B 5		
2584	J26	3342	K19	5122	A 6		
2587	I27	3343	K19	5127	C 7		
2588	I26	3351	G17	5133	A 8		
2590	I25	3352	G19	5138	C 9		
2661	M25	3355	G16	5139	A 9		
2663	O25	3360	F21	5145	B 9		
2664	O26	3362	G14	5150	A15		
2665	O31	3365	H14	5156	C14		
2667	M28	3368	H15	5157	A12		
2668	M30	3369	K17	5338	A13		
2669	M29	3381	I17	5331	G18		
2673	N30	3389	F 4	5335	F21		
2674	N30	3390	F 4	5340	F19		
2675	M31	3391	G 4	5345	H2C		
2676	N22	3392	G 4	5351	G17		
2677	N31	3400	G31	5355	F18		
2678	O32	3401	K33	5392	G 4		
2679	M33	3404	I26	5507	H26		
2680	G33	3405	K33	5508	H26		
2681	N34	3406	J33	5561	I23		
2682	M54	3407	J33	5562	G23		
2683	O32	3408	J32	5563	J23		
2685	N21	3409	K32	5563	G22		
2686	N22	3410	I30	5564	F14		
2688	N22	3411	I33	5565	J25		

1) FOR REMARKS SEE SERVICE MANUAL

CTO-S 20" ASYM

PRS 01294  
102.637

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DIFFERENCE LIST FOR 20" DAS SETS

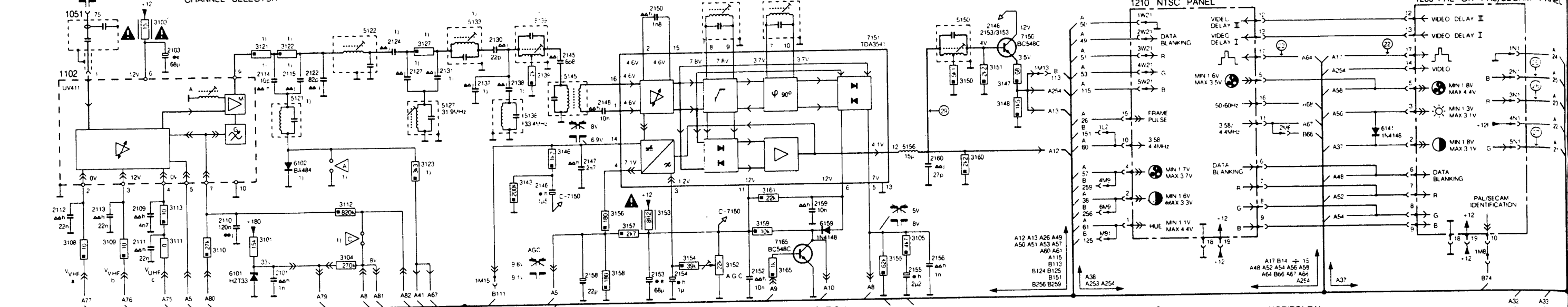
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20CT6550 (vst)	X	X	X	X	X
21CT9651 (vst)	-	X	X	-	X
1080 mains panel	-	X	-	-	-
1200 PAL module	X	-	X	X	X
1200 PAL/SECAM module	-	X	-	-	-
1210 NTSC module	-	X	-	-	-
1220 VST panel	X	X	X	X	X
1605 aut. sync. print	-	-	-	X	X
1606 error amp. print	-	-	-	X	X
1661 filter .MHz	5.5	5.5	6.0	5.5	5.5
1662 filter .MHz	-	4.5	-	-	-
2114	-	10p	-	-	-
2115	-	10p	-	-	-
2124	5p6	5p6	4p7	5p6	5p6
2127	12p	12p	10p	12p	12p
2131	12p	12p	10p	12p	12p
2137	4p7	4p7	3p3	4p7	4p7
2138	10p	10p	6p8	10p	10p
2320	100p	100p	100p	120p	100p
2406	220p	220p	220p	220p	del
2505-20"	47u	47u	47u	47u	47u
2505-21"	220n	220n	220n	220n	220n
2567-20"	8n2	8n2	8n2	8n2	8n2
2567-21"	7n5	7n5	7n5	7n5	7n5
2810	-	120n	-	-	-
2811	680n	560n	680n	680n	680n
2860	4u7	4u7	-	-	-
2870	2n2	3n3	2n2	2n2	2n2
2880	100n	100n	100n	del	del
2891	270n	270n	270n	56n	56n
3121	-	56R	-	-	-
3122	82R	22R	82R	82R	82R
3123	-	3K3	-	-	-
3127	43R	43R	47R	43R	43R
3149	10R	2R2	10R	10R	10R
3321	39R	39R	39R	180R	180R
3337	1R	1R	1R	-	-
3408-20"	39K	39K	39K	39K	39K
3408-21"	33K	33K	33K	33K	33K
3421-20"	1R8	1R8	1R8	1R8	1R8
3421-21"	1R5	1R5	1R5	1R5	1R5
3505-20"	4K7	4K7	4K7	4K7	4K7
3505-21"	22K	22K	22K	22K	22K
3560-21"	1K	1K	1K	1K	1K
3590-20"	2R7	2R7	2R7	2R7	2R7
3590-21"	1R2	1R2	1R2	1R2	1R2
3662	4K3	4K3	4K7	4K3	4K3
3663	-	1K2	-	-	-
3664	-	1K2	-	-	-
3816	-	15K	-	-	-
3817	-	2K2	-	-	-
3879	6K8	6K8	6K8	-	6K8
3885	15K	15K	15K	-	15K
3890	470R	470R	470R	2K4	470R
3870	36K	20K	36K	36K	36K
3873	-	220K	-	-	-
3879	6K8	6K8	6K8	6K8	-
3890	470R	470R	470R	2K4	2K4

Item*	/50	/51	/57	/67	/70
5121 ..μH	-	0.32	-	-	-
5133 ..μH	0.32	0.32	-	0.32	0.32
5560 (only 21")	X	X	X	X	X
5672 ..μH	-	12.5	-	-	-
6102	-	BA484	-	-	-
6392	BY527	BY527	BY527	1N5062	BY527
6393	BY527	BY527	BY527	1N5062	BY527
6395	BY527	BY527	BY527	1N5062	BY527
6396	BY527	BY527	BY527	1N5062	BY527
8661	-	1N4148	-	-	-
6662	-	1N4148	-	-	-
3873	-	1N4148	-	-	-
7877	-	BC548	-	-	-
jumper A (cl=closed)	-	-	-	-	-
jumper B	-	-	-	-	-
jumper C	-	-	-	-	-

\* Item only present when marked with "X"

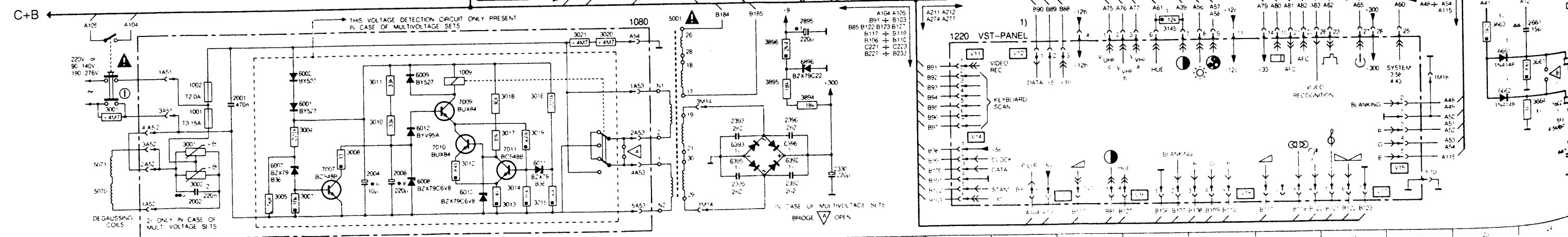
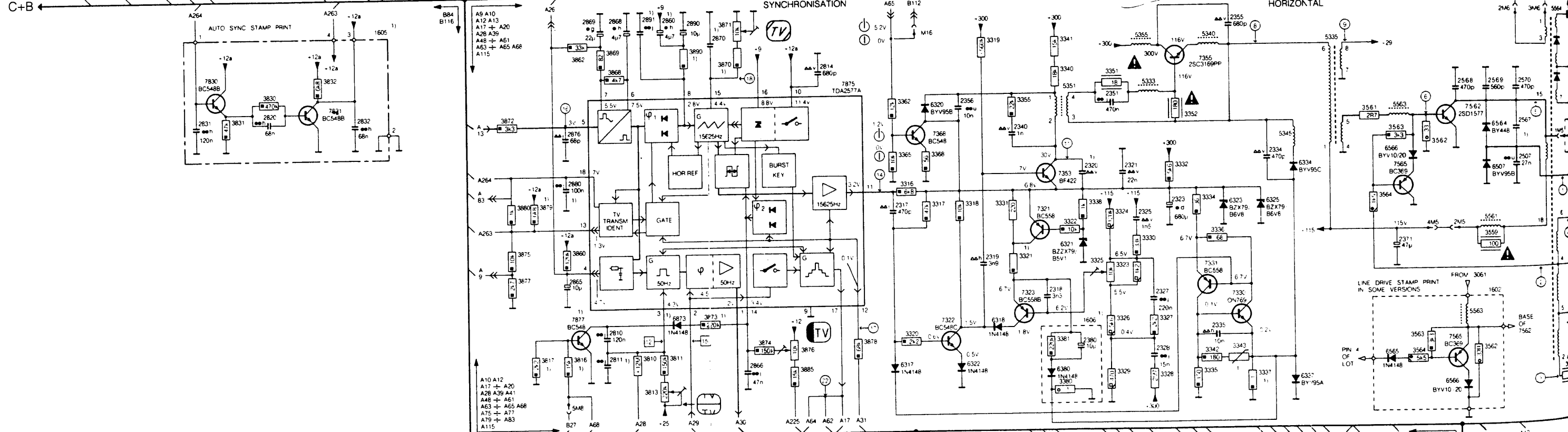
DIAGRAM A

CHANNEL SELECTOR



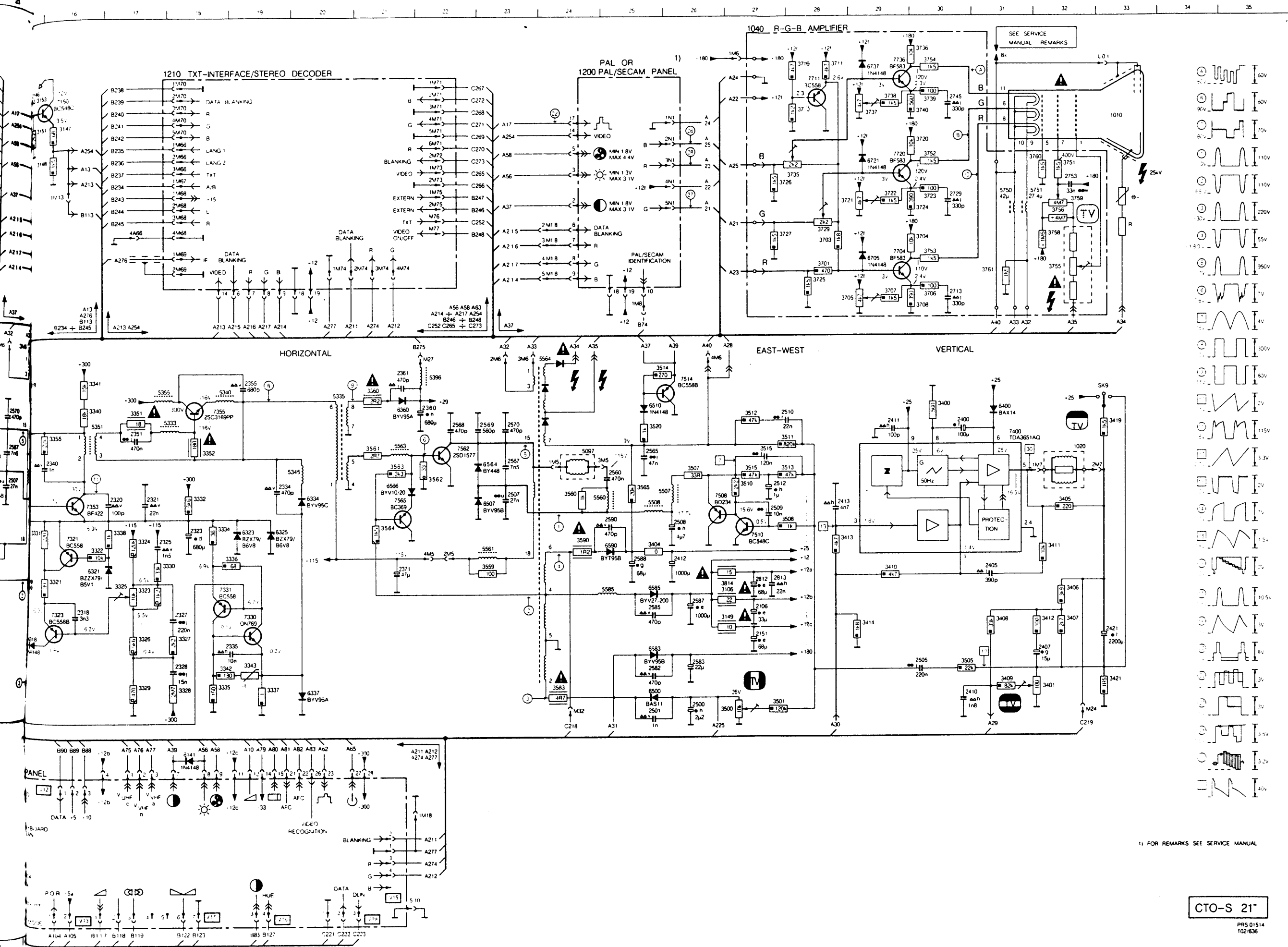
1210 NTSC PANEL

1200 PAL OR PAL/SECAM PANEL









1001	N	3	3104	E	6	3868	G10
1002	M	3	3105	E14	3869	F10	
1009	M	7	3106	O	2	3870	G11
1010	B33	3108	O	2	3871	F11	
1020	G32	3109	O	2	3872	G8	
1040	U27	3110	E	4	3874	K12	
1051	A	2	3111	O	3	3875	I8
1080	L10	3112	O	6	3876	K12	
1102	B	2	3113	B	5	3877	F8
1170	B	3	3122	B	5	3878	K13
1200	A24	3127	B	7	3879	I9	
1210	A18	3139	B	9	3880	I8	
1220	M15	3143	O	8	3885	K12	
2001	M	4	3146	C9	3890	F11	
2002	O	3	3147	B16	3894	N12	
2004	O	6	3148	C15	3895	M12	
2008	O	6	3149	J27	3896	M12	
2101	E	5	3150	B14	5001	L10	
2103	B	3	3151	B15	5010	O	
2106	J27	3152	E11	5071	N	2	
2109	O	3	3153	D10	5097	G24	
2110	O	4	3154	E11	5122	A	
2111	O	3	3155	E14	5127	C	
2112	O	2	3156	D10	5133	A	
2113	O	2	3157	D10	5138	C	
2122	B	5	3158	E10	5139	A	
2124	B	6	3159	O12	5145	B	
2127	B	8	3162	K18	5151	B	
2130	B	8	3161	O12	5156	C14	
2131	B	7	3165	E12	5157	A11	
2137	B	7	3316	H14	5158	A12	
2138	B	8	3317	I11	5161	B15	
2139	B	8	3318	I15	5333	G18	
2145	B	9	3319	F15	5335	F20	
2146	D	9	3320	K14	5340	F18	
2147	C	9	3321	J16	5345	H19	
2148	C10	3322	I16	5351	G16		
2150	A10	3323	J17	5355	F17		
2151	J27	3324	I17	5396	F22		
2152	E12	3325	J17	5507	H25		
2153	E10	3326	J17	5508	H25		
2154	E11	3328	K18	5560	H24		
2155	E14	3328	K18	5561	I23		
2156	E14	3329	K17	5563	G21		
2158	E	9	3330	I18	5564	F24	
2159	D13	3331	I15	5585	I25		
2160	C1	3332	H18	5750	C31		
2161	C15	3334	I18	5751	C32		
2317	I14	3335	K18	6001	N	5	
2318	J16	3336	I19	6002	M	5	
2319	J15	3337	K19	6007	M	5	
2320	H17	3338	I17	6008	O	7	
2321	H17	3340	G16	6009	M	7	
2323	I18	3341	F16	6010	O	7	
2325	I18	3342	K18	6011	K	8	
2327	J18	3343	K18	6012	N	7	
2328	K18	3351	G17	6101	E	4	
2330	O13	3352	G18	6141	L18		
2334	H19	3355	G16	6159	D13		
2335	K19	3356	F21	6317	K14		
2340	H16	3362	G14	6318	J15		
2351	G17	3365	H14	6320	G14		
2355	F19	3368	H14	6321	I16		
2356	G15	3400	G30	6322	K15		
2357	G20	3402	G32	6323	K15		
2361	F21	3404	I25	6325	I19		
2371	I21	3405	H32	6334	H20		
2392	O12	3406	J32	6337	K20		
2393	H28	3411	J32	6360	H12		
2395	O11	3408	G31	6392	N12		
2396	N12	3409	K31	6393	N11		
2400	G30	3410	I29	6395	N11		
2405	I31	3411	I32	6398	N12		
2407	K32	3412	I32	6400	G31		
2410	K31	3413	I29	6500	K25		
2411	G29	3414	J29	6507	H23		
2412	I26	3419	G33	6510	G25		
2413	H28	3421	K33	6564	H23		
2414	I31	3500	H32	6566	H21		
2500	L26	3501	L27	6583	K25		
2501	L25	3505	K30	6585	J25		
2505	K30	3507	H26	6590	I25		
2507	H23	3508	I29	6664	E13		
2508	I26	3510	H2	7005	D29		
2509	H27	3511	G28	6721	C29		
2510	G28	3512	G27	6737	A29		
2512	H27	3513	H28	6896	M12		
2515	G27	3514	F29	6864	E13		
2560	H25	3515	H27	7009	N	7	
2565	G25	3520	G25	7010	N	7	
2567	H23	3559	I23	7011	N	8	
2568	G22	3560	H24	7150	B16		
2569	G21	3561	I24	7151	B14		
2570	G23	3562	H22	7165	E12		
2582	K25	3563	H21	7321	I16		
2583	K26	3564	I21	7322	J15		
2585	J25	3565	H25	7323	J16		
2587	J26	3583	K24	7330	J19		
2588	I25	3590	I24	7331	J18		
2590	I25	3701	O28	7353	H16		
2713	E30	3703	O28	7355	G18		
2729	C30	3704	O30	7358	H14		
2745	B30	3705	E28	7400	G31		
2753	C32	3706	E30	7508	H26		
2811	K10	3707	E29	7510	I27		
2812	J27	3708	E30	7514	F26		
2813	J27	3709	A28	7562	G22		
2814	G13	3710	B28	7565	H21		
2860	F10	3711	A28	7704	D29		
2865	J	3720	B30	7711	A28		
2866	H12	3721	C28	7720	C29		
2868	F10	3722	C29	7736	A28		
2869	F	3723	C30	7875	G13		
2870	F	3724	C30				
2876	H	3725	O32				
2880	O	3726	O28				
2890	F11	3727	O28				
2891	F10	3729	O28				
2895	L12	3735	C28				
3001	N	3736	A30				
3001	N	3737	B29				
3002	O	3738	B29				
3004	N	3739	B30				
3005	O	3740	B30				
3007	O	3751	C32				
3008	N	3752	C30				
3010	N	3753	O30				
3011	M	3754	A30				
3012	N	3755	O32				
3013	O	3756	O32				
3014	O	3758	O32				
3015	O	3759	C32				
3016	M	3760	C32				
3017	N	3761	O31				
3018	M	3810	K10				
3019	N	3811	K11				
3020	M	3813	K10				
3021	M	3814	J27				
3101	O	3850	F				
3103	A	3862	F				

1) FOR REMARKS SEE SERVICE MANUAL

CTO-S 21"

PRS 01514  
102-636

DIFFERENCE LIST FOR 26" SETS

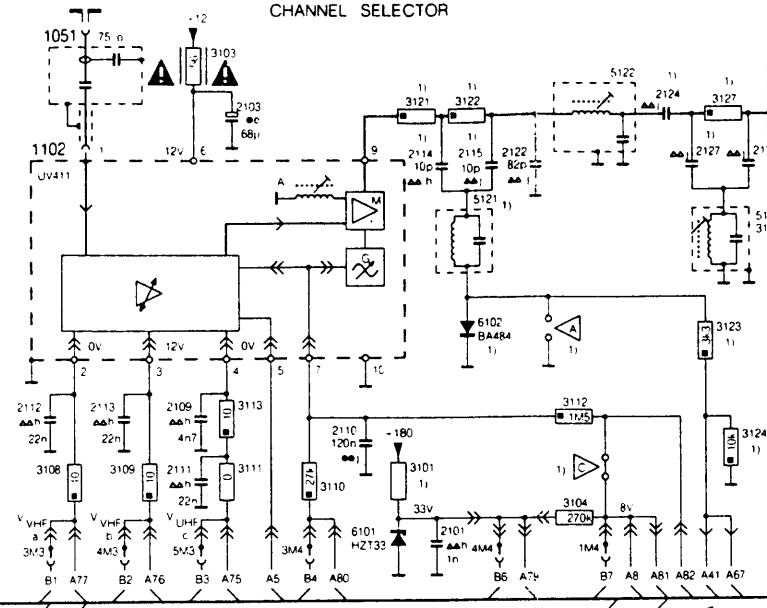
Item*	/50	/51	/57	/65	/67
26ct6070 (pb)	X	-	X	X	-
26ct6470 (vst)	X	X	X	X	-
26ct6770 (vst, txt)	X	-	-	-	X
1045 mains filter	-	-	-	X	-
1070 vst clock power supply	X	X	X	X	X
1200 PAL module	X	-	X	X	X
1200 SECAM module	-	X	-	-	-
1210 NTSC module	-	X	-	-	-
1300 mains panel	-	X	-	-	-
1391 fuse ..AT	2.5	3.15	2.5	2.5	2.5
1661 filter ..MHz	5.5	5.5	6.0	5.5	5.5
1662 filter ..MHz	-	4.5	-	-	-
1681 pb IC ASSY SOUND	4W	4W	4W	4W	4W
1681 vst IC ASSY SOUND	10W	10W	10W	10W	10W
2114	-	10p	-	-	-
2115	-	10p	-	-	-
2124	5p6	5p6	4p7	5p6	5p6
2127	12p	12p	10p	12p	12p
2131	12p	12p	10p	12p	12p
2137	4p7	4p7	3p3	4p7	4p7
2138	10p	10p	6p8	10p	10p
2155 (only vst)	2u2	2u2	2u2	2u2	2u2
2360 pb	680u	680u	680u	680u	680u
2360 vst	1000u	1000u	1000u	1000u	1000u
2370	-	470u	-	-	-
2393	-	-	-	-	-
2395	-	-	-	2n2	2n2
2396	-	-	-	2n2	2n2
2670 (only vst)	-	-	-	2n2	2n2
2673 (only vst)	22n	22n	22n	22n	22n
2674 (only vst)	10n	10n	10n	10n	10n
2675 (only vst)	33u	33u	33u	33u	33u
2676 (only pb)	100n	100n	100n	100n	100n
2677	15n	15n	15n	15n	15n
2677 vst	22n	22n	22n	22n	22n
2678 (only pb)	100n	100n	100n	100n	100n
2679 pb	680u	680u	680u	680u	680u
2679 vst	1000u	1000u	1000u	1000u	1000u
2680 pb	22u	22u	22u	22u	22u
2680 vst	150u	150u	150u	150u	150u
2682 pb	470u	470u	470u	470u	470u
2682 vst	2200u	2200u	2200u	2200u	2200u
2683 pb	22u	22u	22u	22u	22u
2683 vst	10u	10u	10u	10u	10u
2684 (only vst)	330p	330p	330p	330p	330p
2810	-	120n	-	-	-
2811	680n	560n	680n	680n	680n
2870	2n2	3n3	2n2	2n2	2n2
3101 pb	18K	18K	18K	18K	18K
3101 vst	15K	15K	15K	15K	15K
3105 (only vst)	10K	10K	10K	10K	10K
3108	10R	10R	10R	22R	22R
3113	10R	10R	10R	-	-
3121	-	56R	-	-	-
3122	82R	22R	82R	82R	82R

Item*	/50	/51	/57	/65	/67
3123	-	3K3	-	-	-
3124	-	10K	-	-	-
3127	43R	43R	47R	43R	43R
3149	12R	2R2	12R	12R	12R
3153	22R	15R	22R	22R	22R
3360 (only pb)	2R2	2R2	2R2	2R2	2R2
3362 (only vst)	12K	12K	12K	12K	12K
3365 (only vst)	10K	10K	10K	10K	10K
3368 (only vst)	56R	56R	56R	56R	56R
3389 ptc	-	110/220V	-	-	-
3390 ptc	200V	110/220V	200V	200V	200V
3660 (only vst)	820R	820R	820R	820R	820R
3662	4K3	4K3	4K7	4K3	4K3
3663 pb	1K2	1K2	1K2	1K2	1K2
3663 vst	-	1K2	-	-	-
3664 pb	1K2	1K2	1K2	1K2	1K2
3664 vst	-	1K2	-	-	-
3666 pb (trimmer)	2K2	2K2	2K2	2K2	2K2
3667 (only vst)	22K	22K	22K	22K	22K
3668 (only vst)	22K	22K	22K	22K	22K
3673 (only vst)	47K	47K	47K	47K	47K
3676 (only vst)	22K	22K	22K	22K	22K
3678 (only pb)	3K	3K	3K	3K	3K
3681 pb	3R3	3R3	3R3	3R3	3R3
3681 vst	2R2	2R2	2R2	2R2	2R2
3682 (only vst)	20K	20K	20K	20K	20K
3683 pb	160R	160R	160R	160R	160R
3683 vst	680R	680R	680R	680R	680R
3685 (only vst)	3K3	3K3	3K3	3K3	3K3
3814	22R	18R	22R	22R	22R
3816	-	15K	-	-	-
3817	-	2K2	-	-	-
3873	-	220K	-	-	-
3879	6K8	6K8	6K8	6K8	6K8
3879 (not for Txt)	-	-	-	-	-
5103	-	-	X	-	-
5121 ..µH	-	0.32	-	-	-
5133 ..µH	0.32	0.32	-	0.32	0.32
5672 ..µH	-	12.5	6	-	-
6102	-	BA484	-	-	-
6141 (only Txt)	1N4148	1N4148	1N4148	1N4148	1N4148
6392	BY527	BY527	BY527	1N5062	1N5062
6393	-	1N5062	-	-	-
6394	-	1N5062	-	-	-
6395	BY527	-	1N5062	-	-
6396	BY527	-	BY527	1N5062	1N5062
6661	-	1N4148	-	-	-
6662	-	1N4148	-	-	-
6665 (only vst)	1N4148	1N4148	1N4148	1N4148	1N4148
6873	-	1N4148	-	-	-
7368 (only vst)	BC548	BC548	BC548	BC548	BC548
7877	-	BC548	-	-	-
jumper A (cl=closed)	-	-	-	-	-
jumper B	-	-	-	-	-
jumper C pb	cl	cl	cl	cl	cl
jumper C vst	-	-	-	-	-
jumper D	-	-	-	-	-
jumper E pb	cl	cl	cl	cl	cl
jumper E vst	-	-	-	-	-

\* item only present when marked with "X"

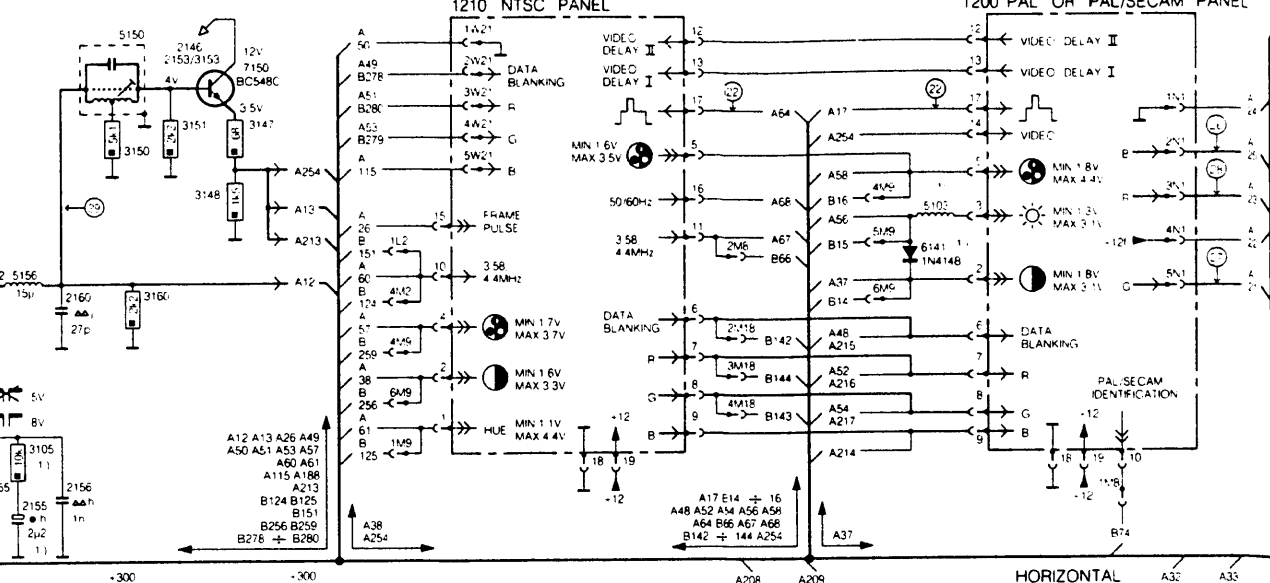
DIAGRAM A

CHANNEL SELECTOR

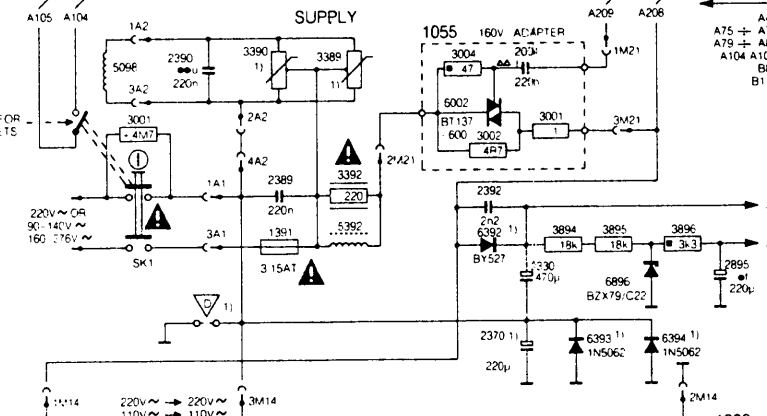


1210 NTSC PANEL

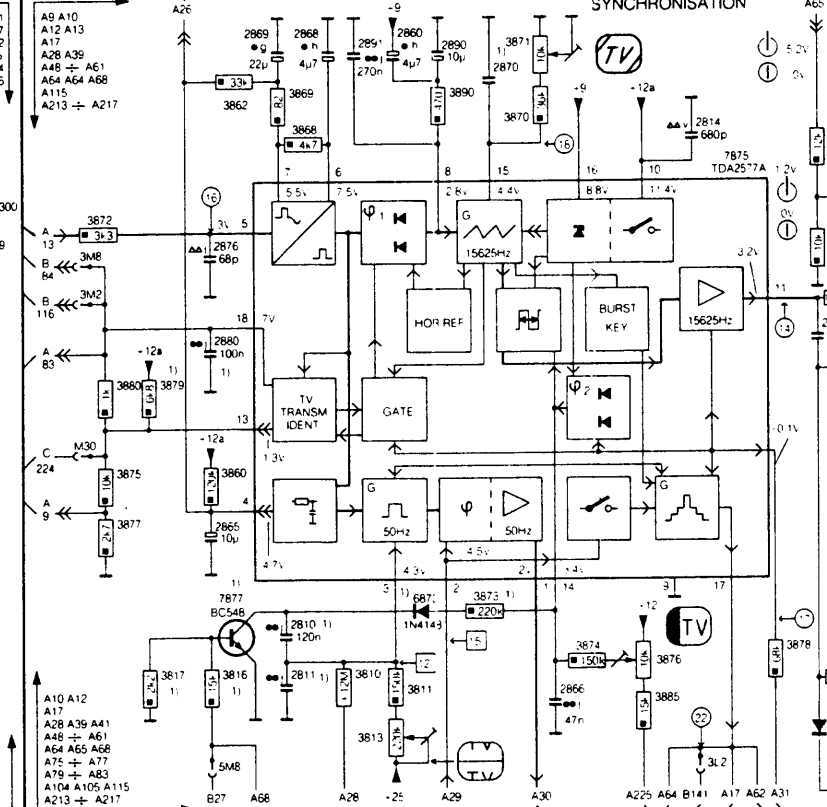
1200 PAL OR PAL/SECAM PANEL



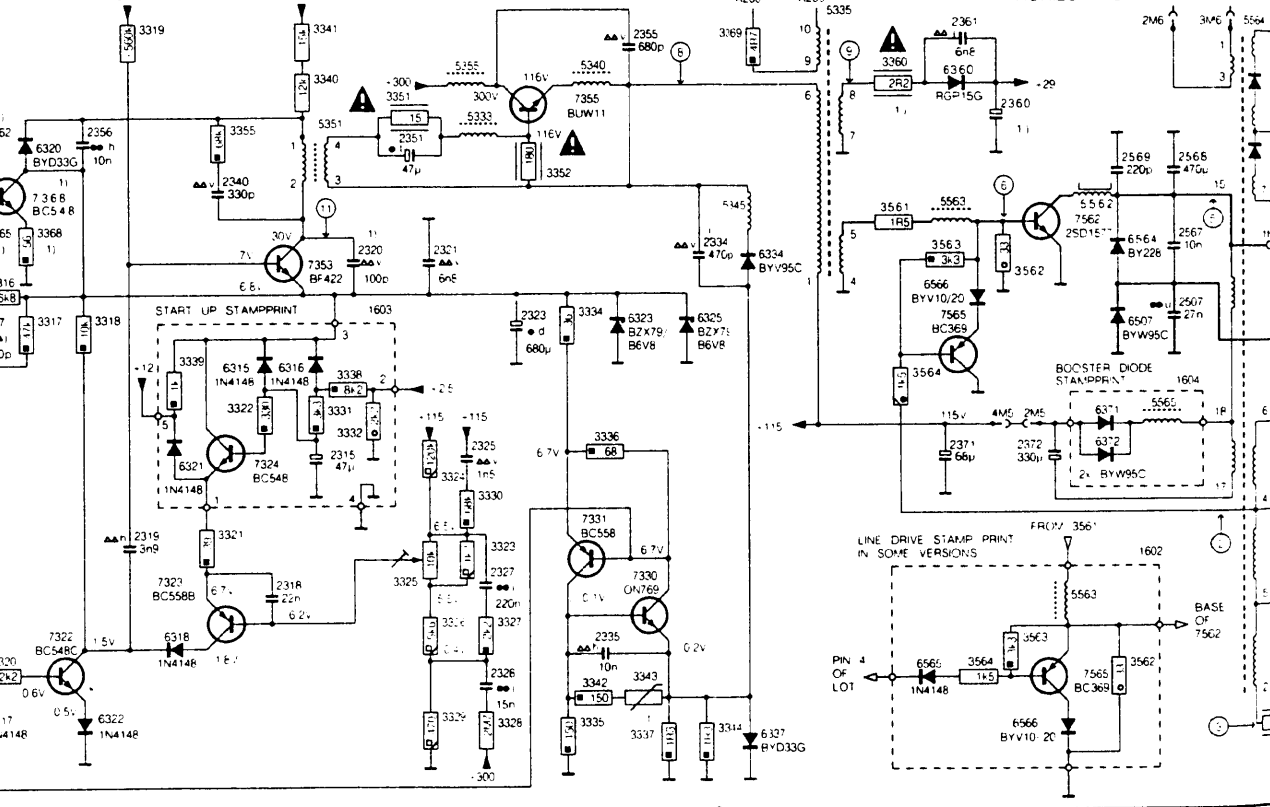
SUPPLY



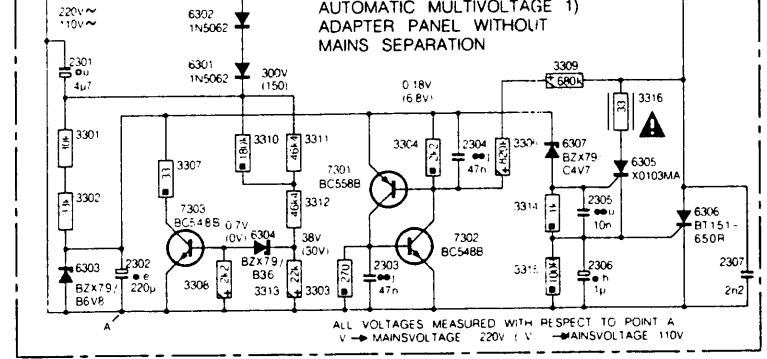
SYNCHRONISATION



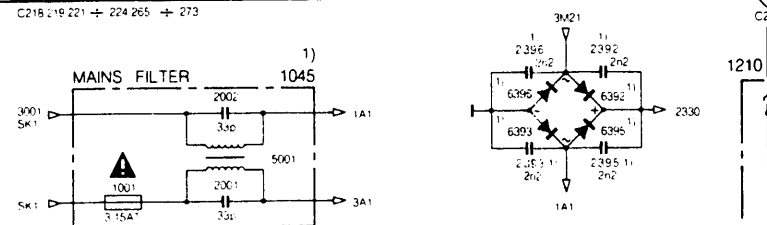
HORIZONTAL



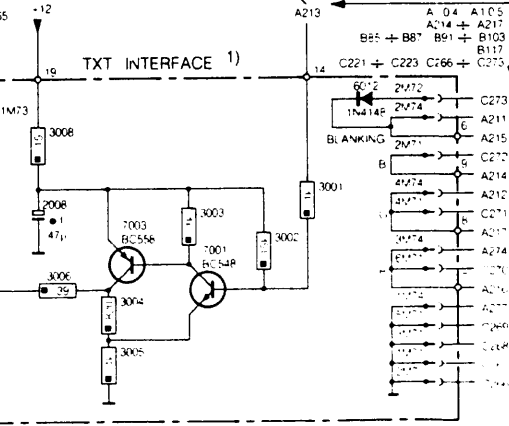
1) ADAPTER PANEL WITHOUT MAINS SEPARATION



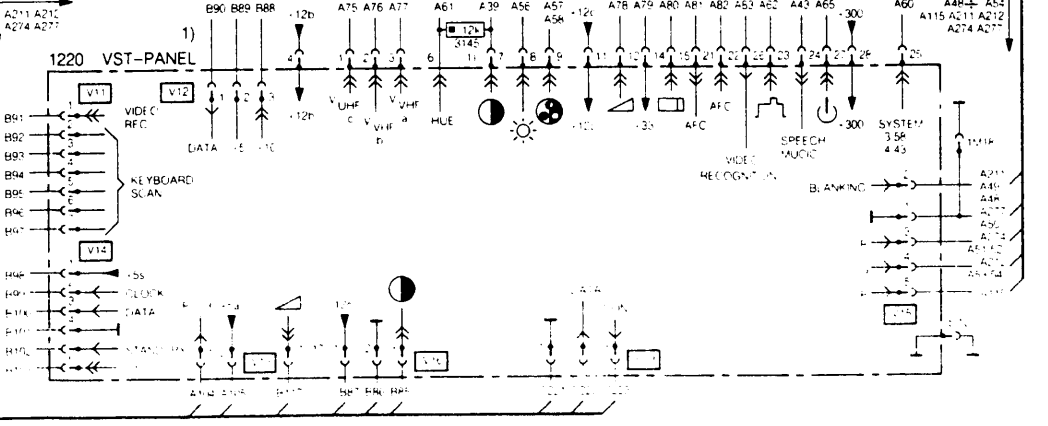
1) MAINS FILTER



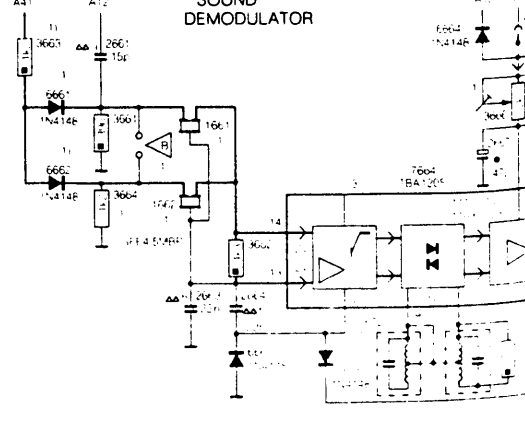
1) TXT INTERFACE



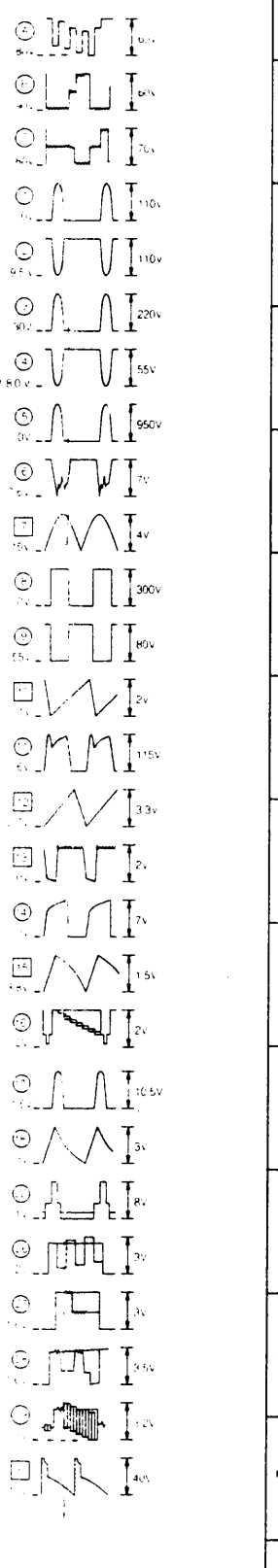
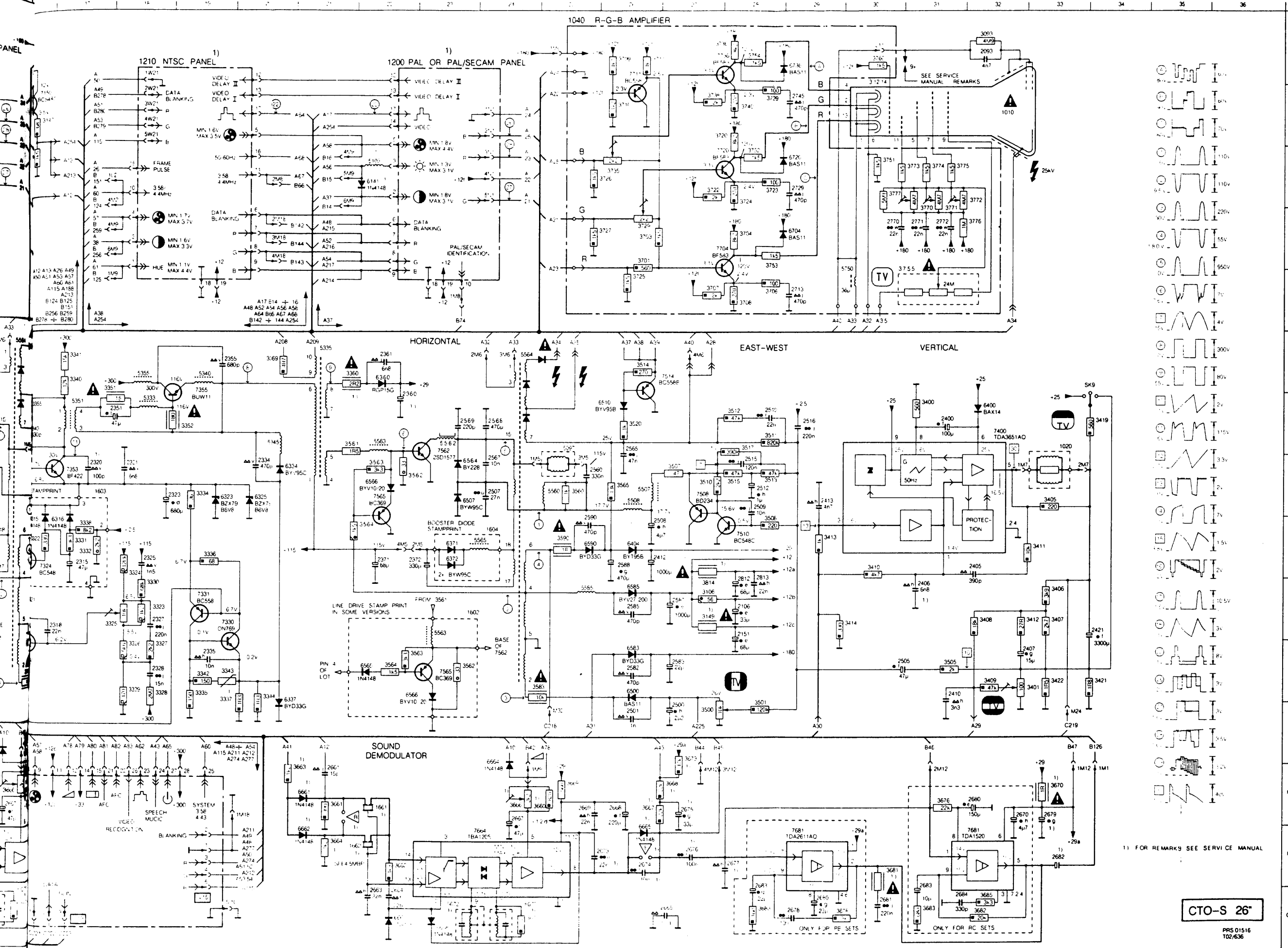
1) 1220 VST-PANEL



SOUND DEMODULATOR



Component and connection labels for various parts of the circuit, including pin numbers and component values.

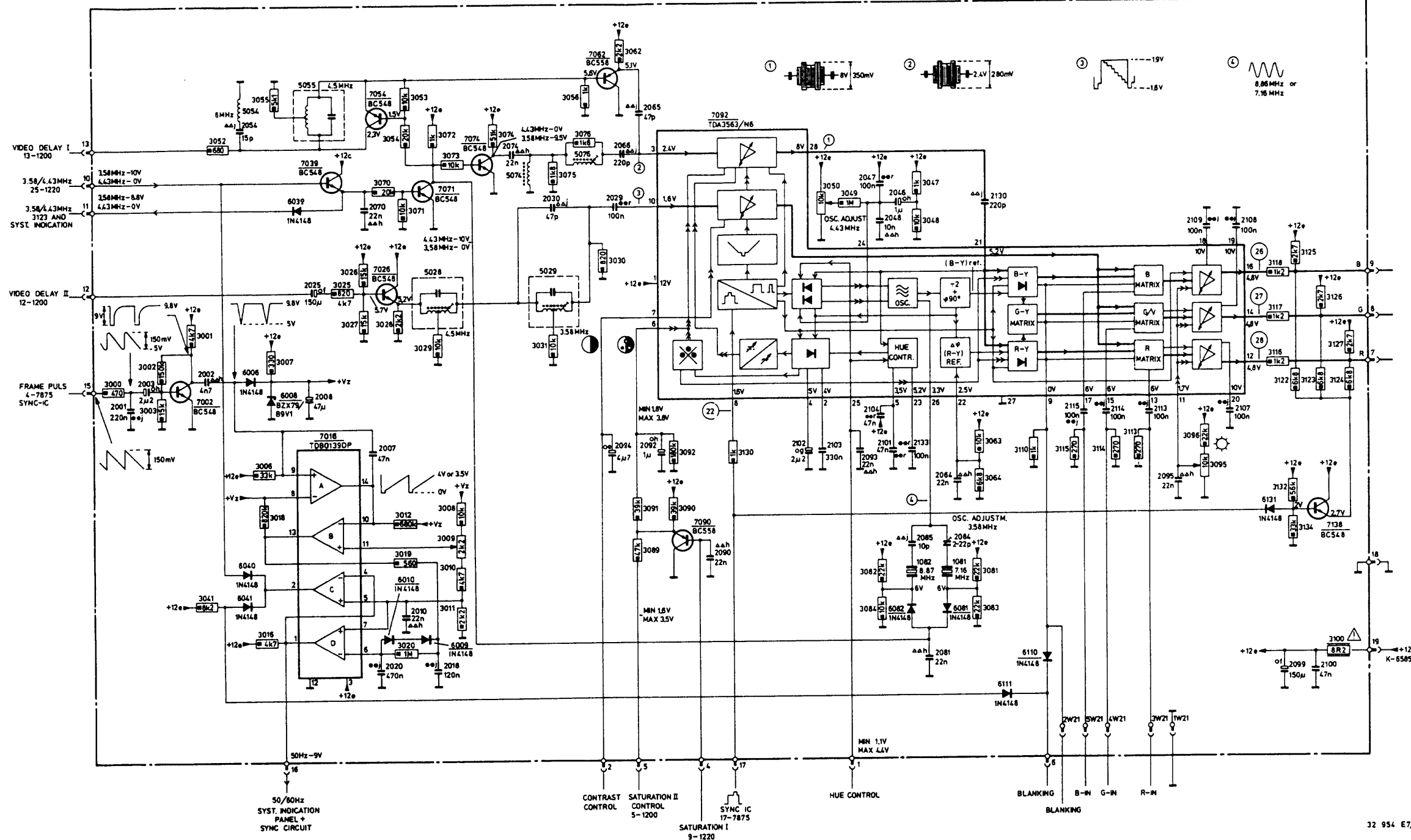


1) FOR REMARKS SEE SERVICE MANUAL

CTO-S 26"

PRS 01516 102/636

1001	N 2	2683	N31	3422	K33	6002	F 5
1010	B3	2684	O31	3500	L27	6102	M10
1020	G33	2713	E29	3501	L28	6101	E 4
1040	A25	2729	C29	3505	K31	6102	C 5
1045	M 4	2745	B29	3507	H27	6141	C22
1051	A	2770	D30	3508	H28	6151	D13
1055	F 2	2771	D31	3510	H27	6301	I 3
1102	B 2	2772	D31	3511	G28	6302	I 3
1200	A22	2810	K10	3512	G28	6303	K 2
1210	A18	2811	K10	3513	H28	6304	K 3
1210	M 7	2812	J28	3514	F26	6305	J 7
1220	M12	2813	L28	3515	H28	6306	K 6
1300	I 7	2814	G13	3517	G28	6307	J 6
1391	G 4	2860	F11	3520	G26	6315	I16
1602	J23	2865	J 9	3560	H25	6316	I17
1603	H17	2866	K12	3561	G21	6317	K14
1604	L24	2868	F10	3562	H22	6318	K16
1661	M22	2869	F10	3562	K23	6320	G15
1662	N22	2870	F12	3563	H22	6321	I16
2001	N 3	2876	H 9	3563	K23	6322	K15
2002	M 3	2880	H 9	3564	I22	6323	M19
2004	F 6	2890	F11	3564	K22	6325	H20
2008	N 8	2891	F11	3565	H26	6334	H20
2093	A32	2895	H 7	3563	H27	6395	M 6
2101	F 5	3106	N 2	3590	F 2	6360	F22
2103	B 3	3001	N10	3600	M25	6371	I23
2106	J28	3001	F 6	3661	M21	6372	I23
2109	D 3	3002	G 5	3662	N22	6392	G 5
2110	D 3	3003	H10	3663	M21	6393	M 6
2111	D 3	3003	N 9	3664	N21	6393	M 6
2112	D 2	3004	N 9	3666	M24	6393	M 6
2113	D 2	3004	F 5	3667	M26	6394	H 7
2114	B 5	3005	O 9	3668	M27	6395	M 6
2115	B 5	3006	N 2	3669	M 8	6396	M 6
2122	B 6	3008	M 8	3670	M33	6400	G32
2124	B 7	3093	A32	3673	L27	6404	I26
2127	B 7	3101	D 5	3675	O24	6500	K26
2130	B 8	3103	G 3	3703	M10	6501	M21
2131	B 8	3104	E 6	3678	O29	6510	G26
2137	B 8	3105	E15	3681	N30	6564	H23
2138	B 9	3106	J27	3682	O32	6565	K22
2145	B 9	3108	D 2	3683	O28	6566	H22
2146	C 10	3109	E 4	3684	O28	6567	K22
2147	C10	3110	E 4	3685	O32	6583	K26
2148	C10	3111	D 3	3701	O26	6585	J26
2150	A11	3112	D 6	3703	O26	6590	I25
2151	J28	3113	D 3	3703	O28	6661	M21
2152	D12	3121	B 5	3706	E28	6662	N21
2153	E11	3122	B 5	3707	E27	6664	L24
2154	E11	3123	C 7	3708	E28	6665	N26
2155	E15	3124	D 7	3709	A28	6667	O22
2156	E15	3125	B 5	3710	E28	6668	O23
2158	E10	3139	B 9	3711	A26	6704	O29
2159	D13	3143	D 9	3720	B27	6720	C29
2160	C15	3145	M16	3722	C27	6736	A29
2301	J 2	3146	C 3	3723	C28	6737	J11
2302	J 2	3147	B16	3724	C28	6896	M 6
2303	K 4	3148	C16	3725	E26	7001	N 9
2304	J 5	3149	J27	3726	C26	7003	N 9
2305	K 6	3150	B15	3727	O26	7150	B16
2306	K 6	3151	B16	3729	M21	7151	B14
2307	K 7	3152	E12	3735	C26	7165	E13
2315	I17	3153	D11	3736	A27	7301	J 4
2317	H14	3154	E11	3738	B27	7302	K 5
2318	J17	3155	E14	3739	C28	7330	J19
2319	K15	3156	D10	3740	H28	7322	K15
2320	H17	3157	D10	3751	C30	7323	J16
2321	H18	3158	E10	3752	C28	7324	I16
2323	H19	3159	D12	3753	D28	7330	J19
2324	H20	3202	K 2	3771	C31	7400	G32
2327	J18	3161	D12	3755	D31	7508	H27
2328	K18	3165	E13	3760	A30	7555	F17
2330	H 6	3301	J 2	3770	C31	7368	G15
2334	H20	3302	K 2	3771	C31	7400	G32
2336	K15	3308	K 3	3776	O22	7565	M22
2340	G16	3304	J 5	3773	C31	7510	I28
2341	G18	3305	J 6	3774	C31	7514	F27
2355	F19	3307	J 3	3775	C31	7562	G23
2356	F15	3308	K 3	3776	O22	7565	M22
2360	G22	3309	J 6	3777	C30	7565	K23
2361	F22	3310	J 4	3810	K11	7664	N24
2370	H 5	3311	J 4	3811	K11	7681	N29
2371	I22	3312	K 4	3813	K10	7681	N32
2372	I23	3313	K 4	3814	K10	7681	N32
2389	G 4	3314	K 6	3816	K 9	7711	A26
2390	F 3	3315	K 6	3817	K 9	7720	C27
2392	G 5	3316	J 7	3860	I 9	7736	A27
2392	L 6	3316	H14	3812	G 7	7875	G13
2393	G 6	3317	H15	3868	F10	7877	J 9
2395	M 6	3318	H15	3869	F10	SK1	H 3
2396	L 6	3319	F16	3870	G12	SK9	F34
2400	G31	3320	K14	3871	F12		
2412	I27	3321	I32	3872	K11		
2406	J31	3322	I16	3873	J11		
2407	K33	3323	J18	3874	K12		
2410	K31	3324	I18	3875	I 9		
2412	I27	3325	I18	3876	K13		
2417	H29	3326	K18	3877	J19		
2421	J34	3327	K18	3878	K14		
2500	L27	3328	K18	3879	I 9		
2501	L26	3329	K18	3880	I 9		
2501	K31	3330	J18	3885	M18		
2507	H24	3331	I17	3890	F11		
2508	I27	3332	I17	3894	G 6		
2509	H28	3334	H19	3895	G 6		
2510	G28	3335	K19	3896	G 7		
2512	H28	3336	I19	5001	M 4		
2515	H28	3337	K19	5097	G25		
2516	G29	3338	I17	5098	F 2		
2560	H25	3339	I16	5103	C22		
2565	G26	3340	F17	5121	B 5		
2567	H24	3341	I17	5122	G 6		
2568	G24	3342	K19	5127	C 8		
2569	G23	3343	K19	5133	C 8		
2582	K26	3344	K20	5138	C 9		
2583	K27	3351	I17	5139	M22		
2585	J26	3352	G19	5145	B 9		
2587	J27	3355	G16	5150	A15		
2588	I26	3360	F21	5156	C14		
2590	F25	3362	G14	5157	A12		
2665	M2	3365	G14	5158	M22		
2663	O22	3368	G15	5333	F18		
2664	O22	3369	F20	5335	G21		
2665	O27	3389	F 4	5340	F19		
2670	M24	3390	F 4	5345	G24		
2668	M26	3392	G 4	5351	G17		
2669	M25	5400	G31	5355	F18		
2670	M25	5401	K33	5392	G 4		
2673	N26	3405	H33	5507	H26		
2674	N26	3406	J33	5508	H26		
2675	N27	3407	J33	5508	H26		
2676	N27	3408	J32	5562	G23		
2677	N28	3409	K32	5563	G23		
2678	O29	3410	J30	5563	J23		
2679	M33	3411	I33	5564	F24		
2680	O29	3412	J33	5565	I 24		
2680	M32	3413	I29	5585	J25		
2681	O30	3414	J30	5672	O23		
2682	N33	3415	G34	5675	O24		
2683	N28	3421	K34	5750	D30		



**ADJUSTMENTS**

**1. 50/60 Hz detector**

Disconnect 3000 from 15-1210.  
Inject a signal of 500 mV-55 Hz square wave (e.g. PM5107) into 3000.  
Adjust 3009 until the voltage on 11-7016 is at minimum.  
Measure the voltage on 2-7016.  
Now increase the voltage on 11-7016 by 3009 until the voltage on 2-7016 changes.  
Connect 3000.

**2. Chrominance and Luminance bandpass**

Disconnect 3052 from 13-1210.  
Inject a signal of 1.8 MHz, 500 mVpp into 3052 (PM5334).  
Connect an oscilloscope to 3-7092.  
Adjust 5076 for minimum signal amplitude of the oscilloscope picture.

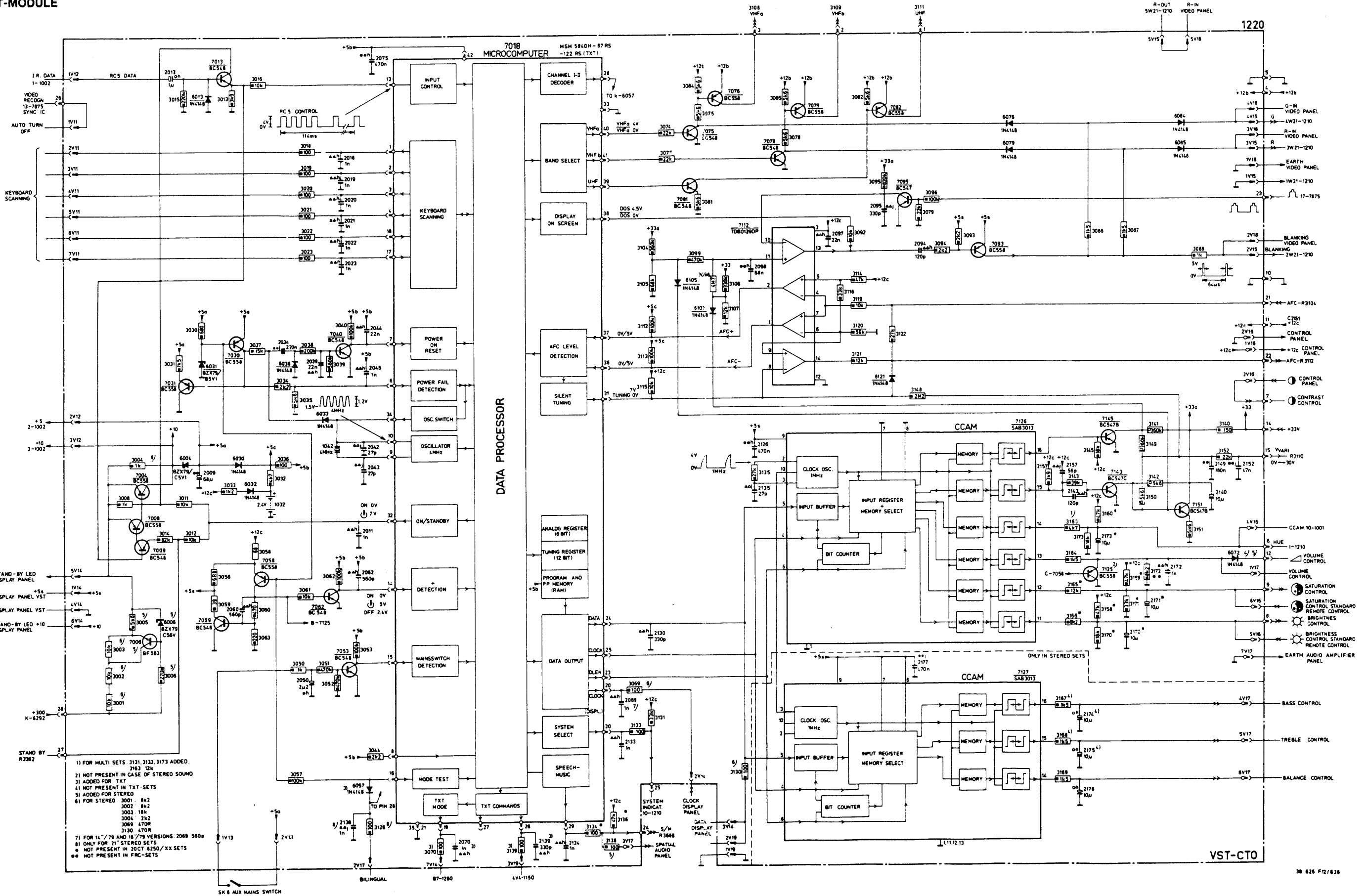
Change input signal to 4.5 MHz, 500 mVpp.  
Adjust 5055 for minimum signal amplitude of the oscilloscope picture.  
Change input signal to 6.0 MHz, 500 mVpp.  
Adjust 5054 for minimum signal amplitude of the oscilloscope picture.  
Connect 3052.  
Disconnect 3025 from 2025.  
Inject a signal of 4.5 MHz, 500 mVpp into 3025.  
Connect the oscilloscope to 10-7092.  
Adjust 5028 for minimum signal amplitude of the oscilloscope picture.  
Change the input signal to 3.58 MHz, 500 mVpp.  
Adjust 5029 for minimum signal amplitude of the oscilloscope picture.  
Connect 3025.

**3. Brightness**

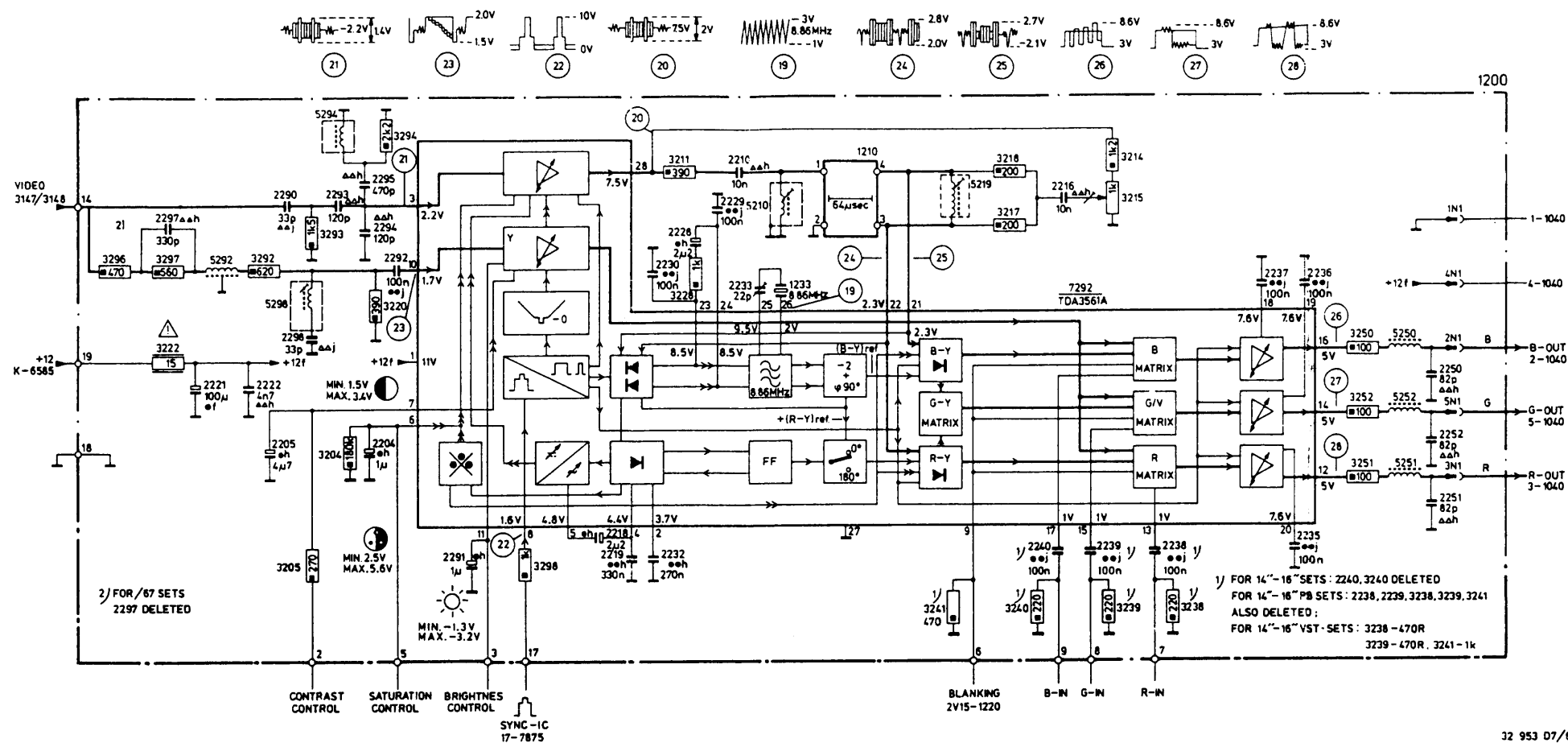
Apply a signal from NTSC pattern generator (e.g. PM5512).  
Connect an oscilloscope to 9-1210.  
Adjust 3095 for black level at  $2 V_{DC}$ .

**4. Oscillator frequency**

Connect the oscilloscope to 11-7092.  
Adjust 3095 for  $2 V_{DC}$  on the oscilloscope picture.  
Connect 10-7092 to earth (27-7092).  
Apply a NTSC -4.43 MHz signal from an adapted PM5519 to the aerial input.  
Connect 6-7092 to 1-7092.  
Adjust 3050 in such a manner that the colour on the screen has practically come to a standstill.  
Now apply a NTSC -3.58 MHz signal from a PM5512 to the aerial input.  
Connect 10-7092 via a 10k resistor to 1-7092.  
Adjust 2084 in such a manner that the colour on the screen has practically come to a standstill.  
Remove the interconnections and the resistor.



- 1) FOR MULTI SETS 3131, 3132, 3173 ADDED. 2163 12H
- 2) NOT PRESENT IN CASE OF STEREO SOUND
- 3) ADDED FOR TXT
- 4) NOT PRESENT IN TXT-SETS
- 5) ADDED FOR STEREO
- 6) FOR STEREO 3001 - 8h2  
3002 - 8h2  
3003 - 18h  
3004 - 2h2  
3069 - 470R  
3130 - 470R
- 7) FOR 14"/78 AND 16"/78 VERSIONS 2069 540P
- 8) ONLY FOR 21" STEREO SETS
- 9) NOT PRESENT IN 20CT 8250/XX SETS
- 10) NOT PRESENT IN FRC-SETS



**ADJUSTMENTS**

For adjustment 1 any colour signal may be used. Adjustment 2 and 3 are effected with a colour pattern generator PM5515 or PM5519.

**1. Subcarrier oscillator**

Apply a colour signal and set the receiver controls to their normal settings. Interconnect points 23 and 24 of 7292. Include a 470 Ω resistor between point 6 and point 1 of 7292. Adjust 2233 in such a manner that the colour on the screen has practically come to a standstill. Remove the resistor and the interconnection.

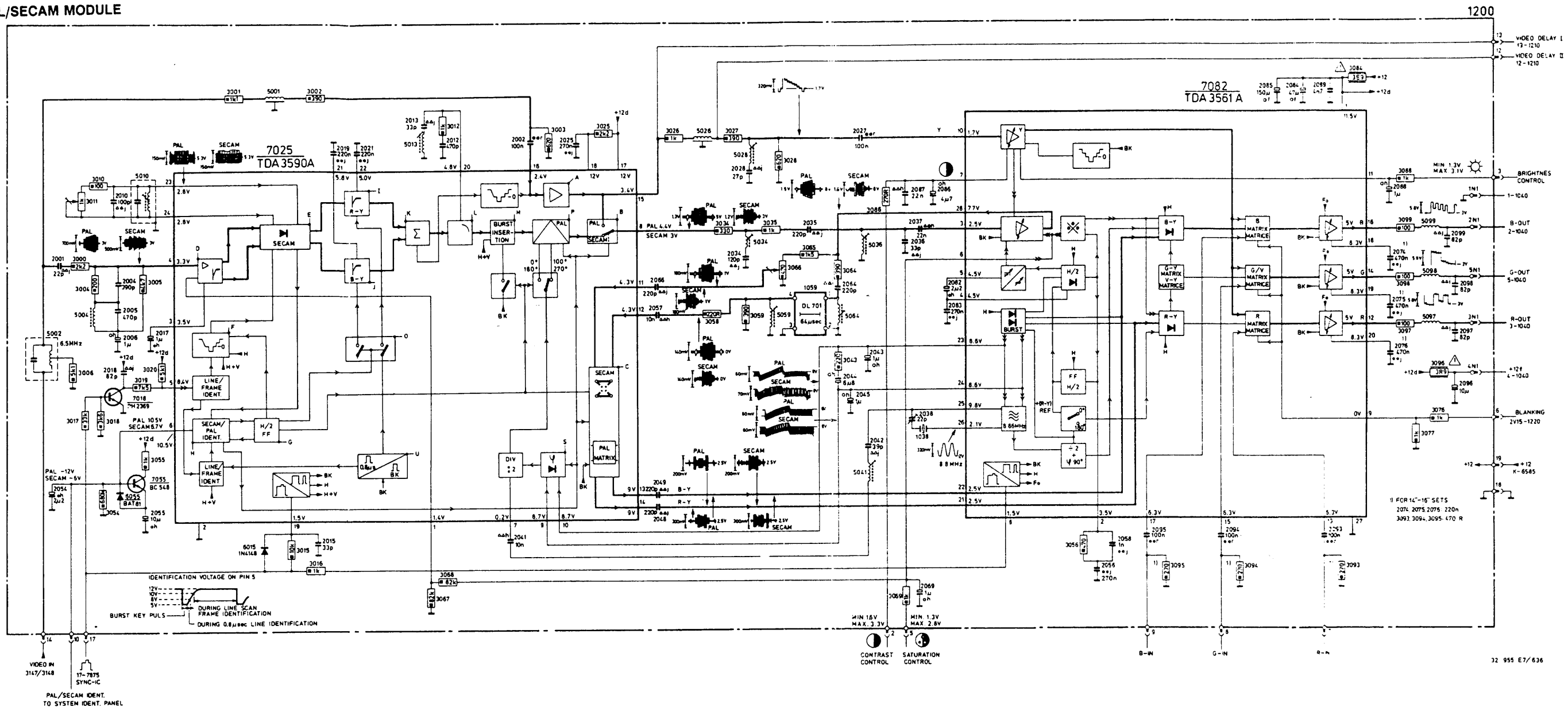
**2. PAL-delay line**

Apply a generator signal. Set the generator to position "DEM", adjust brightness to normal and the saturation control to 3/4 of its range. Adjust 3215 so that the venetian blinds effect in the third bar disappears.

Next, adjust 5210 so that the venetian blinds effect in the first and fourth bar disappears. Readjust 3215. Set the generator to "Colour Bar" position and adjust 5219 so that the venetian blinds effect in the third and/or the fifth bar from the left hand side (resp. cyan and magenta) disappears.

**3. The 4.43 MHz trap in the luminance circuit**

Use a colour bar pattern. The receiver is normally adjusted. Connect an oscilloscope to point 10 of 7292 and adjust 5298 to minimum amplitude of the chrominance signal present on the various brightness steps of the luminance signal.



## ADJUSTMENTS

For adjustment 1 any colour signal may be used. Adjustment 2 till 7 are effected with a colour pattern generator PM5515 or PM5516.

### 1. Subcarrier oscillator

Apply a colour signal and set the receiver controls to their normal settings.  
Interconnect points 23 and 24 of 7082.  
Include a 470  $\Omega$  resistor between point 6 and point 1 of 7082.  
Adjust 2038 in such a manner that the colour on the screen has practically come to a standstill.  
Remove the resistor and the interconnection.

### 2. PAL-delay line

Apply a generator signal. Set the generator to position "DEM", adjust brightness to normal and the saturation control to  $\frac{3}{4}$  of its range.  
Adjust 3066 so that the venetian blinds effect in the third bar disappears. Next, adjust 5064 so that the venetian blinds effect in the first and fourth bar disappears. Readjust 3066.  
Set the generator to "Colour Bar" position and adjust 5059 so that the venetian blinds effect in the third and/or the fifth bar from the left hand side (resp. cyan and magenta) disappears.

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### 3. The 4.43 MHz trap in the luminance circuit

Use a colour bar pattern. The receiver is normally adjusted.  
Connect an oscilloscope to point 10 of 7082 and adjust to minimum amplitude to the chrominance signal present on the various brightness steps of the luminance signal.

### 4. Demodulator phase

Set the generator to position "DEM", PAL system.  
Adjust 5064 until the two grey blocks in the top centre of the picture have the same colour.  
If necessary repeat the adjustment of 3066 (see "PAL delay line").

### 5. Secam demodulator

Set the generator to position "CONV.", SECAM system.  
Connect an oscilloscope to pin 3 on 7082.  
Adjust the time base of the oscilloscope such that at least 2 complete line durations are visible.  
Turn 3011 fully anti-clockwise, viewed from the component side.

Adjust 5010 until the amplitude of the chroma signal during one line equals that of the chroma signal of the next line.  
Adjust 3011 for minimum signal amplitude.  
If the signal of one line and the signal of the adjacent line do not reach their minimum simultaneously, 5010 should be readjusted slightly.

### 6. Chrominance response curve

Switch off the apparatus.  
Apply the signal of a signal generator to 14-1200 via a 100 pF capacitor.  
Connect an oscilloscope, equipped with a 10:1 attenuation head to pin 4 on 7025.  
Set the frequency of the signal generator to 4,32 MHz, unmodulated.  
Adjust 5004 for maximum signal amplitude of the oscilloscope picture.  
Transfer the signal of the signal generator to 8-7025 via a 100 pF capacitor.  
Connect an oscilloscope to pin 3 of 7082.  
Set the frequency of the signal generator to 4,3 MHz, unmodulated.

Adjust 5036 for maximum signal amplitude of the oscilloscope picture.  
Set the frequency of the signal generator to 2,4 MHz.  
Adjust 5034 for minimum signal amplitude.

### 7. 8.867 MHz rejection

Switch on the apparatus.  
Apply a signal of 8.867 MHz of a signal generator (e.g. PM5326) to pin 20 of 7025 ( $\pm 30$  mVpp).  
Connect an oscilloscope to the same point.  
Adjust 5013 for minimum signal amplitude of the oscilloscope picture.

### 8. Phase 8.867 MHz reference

Switch of the apparatus.  
Apply a signal of 6.5 MHz 100 mVpp via a resistor of 75  $\Omega$  to pin 25 of 7082.  
Connect an oscilloscope to 7 of 7025.  
Adjust 5041 for maximum signal amplitude of the oscilloscope picture.