

Service
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24 9S1A12

Service Manual

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INTRODUCTION

VK4900 is a black and white video-camera with built-in microphone, to be used with a b.w.-t.v-receiver/monitor TX1 or TX2.

These t.v-receivers must be suitable to be used with the camera.

The relevant t.v-receiver supplies the required supply voltage for the camera via the HF-cable.

The HF-connection-cable is an ordinary coaxial cable with a male coax connector at both sides and may be extended upto 100 metres max.

Several camera's can be connected via a camera switching unit 22AV5012.

The camera is suitable for limited outdoor use with protection cover; not fully splash proof; camera not to be exposed to direct sunlight.

DIMENSIONS

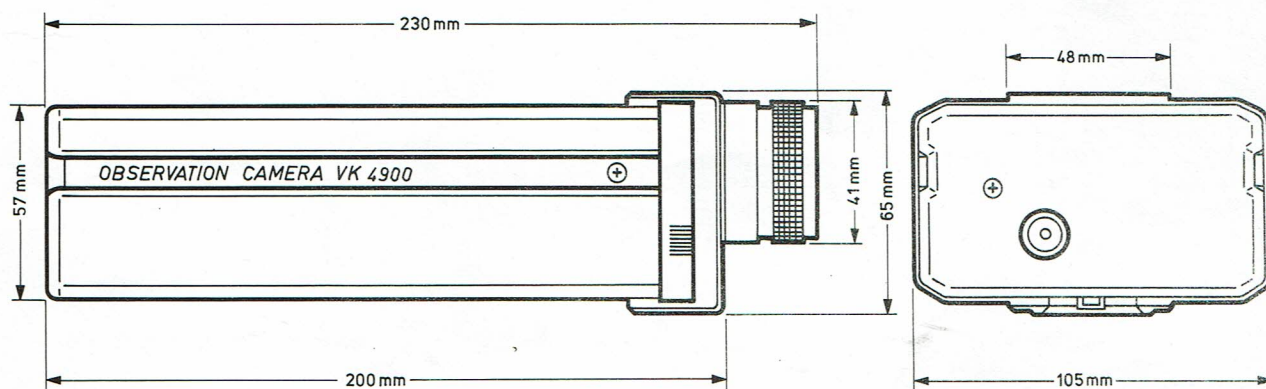


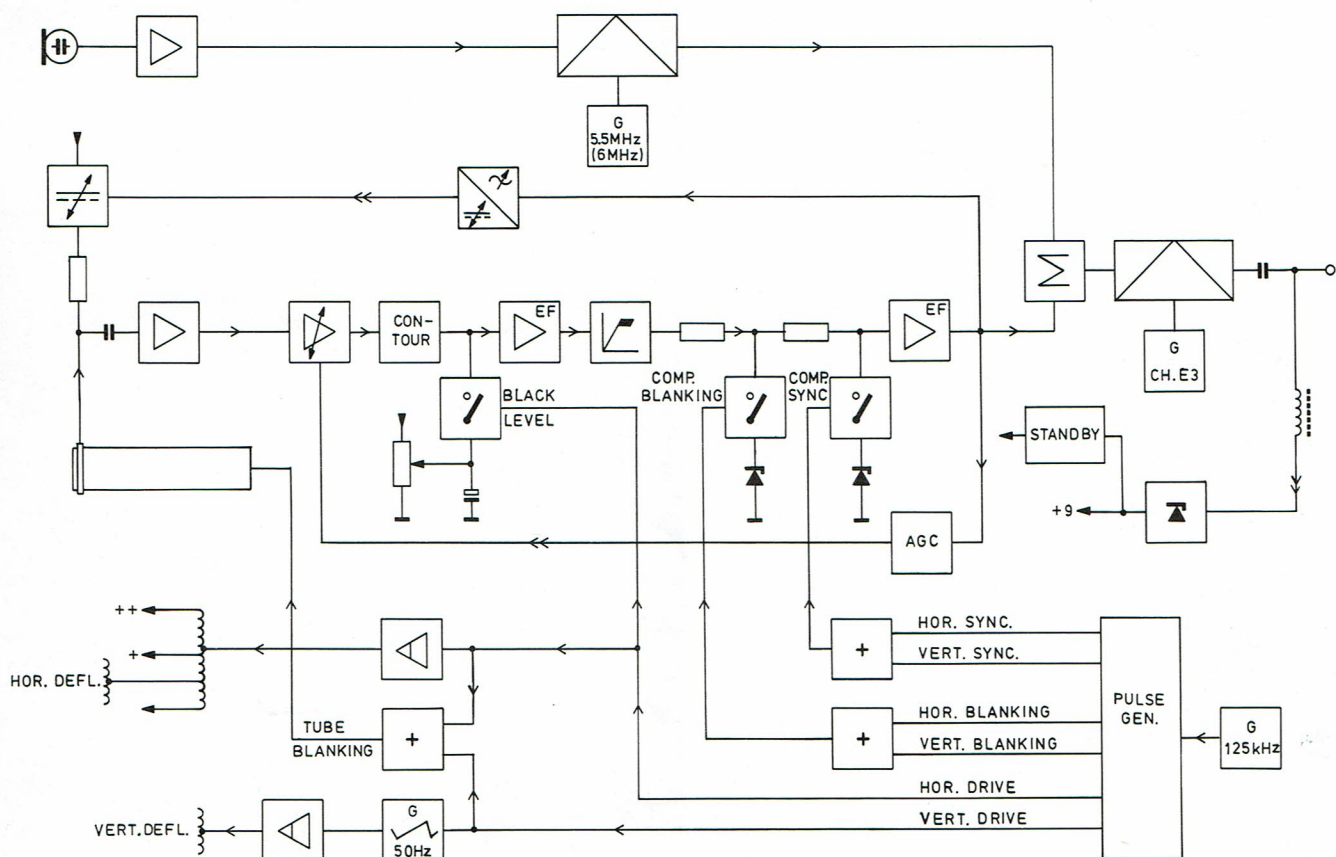
Fig. 1

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TECHNICAL DATA

Supply voltage	: 12 V d.c. (10...15 V d.c.)	T.V. system	-/00: CCIR 625 lines 50 Hz non-interlaced
Power consumption	: 200 mA max. at 12 V d.c. 100 mA max. at 4 V d.c. (in stand-by mode)		-/05: CCIR-I 625 lines 50 Hz non-interlaced
Warming up time	: ≤ 5 sec. with "stand-by" immediate sound	Sync.	: internal
Weight	: about 650 grams	Signal to noise ratio	: ≥ 40 dB (30...30.000 Lux)
Cable length	: 100 m. max.	Modulated RF output	: channel 3 with service soldered bridges for channel 2 and 4 level of spurious signals in output ≤ 30 dB at 3 MHz from carrier
Mounting hole	: 1/4" B.S.W.	Audio frequency	-/00: F.M. modulated 5.5 MHz carrier /05: F.M. modulated 6 MHz carrier
Allowed ambient temperature	: -20 °C to +45 °C in operation -25 °C to +70 °C in storage	Microphone	: built-in electret
Allowed humidity	: 20% to 95% R.H. in operation upon 99% R.H. in storage	Lens	: C-Mount
Air pressure	: 600 ... 1100 mBar	Focal length	: fixed 16 mm
Pick up tube	: 2/3" hybrid vidicon type XQ1272	Relative aperture	: 1.6
Illumination range	: 3 ... 30.000 Lux (automatic sensitivity control)	Focusing	: with focus ring (1,2,5,10,∞)

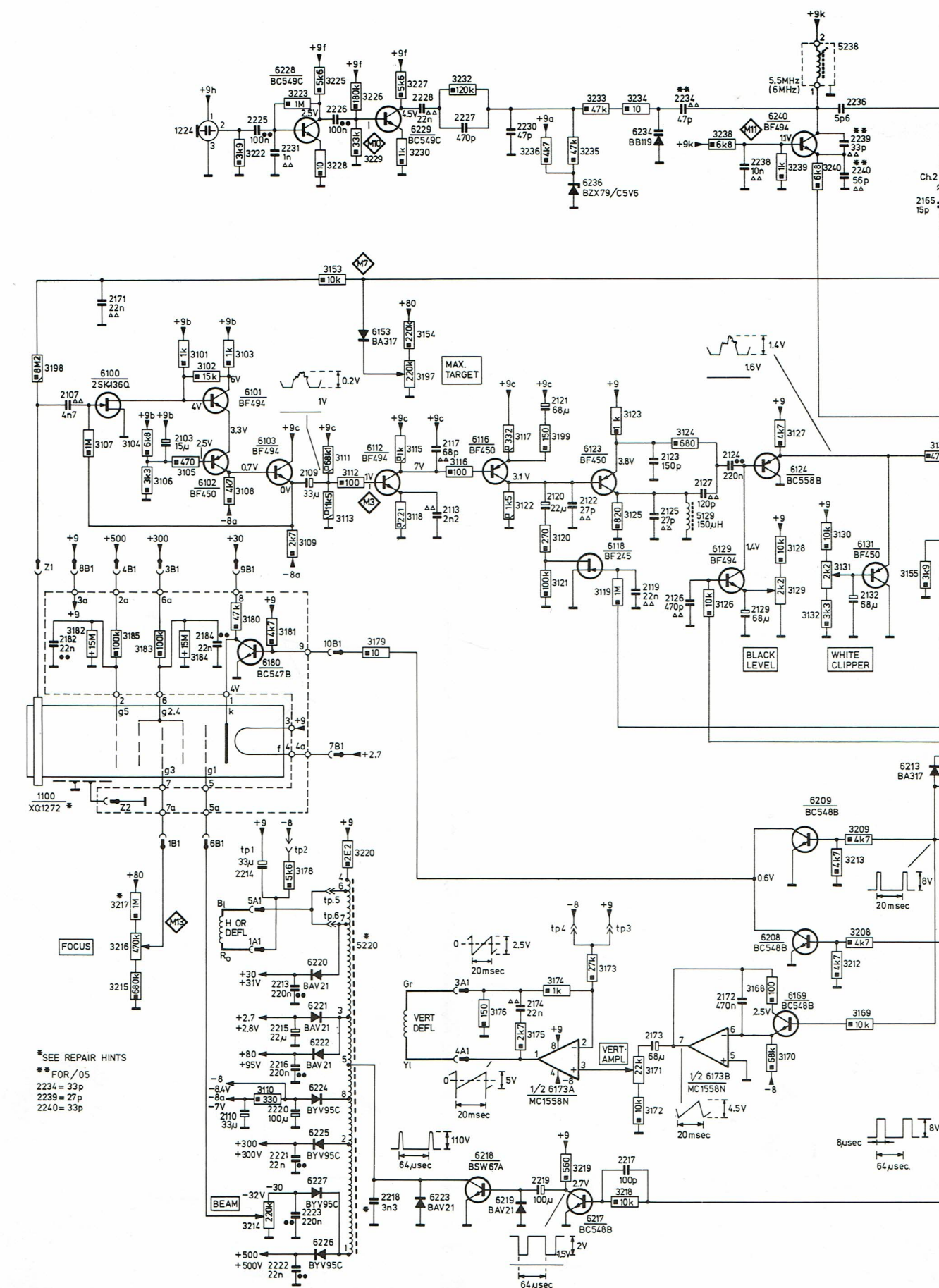
BLOCK DIAGRAM



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Fig. 2

3...	3198	3101+3108					3222, 3223, 3153, 3225+3230, 3179, 3154, 3197	3232	3119+3122, 3233+3236, 3123+3126					3238+3240	3127+3132	3133
3...		3182, 3215+3217	3183+3185	3180, 3181, 310, 324, 3177, 3178, 3109, 3111, 3113, 3220,	3115+3118				3199, 3171+3176, 3218, 3218				3168+3170, 3212, 3212, 3208, 3209	3155		
2...	2182, 2107, 2171		2103, 2184,	2213+2216, 2110, 2225, 2231, 2109,	2228, 2220+2223, 2218, 2217, 2113, 2227, 2176,	2229, 2230, 2120+2122, 2119, 2123+2127, 2234, 2217, 2173, 2238, 2129, 2172, 3132, 2236, 2239, 2240	2165									
MISC		6100	1224	6101+6103	6228	6102, 6153,	6229	6255		6236, 6123, 6118, 6234,	5129, 6129	6240, 6124	5238, 6131			
MISC	1100, Z1	22, 4, 81, 181, 381	681	1A1, 981, 5A1, 881, 6180, 781, 881, 1081, 6222, 5220		61A1, 4A1, 6128, 6219,	6173A, 6217			6173B		6179, 6208, 6209	6213			



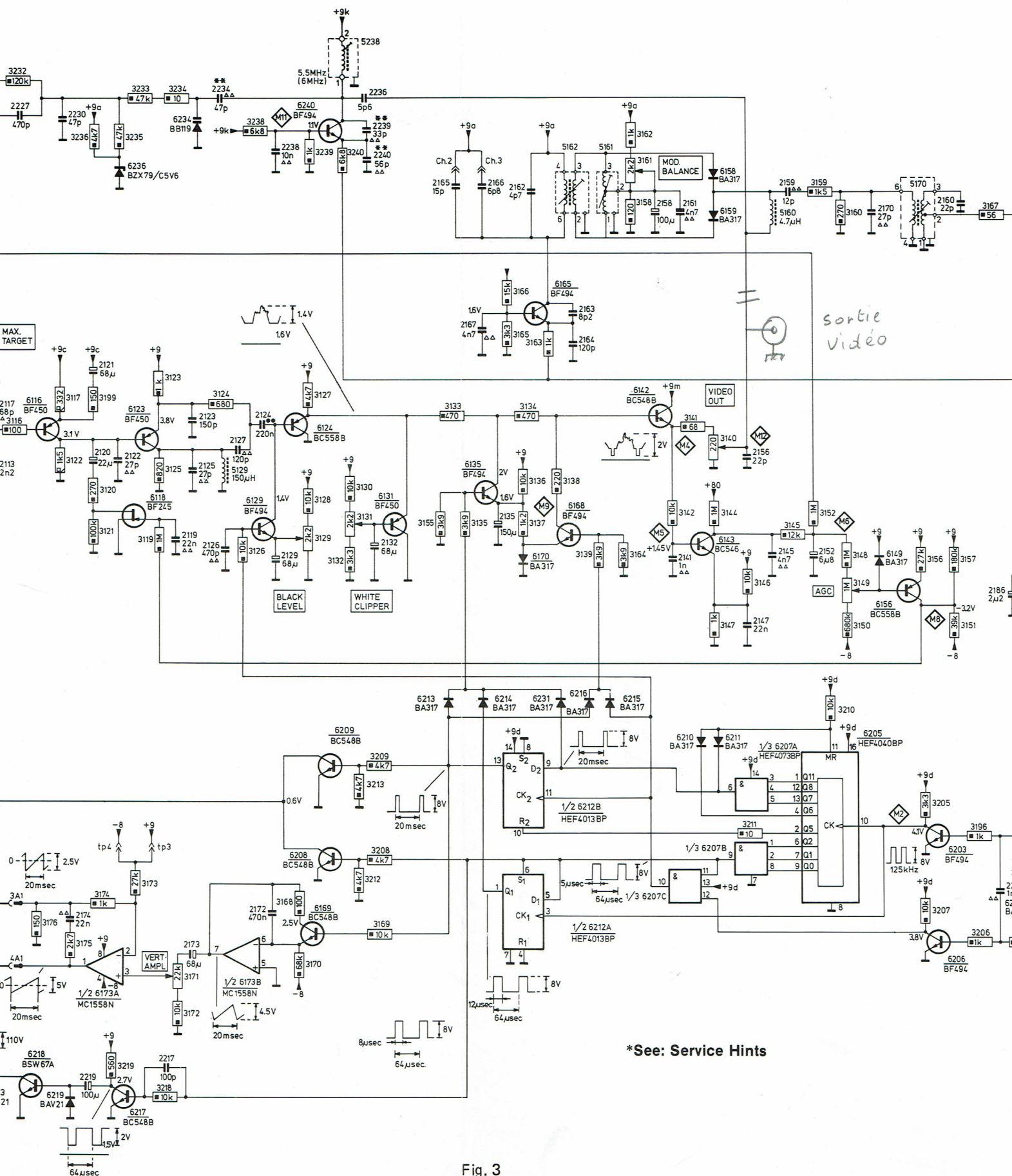


Fig. 3

[illegible]

Fig. 3

WIRING DIAGRAM

2...	2225 2224 2203 2202 2205	2206 2207	2204 2201	2212	2217	2172	2173	2223	221
2...	2107 2231 2226	2110 2228 2229	2113 2119 2120 2122 2123 2125 2126	2135	2147 2219 2141 2145	2162 ÷ 2166	21		
2...	2171 2100	2103 2111 2117 2109 2121	2127 2129 2124	2132	2143	2152	2227		
3...	3222 3228	3202 3194 3223 ÷ 3225 3195 3196 3201 3203 3205	3211 3210	3212 3213 3209 3208 3218 3168 3172 3169	3179 3171 3170 3173 ÷ 3176				
3...	3229 3230 3227 3226 3204 3231 3206 3200	3207 3123 ÷ 3132	3155 3134 ÷ 3139	3155 3134 ÷ 3139	3219 3142 3141 3144 ÷ 3148	3151 3150			
3...	3198 3153 3100 ÷ 3110	3111 ÷ 3122 3199	3133	3143	3197 3154 3152 3164 3156	3157 3149 3232	3		
MISC	1224 6228 6229 6202 5202	6204 6203 6205 ÷ 6207	6210 ÷ 6213 6215 6216 6231 6217 6214 6208 6209 6169	6173 6218 6219 6123 62					
MISC	Z1 6100 ÷ 6103	Z3 6112 6116 6118 6123	5129 6124 6129 6135 6131	6170 6168 6142 6143 6153	6149 6156				

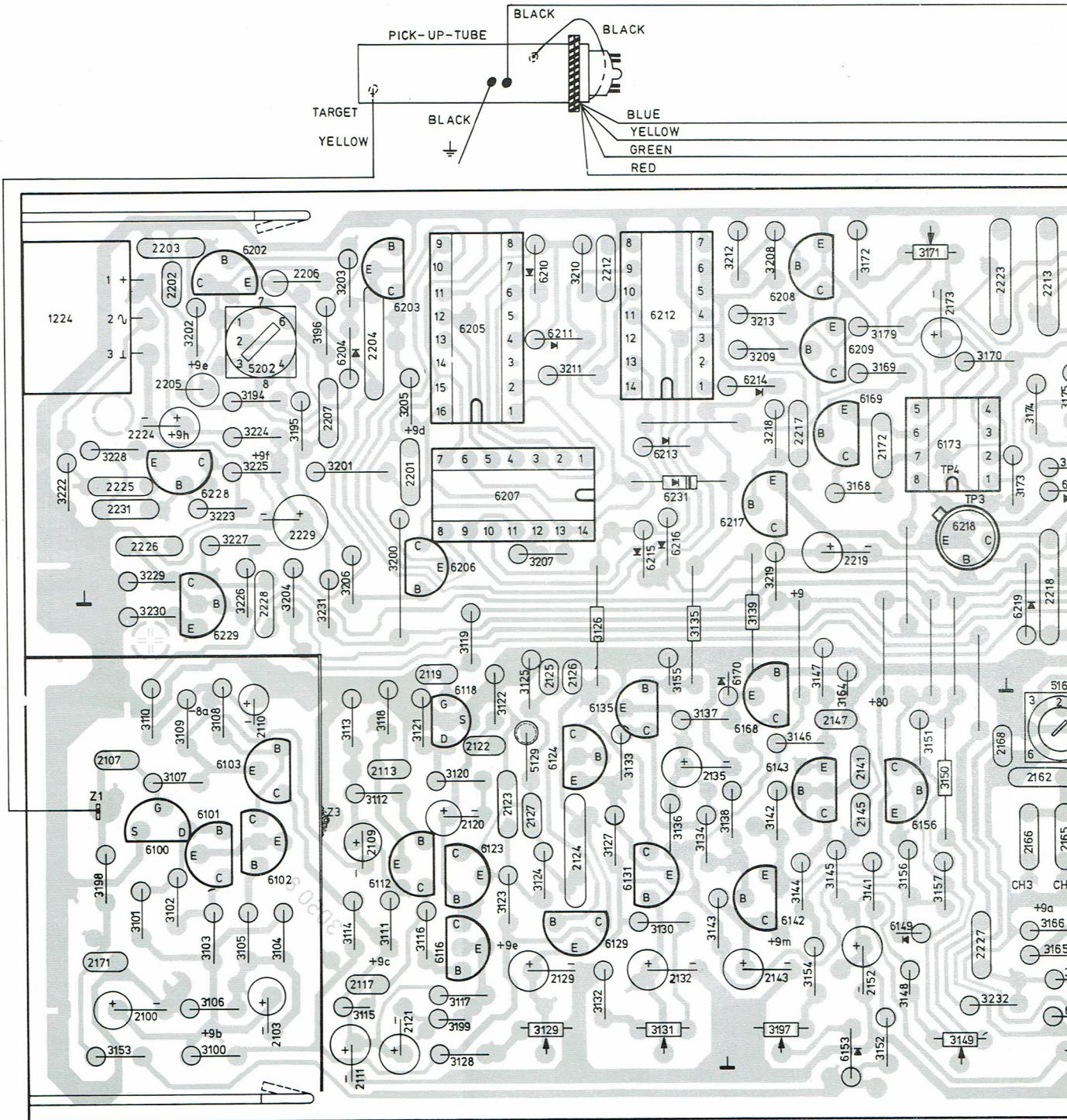


Fig. 4

2212				2217		2172		2173		2223		2213		2174		2222 2221 2216 2215																				
2122	2123	2125	2126	2135		2147		2219	2141	2145	2162 ÷ 2166		2168	2218	2161		2159	2214	2156	2170		2190	2169	2160	2220	2157										
2127		2129		2124	2132		2143		2152		2227		2167		2230	2158		2236		2234	2285		2237 ÷ 2240		2186											
3211		3210		3212		3213	3209	3208	3218	3168	3172	3169	3179	3171	3170	3173 ÷ 3176		3214		3178		3220		3215 ÷ 3217		3190 ÷ 3193										
3207	3123 ÷ 3132		3155		3134	3139		3219		3142	3141	3144 ÷ 3148		3151		3150		3166		3165		3159 ÷ 3161		3238		3237	3167	3186 ÷ 3189								
3133		3143		3197		3154	3152	3164	3156	3157		3149	3232		3140		3235	3236	3162	3158	3163	3263	3233	3234	3239		3240	3283 ÷ 3286								
5 ÷ 6207	6210 ÷ 6213		6215	6216	6231	6217	6214	6208	6209	6169		6173		6218	6219	6123	6227		6232	6220	6221	6158		5220		B1		6221	6222	6224 ÷ 6226		6283	6293	6290	6288	6287
5129	6124	6129	6135	6131	6170		6168	6142	6143		6153	6149		6156		6165		5160	5163	6236	5165		6240		6284	6159	5238	6234	5170	6285		5171	6286		6289	

Fig. 4

SERVICE ADJUSTMENTS (see Fig. 6)

Measuring equipment

- a. Monitor receiver TX1 or TX2
- b. Voltmeter
- c. Frequency counter
- d. Oscilloscope 1:1 probe
- e. Thermometer
- f. 100 Watt "Argenta" lamp
- g. Test charts 3922 986 44151
- h. L.F. generator

1. Supply voltage

Connect a voltmeter to M1.
Adjust 3191 so that the meter reads $9\text{ V} \pm 0.1\text{ V}$.

2. Pulse generator

Connect a frequency counter to M2.
Adjust 5202 so that the counter reads $125\text{ kHz} \pm 320\text{ Hz}$.

3. Beam current

Put the lens cap on the lens.
Short M5 to mass.
Connect an oscilloscope to M3.
Put the lamp in front of the camera.
Remove the lens cap for max. 10 secs. and in this time, adjust 3214 for 450 mVpp signal on M3.

4. Max. target voltage

Put the lens cap on the lens.
Short M5 to mass.
Connect an oscilloscope to M3.
Adjust 3197 for a reading of:
12 mVpp on M3 when the ambient temp. $< 24^\circ\text{C}$, and
20 mVpp on M3 when the ambient temp. $\geq 24^\circ\text{C}$.

5. White clipper

Short M5 to mass.
Direct the camera to a well illuminated white subject (wall) and focus the lens.
Connect the oscilloscope to M4.
Adjust 3131 for a reading of 2.4 V VBS.

6. Black level

Focus the camera on the RTMA test chart.
Connect the oscilloscope to M4.
Adjust 3129 so that the black areas equal the blanking level.

7. A.G.C.

Short M5 to mass.
Short M6 to M7.
Cover the lens. Connect the voltmeter to M8.
Adjust 3149 so that the voltage on M8 is $-4\text{ V} \pm 1\text{ V}$.

8. Video modulation

Short M5 and M11 to mass.
Connect the oscilloscope to M12.
Focus the camera to the test chart.
Adjust 3140 for 300 mV VBS on M12.

9. Back focus

Put the camera on a distance of 1 m from the test chart and put the lens focus ring on 1 m. Loosen screw A a few turns.
Shift the tube until the picture is as sharp as possible.
Tighten screw A.

10. Electrical focus

Focus the lens on e.g. the test chart.
Adjust 3216 so that the picture is as sharp as possible.

11. Picture tilt

Make sure the camera is in a horizontal position.
Remove the lens.
Loosen the four screws in the front a few turns.
Refit the lens.
Turn the deflection coil until the picture position is correct. Tighten the four screws again.

12. Picture geometry

Direct the camera to the RTMA test chart.
When the edge(s) of the vidicon target is (are) visible in the picture corners the horizontal scanning must be decreased. Thereto solderbridge tp5 must be closed and tp6 opened.
Now adjust the vertical amplitude with 3171 until the circle is round again.

13. Horizontal and vertical shift

If necessary the picture can be shifted horizontally by closing or opening solderbridge tp2, and vertically by closing either tp3 or tp4.

14. Beam alignment

Apply an AC signal of approx. 10 V at 10 to 25 Hz to M13 via a capacitor of 220 nF.
Turn the alignment rings of the deflection coil until the middle of the picture is stable.

15. Sound

Connect a frequency counter to the emitter of 6240 via a capacitor of 1 pF and mass.
Short-circuit the basis of 6229 with mass.
Adjust coil 5238 at 5.5 MHz for /00 and 6 MHz for /05.
Remove the short-circuit and the frequency counter.

16. RF oscillator and modulation balance

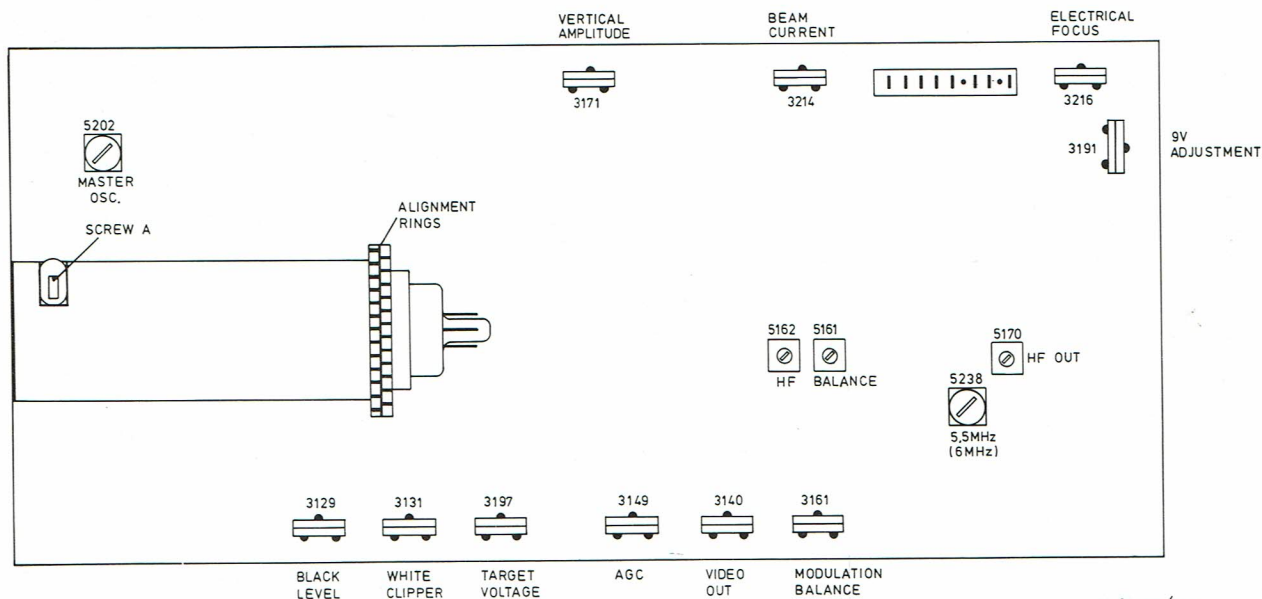
Note:

Both the RF modulator and modulation balance have been carefully adjusted in the factory, and do not need any readjustment by Service.

After necessary replacement of parts in this circuitry service adjustments can be executed as follows:

- a. Tune the monitor receiver.
- b. Tune coil 5162 for optimum picture and sound quality on the monitor screen.
- c. Short M12 via a $100\text{ }\mu\text{F}$ capacitor to mass.
Short M9 to mass.
Short M11 to mass.
Apply the lens cap.
Apply 0.41 V to M12.
Put potmeter 3161 in its mechanical mid position.
- d. Adjust 5161 for minimum RF output (an easy check hereto is the AGC voltage on collector TS351 of the TX receiver monitor).
- e. Then adjust 3161 for minimum RF output.
If necessary repeat e and f, until no further improvement is possible.

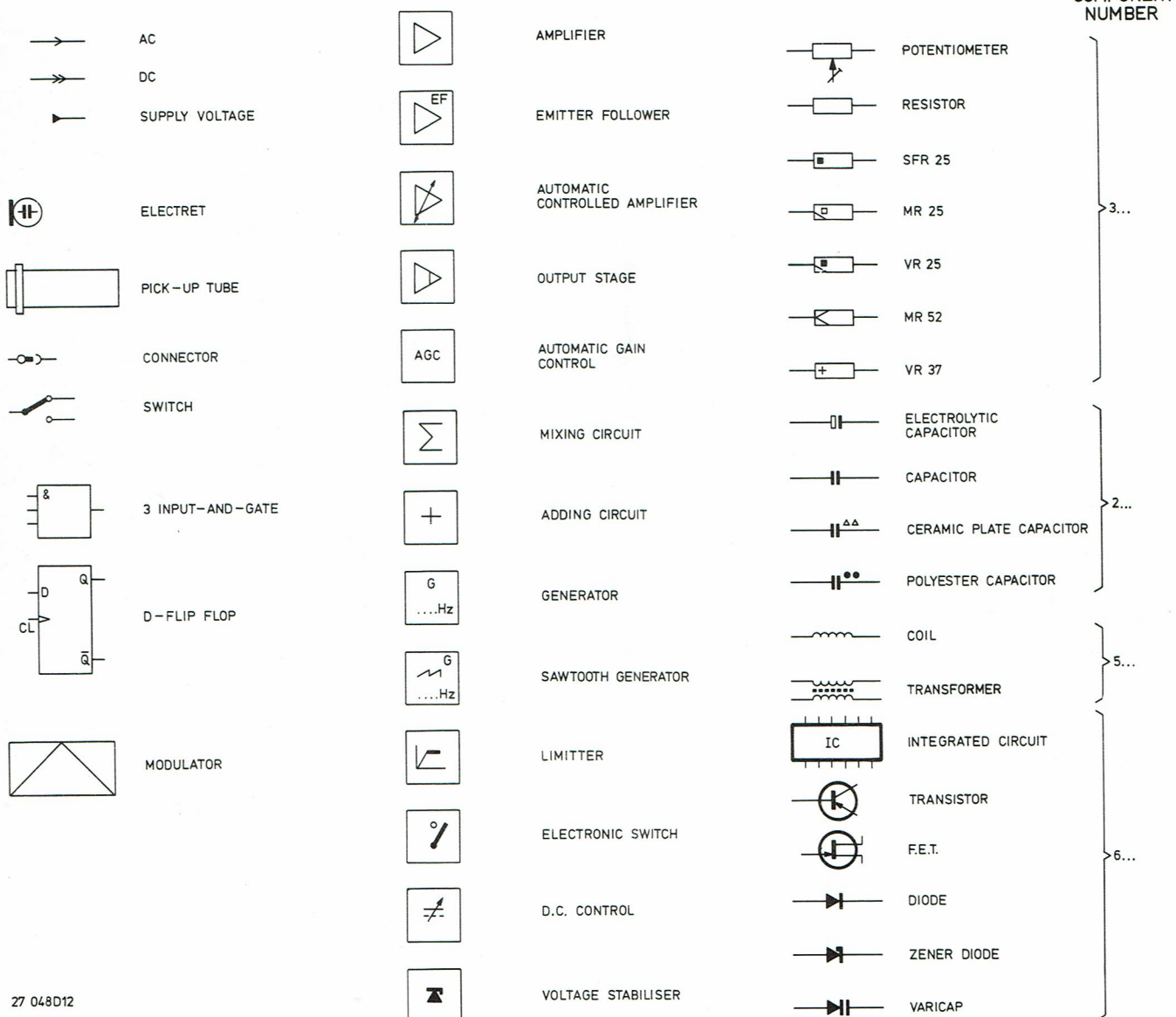
SERVICE ADJUSTMENTS



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Fig. 6

SURVEY OF SYMBOLS



EXPLODED VIEW

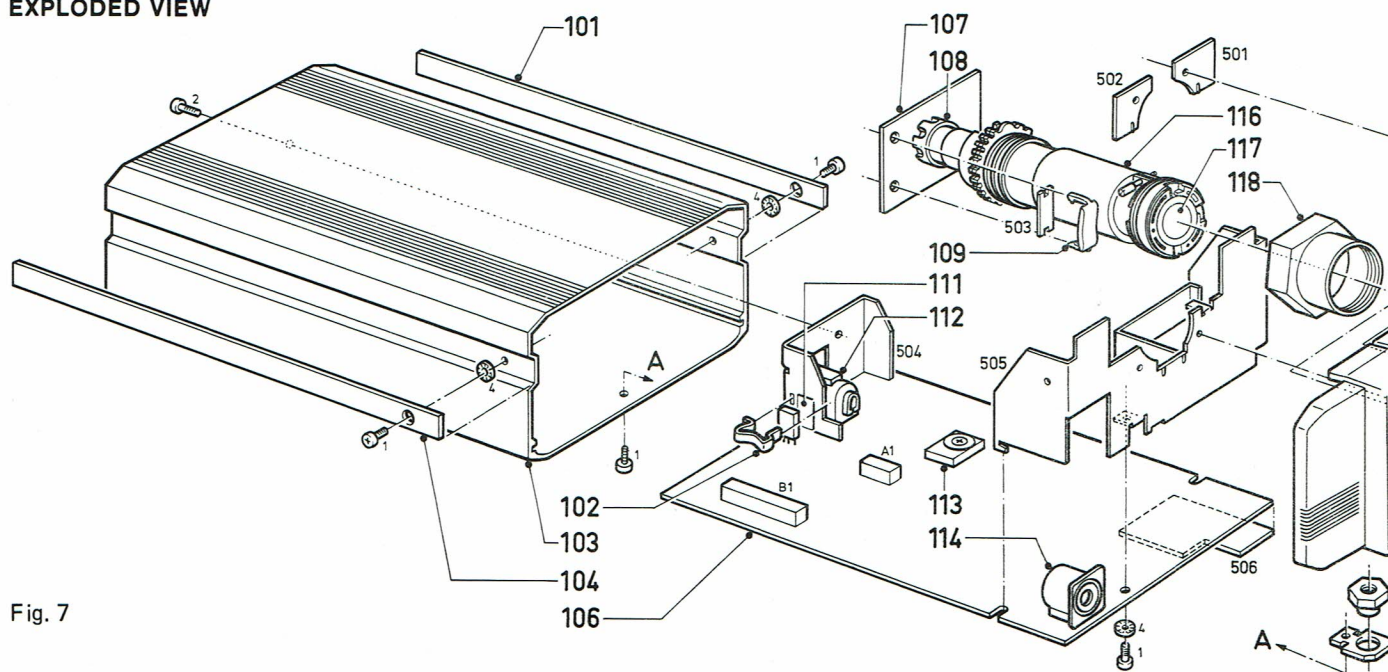


Fig. 7

LIST OF ELECTRICAL PARTS

Pick-up tube XQ1272	4822 131 90054
Deflection coil	4822 150 10138
Microphone	4822 242 30082
Printed board assembly /00 (only available during production)	4822 212 50135
Printed board tube socket /00 (only available during production)	4822 212 50136

Rotary switch 4822 273 30206

5129	150 μ H	4822 157 51247
5160		
5163	4.7 μ H	4822 157 51235
5171		
5161	0.912 μ H	4822 156 10562
5162	0.37 μ H	4822 156 40765
5170	0.348 μ H	4822 156 30822
5202	416 μ H	4822 156 20972
5220**	Auto transformer	4822 140 10191
5220**	Auto transformer	4822 140 10209
5238	17.3 μ H	4822 156 20989

HEF4013BP	5322 209 10002
HEF4040BP	5322 209 14269
HEF4073BP	5322 209 14066
MC1558N	5322 209 85766

BC337	4822 130 40855
BC546	4822 130 41001
BC547B	4822 130 40959
BC548B	4822 130 40937
BC548C	4822 130 44196
BC549C	4822 130 44246
BC558B	4822 130 44197
BD140	4822 130 40824
BF245	4822 130 20051
BF450	4822 130 44237
BF494	4822 130 44195
BSW67A	5322 130 44788
2SK136Q	4822 130 41665

BA317	4822 130 30847
BAV21	4822 130 30842
BB119	4822 130 31273
BYV95C	4822 130 41487
BZX79/B4V7	4822 130 34174
BZX79/C5V1	4822 130 34233
BZX79/C5V6	4822 130 34173

Tube socket	4822 255 70188
Coax. socket female	4822 265 10035
5 p. m.m. male A1	4822 265 30193
10 p. m.m. male B1	4822 267 50338
5 p. m.m. female A1	*
10 p. m.m. female B1	*
*20 p. m.m. female	5322 266 54015

1	Screw M3x5	4822 502 11526
2	Screw M3x10	4822 502 11513
3	Screw M3x16	4822 502 11514
4	Lock washer 3.2x6	4822 530 80216
101	Strip	4822 455 40107
102	Clip	4822 255 40128
103-/00	Casing	4822 432 60021
103-/05	Casing	4822 432 60023
104	Strip	4822 455 40106
106	Printed board	*
107	Printed board	*
108	Tube socket	*
109	Clamp	4822 401 10705
111	Insulating plate	4822 255 40133
112	Coax socket	*
113	Switch	*
114	Microphone	*
116	Deflection coil	*
117	Pick-up tube	*
118	C-mount bush	4822 505 10651
119-/00	Front	4822 432 60022
119-/05	Front	4822 432 60024
121	Lens	4822 381 20065
122	Tripod nut	4822 505 10652
123	Lens cap	4822 462 40457

5	7	38
1	2	35
9	3	33
7	7	38
6	4	
6	3	
7	3	15
4		
1		
7		
5		
8		
5		

					
2100,2109 } 2110,2111 } 2143 }	33 μ F 16 V	4822 124 20688	3129,3131,3161,3191 3140 3149 3171 3197,3214 3216	2.2 k Ω 220 Ω 1 M Ω 22 k Ω 220 k Ω 470 k Ω	4822 100 10435 4822 100 10434 4822 100 10433 4822 100 10436 4822 100 10437 4822 100 10438
2103 2120,2115 2121,2185 2129,2132 } 2173 }	15 μ F 16 V 22 μ F 10 V 68 μ F 6.3 V 68 μ F 16 V	4822 124 20687 4822 124 20677 4822 124 20671 4822 124 20698			
2135 2152 2158,2219 } 2220 }	150 μ F 16 V 6.8 μ F 63 V 100 μ F 10 V	4822 124 20691 4822 124 20727 4822 124 20679			
2186 2190 2214 2224,2229	2.2 μ F 63 V 220 μ F 10 V 33 μ F 10 V 10 μ F 25 V	4822 124 40244 4822 124 20681 4822 124 20945 4822 124 20697			
					
					
2122 2123 2147 2156,2160 2162 2163 2164 2165 2166 2172 2205 2206 2217 2218 2218 2218 2227 2230 2234-/05 2234 2234 2236 2239-/05 2239 2240-/05 2240	27 pF 150 pF 22 nF 22 pF 4.7 pF 8.2 pF 120 pF 15 pF 6.8 pF 470 nF 2.7 nF 1.2 nF 100 pF 2.7 nF 3.3 nF 3.9 nF 470 pF 47 pF 33 pF 39 pF 47 pF 5.6 pF 27 pF 33 pF 33 pF 56 pF	4822 122 30045 4822 122 31413 4822 122 30103 4822 122 31063 5322 122 31567 4822 122 31403 4822 122 31247 4822 122 31404 4822 122 31401 5322 121 40175 5322 121 54065 5322 121 54135 4822 122 40257 4822 121 41227 4822 121 40519 4822 121 41382 5322 122 34159 4822 122 31615 4822 122 31614 4822 122 31069 4822 122 31615 4822 122 31047 4822 122 30045 4822 122 31614 4822 122 31614 4822 122 31616			
			8.2 M Ω 4822 110 72212		
			15 M Ω 4822 110 42218		
**See: Service Hints					

SERVICE HINTS

Some cameras are equipped with pickup tubes 20PE19 pos. 1100.

When this pickup tube is replaced by a XQ1272 or equivalent one, the jumper across resistor 3217 on the copperside of the printed panel must be removed. Furthermore three different transformers pos. 5220 have been used.

When this transformer has to be replaced, special attention has to be paid to the defective one.

- If the defective transformer has a blue dot, the codenumber of the replacement transformer is 4822 140 10209 and capacitor 2218 (1n8) must be changed into 2n7.

- If the defective transformer has a blue tape around the core and this core consists of an E and I half, its codenumber is 4822 140 10209 and capacitor 2218 is 2n7.
- If the defective transformer has a yellow tape around the coil and the core consists of two E-shaped halves, its codenumber is 4822 140 10191 and capacitor 2218 is 3n3.

Please note that the transformers stated above are not interchangeable.