BARCO

BARCO Projection Systems

SECTION H

service sheet

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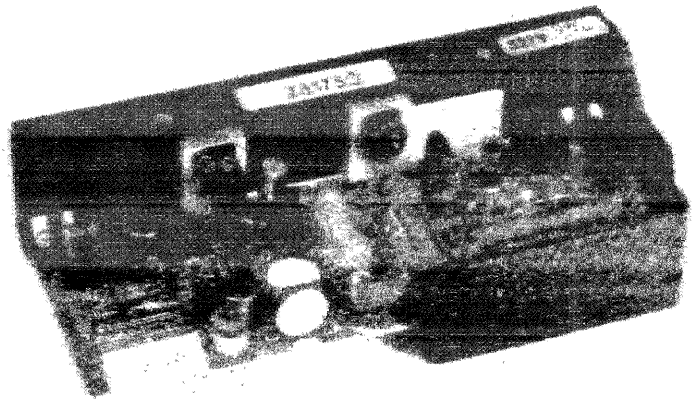
RGB OUTPUT MODULE 76 1750



Remark: This adjustment procedure has to be applied on the RED-, GREEN- and B-output board.

- Necessary equipment: oscilloscope

1. PREPARATION

- Supply an external signal to the projector. (eg. a color bar test pattern)

- Connect the first measuring probe to the video input signal.(use eg.R1)

- Connect the second measuring probe to the cathode output.(use eg.Z2)

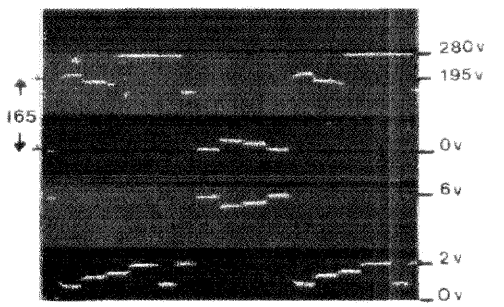
- Adjust the projectors brightness control until the DC blacklevel of the video input reaches 2V.

- Adjust the contrast control until the video input information reaches 6V.

2.. ADJUSTMENT

- Adjust P2 until the blacklevel of the output signal reaches 195V, simultaneously with P1, which controls the gain, until the amplitude of the video output signal reaches 165V pp (neglecting the blanking pulse)

Important note: Both adjustments affect each other.



Use of a color bar pattern:

upper part: Green output signal (Kathode Z2)
Lower part:Green input signal (R1)

INTRODUCTION.

These modules receive the prepared Red, Green and Blue signals from the RGB + Decoder board. The signals are amplified to a level sufficient to drive the cathodes of the respective CRT's.

The beam current per crt is sensed and returned to the decoder and hor defl board for further action (see these boards).

Some arcing protections are included to avoid damage of the output transistors. A feedback circuit provides a mean of determining the gain and reduce the thermal drift.

RED, GREEN AND BLUE AMPLIFIERS.

It is obvious that the three drivers are identical and we limit to only one output stage.

The video input is first buffered by two emitterfollowers Q1/2, a PNP and NPN, to compensate for thermal drift, and then feeding the base of Q3 via the gain control P1 and an adjustable speed-up network C2/R4.

The cut-off, on other terms the black level, is adjusted by P2 which determines the DC - level of Q3 and consequently of the output voltage.

Q3 is an amplifier driving on its turn the parallel connected Q4/5 transistors.

This is achieved to spread the total current over two transistors and thus to reduce the dissipation of the named transistors.

The next amplifier, the Fet Q6, is the power amplifier. It is configured as a common gate amplifier, to reduce its capacitance, with active load. Its drain voltage drives the Q7/8 pair operating as a Darlington.

The required minimum base emitter voltages are obtained by the zener Z3 (3V).

The darlington is followed by the emitterfollower Q9 driving the cathodes via D8/C12.

Note that this drive is mainly a charging or discharging of the cathode capacitance.

The behaviour of this amplifier can be discussed for fast (ac) variations and for slower (dc) variations (brightness control) :

a) Fast response characteristics :

In this case the capacitors C12 and C11 cannot change rapidly their voltages and the change of the cathode capacitor is got via these capacitors. There is a feedback provided via R9/P2 to avoid any shift of the biasing of the amplifier due to these rapid changes.

b) Slow response characteristics :

In this case, the currents flow through Q9/D8 for charging up the cathode capacitors. And Obviously through Q10/D5/D3 for discharging. The feedback now determines the dc gain of the amplifier, and together with P2 (Cut-

Off) the average DC level of the videosignal.

INDIVIDUAL BEAM CURRENT LIMITATION.

As the averaged video signal is found across C12, and, as this capacitor is connected between base-emitter of Q10, the collector current of the latter is proportional with the average beam current.

The voltage across R23 is integrated and serves as IBCL (Individual Beam Current Limiting) information and is subsequently led out to the decoder, where it reduces the contrast, and to the EHT board, where it causes EHT HOLD DOWN if this current lasts for some time(in the event of a failure).

BLANKING DURING RETRACE.

The negative blanking pulses, arrive at the board at J1(5) and pull the base of Q3 at ground level to block the fet Q6. Its drain raises rapidly to the 230 volts and the picture tubes are completely blanked.

PROTECTIONS AGAINST ARCING.

When an arcing in a crt occurs, there is first a heavy increase in current from the cathode into the output amplifier, followed by a short, due to the action of the flash-over circuit. Protection is provided for both of these situations:

1. **Overvoltage protection :**

-The output is flash-protected by D9/D10.

- The drain of Q6 is connected to the +230V by D12/D13 preventing an excess of the drain beyond the supply voltage of +230V.

-The current, caused by this high voltage cannot flow into Q7/8, as this is not possible due to D4.

2. **Overcurrent protection : (short of the output).**

- The maximum current that can flow through R21 (10 Ohm) is limited as follows:

2.8V(Z2) + 0.7V(D7) - (3x0.7V) = 0.7 volts .

The maximum current is consequently : 0.7 volts/10 Ohm = 70 mA.

ITEM NO.	SIT.	DESRIPTION
11 1147	C...	C ELAX 100M T 16
11 1510	C..1	C ELPRMI 22M M5 25
11 7001	C..2	C T 7 -35P 160
11 1510	C..3	C ELPRMI 22M M5 25
11 2774	C..4	C CE MI 100K U5 63
11 2763	C..5	C CE MI 10K U5 63
11 2683	C..7	C N750MI 22P G5 500
11 4132	C..8	C POMEFF 100K K 250
11 4136	C..9	C POMEFF 220K K 250
11 4132	C.10	C POMEFF 100K K 250
11 2763	C.11	C CE MI 10K U5 63
11 2763	C.12	C CE MI 10K U5 63
11 1466	C.13	C ELPR 100M Z5 16
11 2763	C.14	C CE MI 10K U5 63
11 2366	C.16	C N750MI 220P J5 63
11 1510	C.17	C ELPRMI 22M M5 25
13 1621	D..1	D 1N4148 SWITCH
13 1628	D..3	D BAW62 SWITCH
13 1627	D..4	D BAV21 SWITCH
13 1621	D..5	D 1N4148 SWITCH
13 1627	D..6	D BAV21 SWITCH
13 1621	D..7	D 1N4148 SWITCH
13 1621	D..8	D 1N4148 SWITCH
13 19481	D..9	D BYD33J 600V/1A3FSR
13 19481	D.10	D BYD33J 600V/1A3FSR
13 1621	D.11	D 1N4148 SWITCH
13 1627	D.12	D BAV21 SWITCH
13 1627	D.13	D BAV21 SWITCH
13 1621	D.15	D 1N4148 SWITCH
13 4035	I..1	U 79L05 -05V/0A1 STAB
31 3949	J..1	J CT-MT MBS P 9 2
31 3945	J..2	J CT-MT MBS P 5 2
77 4275	L..1	COIL N14,5 B5WC D0,2
30 61322	L..2	CHOKE AX NS 10 UH
77 4272	L..3	COIL N10,5 B5ZK D0,2
30 61341	L..4	CHOKE RA NS 100 UH
30 61582	L..5	CHOKE AX NS 1,5 MH
10 6826	P..1	R TCE V 1K K 0W5 S10SS3386H
10 6725	P..2	R TCE H500E K 0W5 S10TS3386P
78 0015	PC..	PCB PJ 49 RGB OUT *800 761750

ITEM NO.	SIT.	DESRIPTION
13 14181	Q..1	Q BC559B P 30 / 0A1
13 14295	Q..2	Q BC549B N 30 / 0A1
13 2586	Q..3	Q BFR95 N 25 / 150
13 2911	Q..4	Q 2N5583 P 30 / 0A5
13 2911	Q..5	Q 2N5583 P 30 / 0A5
13 2917	Q..6	Q 2SK511 FN 250 / 0A3
13 1471	Q..7	Q BF458 N 250 / 0A1
13 1471	Q..8	Q BF458 N 250 / 0A1
13 1471	Q..9	Q BF458 N 250 / 0A1
13 2552	Q.10	Q BF423 P 250 / 50
10 11231	R..1	R CF H 75E J 0W25
10 1130	R..2	R CF H330E J 0W25
10 1130	R..3	R CF H330E J 0W25
10 1134	R..4	R CF H680E J 0W25
10 1128	R..5	R CF H220E J 0W25
10 1130	R..6	R CF H330E J 0W25
10 1105	R..7	R CF H 2E7 J 0W25 R25X
10 1105	R..8	R CF H 2E7 J 0W25 R25X
10 3352	R..9	R MO H 22K J 4W WK8
10 1137	R.11	R CF H 1K2 J 0W25
10 1132	R.12	R CF H470E J 0W25
10 1121	R.13	R CF H 56E J 0W25
10 1129	R.14	R CF H270E J 0W25
10 37382	R.15	R WW H680E J 5W
10 37382	R.16	R WW H680E J 5W
10 37382	R.17	R WW H680E J 5W
10 37382	R.18	R WW H680E J 5W
10 1137	R.19	R CF H 1K2 J 0W25
10 1110	R.20	R CF H 6E8 J 0W25 SK2
10 1112	R.21	R CF H 10E J 0W25
10 11369	R.22	R CFFH 1K J 0W25
10 1145	R.23	R CF H 5K6 J 0W25
10 1160	R.24	R CF H100K J 0W25
10 1160	R.25	R CF H100K J 0W25
10 11129	R.26	R CFFH 10E J 0W25
10 11249	R.27	R CFFH100E J 0W25
10 11008	R.29	R CFFH 1E J 0W25 0207
10 11129	R.30	R CFFH 10E J 0W25
10 1130	R.35	R CF H330E J 0W25
10 1151	R.36	R CF H 18K J 0W25
13 1704	Z..2	D ZENER 2V8 0W25 C
13 1754	Z..3	D ZENER 3V3 0W5 C

ART.NO.	DESCRIPTION	QUANTITY
10 11008	R CFFH 1E J 0W25 0207	1
10 1110	R CF H 6E8 J 0W25 SK2	1
10 11129	R CFFH 10E J 0W25	2
10 11249	R CFFH100E J 0W25	1
10 11369	R CFFH 1K J 0W25	1
10 3352	R MO H 22K J 4W WK8	1
10 37382	R WW H680E J 5W	*4
10 6725	R TCE H500E K 0W5 S10TS3386	*1
10 6826	R TCE V 1K K 0W5 S10SS3386	*1
11 2683	C N750MI 22P G5 500	1
11 4132	C POMEFF 100K K 250	2
11 4136	C POMEFF 220K K 250	1
11 7001	C T 7 -35P 160	*1
13 14181	Q BC559B P 30 / 0A1	1
13 14295	Q BC549B N 30 / 0A1	1
13 1471	Q BF458 N 250 / 0A1	*3
13 1621	D 1N4148 SWITCH	6
3 1627	D BAV21 SWITCH	4
13 1628	D BAW62 SWITCH	1
13 1704	D ZENER 2V8 0W25 C	1
13 1754	D ZENER 3V3 0W5 C	1
13 19481	D BYD33J 600V/1A3FSR	2
13 2552	Q BF423 P 250 / 50	1
13 2586	Q BFR95 N 25 / 150	1
13 2911	Q 2N5583 P 30 / 0A5	2

ART.NO.	DESCRIPTION	QUANTITY
13 2917	Q 2SK511 FN 250 / 0A3	*1
13 3013	Q MOUNTING PAD TO-5	2
13 3015	Q COOLER TO-5	2
13 30191	Q WASHER TO-126	2
13 30193	Q BUSH INSULAT TO-126	2
13 3071	Q AL OX WAFER AOS220SL4,5	*2
13 4035	U 79L05 -05V/0A1 STA	1
30 61322	CHOKE AX NS 10 UH	1
30 61341	CHOKE RA NS 100 UH	1
30 61582	CHOKE AX NS 1,5 MH	1
31 3945	J CT-MT MBS P 5 2	*1
31 3949	J CT-MT MBS P 9 2	*1
36 20167	SCREW DIN84 M 2,5X16 MP-	2
36 26696	SCREW DIN921 M 3 X 8 MP-	2
36 61106	NUT DIN934 M 2,5 HEXAGO	2
36 7455	RIVET P AL FE TAP/D/BS46 D3,	2
36 7528	WASHER DIN6798 A 2,7	2
76 1750A	UN RGB PJ 49 GR800 OUTPUT	1
76 1750D	UN RGB PJ 49 GR800 OUTPUT	1
77 4272	COIL N10,5 B5ZK D0,2	1
77 4275	COIL N14,5 B5WC D0,2	1
80 2619	HEATSINK PJ 49 RGB OUT	*1

* NUMBERS REFERRING TO PICTURE