



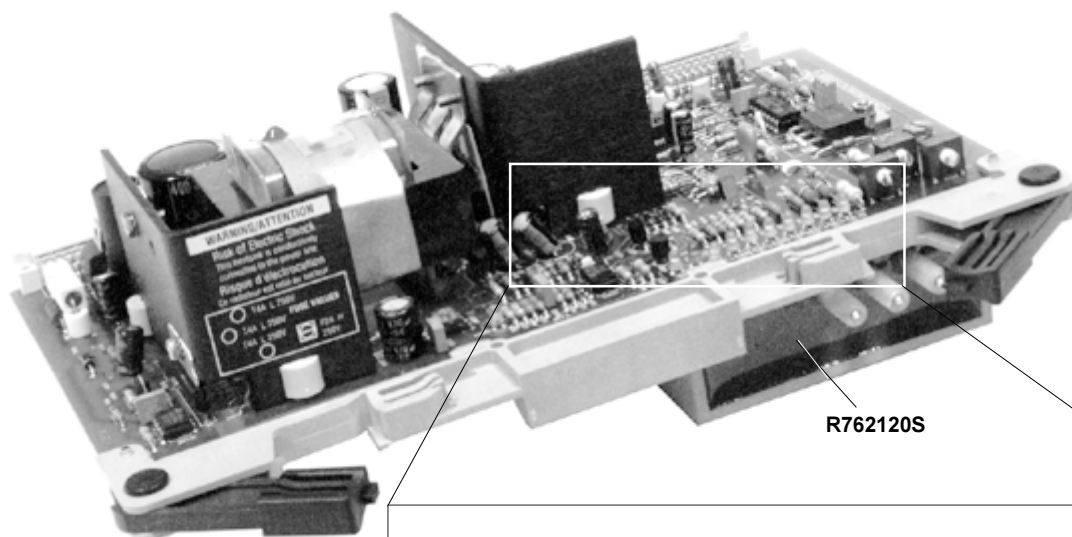
BARCO Projection Systems

SECTION L

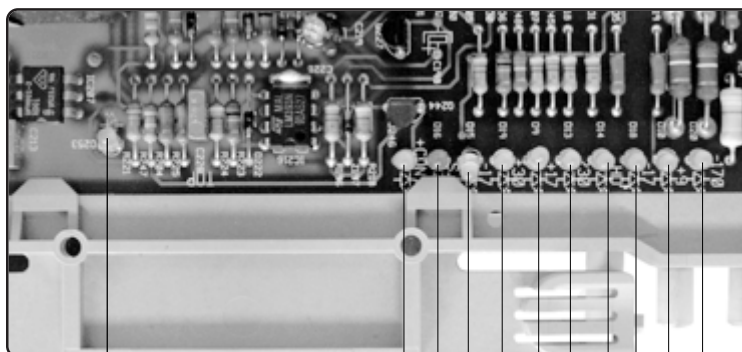
service sheet

WARNING

THIS CIRCUIT BOARD IS HOT TO AC. THIS POWER SUPPLY, LIKE THE HIGH VOLTAGE POWER SUPPLY, DOES NOT USE A LINE ISOLATION TRANSFORMER, MEANING A PORTION OF THE CIRCUITRY IS HOT-TO-LINE AND SHOULD BE TREATED WITH CAUTION.



R762120S



+CONV' Overvoltage

+CONV

SCAN FAIL

-17V

+30V

+17V

+230V

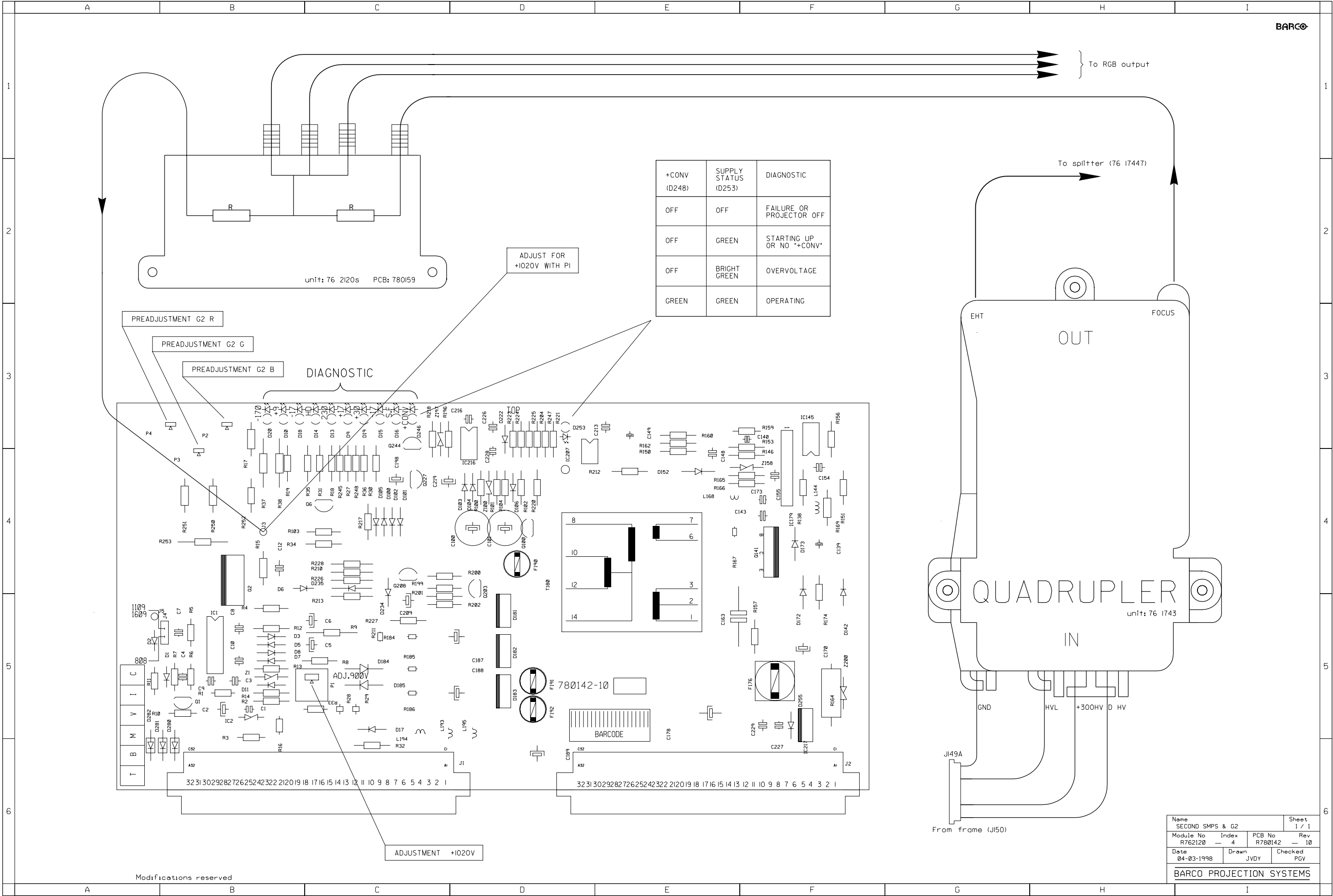
HTHD

-17V

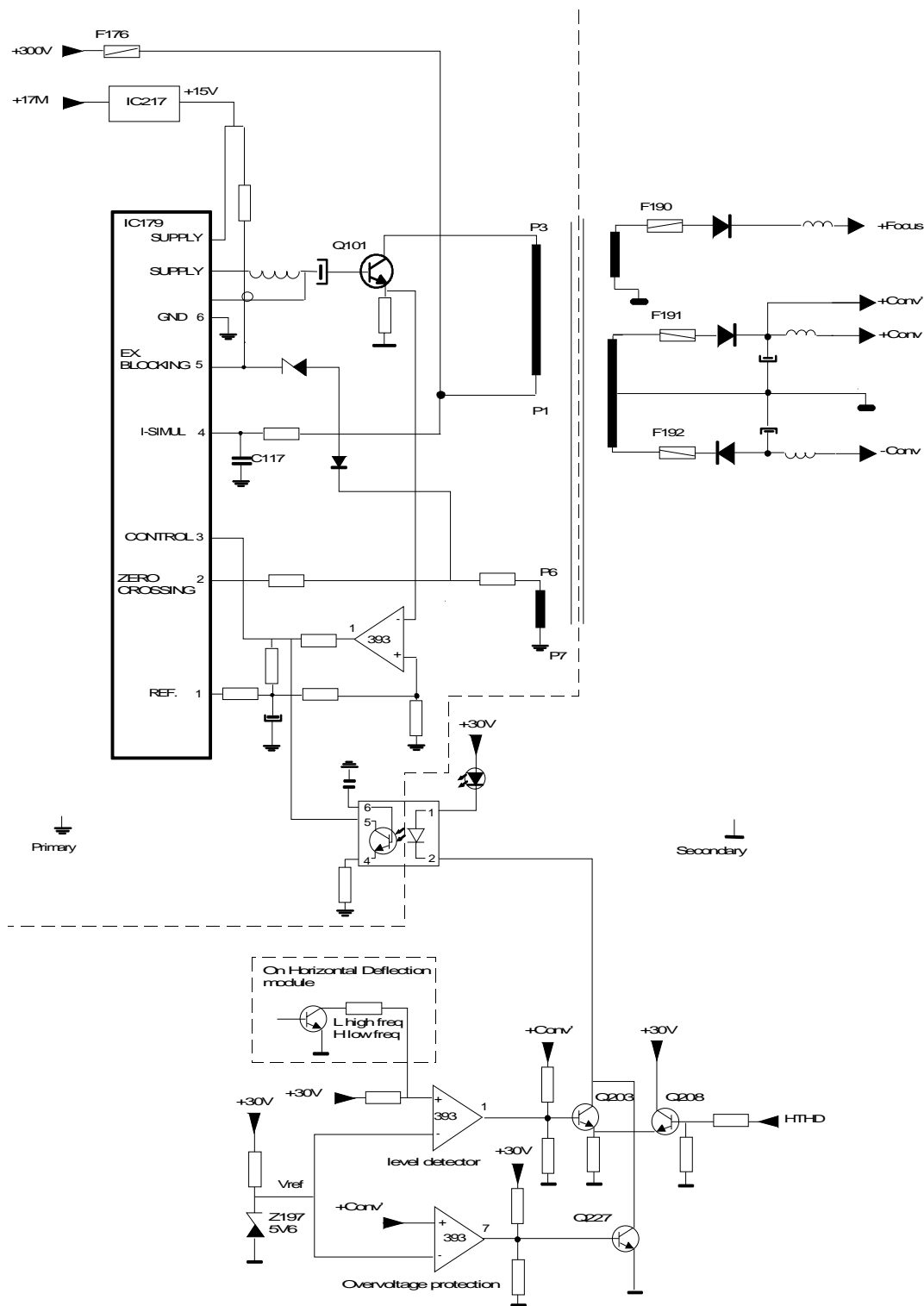
+9V

-170V

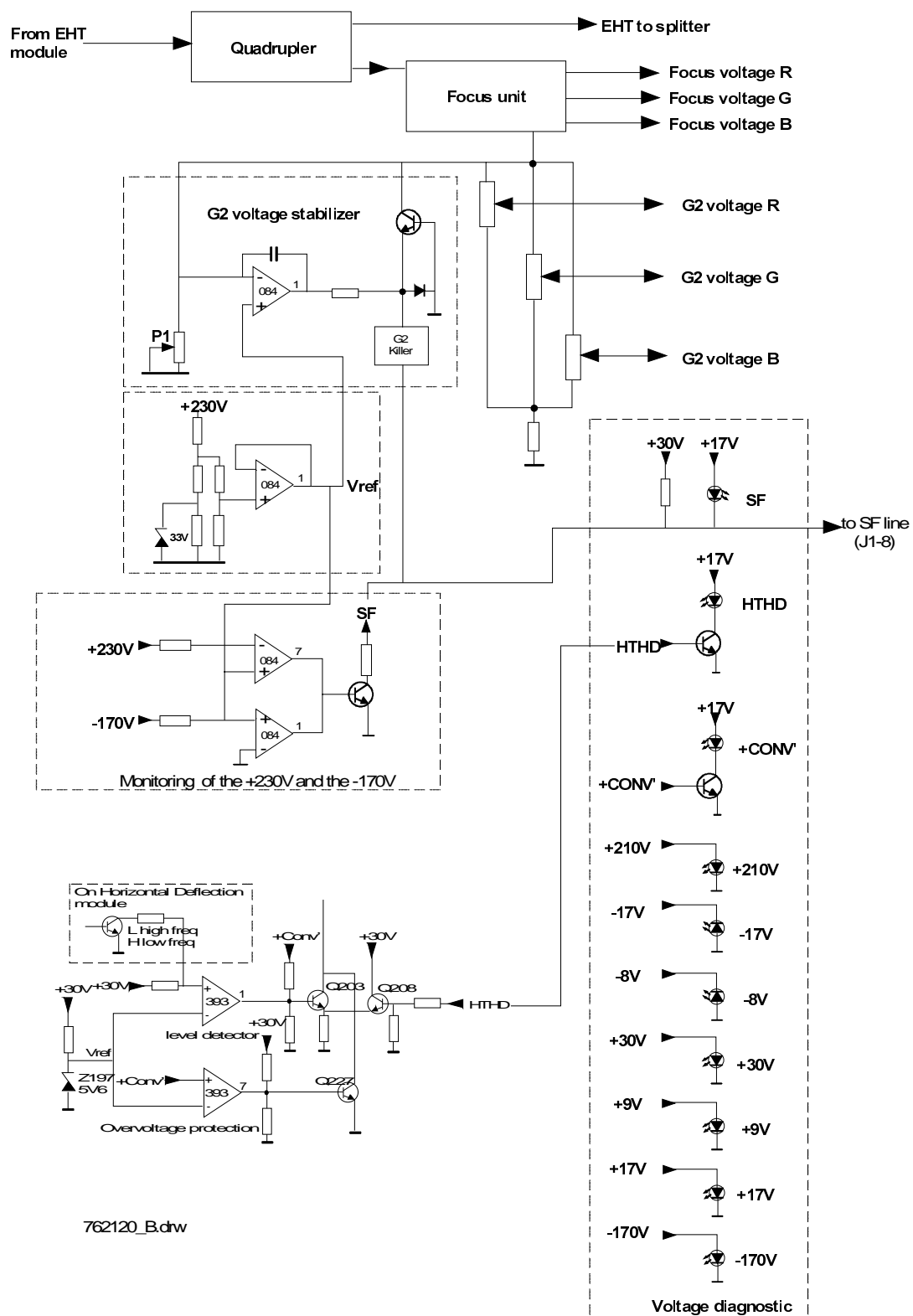
Voltage diagnostic



Name SECOND SMPs & G2			Sheet 1 / 1	
Module No R762120		Index — 4	PCB No R780142	Rev — 10
Date 04-03-1998		Drawn JVDY		Checked PGV
BARCO PROJECTION SYSTEMS				



762120_A.drw



Technical description “G2 + DIAGNOSTIC” (76 2120).**Introduction**

This board comprises :

- the SMPS for the convergence end stages and the Focus power stages.
- the stabilisation and alignment circuits of the G2 voltages.
- monitoring circuits of the +210V / -170V to cause scan fail if absent.
- the LEDs for diagnosis of the supply voltages and scan fail.

A. SMPS for +/- CONV and +FOC voltages.

This power supply uses the same TDA4601 as the main SMPS. We refer to the description of this board for more details. We just limit here to the differences and the control loop to generate the correct amplitude of these voltages.

Because of the high scanning range of the projector, from 15khz to 135khz, we apply a ‘tracking’ of the power supply with the line frequency. This means the power supply for the power convergence stages increases with the line frequency, but, not in a linear way.

The available information on the line frequency is the +HTHD voltage. However, this voltage is not linearly proportional for the full range of frequencies. Nevertheless, this voltage is used for tracking, but an adaptation of the gain in the feedback will be needed in the second range.

The TDA4601(IC179) totally relies on the +15V(derived from the +17M) delivered by the first or main SMPS and the +300VM.

The transformer and associated rectifier circuits provide the +FOCUS, +/- CONV and the +CONV’ for the feedback control loop discussed hereafter.

B. Control loop / Feedback / Adaptation.

To obtain a tracking with the line frequency, a portion of the +HTHD voltage is applied to the base of Q208.

The main loop is realised by applying the +CONV’ voltage to the base of Q203, the error-amplifier. The amplitude of the feedback depends on the status of the output of the level detector LM393 (IC216) , pin 1. If that pin 1 output is low (=ground), R200 is added in parallel on R201. In the other case R200 is hooked up to the +30V (output of level detector).

Pin 2 of the LM393 is set at 5.6 volt with Z197. “REL2” is connected to the collector of Q8 on the HOR DEFL board. For the second range, this line is low or ground level and pin 3 is then lower than the zener voltage. Pin 1 is then at ground level and consequently R200 is put in parallel with R201. The feedback is changed to compensate for the decrease of the +HTHD voltage.

Via an insulating opto-coupler, the collector current of Q203 is transferred to pin 3 of the regulating TDA4601.

The +CONV’ voltage is also applied to another level detector in IC216, pin 5. The same reference voltage of 5.6 volts is applied to pin 6. When an overvoltage situation occurs, Q227 saturates and the collector of Q203 drops to ground level. The SMPS switches into a safe loop, whereas the output voltage is dropped to a minimum.

If, on the other hand, the HTHD voltage is too , the +CONV voltage drops also via D235/ R227.

C. Monitoring of the +210V and -170V.

A very stable Vref voltage is formed with IC2 (33V) and buffered with an OPAMP. IC2 stabilizes a 33 volts which is then divided by R14/R1 to exactly 10 volt and buffered to provide sufficient current.

If the +210V were absent, the Vref would disappear and the monitoring circuit cannot work. The +9V takes over in this case and installs a reference voltage via Z1 / D11. This Vref of 10 volt is used for the level detectors monitoring the supply voltages of the video power stages : the +210V and -170V.

The absence of one or both of these voltages can damage the picture tubes. The Scan Fail line switches low through Q1 as soon one of the voltages drops below some level.

D. G2 voltages.

1. Stabilisation.

The G2 voltages must be very stable to avoid thermal drift, and, they should be adjustable between 400V and 1020 volt.

The voltage coming from the unit 76 2120S is already very stable since it is coming from a stabilised source, the EHT.

The series output resistor in the unit forms together with P2, P3, P4 and R17 a divider. If we can stabilize the voltage at the node mentioned "Adjust for 1020V with P1" we also have a stable G2 voltage at the sliders.

That 1020 volt point is sensed with the divider R15 / R13/ P1. Since the Vref is 10volt, the output of the OPAMP will change until pin 13 is also at 10 volt.

Any voltage difference due to a change of the 1020 volt is adjusted by Q2 which will feed a current from to the (negative) output of the OPAMP via the "voltage dropping" Q2 transistor. Note that Q2 is needed because the 1020 volts is a too high voltage for the OPAMP. A high voltage transistor such like the ON4046 (BU508A) is therefore required.

2. G2 - Killer.

The G2 voltages must drop very quickly to zero in the event of a scan failure and at switching off the projector. There is a risk that the spot suppression does not sufficiently work when these voltage are too high.

The drop of the G2 voltage is realised with D100-D104 taking the heavy drop of the +17V and +30V at information to cause a heavy conduction of Q2.

In the event of a scan failure, Q110 gets forward biased as its emitter Q2 becomes negative.

E. LEDs for diagnosis.

The presence of the various voltages are all displayed with green LEDs. The variable voltages like the +HTHD and +CONV' drive a LED through a transistor to obtain a constant light output of the LED.

The scan fail diode D16 is red and shows that there is a problem in the horizontal or vertical deflection (see these boards for more explanations).

R762120Rev. 18.06.96

ADJUSTMENT PROCEDURE 'G2 CONTROL+DIAGNOSTIC MODULE'

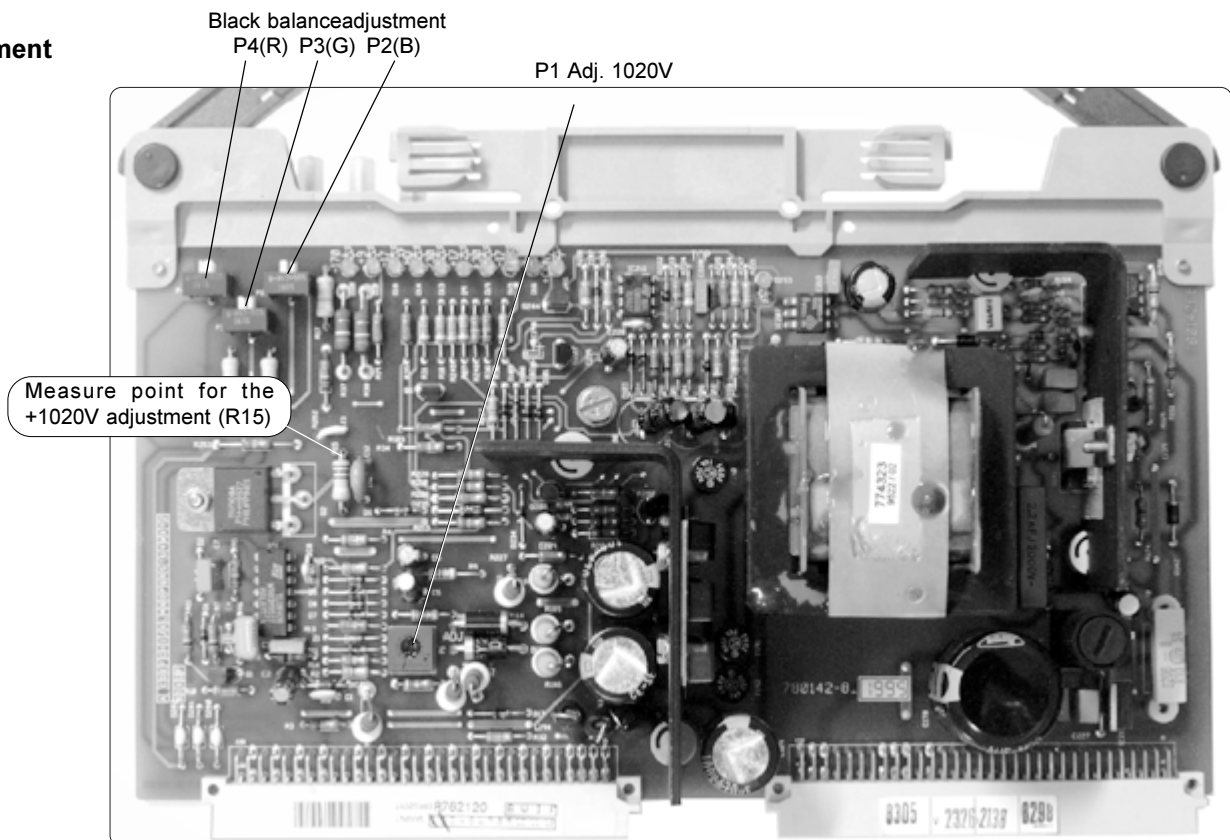
The alignment is restricted to the adjustment of :

- alignment of the +1020V
- pre-alignment of the BLACK BALANCE

HIGH VOLTAGE WARNING

To avoid DANGER TO LIFE, do not attempt to service the chassis until all precautions necessary for working on HIGH VOLTAGE equipment have been observed.

Alignment



Preparation

WARNING: The power must be OFF before removing any connector from circuit board or unit. Failure to do so may result in severe damage to the projection unit.

- Turn the projector off.
- Put the module on the extension boards.
- Connect to the VIDEO input e.g. an electronic colour test video signal.
- Switch the projector in the VIDEO MODE. Select source 1.

Alignment +1020V

- Connect to the resistor R15 (side wire soldering J3) a precision **focus** probe.

CAUTION: read carefully all safety instructions, mentioned in the user's manual of the precision focus probe.

- Switch on the projector.
- Adjust the potentiometer P1 for +1020V read out.

Black balance

- Connect to the video input a colour bar signal.
- Proceed to **Random access adjustment mode** and highlight **color balance**.

Press **ENTER** to display menu R10 (refer to owner's manual of the projector)
Use the arrow keys to select *black balance* and then press **ENTER**.
Adjust the "cut off" for each color for a bar scale level of 50.

- Adjust CONTRAST to minimum (number indication below the bar scale of 0) and COLOUR until colour is off.
- Adjust BRIGHTNESS to mid-position (number indication below the bar scale of 50).

Proceed to the pre-adjustment of the black balance P2(B)-P3(G)-P4(R)
Observe the bars on the screen. If any trace of color appears on the black or white bars then perform the following adjustments in low ambient light.

- Cover the blue and the red lens with the lenscap.

Short-circuit the two pins on the top side of the respective colour driver, see illustration.

Adjust the Green G-2 control P3 until the green raster is just visible on the screen.

Remove short-circuit

- Cover the green and the red lens with the lenscap.

Short-circuit the two pins on the top side of the respective colour driver, see illustration.

Adjust the Blue G-2 control P2 until the blue raster is just visible on the screen.
Remove short-circuit

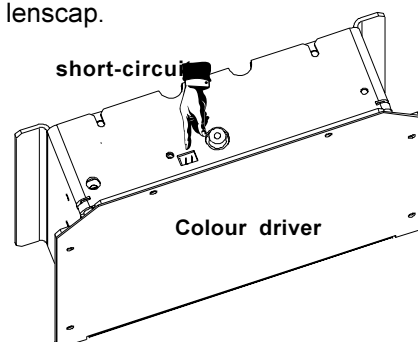
- Cover the blue and the green lens with the lenscap.

Short-circuit the two pins on the top side of the respective colour driver, see illustration.

Adjust the Red G-2 control P4 until the red raster is just visible on the screen.
Remove short-circuit

Remove the lenscaps

The raster on the screen should appear white.



Note: if any coloration is still visible, then adjust the **black balance** (Red cut-off, and Blue cut-off) in the **Random access adjustment mode** slightly to eliminate any trace of colour.

Re-adjust brightness and contrast for optimum picture. There should be no coloration between shades of gray.

Re-adjust color control at normal.

Parts listing R762120

SIT.	ITEM NO.	DESCRIPTION	QUANTITY	SIT.	ITEM NO.	DESCRIPTION	QUANTITY
20	R133036	SPRL6 D 2,4D 6 CE	5	F190	R314188	F TR5 T 4A L UL	1
120	R133063	HTSN@ASOT93I_MICA28X	1	F191	R314188	F TR5 T 4A L UL	1
220	R133074	HTSN@A I_SIL W30		F192	R314188	F TR5 T 4A L UL	1
400	R3631049	SCR Z933 M 3 X 6 SS	1	F176	R314516	F A H+C 6A 5X20 BV B	1
30	R3631059	SCR Z933 M 3 X 8 SS	1				
130	R3631059	SCR Z933 M 3 X 8 SS	3	I207	R131691	U 601-3 SFH DIP6 P	1
230	R3631059	SCR Z933 M 3 X 8 SS	4	I179	R132787	U 4601-5 TDA SIP9 P	1
500	R3631239	SCR Z933 M 4 X 10 SS	2	I217	R134010	U 7815 TO220 P	1
401	R3661026	NUT D934 M 3 SS	1	I 1	R134113	U 084 TL DIP14 P	1
140	R366988	NUT TRAD M3 EDGE PLBK	2	I145	R134114	U 393 LM DIP8 P	1
240	R366988	NUT TRAD M3 EDGE PLBK	2	I216	R134114	U 393 LM DIP8 P	1
402	R367502	SPR D6798AD 3,2D 6 STZN	1				
10	R367699	RVT AVTRON2,5L 8,1 AL	6	J 1	R313525	JEUR2C MBSP64E1C2S 1,6	1
1010	R367699	RVT AVTRON2,5L 8,1 AL	2	J 2	R313525	JEUR2C MBSP64E1C2S 1,6	1
1000	R722276	LOCK49PCBUNCPL	1				
100	R803607	HTSNG808 SMP2+G2	1	L144	R302108	CORE TUBE 3,5/1,3 X 3	1
200	R804614	HTSNG808 SMP+G2	1	L193	R305913	CH MNS AX NS 12 UH 3A	1
110	R804832	HTSNA GEN SPG 1XM3 LG	1	L194	R305913	CH MNS AX NS 12 UH 3A	1
210	R804834	HTSNA GEN SPG 2XM3 LG	1	L195	R305913	CH MNS AX NS 12 UH 3A	1
				L168	R3061322	CH AX NS 10 UH	1
	R762120A	UNG1200G2+CHK	1	L144	Z3450110	WU CUSN 0,60 MM 40	1
	R762120S	UNG1200G2+CHK SUB	1	P 1	R106733	R TCE H100K K 0W5 S10TS	1
	Z3450110	WU CUSN 0,60 MM 40	1	P 2	R1076136	R THV V 5M M 0W5 1000	1
				P 3	R1076136	R THV V 5M M 0W5 1000	1
				P 4	R1076136	R THV V 5M M 0W5 1000	1
C149	R111468	C EL RA 470M M 16E2 85	1	Q203	R1314072	Q BC547A N SS TO92	1
C100	R111477	C EL RA 100M M 25E2 85	1	Q100	R1314131	Q BC557B P SS TO92	1
C170	R111477	C EL RA 100M M 25E2 85	1	Q 2	R1325096	Q BU508A N P SOT93	1
C101	R111486	C EL RA 47M M 50E2 85	1	Q141	V132599	Q BU2525A N P SOT93	1
C187	R111556	C EL RA 470M M100E3 85	1				
C188	R111556	C EL RA 470M M100E3 85	1	R 16	R101358	R MF H 68K J 2W E7	1
C189	R111556	C EL RA 470M M100E3 85	1	R211	R101359	R MF H 82K J 2W E7	1
C178	R111578	C EL RA 100M M400E4 105	1	R 28	R101462	R MF H150K J 2W E7	1
C 12	R111718	C CE DI 1N K302E3 HV	1	R 29	R101462	R MF H150K J 2W E7	1
C140	R112741	C CE MI 1N5K100E2	1	R 37	R101462	R MF H150K J 2W E7	1
C 1	R112747	C CE MI 4N7K100E2 85	1	R 38	R101462	R MF H150K J 2W E7	1
C226	R113720	C POMERA 47N K 63E2 85	1	R169	R102498	R MF H E47J 0W6	1
C154	R113724	C POMERA 100N K 63E2 85	1	R167	R103226	R MO H150E J 2W E10	1
C216	R113724	C POMERA 100N K 63E2 85	1	R184	R103248	R MO H 10K J 2W E10	1
C229	R113724	C POMERA 100N K 63E2 85	1	R185	R103248	R MO H 10K J 2W E10	1
C 4	R113728	C POMERA 220N K 63E2 85	1	R186	R103248	R MO H 10K J 2W E10	1
C148	R114090	C POMERA 1M K 63E2 85	1	R164	R103600	R VVH E1 K 4W	1
C163	R1150051	C PPMERA 2N2J162E9 HV	1	R 17	R104668	R HV H 3M9 J 0W5 3500	1
C143	R115936	C PP RA 6N8J 63E2 85	1	R250	R104668	R HV H 3M9 J 0W5 3500	1
				R251	R104668	R HV H 3M9 J 0W5 3500	1
D 16	R131662	D LED D3 T RD	1	R 15	R104678	R HV H 10M J 0W5 3500	1
D 9	R131667	D LED D3 T GN	1	R151	V1026006	R MF H 1K F 0W6 E4	1
D 10	R131667	D LED D3 T GN	1	R156	V1026006	R MF H 1K F 0W6 E4	1
D 13	R131667	D LED D3 T GN	1	R 1	V1026008	R MF H100K F 0W6 E4	1
D 14	R131667	D LED D3 T GN	1	R174	V1026424	R MF H 27E4 F 0W6 E4	1
D 15	R131667	D LED D3 T GN	1	R103	V1026655	R MF H475E F 0W6 E4	1
D 18	R131667	D LED D3 T GN	1	R 13	V1026727	R MF H 56K2 F 0W6 E4	1
D 19	R131667	D LED D3 T GN	1				
D 20	R131667	D LED D3 T GN	1	T180	R774323	T G1200 SMP VAR	1
D246	R131667	D LED D3 T GN	1				
D253	R131667	D LED D3 T GN	1	Z200	A509022	D TVS 33V 1500WU CB429	1
D184	R1319025	D R BY255 1323A0 DO201	1				
D185	R1319025	D R BY255 1323A0 DO201	1				
D280	R131907	D R BY584 182085 SOD61A	1				
D281	R131907	D R BY584 182085 SOD61A	1				
D282	R131907	D R BY584 182085 SOD61A	1				
D181	R131927	D R BY229 60007A TO220C	1				
D182	R131927	D R BY229 60007A TO220C	1				
D183	R131927	D R BY229 60007A TO220C	1				
F176	R314143	F 5X20 F 2A H UL	1				

