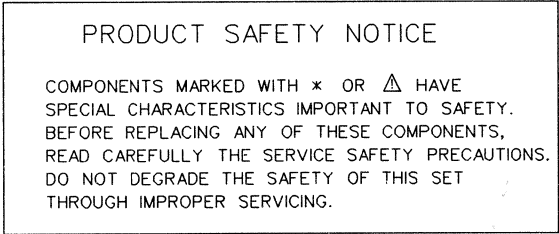
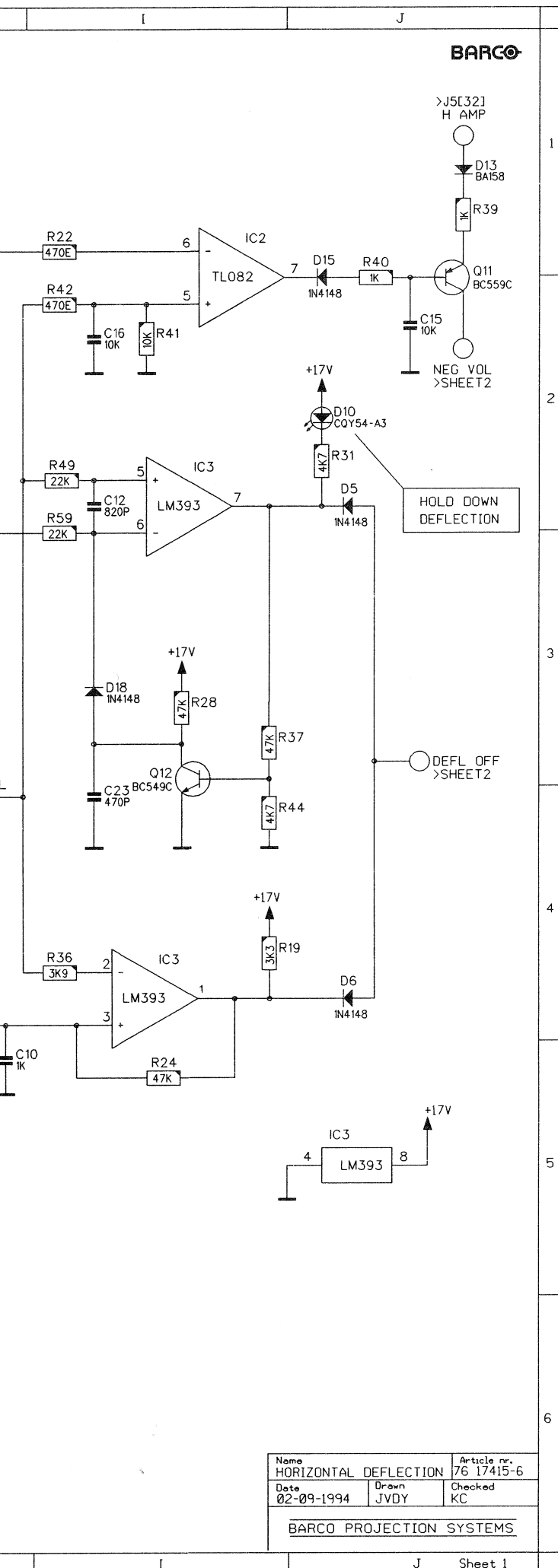


Name HORIZONTAL DEFLECTION		Article nr. 76 17415-6
Date 22-02-1995	Drawn JVDY	Checked KC
BARCO PROJECTION SYSTEMS		

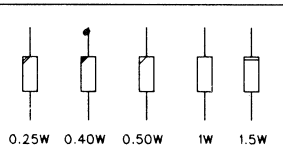
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C4	D 2	Q26	C 4	Z6	C 3
C5	E 2	Q27	C 4	Z7	E 3
C6	E 2	Q28	C 4	Z8	E 3
C7	C 2	Q29	D 4	Z9	G 3
C8	D 2	Q30	D 4	Z10	F 4
C9	C 3	Q31	E 4	Z11	E 4
C10	C 3	Q32	E 4		
C11	D 3	Q33	F 4		
C12	D 3	Q34	F 4		
C13	G 3	Q35	G 4		
C14	E 3	Q36	G 4		
C15	C 3				
C16	C 3	R1	C 2		
C17	C 3	R2	D 2		
C18	F 3	R3	C 2		
C19	D 3	R4	E 2		
C20	D 3	R5	E 2		
C21	E 3	R6	F 2		
C22	E 3	R7	C 2		
C23	D 3	R8	C 2		
C24	D 3	R9	C 2		
C25	D 3	R10	C 2		
C26	E 3	R11	E 2		
C27	B 3	R12	C 2		
C28	C 3	R13	D 2		
C29	D 3	R14	F 3		
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J3	F 3	R87	D 4		
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		R91	E 4		
LI	F 4	R92	G 4		
		R93	G 4		
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Q2	G 2	R98	D 3		
Q3	F 2	R99	E 3		
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Q6	D 2	SR2	G 2		
Q7	C 2	SR3	E 3		
Q8	D 2	SR4	E 3		
Q9	E 3	SR5	C 3		
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Q11	C 3	SR7	E 3		
Q12	D 3	SR8	D 3		
Q13	F 3	SR9	F 4		
Q14	F 3	SR10	F 4		
Q15	C 3	SR11	F 4		
Q16	F 3				
Q17	D 3	T1	F 3		
Q18	F 3	T2	E 3		
Q19	C 3	T3	G 4		
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Q22	E 3	Z2	G 2		



Name	HORIZONTAL
Date	02-09-1994
BARCO PRO	

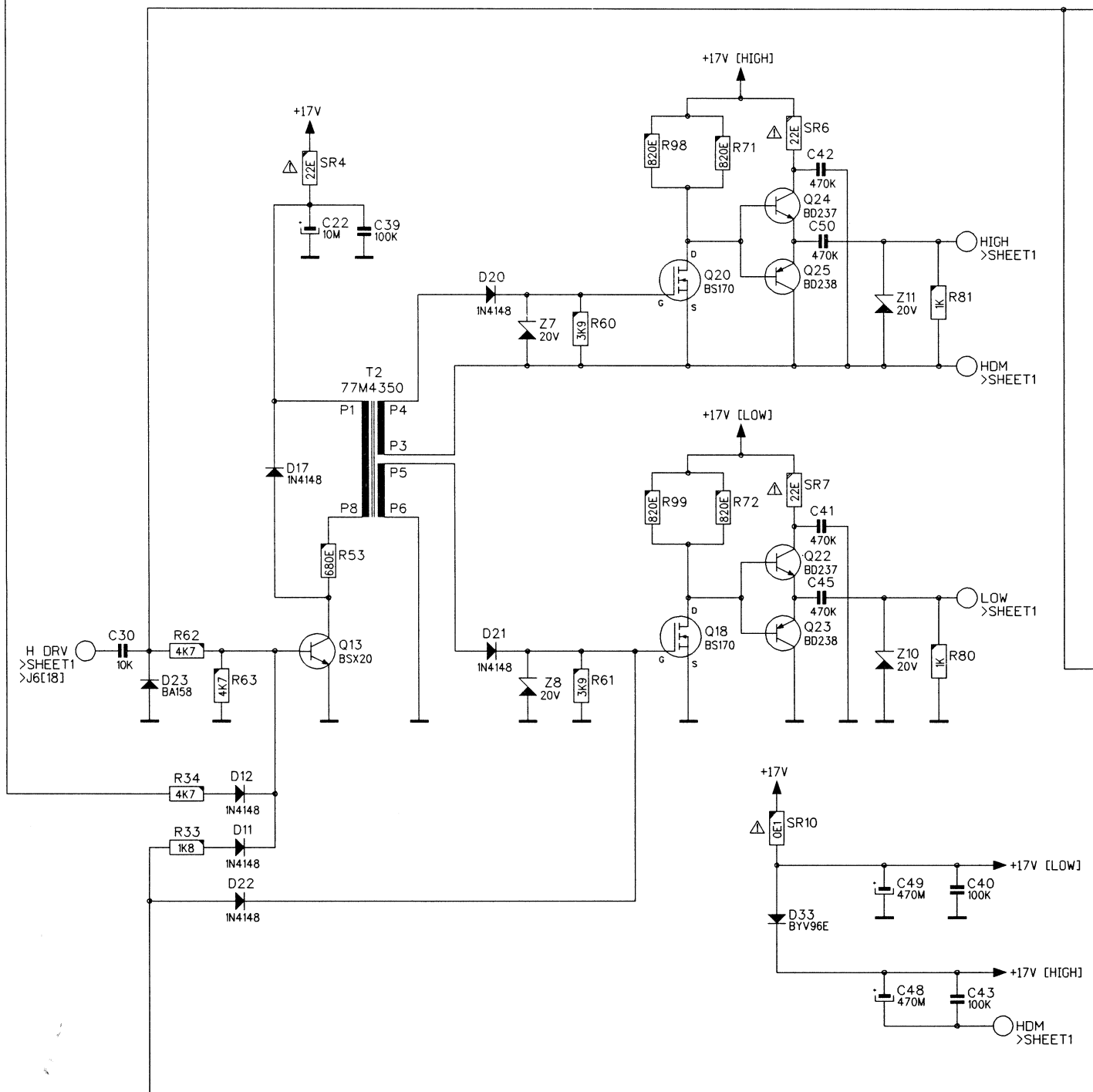


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C2	J 5	sheet 2	P1	I 4	sheet 2	R74	D 2	sheet 1
C3	J 4	sheet 2	P2	H 2	sheet 1	R75	D 1	sheet 1
C4	J 4	sheet 2	Q1	H 3	sheet 2	R76	B 2	sheet 1
C5	G 6	sheet 2	Q2	G 4	sheet 2	R77	B 1	sheet 1
C6	F 5	sheet 2	Q3	F 3	sheet 2	R78	F 4	sheet 2
C7	K 3	sheet 2	Q4	I 2	sheet 2	R79	B 2	sheet 1
C8	J 5	sheet 2	Q5	J 6	sheet 2	R80	D 5	sheet 2
C9	I 4	sheet 2	Q6	J 5	sheet 2	R81	D 3	sheet 2
C10	H 5	sheet 1	Q7	K 3	sheet 2	R82	E 2	sheet 1
C11	K 6	sheet 2	Q8	J 4	sheet 2	R83	D 2	sheet 1
C12	I 2	sheet 1	Q9	F 6	sheet 2	R84	G 6	sheet 1
C13	E 2	sheet 2	Q10	E 1	sheet 2	R85	F 3	sheet 1
C14	F 6	sheet 2	Q11	J 1	sheet 1	R86	E 3	sheet 1
C15	J 2	sheet 1	Q12	I 3	sheet 1	R87	D 3	sheet 1
C16	I 2	sheet 1	Q13	B 5	sheet 2	R88	C 3	sheet 1
C17	J 1	sheet 2	Q14	F 1	sheet 2	R89	E 3	sheet 2
C18	F 1	sheet 2	Q15	G 1	sheet 1	R90	B 3	sheet 1
C19	K 1	sheet 2	Q16	G 2	sheet 2	R91	A 3	sheet 1
C20	K 1	sheet 2	Q17	B 2	sheet 1	R92	F 4	sheet 2
C21	K 3	sheet 2	Q18	C 4	sheet 2	R93	A 3	sheet 1
C22	B 3	sheet 2	Q19	F 2	sheet 1	R94	E 3	sheet 1
C23	I 3	sheet 1	Q20	C 3	sheet 2	R95	D 3	sheet 1
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C25	J 1	sheet 2	Q22	D 4	sheet 2	R97	B 3	sheet 1
C26	K 2	sheet 2	Q23	D 4	sheet 2	R98	C 3	sheet 2
C27	H 1	sheet 1	Q24	D 3	sheet 2	R99	C 4	sheet 2
C28	G 1	sheet 1	Q25	D 3	sheet 2	REL1	I 1	sheet 2
C29	H 3	sheet 1	Q26	F 3	sheet 1	REL1	H 1	sheet 2
C30	A 4	sheet 2	Q27	E 3	sheet 1	SR1	F 3	sheet 2
C31	H 4	sheet 2	Q28	D 3	sheet 1	SR2	F 3	sheet 2
C32	G 4	sheet 1	Q29	C 3	sheet 1	SR3	J 5	sheet 2
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C55	F 3	sheet 1	R16	F 5	sheet 2			
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C59	H 4	sheet 2	R20	J 4	sheet 2			
D1	F 3	sheet 2	R21	E 5	sheet 2			
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D3	E 4	sheet 2	R23	I 1	sheet 2			
D4	E 5	sheet 2	R24	I 5	sheet 1			
D5	J 2	sheet 1	R25	G 6	sheet 2			
D6	J 4	sheet 1	R26	E 2	sheet 2			
D7	J 5	sheet 2	R27	H 5	sheet 1			
D8	J 6	sheet 2	R28	I 3	sheet 1			
D9	E 1	sheet 2	R29	I 3	sheet 2			
D10	J 2	sheet 1	R30	I 3	sheet 2			
D11	A 5	sheet 2	R31	J 2	sheet 1			
D12	A 5	sheet 2	R32	F 6	sheet 2			
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D14	F 1	sheet 2	R34	A 5	sheet 2			
D15	J 1	sheet 1	R35	F 2	sheet 2			
D16	F 6	sheet 2	R36	I 4	sheet 1			
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J3	G 2	sheet 2	R68	F 2	sheet 1			
J4	H 4	sheet 2	R69	F 1	sheet 1			
J5	C 4	sheet 1	R70	G 2	sheet 2			
J6	B 4	sheet 1	R71	C 3	sheet 2			
			R72	C 4	sheet 2			



PRODUCT SAFETY NOTICE

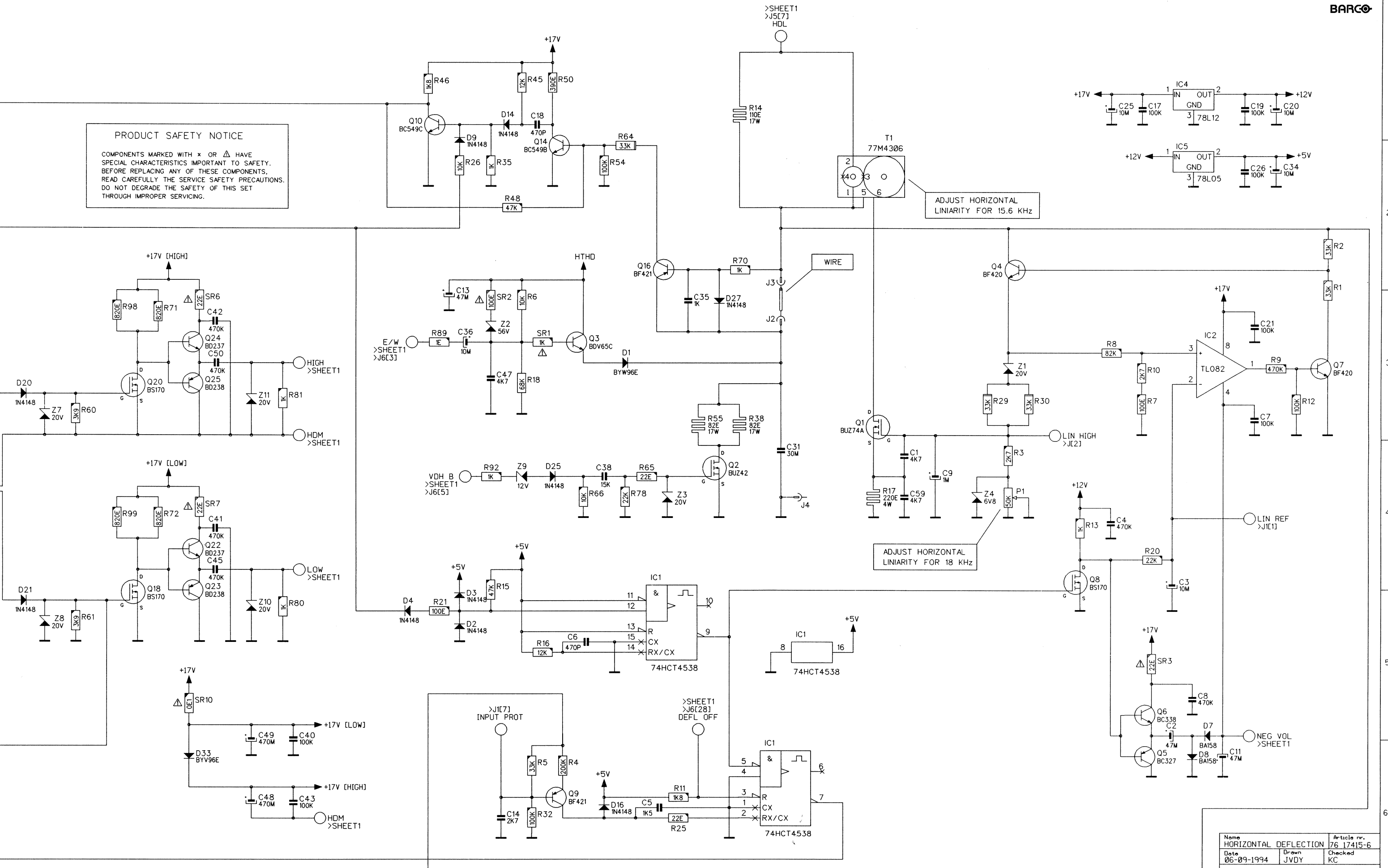
COMPONENTS MARKED WITH * OR Δ HAVE SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY. BEFORE REPLACING ANY OF THESE COMPONENTS, READ CAREFULLY THE SERVICE SAFETY PRECAUTIONS. DO NOT DEGRADE THE SAFETY OF THIS SET THROUGH IMPROPER SERVICING.



Modifications reserved

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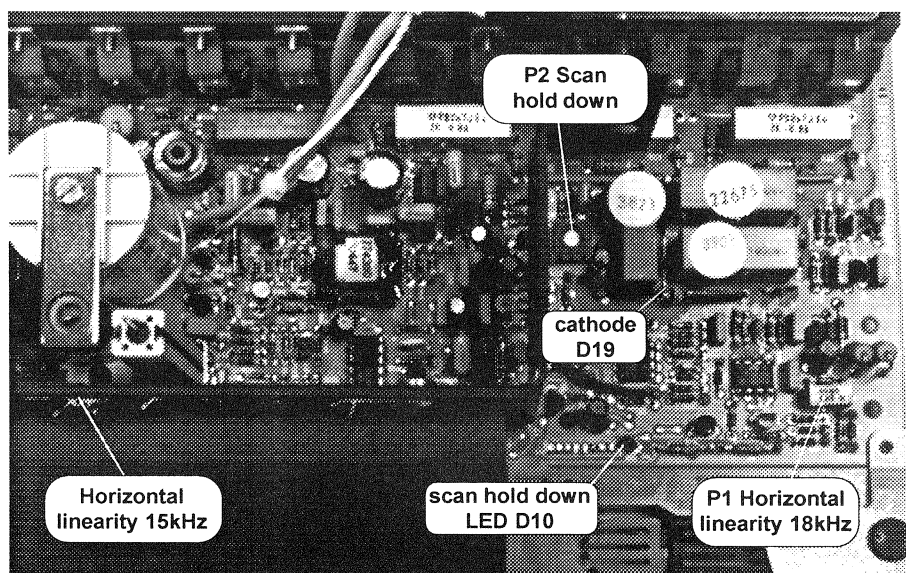
Name		Article nr.
HORIZONTAL DEFLECTION		76 17415-6
Date	Drawn	Checked
06-09-1994	JVDY	KC
BARCO PROJECTION SYSTEMS		

Introduction

The following adjustments are provided on the module:

a: Overvoltage protection (=scan hold down) P2

b: Horizontal linearity adj. at 15 kHz (linearity coil)
and
at 18 kHz (P1)



Overvoltage protection

Preparation

Switch **OFF** the projector
Adjust P2 to its physical minimum (turning counter-clockwise)
Adjust P2 "MAX HOR. AMPL." **on the SM Power Supply** to its physical minimum (turning counter-clockwise).

Adjustment

Switch **ON** the projector.
With respect to chassis ground, measure the dc voltage at the cathode of D19.
Adjust P2 **on the SM Power Supply** for 1950Vdc.
Adjust P2 (turning clockwise) until the scan hold down LED D10 lights up. (Projector in hold down)
Reduce the HOR. AMPL. P2 setting (turning counter-clockwise)

Restart the projector (power switching Off/On)

Adjust P2 as explained in the adjustment procedure of the SM Power Supply (refer to corresponding service sheet)

Horizontal linearity

1. Adjust the core of the linearity coil using a 15 kHz input source.
2. Adjust P2 using a 18 kHz input source.

Note: If a 18 kHz input source is not available, then any source close to 18 kHz may be used.

HORIZONTAL DEFLECTION 76 22675

Introduction.

On this board we find the MOSFET switching transistors, acting as switches to start and stop the currents through the deflection coils. As we need a very short retrace time, the amplitude of the flyback pulse is bigger than the maximum of one Mosfet. Therefore, two Mosfet switches are used in series.

Furthermore, on this board, we find the required protection circuits such as "*scan hold down*" and "*scan failure*".

Preparation of the drive pulses.

The horizontal deflection circuit uses two MOSFETS in series in order to be capable of handling more than 1000 volt pulses. Therefore, two drive pulses on different ground reference levels are required.

The "bottom" MOSFETS are driven by a pulse train referenced to ground or chassis ground, the "top" MOSFETS by drive pulses referenced to the mid-point of the two series connected MOSFETs, the **HDM** point.

The power supply for generating the "top drive pulses" is taken from the +17 volt via diode D33 to block the pulses, as HDM, the reference ground for the top drive pulses, carries line pulses.

The hor. drive pulses, prepared on the "*UN SYNC+VERT DEFL*" board, are sent to the amplifier Q13. By using a transformer T2, a "floating" drive pulse referred to HDM for the top Mosfets can easily be obtained.

When the flyback pulse is present during retrace, D33 becomes reversed biased and act like an open circuit to the 17VDC line. At that time, the drive circuit receives its voltage supply from the charge stored in C48.

The "high" drive pulses reach the gate-source of the top Mosfets, and the "low" drive pulses drive the bottom Mosfet switches.

Modulation of the scan voltage East-West correction

The +HTHD voltage from the SMPS board is modulated in Q3 by the East-West correction signal prepared on the "Sync + Vert Defl" board. Z2 protects the transistor and SR2 limits the charging current of this coupling capacitor through the zener. Transistor Q2 is used to discharge the boosting capacitor C31 at the start of a vertical scan. A vertical flyback pulse, derived from VDH B (Vertical Deflection High Blue) is sent to the gate. This minimizes keystone problems at the top due to a remaining charge on C31 after the vertical retrace. It causes the charge on C31 to always start from the same amplitude after each vertical retrace, regardless of the voltage that was built up at the end of the vertical scan.

Horizontal linearity tracking control.

The problem we meet with such a big frequency range, is the frequency dependent characteristic of the linearity coil. At a higher scanning frequency, the impedance of the linearity coil would increase.

To overcome this, a second coil T1 is magnetically coupled to the standard linearity coil. This current in this modulating coil is delivered by a Mosfet Q1.

The needed current for tracking is got via the biasing circuit of the gate of Q1 (LIN HIGH) as follows.

The drive pulses trigger a one-shot in IC1 at the positive going transient input. The output pulses are then applied to the gate of a Mosfet Q8 and at the drain split to two circuits :

- the simple integrator R20 / C3, the obtained voltage across the capacitor is consequently a voltage proportional with the line frequency labelled "*LIN REF*".
- the push-pull Q5 / Q6 and the top/top detector just to obtain a negative voltage to supply amongst others the OPAMP IC2.

The DC level of this LIN REF voltage is not correct to drive the Mosfet Q1 and a level shift is realised with the OPAMP 1-2-3 of IC2.

This OPAMP receives at the inverting input a voltage that is proportional with the line frequency, the amplitude adjustment does not affect this LIN REF voltage.

The other non-inverting input receives a voltage that is proportional with the scan voltage. This voltage is proportional with the line frequency and with the amplitude adjustment. The influence of the amplitude adjustment must be minimized and this done as follows.

For one typical frequency, we obtain one typical LIN REF voltage. The HTHD voltage however depends also on the horizontal amplitude. Any change in the emitter voltage of Q4 is compensated via the feedback Q7 - base Q4.

Protection circuits.

a) Overcurrent protection.

If the sum of the currents of the three scan coils exceeds a pre-determined level, the drive is inhibited as follows :

The wire J2-J3 in series with the three scan coils , acts as a low value resistor and is connected across the base-emitter of Q16. When a 0.6 volt or greater voltage is dropped across the wire, Q16 starts to conduct and triggers the monoflop Q10/Q14. As long Q10 is blocked, the drive transistor Q13 remains "on", inhibiting the drive. BY re-applying the drive pulse to the base of Q10 via D9 (a kind of feedback), a faster reaction on the overcurrent can be obtained.

b) Overvoltage protection.

The sum of flyback pulses on each of the series connected Mosfets are checked by a rectifier network consisting of diodes D30, D31 and D32 and common decoupling capacitors. The pulses at the node of the two Mosfets (HDM) are rectified with D24 . This voltage must be half of the total flyback voltage in order to protect the mosfets against overvoltage. This is realised with the circuit R73/ C46/ D24/SR5/ R56/C32.

The rectified voltage is dropped with R52 / P2 / R51 and sent to two level detectors. The threshold level is set by a zener at 6.2 volt with Z5. At the moment pin 6 of IC2 exceeds the threshold, the horizontal amplitude is reduced with Q11. This will avoid the action of the "Hold Down Deflection" protection circuit.

If for any reason, the 1950V level is reached the HOLD DOWN DEFLECTION circuit is activated.

- 1) The drive is inhibited through the DEFL OFF.
- 2) The input pin 6 remains "high" as transistor Q12 is blocked and D18 conducts via R28 to keep pin 6 of IC1 high. This requires that the set be powered off to reset this circuit.
- 3) The red LED D10 (HOLD DOWN DEFLECTION) is illuminated in order to show that "scan hold down" has occurred.
- 4) As the deflection is stopped, there is also a horizontal scan failure and the associated circuit will drop the EHT voltage and blank the three CRT's to prevent damage to the CRT phosphorus.

c) Too low drive protection (+17V monitoring).

It is imperative that the Mosfets are fully switched on, so that the internal resistance will be as low as possible. Due to the large deflection current, even a small amount of excess resistance, will cause the Mosfets to generate too much heat.

This Mosfet drive pulse amplitude depends in part on the **+17 volt** supply and the voltage supplied from the +17VDC line. The drive signals are developed from the 17VDC and to prevent damage, due to insufficient drive, if this voltage becomes too low, IC1 pin 3 gets low and inhibits the drive signal via the 'DEFL OFF'.

The DEFL OFF is connected with the R(eset) of the monoflop in IC1. The function of the latter will be explained hereafter.

d) Input protection :

The H DR from the UN SYNC + VERT DEFL has as task to start and stop the conduction of the Mosfets. If however the Mosfets are in conduction and there is a "stop" that does not arrive, there is a risk of damaging the power switchers. In such case, a stop pulse will be automatically generated by the monoflop in IC1, output 7. This output remains low as long as the input is retriggered at pin 5. When such a trigger pulse is absent, the output switches high after a time determined by the time constant $R25 / C5$ + current delivered by Q9. This current is tracked with the line frequency by using the scan voltage as emitter supply.

e) Horizontal scan failure.

Horizontal pulses are fed into the transistors Q17, Q21 and Q19. As long as there are horizontal pulses on the base of these transistors, they are conducting for each horizontal period, and the collectors are held "low" by C33, C44 and C37. These smoothed collector voltages keep the gating diodes D28, D29 and D26 blocked.

If either one of the pulses or all pulses are missing, Q15 transistor gets in conduction and turns its collector at low level. The SF line will be pulled low and the scan fail condition will be met.

Feedback to the SMPS (to stabilise the horizontal width).

The scan voltage +HTHD has to track the line frequency in order to regulate the horizontal width of the picture. The amplitude of the flyback pulses at the connection of the top and bottom Mosfets (=HDM) is a direct result of the horizontal width and can be taken as a reference. These pulses are coupled and isolated by transformer T3, rectified by D34 and the **FBHD** voltage is sent to the SMPS, to regulate the HTHD.

This voltage is proportional to the width of the raster on the CRT faceplate.

Horizontal deflection

R7617415

Parts listing R7617415

SIT.	ITEM NO.	DESCRIPTION	QUANTITY	ITEM NO.	SIT.	DESCRIPTION	
110	R133036	SPR L 6 D 6 D 2.4 C	1	C 28	R1137161	C POMERA 22N K100E2	1
350	R133074	Q ACC ISO SIL600 W 30	0,23	C 29	R112242	C NP0 MI 100P G100E2	1
460	R133074	Q ACC ISO SIL600 W 30	0,035	C 30	R112763	C CE MI 10N U 63E2	1
470	R133074	Q ACC ISO SIL600 W 30	0,015	C 31	R114799	C PAMERA 30M K330TAP	1
				C 32	R114603	C POMERA 100N M102E9 HV	1
100	R313220	R ACC HLDR H10 WW V	3	C 33	R1137131	C POMERA 12N K100E2	1
	R34214425	WU UL1007 AWG24 SO YE 250	1	C 34	R111531	C EL RA 10M M 35E2 85	
	R342199110	WU UL1015 AWG18 ST GY 100	1	C 35	R112739	C CE MI 1N K100E2	
	R342199112	WU UL1015 AWG18 ST GY 120	1	C 36	R1114169	C EL RA 10M M350E2 105	1
	R3481107	WU JUMP 0,51 27,5 ISO RD	1	C 37	R1137131	C POMERA 12N K100E2	1
	R3481122	WU JUMP 0,51 32,5 ISO	1	C 38	R1137141	C POMERA 15N K100E2	1
	R3481135	WU JUMP 0,51 35 ISO	1	C 39	R113724	C POMERA 100N K 63E2	
				C 40	R113724	C POMERA 100N K 63E2	
240	R362020	SCR D84 M 3 X 4 SS Z	2	C 41	R113732	C POMERA 470N K 63E2 85	
230	R3631059	SCR D933 M 3 X 8 XIC	1	C 42	R113732	C POMERA 470N K 63E2 85	
340	R3631059	SCR D933 M 3 X 8 XIC	3	C 43	R113724	C POMERA 100N K 63E2	
420	R3631059	SCR D933 M 3 X 8 XIC	2	C 44	R1137131	C POMERA 12N K100E2	1
450	R3631059	SCR D933 M 3 X 8 XIC	3	C 45	R113732	C POMERA 470N K 63E2 85	
510	R3631059	SCR D933 M 3 X 8 XIC	2	C 46	R114603	C POMERA 100N M102E9 HV	1
330	R3631069	SCR D933 M 3 X 10 XIC	11	C 47	R112833	C CE DI 4N7S400E3	1
430	R3631069	SCR D933 M 3 X 10 XIC	1	C 48	R111479	C EL RA 470M Z 25E2 85	1
241	R367502	WSHR D6798 A 3.2 S Z	2	C 49	R111479	C EL RA 470M Z 25E2 85	1
411	R367608	SPR L70 H 7 M 4 BNN	1	C 50	R113732	C POMERA 470N K 63E2 85	
610	R367699	RVT CHB D2.38L6.35 P A	6	C 51	R111477	C EL RA 100M Z 25E2 85	
				C 52	R114154	C POMERA 22N K400E2	1
600	R722276	LOCK PJ49 PCB UN CPL	1	C 53	R112692	C N750MI 120P G500E2	1
				C 54	R114154	C POMERA 22N K400E2	1
210	R802665	FRM PJ49 HOR CORE LIN FIX	1	C 55	R111773	C PPMERA 4N7J162E9 HV	1
300	R802691	HTSNK PJ49 HOR A GRAPHICS	1	C 56	R111773	C PPMERA 4N7J162E9 HV	1
500	R802741	HTSNK PJ49 HOR FIX CAP	1	C 57	R111773	C PPMERA 4N7J162E9 HV	1
220	R802751	COIL LIN PJ49 POSITION	1	C 58	R1150654	C PPMERA 15N J162E9 HV	1
200	R802827	CORE LIN 802739+802626	1	C 59	R112747	C CE MI 4N7K100E2	1
440	R804525	Q ACC SPG 1X 3.1 SHORT	3	D 1	R131952	D R BYW96E 10203A SOD64	1
320	R804674	Q ACC SPG 1XM3 SHORT	11	D 2	R131621	D S 1N4148 075150 DO35	
221	R805060	WSHR D 6 X10 T1 P	1	D 3	R131621	D S 1N4148 075150 DO35	
410	R805848	HTSNK PJ49 HOR BG	1	D 4	R131621	D S 1N4148 075150 DO35	
				D 5	R131621	D S 1N4148 075150 DO35	
C 1	R112747	C CE MI 4N7K100E2		D 6	R131621	D S 1N4148 075150 DO35	
C 2	R111476	C EL RA 47M M 25E2 85		D 7	R131637	D R BA158 600400 DO7	1
C 3	R111531	C EL RA 10M M 35E2 85		D 8	R131637	D R BA158 600400 DO7	1
C 4	R113732	C POMERA 470N K 63E2 85		D 9	R131621	D S 1N4148 075150 DO35	
C 5	R1159201	C PP RA 1N5J100E2 85		D 10	R131662	D LED D3 T RD	1
C 6	R1159081	C PP RA 470P J100E2 85		D 11	R131621	D S 1N4148 075150 DO35	
C 7	R113724	C POMERA 100N K 63E2		D 12	R131621	D S 1N4148 075150 DO35	
C 8	R113732	C POMERA 470N K 63E2 85		D 13	R131637	D R BA158 600400 DO7	
C 9	R111546	C EL RA 1M M 50E2 85		D 14	R131621	D S 1N4148 075150 DO35	
C 10	R112739	C CE MI 1N K100E2	1	D 15	R131621	D S 1N4148 075150 DO35	
C 11	R111476	C EL RA 47M M 25E2 85		D 16	R131621	D S 1N4148 075150 DO35	
C 12	R1159141	C PP RA 820P J100E2 85	1	D 17	R131621	D S 1N4148 075150 DO35	
C 13	R111649	C EL RA 47M T350SKT 85	1	D 18	R131621	D S 1N4148 075150 DO35	
C 14	R112797	C CE MI 2N7K500E2	1	D 19	R131906	D R BYV96E 1021A5 SOD57	1
C 15	R1137121	C POMERA 10N K250E2 85		D 20	R131621	D S 1N4148 075150 DO35	
C 16	R112763	C CE MI 10N U 63E2	1	D 21	R131621	D S 1N4148 075150 DO35	
C 17	R113724	C POMERA 100N K 63E2		D 22	R131621	D S 1N4148 075150 DO35	
C 18	R1159081	C PP RA 470P J100E2 85		D 23	R131637	D R BA158 600400 DO7	
C 19	R113724	C POMERA 100N K 63E2		D 24	R131906	D R BYV96E 1021A5 SOD57	1
C 20	R111531	C EL RA 10M M 35E2 85		D 25	R131621	D S 1N4148 075150 DO35	
C 21	R113724	C POMERA 100N K 63E2		D 26	R131621	D S 1N4148 075150 DO35	
C 22	R111531	C EL RA 10M M 35E2 85		D 27	R131621	D S 1N4148 075150 DO35	
C 23	R112735	C CE MI 470P K100E2	1	D 28	R131621	D S 1N4148 075150 DO35	
C 24	R1117201	C PPMERA 6N8J202E9 HV	1	D 29	R131621	D S 1N4148 075150 DO35	
C 25	R111531	C EL RA 10M M 35E2 85		D 30	R131906	D R BYV96E 1021A5 SOD57	1
C 26	R113724	C POMERA 100N K 63E2		D 31	R131906	D R BYV96E 1021A5 SOD57	1
C 27	R1137161	C POMERA 22N K100E2		D 32	R131906	D R BYV96E 1021A5 SOD57	1

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D 33	R131906	D R BYV96E 1021A5 SOD57	1	R 13	R101536	R MF H 1K F 0W4 E3	
D 34	R131906	D R BYV96E 1021A5 SOD57		R 14	R1045261	R WW V110E K17W	1
I 1	R137098	U 74HCT4538 DIP16 P	1	R 15	R101556	R MF H 47K F 0W4 E3	
I 2	R134124	U 082 TL DIP8 P	1	R 16	R101549	R MF H 12K F 0W4 E3	
I 3	R134114	U 393 LM DIP8 P	1	R 17	R103640	R WW H220E K 4W	1
I 4	R134033	U 78L12 TO92 P	1	R 18	R103158	R MO H 68K J 0W7	1
I 5	R134032	U 78L05 TO92 P	1	R 19	R101542	R MF H 3K3 F 0W4 E3	
J 5	R313525	J EUR2C MBS P64 E1C2S 1,6	1	R 20	R101552	R MF H 22K F 0W4 E3	
J 6	R313525	J EUR2C MBS P64 E1C2S 1,6	1	R 21	R101524	R MF H100E F 0W4 E3	
L 1	R773215	CH SMP PJ49	1	R 22	R101532	R MF H470E F 0W4 E3	
P 1	R106832	R TCE V 50K K 0W5 S10SS	1	R 23	R101524	R MF H100E F 0W4 E3	
P 2	R106732	R TCE H 50K K 0W5 S10TS	1	R 24	R101556	R MF H 47K F 0W4 E3	
PC	R780043	PCS PJ49 800 HOR 7		R 25	R101516	R MF H 22E F 0W4 E3	
Q 1	R132593	Q BUZ74A FN P TO220	1	R 26	R101548	R MF H 10K F 0W4 E3	
Q 2	R132591	Q BUZ42 FN P TO220	1	R 27	R101547	R MF H 8K2 F 0W4 E3	
Q 3	R132945	Q BDV65C DN P SOT93	1	R 28	R101556	R MF H 47K F 0W4 E3	
Q 4	R132973	Q BF420 N SS TO92	1	R 29	R103254	R MO H 33K J 1W5	1
Q 5	R1314311	Q BC327 P SS TO92	1	R 30	R103254	R MO H 33K J 1W5	1
Q 6	R131424	Q BC338 N SS TO92		R 31	R101544	R MF H 4K7 F 0W4 E3	
Q 7	R132973	Q BF420 N SS TO92	1	R 32	R101560	R MF H100K F 0W4 E3	
Q 8	R132910	Q BS170 FN SS TO92	1	R 33	R101539	R MF H 1K8 F 0W4 E3	
Q 9	R132972	Q BF421 P SS TO92	1	R 34	R101544	R MF H 4K7 F 0W4 E3	
Q 10	R131411	Q BC549C N SS TO92	1	R 35	R101536	R MF H 1K F 0W4 E3	
Q 11	R1314182	Q BC559C P SS TO92	1	R 36	R101543	R MF H 3K9 F 0W4 E3	
Q 12	R131411	Q BC549C N SS TO92		R 37	R101556	R MF H 47K F 0W4 E3	
Q 13	R131491	Q BSX20 .2369 N SS TO18	1	R 38	R104446	R WW V 82E K17W	1
Q 14	R1314295	Q BC549B N SS TO92	1	R 39	R101536	R MF H 1K F 0W4 E3	
Q 15	R131411	Q BC549C N SS TO92		R 40	R101536	R MF H 1K F 0W4 E3	
Q 16	R132972	Q BF421 P SS TO92	1	R 41	R101548	R MF H 10K F 0W4 E3	
Q 17	R131411	Q BC549C N SS TO92		R 42	R101530	R MF H330E F 0W4 E3	
Q 18	R132910	Q BS170 FN SS TO92	1	R 43	R101547	R MF H 8K2 F 0W4 E3	
Q 19	R131411	Q BC549C N SS TO92	1	R 44	R101544	R MF H 4K7 F 0W4 E3	
Q 20	R132910	Q BS170 FN SS TO92	1	R 45	R101549	R MF H 12K F 0W4 E3	
Q 21	R131411	Q BC549C N SS TO92	1	R 46	R101539	R MF H 1K8 F 0W4 E3	
Q 22	R1314446	Q BD237 N P TO126	1	R 47	R101536	R MF H 1K F 0W4 E3	
Q 23	R1314451	Q BD238 P P TO126	1	R 48	R101556	R MF H 47K F 0W4 E3	
Q 24	R1314446	Q BD237 N P TO126	1	R 49	R101552	R MF H 22K F 0W4 E3	
Q 25	R1314451	Q BD238 P P TO126	1	R 50	R101531	R MF H390E F 0W4 E3	
Q 26	R132951	Q IXTH11N100 FN P TO247	1	R 51	R101560	R MF H100K F 0W4 E3	1
Q 27	R132951	Q IXTH11N100 FN P TO247	1	R 52	R104690	R HV H 33M J 0W5 3500	1
Q 28	R132951	Q IXTH11N100 FN P TO247	1	R 53	R101534	R MF H680E F 0W4 E3	
Q 29	R132951	Q IXTH11N100 FN P TO247	1	R 54	R101560	R MF H100K F 0W4 E3	
Q 30	R132951	Q IXTH11N100 FN P TO247	1	R 55	R104446	R WW V 82E K17W	1
Q 31	R132951	Q IXTH11N100 FN P TO247	1	R 56	R104690	R HV H 33M J 0W5 3500	1
Q 32	R132951	Q IXTH11N100 FN P TO247	1	R 57	R101560	R MF H100K F 0W4 E3	
Q 33	R132951	Q IXTH11N100 FN P TO247	1	R 58	R101554	R MF H 33K F 0W4 E3	
Q 34	R132951	Q IXTH11N100 FN P TO247	1	R 59	R101552	R MF H 22K F 0W4 E3	
Q 35	R132951	Q IXTH11N100 FN P TO247	1	R 60	R101543	R MF H 3K9 F 0W4 E3	
Q 36	R132951	Q IXTH11N100 FN P TO247	1	R 61	R101543	R MF H 3K9 F 0W4 E3	
R 1	R101254	R MF H 33K2 F 0W6 E4		R 62	R101544	R MF H 4K7 F 0W4 E3	
R 2	R101254	R MF H 33K2 F 0W6 E4		R 63	R101544	R MF H 4K7 F 0W4 E3	
R 3	R101541	R MF H 2K7 F 0W4 E3	1	R 64	R103254	R MO H 33K J 1W5	1
R 4	R1015641	R MF H200K F 0W4 E3	1	R 65	R101516	R MF H 22E F 0W4 E3	
R 5	R101554	R MF H 33K F 0W4 E3		R 66	R101548	R MF H 10K F 0W4 E3	
R 6	R101548	R MF H 10K F 0W4 E3		R 67	R101524	R MF H100E F 0W4 E3	
R 7	R101524	R MF H100E F 0W4 E3		R 68	R101537	R MF H 1K2 F 0W4 E3	1
R 8	R101559	R MF H 82K F 0W4 E3		R 69	R101551	R MF H 18K F 0W4 E3	
R 9	R101568	R MF H470K F 0W4 E3		R 70	R101536	R MF H 1K F 0W4 E3	
R 10	R101541	R MF H 2K7 F 0W4 E3		R 71	R101535	R MF H820E F 0W4 E3	
R 11	R101539	R MF H 1K8 F 0W4 E3		R 72	R101535	R MF H820E F 0W4 E3	
R 12	R101560	R MF H100K F 0W4 E3		R 73	R104690	R HV H 33M J 0W5 3500	1
				R 74	R101537	R MF H 1K2 F 0W4 E3	1
				R 75	R101551	R MF H 18K F 0W4 E3	
				R 76	R104654	R HV H 1M J 0W5 3500	1
				R 77	R101551	R MF H 18K F 0W4 E3	
				R 78	R101552	R MF H 22K F 0W4 E3	
				R 79	R101537	R MF H 1K2 F 0W4 E3	1
				R 80	R101536	R MF H 1K F 0W4 E3	

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R 81	R101536	R MF H 1K F 0W4 E3		T 1	R774306	T PJ49 LIN CTRL	1
R 82	R104654	R HV H 1M J 0W5 3500	1	T 2	R774350	T PJ49 G 801 HOR DVR	1
R 83	R104654	R HV H 1M J 0W5 3500	1	T 3	R774310	T PJ49 HOR DEF	1
R 84	R103341	R MO H 2K7 J 4W	1	T 2E	R774153	COIL LIN PJ45 HOR DHR	1
R 85	R101514	R MF H 15E F 0W4 E3		Z 1	R131730	D ZEN 20V 0W5 C DO35	
R 86	R101514	R MF H 15E F 0W4 E3		Z 2	R131707	D ZEN 47V 1W3 C DO41	1
R 87	R101514	R MF H 15E F 0W4 E3		Z 3	R131730	D ZEN 20V 0W5 C DO35	
R 88	R101514	R MF H 15E F 0W4 E3		Z 4	R131767	D ZEN 6V8 0W5 B DO35	1
R 89	R101500	R MF H 1E F 0W4 E3		Z 5	R131720	D ZEN 6V2 0W5 C DO35	
R 90	R101514	R MF H 15E F 0W4 E3	1	Z 6	R131720	D ZEN 6V2 0W5 C DO35	
R 91	R101514	R MF H 15E F 0W4 E3	1	Z 7	R131730	D ZEN 20V 0W5 C DO35	
R 92	R101536	R MF H 1K F 0W4 E3		Z 8	R131730	D ZEN 20V 0W5 C DO35	
R 93	R101514	R MF H 15E F 0W4 E3		Z 9	R131740	D ZEN 12V 0W5 C DO34	
R 94	R101514	R MF H 15E F 0W4 E3		Z 10	R131730	D ZEN 20V 0W5 C DO35	
R 95	R101514	R MF H 15E F 0W4 E3		Z 11	R131730	D ZEN 20V 0W5 C DO35	
R 96	R101514	R MF H 15E F 0W4 E3					
R 97	R101514	R MF H 15E F 0W4 E3					
R 98	R101535	R MF H820E F 0W4 E3	1				
R 99	R101535	R MF H820E F 0W4 E3	1				
SR 1	R1011369	R CFFH 1K J 0W25					
SR 2	R1011249	R CFFH100E J 0W3	1				
SR 3	R1011169	R CFFH 22E J 0W25	1				
SR 4	R1003169	R CFFV 22E J 0W25 E1	1				
SR 5	R1003009	R CFFV 1E J 0W25 E1	1				
SR 6	R1011169	R CFFH 22E J 0W25	1				
SR 7	R1011169	R CFFH 22E J 0W25	1				
SR 8	R1003009	R CFFV 1E J 0W25 E1	1				
SR 9	R1011209	R CFFH 47E J 0W25	1				
SR10	R1011907	R CFFH E1 J 0W4					
SR11	R1011907	R CFFH E1 J 0W4					

