BARCO

BARCO Projection Systems

SECTION M

service sheet

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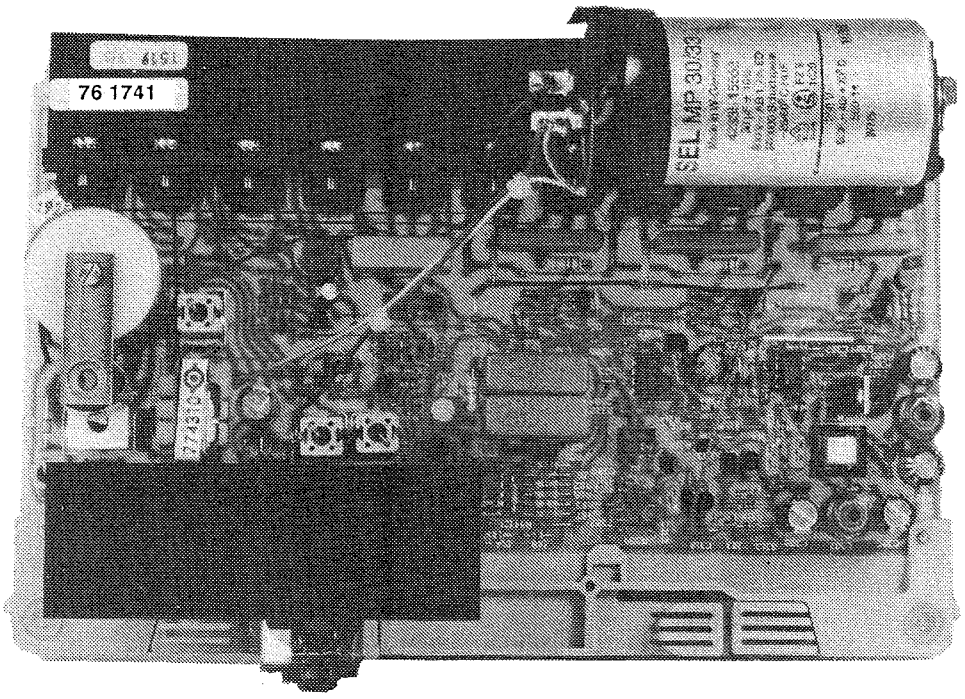
HORIZONTAL DEFLECTION MODULE 76 1741



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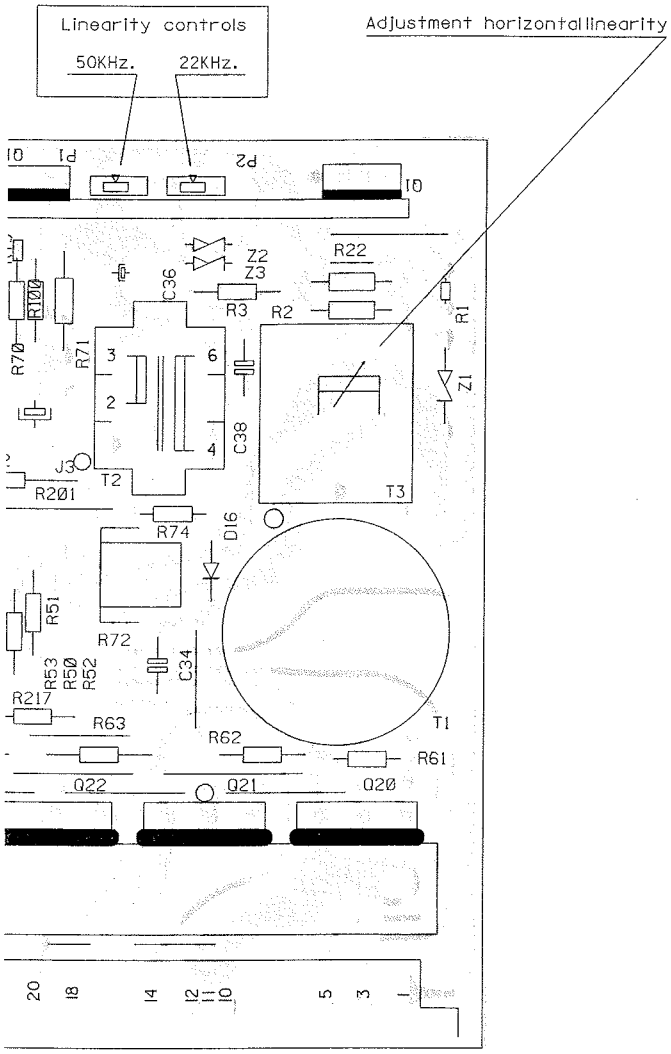

COMP.	LOC.
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C2	E 3
C3	B 3
C4	C 3
C5	D 3
C6	B 4
C7	C 3
C23	D4
C24	C4
C25	F 3
C26	E 3
C27	B 4
C28	C 4
C29	D 4
C30	D 3
C31	D 3
C32	F 3
C33	D 3
C34	F 4
C35	F 3
C36	F 2
C37	E 3
C38	F 3
C40	E 3
C41	E 3
C201	E 3
C301	C 3
C302	C 3
C303	C 3
C304	C 3
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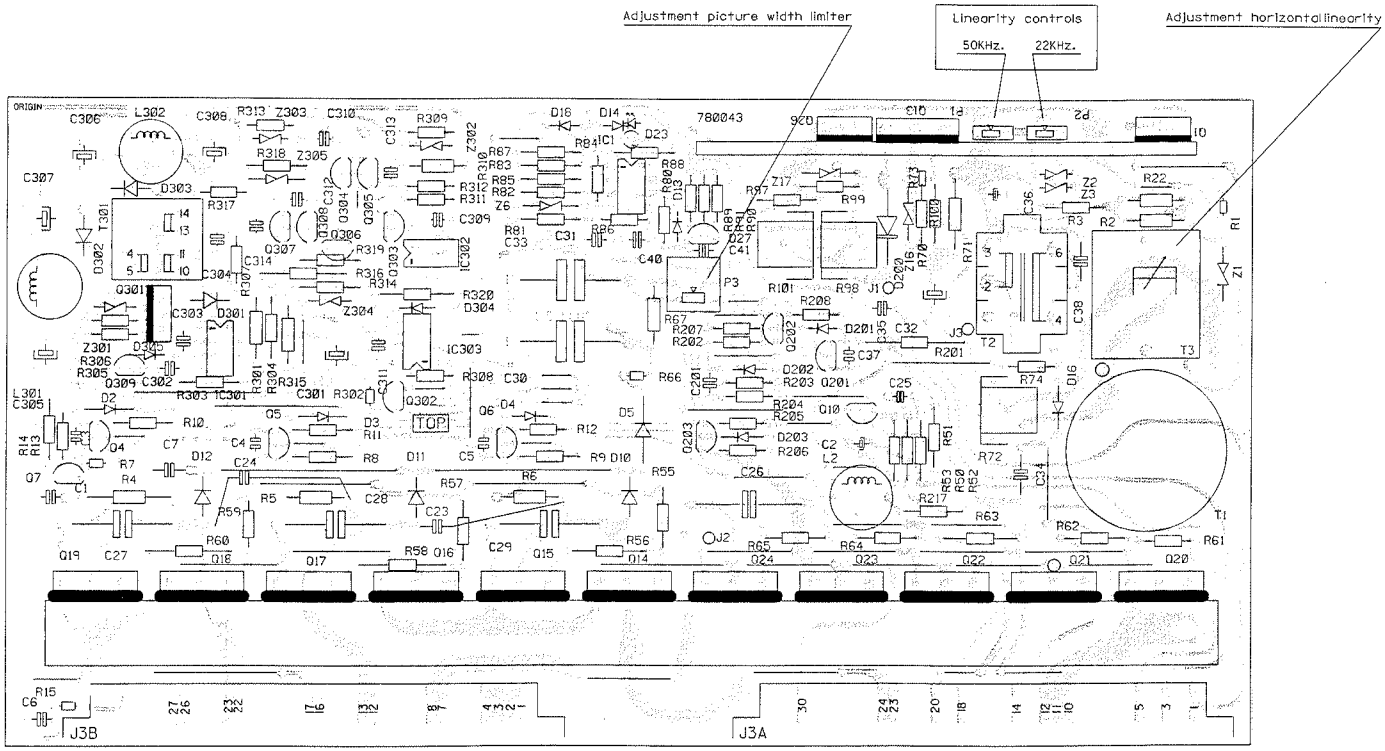
C307	B 2
C308	C 2
C309	D 2
C310	C 2
C311	C 3
C312	C 2
C313	D 2
C314	C 3
D2	B 3
D3	C 3
D4	D 3
D5	D 3
D10	D 3
D11	D 3
D12	C 3
D13	E 2
D14	D 2
D16	F 3
D18	D 2
D23	E 2
D200	F 3
D201	E 3
D202	E 3
D203	E 3
D301	C 3
D302	B 3
D303	C 2
D304	D 3
D305	B 3
IC1	D 2
IC301	C 3
IC302	D 3
IC303	D 3
J1	E 3
J2	E 4
J3	F 3
J10	B 4
J20	G 4
L2	E 3
L301	B 3
L302	B 2
P1	F 2
P2	F 2
P3	E 3
Q1	G 2
Q4	B 3
Q5	C 3
Q6	D 3
Q7	B 4
Q10	E 3
Q13	F 2
Q14	D 4
Q15	D 4
Q16	D 4
Q17	C 4
Q18	C 4
Q19	B 4
Q20	G 4
Q21	F 4
Q22	F 4
Q23	E 4
Q24	E 4
Q26	E 2
Q27	E 3
Q201	E 3
Q202	E 3
Q203	E 3
Q301	B 3
Q302	D 3
Q303	D 3
Q304	C 2
Q305	C 2
Q306	C 3
Q307	C 3
Q308	C 3
Q309	B 3

COMP.	LOC.
R1	G 2
R2	F 2
R3	F 2
R4	B 4
R5	C 4
R6	D 4
R7	B 3
R8	C 3
R9	D 3
R10	C 3
R11	C 3
R12	D 3
R13	B 3
R14	B 3
R15	B 4
R22	G 2
R50	F 4
R51	F 3
R52	F 4
R53	F 4
R55	E 3
R56	D 4
R57	D 4
R58	D 4
R59	C 4
R60	C 4
R61	G 4
R62	F 4
R63	F 4
R64	E 4
R65	E 4
R66	E 3
R67	E 3
R70	F 3
R71	F 3
R72	F 3
R73	F 2
R74	F 3
R80	E 2
R81	D 2
R82	D 2
R83	D 2
R84	D 2
R85	D 2
R86	D 2
R87	D 2
R88	E 2
R89	E 2
R90	E 2
R91	E 2
R97	E 2
R98	E 3
R99	E 2
R100	F 2
R101	E 3
R201	F 3
R202	E 3
R203	E 3
R204	E 3
R205	E 3
R206	E 3
R207	E 3
R208	E 3
R217	F 4
R301	C 3
R302	C 3
R303	C 3
R304	C 3
R305	B 3
R306	B 3
R307	C 3
R308	D 3
R309	D 2
R310	D 2
R311	D 2
R312	D 2
R313	C 2
R314	C 3
R315	C 3
R316	C 3
R317	C 2
R318	C 2
R319	C 3
R320	D 3
T1	G 4
T2	F 3
T301	B 2
Z1	G 3
Z2	F 2
Z3	F 2
Z6	D 2
Z16	F 3
Z17	E 2
Z301	B 3
Z302	D 2
Z303	C 2
Z304	C 3
Z305	C 2



COMP.	LOC.
C1	B 4
C2	E 3
C3	B 3
C4	C 3
C5	D 3
C6	B 4
C7	C 3
C23	D 4
C24	C 4
C25	F 3
C26	F 3
C27	B 4
C28	C 4
C29	D 4
C30	D 3
C31	D 3
C32	F 3
C33	D 3
C34	F 4
C35	F 3
C36	F 2
C37	E 3
C38	F 3
C40	E 3
C41	E 3
C200	E 3
C301	C 3
C302	C 3
C303	C 3
C304	C 3
C305	B 3
C306	B 2
C307	B 2
C308	C 2
C309	D 2
C310	C 2
C311	C 3
C312	C 2
C313	D 2
C314	C 3
D2	B 3
D3	C 3
D4	D 3
D5	D 3
D10	D 3
D11	D 3
D12	C 3
D13	E 2
D14	D 2
D16	F 3
D18	D 2
D23	E 2
D200	F 3
D201	E 3
D202	E 3
D203	E 3
D301	C 3
D302	B 3
D303	C 2
D304	D 3
D305	B 3
IC1	D 2
IC301	C 3
IC302	D 3
IC303	D 3
J1	E 3
J2	E 4
J3	F 3
J10	B 4
J20	G 4
L2	E 3
L301	B 3
L302	B 2
P1	F 2
P2	F 2
P3	E 3
Q1	G 2
Q4	B 3
Q5	C 3
Q6	D 3
Q7	B 4
Q10	E 3
Q13	F 2
Q14	D 4
Q15	D 4
Q16	D 4
Q17	C 4
Q18	C 4
Q19	B 4
Q20	G 4
Q21	F 4
Q22	F 4
Q23	E 4
Q24	E 4
Q26	E 2
Q27	E 3
Q201	E 3
Q202	E 3
Q203	E 3
Q301	B 3
Q302	D 3
Q303	D 3
Q304	C 2
Q305	C 2
Q306	C 3
Q307	C 3
Q308	C 3
Q309	B 3

Name	Horizontal deflection module	Artwork nr. 76174
Date 15/09/1990	Drawn PG	Checked KC

BARCO PROJECTION SYSTEMS

COMP.	LOC.	COMP.	LOC.
C1	H 3	R300	A 5
C2	G 4	R301	A 5
C3	G 2	R303	A 6
C4	G 3	R304	B 6
C5	G 4	R305	C 6
C6	I 3	R306	C 6
C7	I 7	R307	C 5
C23	G 6	R308	A 7
C24	H 6	R309	C 7
C25	C 4	R310	C 6
C26	I 7	R311	C 7
C27	I 7	R312	C 6
C28	H 7	R313	D 7
C29	F 7	R314	C 8
C30	J 7	R315	C 7
C31	J 7	R316	C 7
C32	A 2	R317	C 7
C33	J 7	R318	D 8
C34	F 5	R319	I 6
C35	A 4		
C36	B 4	SR217	G 4
C37	D 3		
C38	E 5	T1	B 3
C39	B 3	T2	E 5
C40	K 6	T3	B 1
C41	K 7	T301	C 5
C201	E 3		
C301	A 6	Z1	B 3
C302	B 6	Z2	B 4
C303	C 5	Z3	B 4
C304	C 5	Z6	J 6
C305	D 5	Z16	A 2
C306	D 5	Z17	A 4
C307	D 5	Z301	C 6
C308	D 5	Z302	B 7
C309	B 7	Z303	D 7
C310	C 7	Z304	B 8
C311	B 8	Z305	D 8
C312	C 8	Z306	A 7
C313	D 7		
C314	D 8		
D2	G 2		
D3	G 2		
D4	G 3		
D5	J 6		
D10	I 6		
D11	I 6		
D12	I 7		
D13	K 7		
D16	F 5		
D23	K 6		
D200	B 2		
D202	D 3		
D203	E 3		
D300	C 5		
D301	C 5		
D302	D 5		
D303	D 5		
IC1	J 5		
IC301	B 5		
IC302	B 7		
IC303	B 8		
L2	G 4		
P1	B 4		
P2	B 4		
P3	J 7		
Q1	C 4		
Q4	G 2		
Q5	G 3		
Q6	G 4		
Q7	H 2		
Q10	D 4		
Q13	B 2		
Q14	E 7		
Q15	F 7		
Q16	G 7		
Q17	G 7		
Q18	H 7		
Q19	I 7		
Q20	E 8		
Q21	F 8		
Q22	G 8		
Q23	G 8		
Q24	H 8		
Q26	A 4		
Q27	K 7		
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Q203	E 3		
Q300	C 6		
Q301	C 5		
Q302	A 6		
Q303	C 7		
Q304	C 7		
Q305	C 7		
Q306	C 8		
Q307	C 8		
Q308	C 8		
R1	C 4		
R2	B 4		
R3	B 4		
R4	G 2		
R5	G 3		
R6	G 3		
R7	G 2		
R8	G 3		
R9	G 4		
R10	G 1		
R11	G 2		
R12	G 3		
R13	H 2		
R14	H 3		
R15	H 2		
R22	B 4		
R50	C 4		
R51	C 4		
R52	C 4		
R53	D 4		
R55	E 7		
R56	F 7		
R57	G 7		
R58	G 7		
R59	H 7		
R60	H 7		
R61	E 7		
R62	F 7		
R63	G 7		
R64	G 7		
R65	H 7		
R66	J 6		
R67	J 6		
R70	A 2		
R71	A 2		
R72	B 1		
R73	A 2		
R74	E 5		
R80	J 7		
R81	J 5		
R83	K 5		
R84	K 6		
R85	K 6		
R86	K 6		
R87	K 5		
R88	L 5		
R89	K 7		
R90	K 7		
R91	K 7		
R97	A 4		
R98	A 4		
R99	A 4		
R100	A 2		
R101	A 4		
R201	D 3		
R202	E 3		
R203	D 3		
R204	E 3		
R205	E 3		
R206	E 3		
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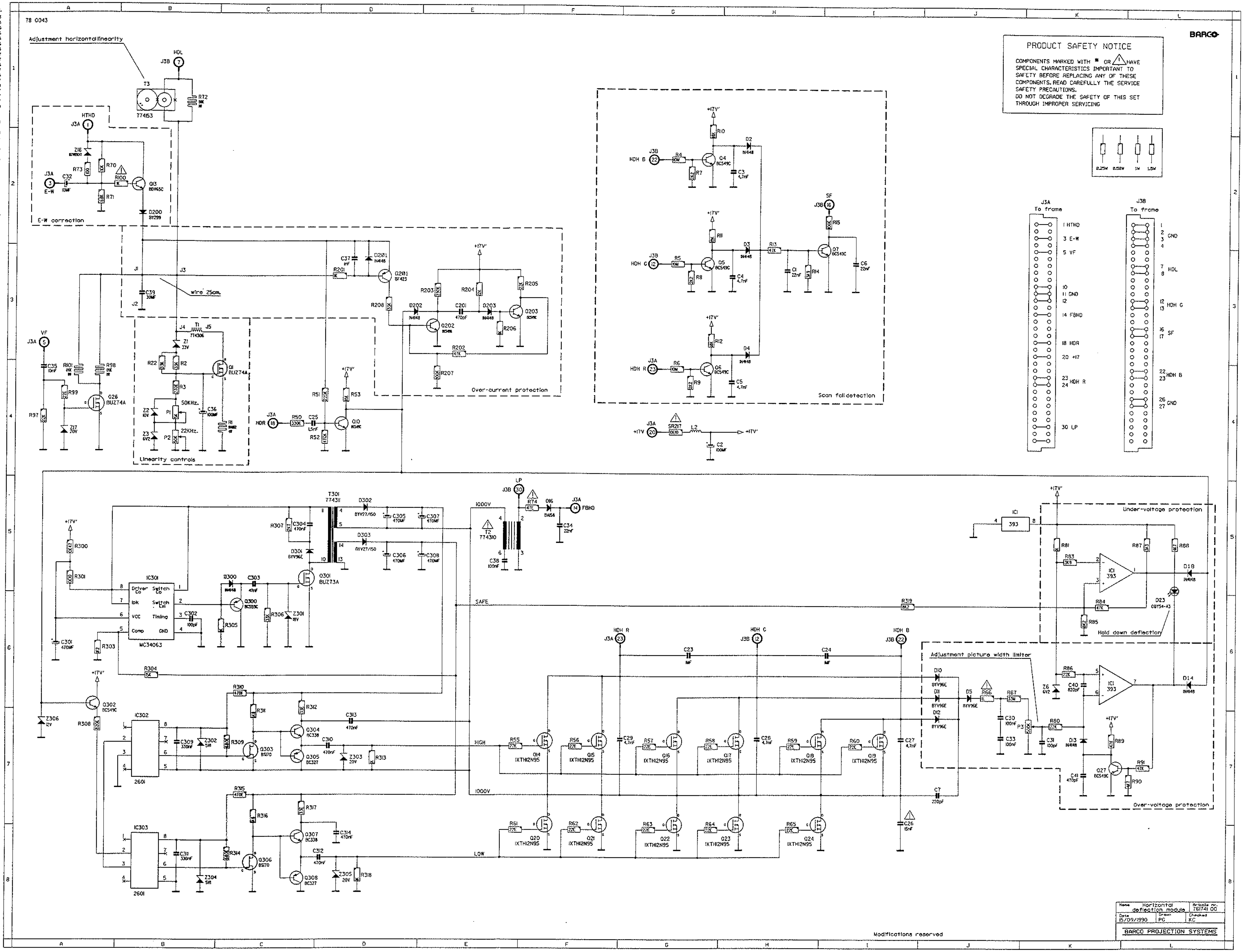
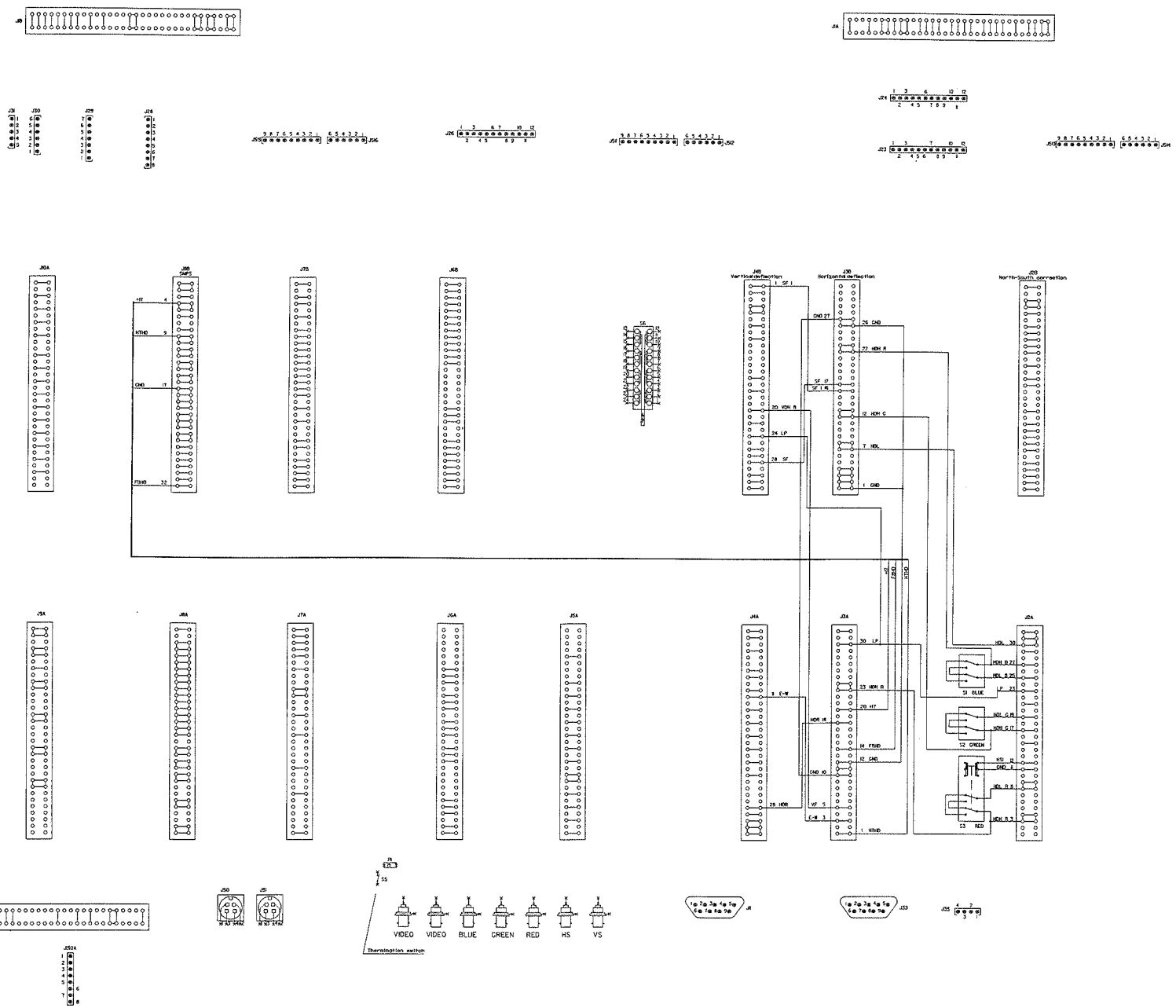
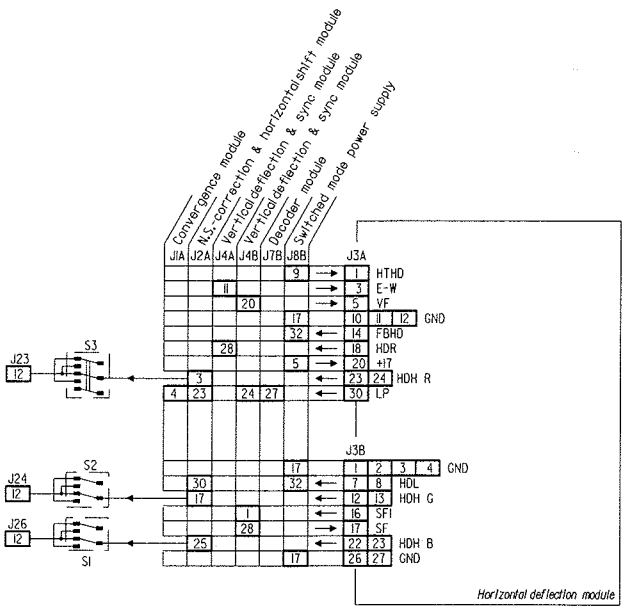
R208	D 3		



Main frame interconnection
Horizontal deflection module



Name: Interconnection Horizontal deflection	Schem. no.: 76776	
Date: 9/29/1990	Drawn: PG	Checked: RC
BARCO PROJECTION SYSTEMS		



Name Interconnection Horizontal deflection module			Article nr. 761741
Date 15/09/1990	Drawn PG	Checked KC	
BARCO PROJECTION SYSTEMS			

HORIZONTAL DEFLECTION MODULE 76 1741

Introduction

The following adjustments are provided on the main board:

a: Overvoltage protection (=scan hold down) P3

b: Horizontal linearity adj. at 15 kHz
at 22 kHz and
at 50 kHz

Overvoltage protection

Preparation
Switch **OFF** the projector
Adjust P3 to its physical minimum (turning anti-clockwise)
Adjust P2 "MAX HOR. AMPL." on the SM Power Supply to its physical minimum (turning anti-clockwise).

Adjustment
Switch **ON** the projector.
With respect to chassis ground, measure the dc voltage at resistor R66.
Adjust P2 on the SM Power Supply for 1850Vdc.
Adjust P3 (turning clockwise) until the scan hold down LED D23 lights up. (Projector in hold down)
Reduce the HOR. AMPL. P2 setting (turning anti-clockwise)

Restart the projector (power switch Off/On)
Adjust P2 as explained in the adjustment procedure of the SM Power Supply (refer to corresponding service scheet)

Horizontal linearity

1. Adjust the core of the linearity coil using a 15 kHz input source.
2. Adjust P2 using a 22 kHz input source.
3. Adjust P1 using a 50 kHz input source.
   Note: If a 50 kHz input source is not available, then any source between 50-64 kHz may be used.

HORIZONTAL DEFLECTION MODULE 76 1741

INTRODUCTION.

On this board we find the Mosfet switchers to generate the currents through the scan coils.

In order to obtain a very short retrace time with a relative low scan voltage, and, as a Mosfet only may have 1000 volts across its drain-source, we find two switchers in series.

The drive pulses for the top switchers may not be related to ground level and consequently, a special drive pulse preparation is necessary.

Furthermore, we find the required protection circuits like æscan hold downÆ and scan failure.

PREPARATION OF THE DRIVE PULSES.

The horizontal deflection uses two Mosfets in series in order to be capable of handling about 2000 volts pulses with a flyback time of less than 2 uS.

Two drive pulses on different voltage level are required.

The bottom Mosfet is driven by a pulse train referred to ground level, whereas the top Mosfets are driven by a pulse train referred to the mid point of the two series connected mosfets.

The drive pulses, prepared on the un sync+vert defl board, are sent to the amplifier-shaper Q10. At the collector these pulses are buffered by Q302 and feed the series connected opto-couplers IC302/IC303.

A switched mode power supply around IC301, drives a Mosfet Q301, producing two same voltages .

One of the windings produces a floating voltage that will be referred to the node of the two mosfet switchers is .The other winding produces a voltage referred to ground to reproduce the 'low' drive pulse.

Note that this voltage is equally used as feedback for the switched mode power supply on this board..

Obviously; the High drive pulses are reaching the gate-source of the top-Mosfets and the Low drive pulses are driving the bottom Mosfet switchers.

The 20 volts zenerdiodes ptotect the gate-sources from exceeding the maximum tolerable voltage.
And on the other hand clamp the pulses at -0.6volts.

MODULATION OF THE SCAN VOLTAGE (EAST - WEST CORRECTION).

The +HTHD voltage from the Switched Mode Power Supply is modulated in Q13 by means of the East-West correcting waveform.

As the change of voltage on the capacitor C39 (buffer) is maximum during the vertical retrace time, there exists a risk that this change of voltage is not fully performed during this short period of time.

A vertical flyback pulse VF saturates Q26 at each vertical retrace and discharges the buffer capacitor C39 to the same voltage. By this measure, there is a minimum interaction of the bottom correction on the top of the picture.

HORIZONTAL LINEARITY CONTROL.

The horizontal linearity coil is line frequency dependent and can obviously not give full satisfaction for the whole frequency range. A modulation of the coil, on other terms a 'tracking' with the line frequencies is really a need.

A second coil is now magnetically coupled with the linearity coil T3.
The current flowing in the above tracking coil is the drain-source current of Q1.

The gate voltage of Q1 is the +HTHD voltage, thus a voltage that increases linearly with the line frequency.

Now, in the bias of this gate we find some three zeners and two adjustable resistors.
It is obvious that the zeners cannot perform a 'zener' function as long the applied voltage is below the zener level.

The Z1 (33V) stabilises a 33 volts as soon the +HTHD is beyond the 33 volts or the line frequency beyond the 15khz.

The next step is reached when Z3 starts stabilising.

From that moment onwards, the voltage across P2 is stabilised at 6.2 volts and the current through P2 is no more contributing to the drain-source current.

Obviously, the next sdtep is reached when Z2 stabilises and from then onwards, the resitors R2/R3/R22 determione the gate voltage and thus the drain-source current.

As a conclusion, we see that the required current for the modulating coil is not increasing linearly with the line frequency, but rather exponentially.

The total frequency range is divided into three ranges, whereas ewg of these ranges has a well determined correcting current.

PROTECTION CIRCUITS.

a) Overcurrent protection :

If for some reason, the sum of the currents in the scan coils exceeds a well-determined level, the drive is inhibited as follows:

The wire J1-J3, in series with the three scan coils, acts as a small resistor and its extremities are connected to the base-emitter of Q201. When the 0.6 V level is obtained, Q202 starts conducting and triggers the monoflop Q202/Q203.
The switched on Q202 inhibits the drive pulses via D202, and, the deflection is interrupted for some rasters (=time constant of the monoflop).

b) Overvoltage protection (=scan hold down) :

The flyback pulses on each of the series connected Mosfets are checked by a rectifier network consisting of a diode and common decoupling capacitors.

The resulting voltage is divided by R67/P3 and sent to the voltage comparator IC1.

The threshold level is set by the zener diode Z6 at 6.2 volts. At the moment pin 6 exceeds this threshold, the output pin 7 switches low and consequently :

1. The drive is inhibited through D14.
2. The input is kept high as transistor Q27 is blocked and D13 conducting via R89.
3. The red LED D23 is lit in order to show the occurred fault.
4. As the deflection is stopped, there is horizontal scan fail and as a result the appropriated circuit (see further) will drop the EHT voltage and blank the three crt's, to prevent damage to the phosphors.

c) Too low drive protection :

It is imperative that the Mosfets are fully switched on as to show a minimum resistance for the deflection circuit.

The amplitude of the drive pulse depends on the amplitude of the voltage produced by the IC301 switched mode power supply.

This voltage , being divided by R319/R320 is used as SAFE info and applied to pin 3 of the voltage detector IC1.

If this voltage is too low, the output pin 1 gets a low and inhibits the horizontal drive via D18.

d) Horizontal scan failure detection:

The flyback pulses HDH G, R and B are all three applied on a divider and the base of a transistor. As long pulses with sufficient amplitude are available , the collector voltage of all transistors Q4-Q6 are low and cannot saturate Q7. It proves to be the opposite, when one or more flybackpulses are absent.

FEEDBACK TO THE SMPS.

The scan voltage +HTHD has to 'follow ' the line frequency in order to stabilise the horizontal width of the picture.

The amplitude of the line flyback pulses is proportional with the horizontal scan amplitude.When, by means of a looped feedback system one can stabilise the amplitude of these flyback pulses, the horizon,tam width is stable as well.

These pulses are rectified by D16 and the +FBHD voltage is linked with the switched mode power supply (see description SMPS).

HORIZONTAL DEFLECTION MODULE 76 1741

ITEM NO.	SIT.	DESCRIPTION
11 4106	C...	CAP POMEFF 1M K 100
11 37161	C..1	CAP POME 22K K5 100
11 1477	C..2	CAP ELPR 100M Z5 25
11 2747	C..3	CAP CE MI 4K7 K5 63
11 2747	C..4	CAP CE MI 4K7 K5 63
11 2747	C..5	CAP CE MI 4K7 K5 63
11 37161	C..6	CAP POME 22K K5 100
11 2094	C..7	CAP CE DI 220P K 750
11 2741	C.25	CAP CE MI 1K5 K5 63
11 50654	C.26	CAP PPMEPO 15K J 1600
11 1773	C.27	CAP PPMEPO 4K7 J 1500
11 1773	C.28	CAP PPMEPO 4K7 J 1500
11 1773	C.29	CAP PPMEPO 4K7 J 1500
11 4603	C.30	CAP POHVPO 100K M 1000
11 2242	C.31	CAP NPO MI 100P J5 63
11 1569	C.32	CAP ELPRMI 10M M5 250
11 4603	C.33	CAP POHVPO 100K M 1000
11 4154	C.34	CAP POMEFF 22K K 400
11 37121	C.35	CAP POME 10K K5 100
11 1487	C.36	CAP ELPR 100M Z5 40
11 2739	C.37	CAP CE MI 1K K5 63
11 4100	C.38	CAP POMEFF 100K K 100
11 4799	C.39	CAP PAMERA 30M K AC300
11 59141	C.40	CAP PP RA 820P J5 100
11 2387	C.41	CAP N152MI 470P J5 63
11 2387	C201	CAP N152MI 470P J5 63
11 1479	C301	CAP ELPR 470M Z5 25
11 2242	C302	CAP NPO MI 100P J5 63
11 3720	C303	CAP POME 47K K5 63
11 3732	C304	CAP POME 470K K5 63
11 1479	C305	CAP ELPR 470M Z5 25
11 1479	C306	CAP ELPR 470M Z5 25
11 1479	C307	CAP ELPR 470M Z5 25
11 1479	C308	CAP ELPR 470M Z5 25
11 3730	C309	CAP POME 330K K5 63
11 3732	C310	CAP POME 470K K5 63
11 3730	C311	CAP POME 330K K5 63
11 3732	C312	CAP POME 470K K5 63
11 3732	C313	CAP POME 470K K5 63
11 3732	C314	CAP POME 470K K5 63
13 1621	D..2	DIODE 1N4148 SWITCH
13 1621	D..3	DIODE 1N4148 SWITCH
13 1621	D..4	DIODE 1N4148 SWITCH
13 1906	D..5	DIODE BYV96E
13 1906	D.10	DIODE BYV96E
13 1906	D.11	DIODE BYV96E
13 1906	D.12	DIODE BYV96E
13 1621	D.13	DIODE 1N4148 SWITCH
13 1621	D.14	DIODE 1N4148 SWITCH
13 1637	D.16	DIODE BA158 SWITCH
13 1621	D.18	DIODE 1N4148 SWITCH
13 1662	D.23	DIODE CQY54-A3 LED D3 RED
13 1921	D200	DIODE BY299,SK4G-8 800V/2A R
13 1621	D201	DIODE 1N4148 SWITCH
13 1621	D202	DIODE 1N4148 SWITCH
13 1621	D203	DIODE 1N4148 SWITCH
13 1906	D301	DIODE BYV96E
13 1950	D302	DIODE BYV27/150 150V/2A R
13 1950	D303	DIODE BYV27/150 150V/2A R
13 1621	D305	DIODE 1N4148 SWITCH
13 4114	I..1	IC 393 DUAL VOLT COMP
13 7625	I301	IC 34063 DC DC CONVERTER
13 1683	I302	OPTO COUPLER 2601
13 1683	I303	OPTO COUPLER 2601

ITEM NO.	SIT.	DESCRIPTION
31 3525	J10.	CONN EURO MBS P64
31 3525	J20.	CONN EURO MBS P64
77 3215	L..2	COIL CHOKE SMP
10 6828	P..1	TRIMPOT CEMV 5K K 0W50
10 6832	P..2	TRIMPOT CEMV 50K K 0W50
10 6736	P..3	TRIMPOT CEMH 500K K 0W50
78 0043	PC..	PC PJ 49 HOR GR800__ 761766
13 2593	Q..1	TSTR BUZ74A FET N 500 / 2A
13 1411	Q..4	TSTR BC549C,BC239C N 30 / 0A1
13 1411	Q..5	TSTR BC549C,BC239C N 30 / 0A1
13 1411	Q..6	TSTR BC549C,BC239C N 30 / 0A1
13 1411	Q..7	TSTR BC549C,BC239C N 30 / 0A1
13 1411	Q.10	TSTR BC549C,BC239C N 30 / 0A1
13 2945	Q.13	TSTR BDV65C DAR N 120 /20A
13 2918	Q.14	TSTR IXTH12N100FET 1000 /12A
13 2918	Q.15	TSTR IXTH12N100FET 1000 /12A
13 2918	Q.16	TSTR IXTH12N100FET 1000 /12A
13 2918	Q.17	TSTR IXTH12N100FET 1000 /12A
13 2918	Q.18	TSTR IXTH12N100FET 1000 /12A
13 2918	Q.19	TSTR IXTH12N100FET 1000 /12A
13 2918	Q.20	TSTR IXTH12N100FET 1000 /12A
13 2918	Q.21	TSTR IXTH12N100FET 1000 /12A
13 2918	Q.22	TSTR IXTH12N100FET 1000 /12A
13 2918	Q.23	TSTR IXTH12N100FET 1000 /12A
13 2918	Q.24	TSTR IXTH12N100FET 1000 /12A
13 2593	Q.26	TSTR BUZ74A FET N 500 / 2A
13 1411	Q.27	TSTR BC549C,BC239C N 30 / 0A1
13 2552	Q201	TSTR BF423 P 250 / 50
13 14295	Q202	TSTR BC549B N 30 / 0A1
13 1411	Q203	TSTR BC549C,BC239C N 30 / 0A1
13 2592	Q301	TSTR BUZ73A FET N 200 / 5A8
13 1411	Q302	TSTR BC549C,BC239C N 30 / 0A1
13 2910	Q303	TSTR BS170 FET N 60 / 0A5
13 1424	Q304	TSTR BC338 N 25 / 0A8
13 14311	Q305	TSTR BC327 P 45 / 0A5
13 2910	Q306	TSTR BS170 FET N 60 / 0A5
13 1424	Q307	TSTR BC338 N 25 / 0A8
13 14311	Q308	TSTR BC327 P 45 / 0A5
13 14185	Q309	TSTR BC559C P 30 / 0A1
10 11947	R...	RES CFF E47 K 0W40
10 3640	R..1	RES WW H 220E J 4W
10 1254	R..2	RES CF 33K J 0W50
10 1129	R..3	RES CF 270E J 0W25
10 4678	R..4	RES HV 10M J 0W50
10 4678	R..5	RES HV 10M J 0W50
10 4678	R..6	RES HV 10M J 0W50
10 1140	R..7	RES CF 2K2 J 0W25
10 1140	R..8	RES CF 2K2 J 0W25
10 1140	R..9	RES CF 2K2 J 0W25
10 1151	R.10	RES CF 18K J 0W25
10 1151	R.11	RES CF 18K J 0W25
10 1151	R.12	RES CF 18K J 0W25
10 1156	R.13	RES CF 47K J 0W25
10 1143	R.14	RES CF 3K9 J 0W25
10 1124	R.15	RES CF 100E J 0W25
10 1254	R.22	RES CF 33K J 0W50
10 1130	R.50	RES CF 330E J 0W25
10 1164	R.51	RES CF 220K J 0W25
10 1168	R.52	RES CF 470K J 0W25
10 1151	R.53	RES CF 18K J 0W25
10 1116	R.55	RES CF 22E J 0W25
10 1116	R.56	RES CF 22E J 0W25

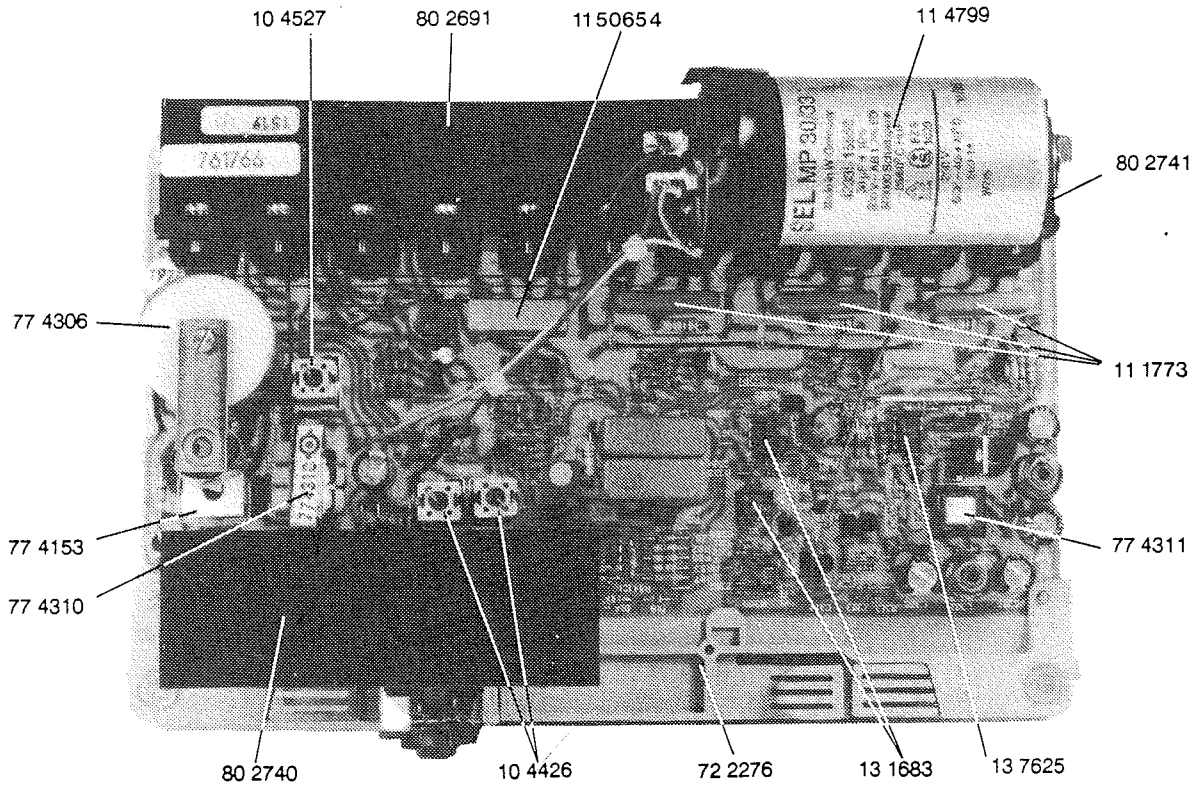
ITEM NO.	SIT.	DESCRIPTION
10 1116	R.57	RES CF 22E J 0W25
10 1116	R.58	RES CF 22E J 0W25
10 1116	R.59	RES CF 22E J 0W25
10 1116	R.60	RES CF 22E J 0W25
10 1116	R.61	RES CF 22E J 0W25
10 1116	R.62	RES CF 22E J 0W25
10 1116	R.63	RES CF 22E J 0W25
10 1116	R.64	RES CF 22E J 0W25
10 1116	R.65	RES CF 22E J 0W25
10 11008	R.66	RES CFF 1E J 0W25
10 4690	R.67	RES HV 33M J 0W50
10 1148	R.70	RES CF 10K J 0W25
10 3158	R.71	RES MO 68K J 0W70
10 4527	R.72	RES WW V 150E K 17W
10 11209	R.74	RES CFF UL 47E J 0W25
10 1152	R.80	RES CF 22K J 0W25
10 1136	R.81	RES CF 1K J 0W25
10 1143	R.83	RES CF 3K9 J 0W25
10 1156	R.84	RES CF 47K J 0W25
10 1147	R.85	RES CF 8K2 J 0W25
10 1152	R.86	RES CF 22K J 0W25
10 1142	R.87	RES CF 3K3 J 0W25
10 1144	R.88	RES CF 4K7 J 0W25
10 1156	R.89	RES CF 47K J 0W25
10 1144	R.90	RES CF 4K7 J 0W25
10 1156	R.91	RES CF 47K J 0W25
10 1152	R.97	RES CF 22K J 0W25
10 4426	R.98	RES WW V 120E K 11W
10 1116	R.99	RES CF 22E J 0W25
10 11369	R100	RES CFF UL 1K J 0W25
10 4426	R101	RES WW V 120E K 11W
10 1136	R201	RES CF 1K J 0W25
10 1156	R202	RES CF 47K J 0W25
10 1131	R203	RES CF 390E J 0W25
10 1149	R204	RES CF 12K J 0W25
10 1152	R205	RES CF 22K J 0W25
10 1136	R206	RES CF 1K J 0W25
10 1160	R207	RES CF 100K J 0W25
10 1154	R208	RES CF 33K J 0W25
10 11907	R217	RES CFF E10 J 0W40
10 11907	R301	RES CFF E10 J 0W40
10 1137	R303	RES CF 1K2 J 0W25
10 1150	R304	RES CF 15K J 0W25
10 1136	R305	RES CF 1K J 0W25
10 1154	R306	RES CF 33K J 0W25
10 1141	R307	RES CF 2K7 J 0W25
10 1135	R308	RES CF 820E J 0W25
10 1134	R309	RES CF 680E J 0W25
10 1232	R310	RES CF 470E J 0W50
10 1139	R311	RES CF 1K8 J 0W25
10 1118	R312	RES CF 33E J 0W25
10 1136	R313	RES CF 1K J 0W25
10 1134	R314	RES CF 680E J 0W25
10 1232	R315	RES CF 470E J 0W50
10 1139	R316	RES CF 1K8 J 0W25

ITEM NO.	SIT.	DESCRIPTION
10 1118	R317	RES CF 33E J 0W25
10 1136	R318	RES CF 1K J 0W25
10 1147	R319	RES CF 8K2 J 0W25
77 4306	T1..	TRANSF PJ 49 LIN CTRL
77 4153	T1E.	COIL LIN PJ 45 HOR DATA HR45
77 4310	T2..	TRANSF PJ 49 HOR DEFL
77 4311	T301	TRANSF PJ 49 HOR SMP DRIVE
13 1740	Z...	DIODE ZENER 12V 0W5 C
13 1790	Z..1	DIODE ZENER 33V 1W C
13 1735	Z..2	DIODE ZENER 10V 0W5 C
13 1720	Z..3	DIODE ZENER 6V2 0W5 C
13 1720	Z..6	DIODE ZENER 6V2 0W5 C
13 1707	Z.16	DIODE ZENER 47V 1W3 C
13 1730	Z.17	DIODE ZENER 20V 0W5 C
13 1789	Z301	DIODE ZENER 18V BZX79C18
13 1716	Z302	DIODE ZENER 5V1 0W5 C
13 1730	Z303	DIODE ZENER 20V 0W5 C
13 1716	Z304	DIODE ZENER 5V1 0W5 C
13 1730	Z305	DIODE ZENER 20V 0W5 C
13 3039	0010	SPACER L 8 D 4 D1,2 CER
36 7699	0010	RIVET CHOBERT D2,38 L6,35
31 3224	0020	RES WW V HOLDER H25
31 3224	0021	RES WW V HOLDER H25
31 3220	0022	RES WW V HOLDER H10
80 2827	0030	CORE LINEARITY (802739+802626)
80 2665	0032	FIX PJ 49 CORE LINEARITY
80 2751	0033	COIL LIN PJ 49 POSITION
36 20226	0034	SCREW DIN84 M 3 X 8 MP-
36 7502	0035	WASHER DIN6798 A 3,2
36 2021	0036	SCREW DIN84 M 3 X 6 MP-
36 7502	0037	WASHER DIN6798 A 3,2
80 2691	0100	HEATSINK PJ 49 HOR A GRAPHICS
80 2691Y	0100	HEATSINK PJ 49 HOR A GRAPHIC02
36 6988	0101	NUT INS SOUTHCO SHEET EDGE M3
80 2783	0110	TSTR INSULAT SHEET 30X225
80 2777	0120	FIX PJ 49 TSTR SPRING 2X M3
80 2686	0130	FIX PJ 49 TSTR SPRING 1X M3
80 2758	0140	HEATSINK PJ 49 HOR I FIX
36 20226	0150	SCREW DIN84 M 3 X 8 MP-
36 7502	0151	WASHER DIN6798 A 3,2
80 2740	0200	HEATSINK PJ 49 HOR B GRAPHICS
80 2920	0208	TSTR INSULAT SHEET 28X16
13 3063	0209	TSTR MICA INSULAT SOT-93
80 2628	0210	FIX PJ 49 TSTR SPRING 1X HOR
36 20226	0211	SCREW DIN84 M 3 X 8 MP-
36 7502	0212	WASHER DIN6798 A 3,2
36 7502	0214	WASHER DIN6798 A 3,2
80 2741	0300	HEATSINK PJ 49 HOR FIX CAP
36 20226	0301	SCREW DIN84 M 3 X 8 MP-
36 7502	0302	WASHER DIN6798 A 3,2
34 8100	8100	WIRE JUMPER 0,6 M AUTOM

HORIZONTAL DEFLECTION MODULE 76 1741

ART NO.	DESCRIPTION	QUANTITY
10 11008	RES CFF 1E J 0W25	1
10 11209	RES CFF UL 47E J 0W25	1
10 11369	RES CFF UL 1K J 0W25	1
10 11907	RES CFF E10 J 0W40	2
10 11947	RES CFF E47 K 0W40	1
10 3158	RES MO 68K J 0W70	1
10 3640	RES WW H 220E J 4W	1
10 4426	RES WW V 120E K 11W	2 *
10 4527	RES WW V 150E K 17W	1 *
10 4678	RES HV 10M J 0W50	3
10 4690	RES HV 33M J 0W50	1
10 6736	TRIMPOT CEMH 500K K 0W50	1
10 6828	TRIMPOT CEMV 5K K 0W50	1
10 6832	TRIMPOT CEMV 50K K 0W50	1

ART NO.	DESCRIPTION	QUANTITY
13 1411	TSTR BC549C,BC239C N 30 / 0A1	8
13 14185	TSTR BC559C P 30 / 0A1	1
13 1424	TSTR BC338 N 25 / 0A8	2
13 14295	TSTR BC549B N 30 / 0A1	1
13 14311	TSTR BC327 P 45 / 0A5	2
13 1621	DIODE 1N4148 SWITCH	10
13 1637	DIODE BA158 SWITCH	1
13 1662	DIODE CQY54-A3 LED D3 RED	1
13 1683	OPTO COUPLER 2601	2 *
13 1707	DIODE ZENER 47V 1W3 C	1
13 1716	DIODE ZENER 5V1 0W5 C	2
13 1720	DIODE ZENER 6V2 0W5 C	2
13 1730	DIODE ZENER 20V 0W5 C	3
13 1735	DIODE ZENER 10V 0W5 C	1



11 1569	CAP ELPRMI 10M M5 250	1	13 1740	DIODE ZENER 12V 0W5 C	1
11 1773	CAP PPMEPO 4K7 J 1500	3 *	13 1789	DIODE ZENER 18V BZX79C18	1
11 2094	CAP CE DI 220P K 750	1	13 1790	DIODE ZENER 33V 1W C	1
11 4154	CAP POMEFF 22K K 400	1	13 1906	DIODE BYV96E	5
11 4603	CAP POHVPO 100K M 1000	2	13 1921	DIODE BY299,SK4G-8 800V/2A R	1
11 4799	CAP PAMERA 30M K AC300	1	13 1950	DIODE BYV27/150 150V/2A R	2
11 50654	CAP PPMEPO 15K J 1600	1 *			

HORIZONTAL DEFLECTION MODULE 76 1741

ART NO.	DESCRIPTION	QUANTITY
13 2552	TSTR BF423 P 250 / 50	1
13 2592	TSTR BUZ73A FET N 200 / 5A8	1
13 2593	TSTR BUZ74A FET N 500 / 2A	2
13 2910	TSTR BS170 FET N 60 / 0A5	2
13 2918	TSTR IXTH12N100FET 1000 /12A	11
13 2945	TSTR BDV65C DAR N 120 /20A	1
13 3039	SPACER L 8 D 4 D1,2 CER	1
13 3063	TSTR MICA INSULAT SOT-93	2
13 4114	IC 393 DUAL VOLT COMP	1
13 7625	IC 34063 DC DC CONVERTER	1 *
31 3220	RES WW V HOLDER H10	1
31 3224	RES WW V HOLDER H25	2
31 3525	CONN EURO MBS P64	2
36 2021	SCREW DIN84 M 3 X 6 MP-	1
36 20226	SCREW DIN84 M 3 X 8 MP-	20
36 6988	NUT INS SOUTHCO SHEET EDGE M3	2
36 7502	WASHER DIN6798 A 3,2	25
36 7699	RIVET CHOBERT D2,38 L6,35	4
72 2276	LOCKING PCB BOARD	1 *

ART NO.	DESCRIPTION	QUANTITY
77 3215	COIL CHOKE SMP	1
77 4153	COIL LIN PJ 45 HOR DATA HR45	1 *
77 4306	TRANSF PJ 49 LIN CTRL	1 *
77 4310	TRANSF PJ 49 HOR DEFL	1 *
77 4311	TRANSF PJ 49 HOR SMP DRIVE	1 *
80 2628	FIX PJ 49 TSTR SPRING 1X HOR	3
80 2665	FIX PJ 49 CORE LINEARITY	1
80 2686	FIX PJ 49 TSTR SPRING 1X M3	3
80 2691	HEATSINK PJ 49 HOR A GRAPHICS	1 *
80 2691Y	HEATSINK PJ 49 HOR A GRAPHIC02	1
80 2740	HEATSINK PJ 49 HOR B GRAPHICS	1 *
80 2741	HEATSINK PJ 49 HOR FIX CAP	1 *
80 2751	COIL LIN PJ 49 POSITION	1
80 2758	HEATSINK PJ 49 HOR I FIX	1
80 2777	FIX PJ 49 TSTR SPRING 2X M3	4
80 2783	TSTR INSULAT SHEET 30X225	1
80 2827	CORE LINEARITY (802739+802626)	1
80 2920	TSTR INSULAT SHEET 28X16	1

NUMBERS REFRRING TO PICTURE