



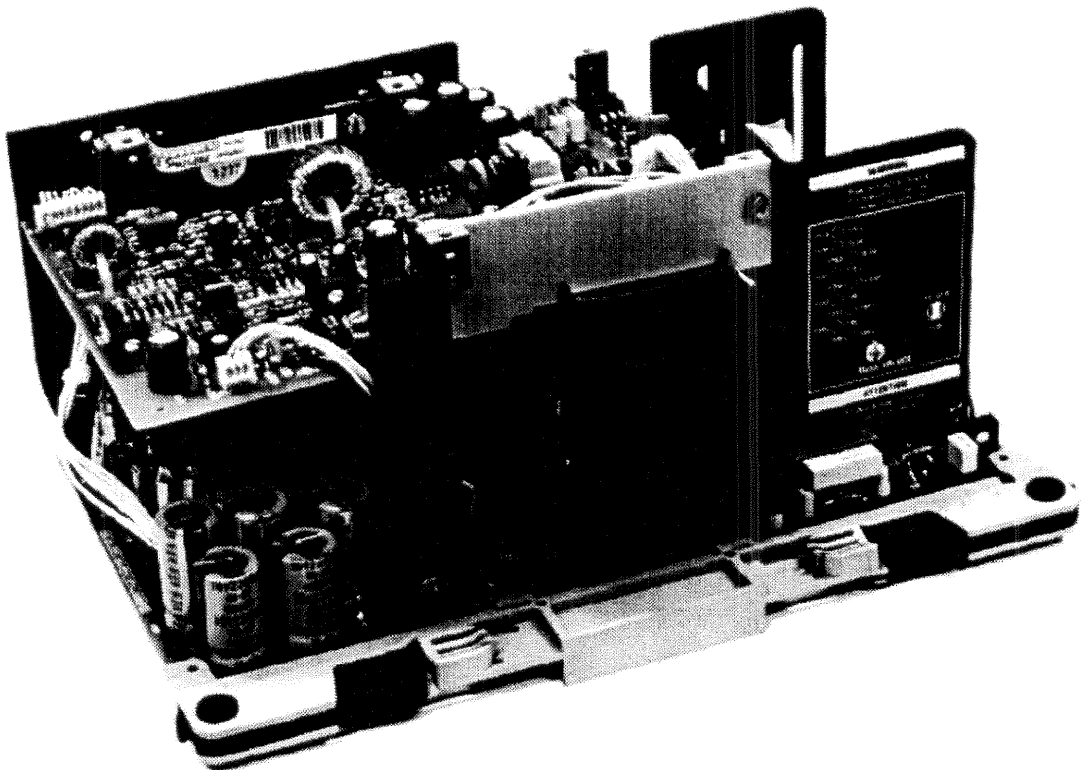
BARCO Projection Systems

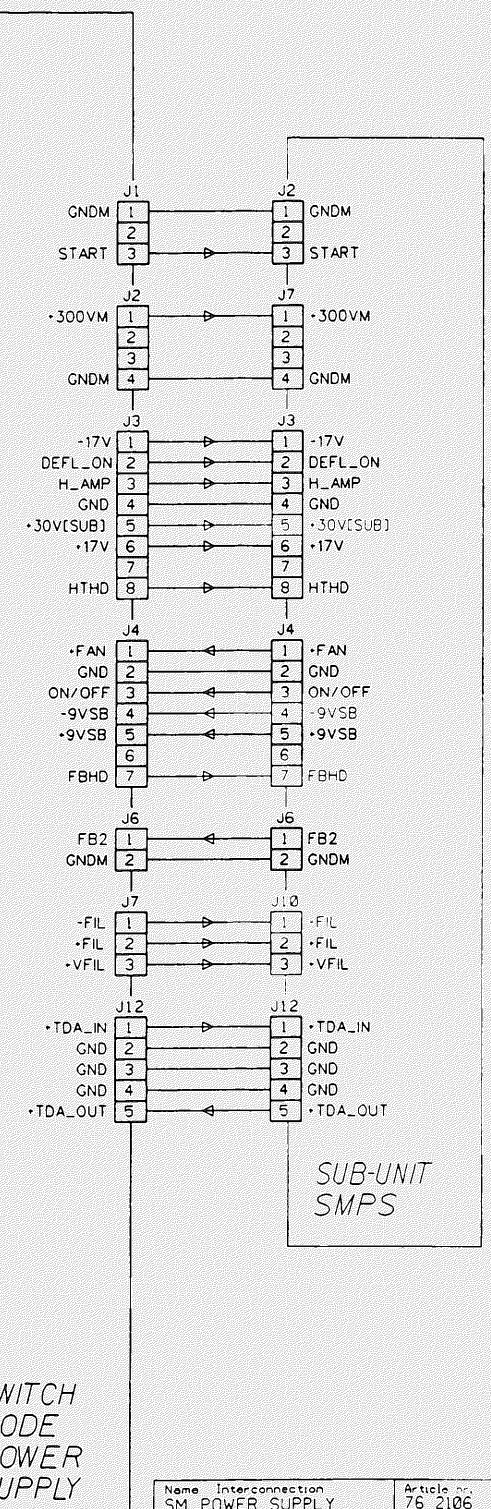
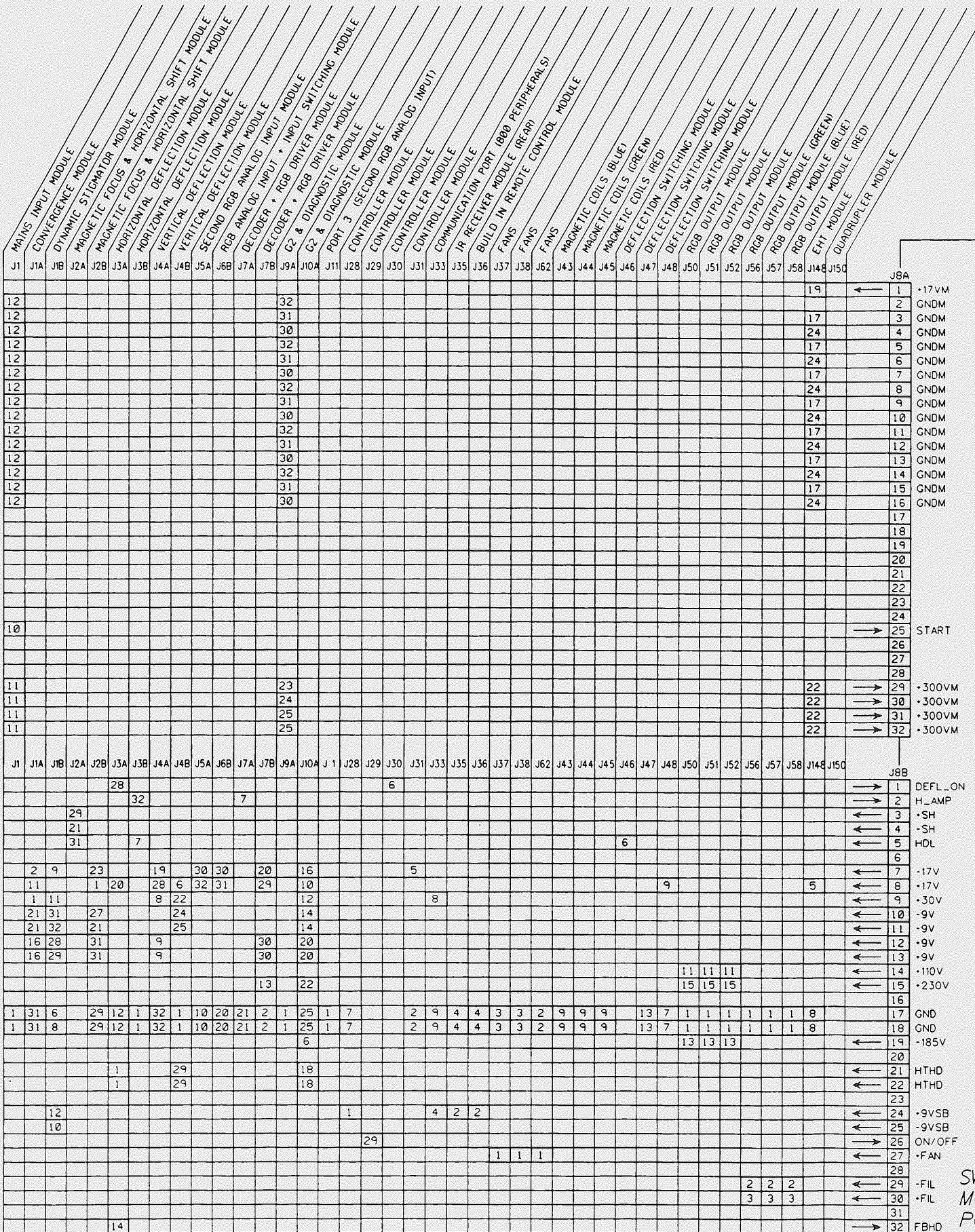
SECTION **K**

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



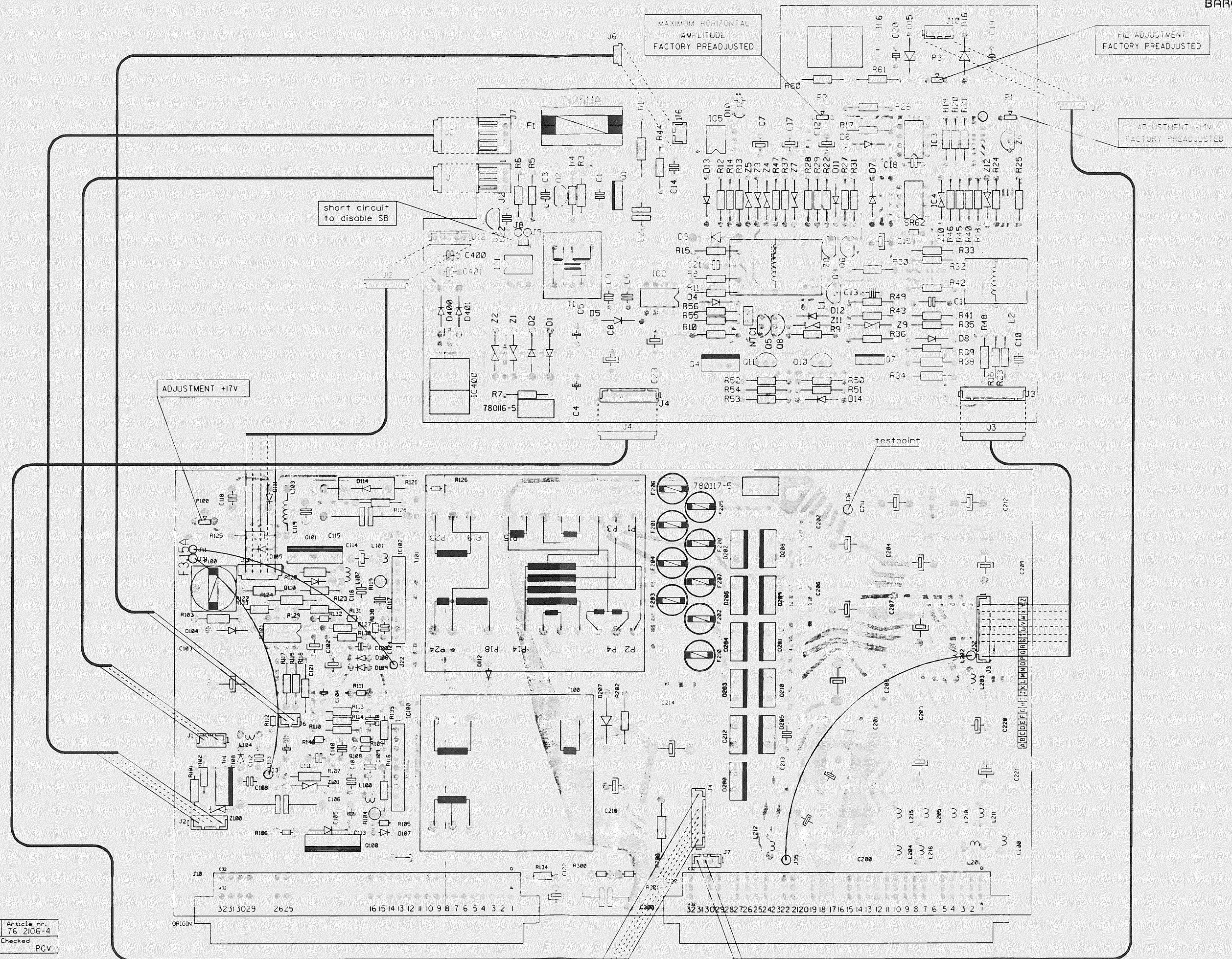


Name	Interconnection	Article no.
SM POWER SUPPLY		76 2106
Date	Drawn	Checked
14-12-1994	JVDY	PGV

BARCO PROJECTION SYSTEMS

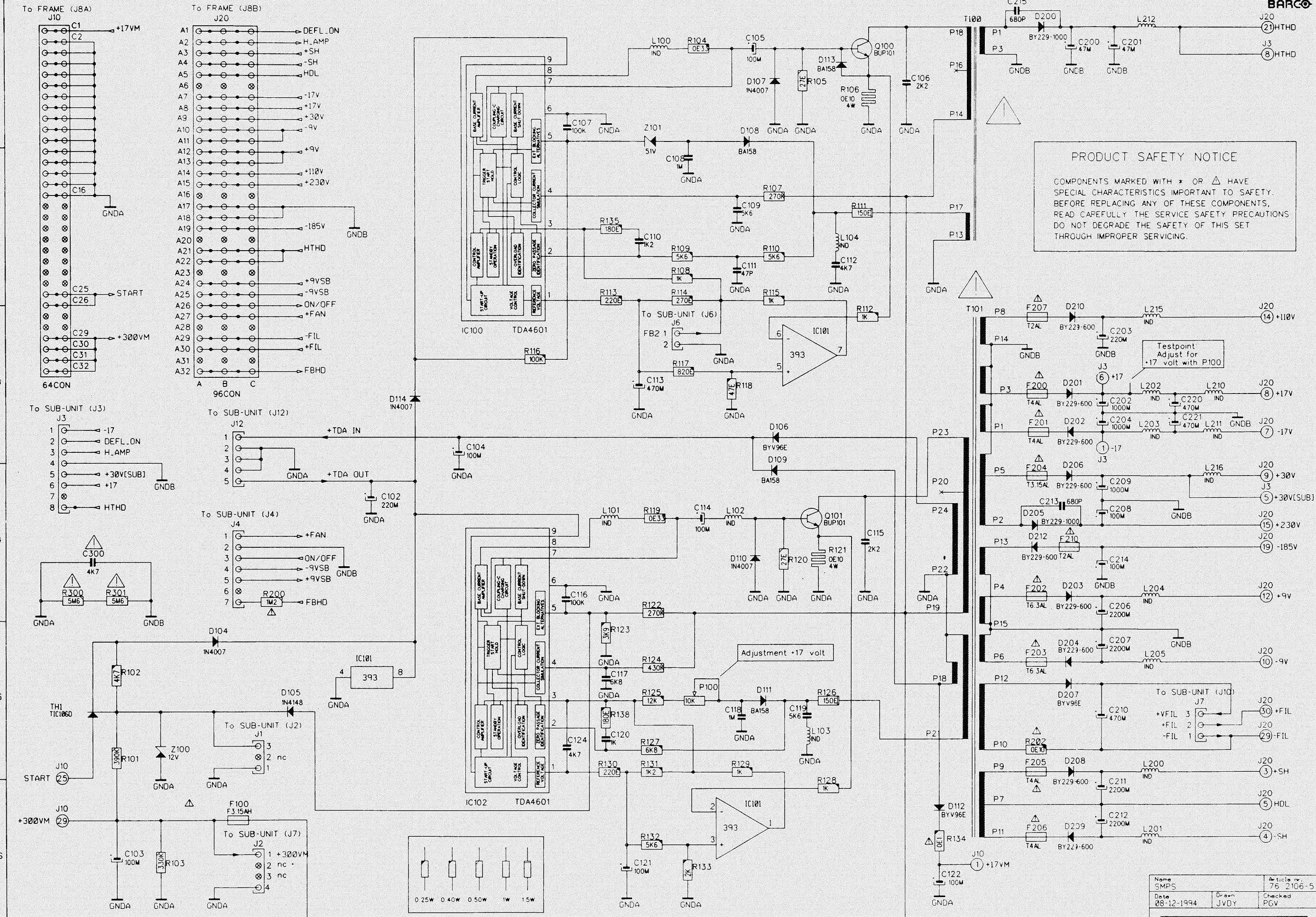
Modifications reserved

COMP. LOC.		COMP. LOC.		COMP. LOC.	
C1	E 2	J4	E 3	R118	C 5
C2	E 2	J6	C 5	R119	C 4
C3	D 2	J6	E 1	R120	C 4
C4	E 3	J7	E 6	R121	D 4
C5	E 3	J7	D 1	R122	C 4
C6	E 2	J8	D 2	R123	C 4
C7	F 1	J9	D 2	R124	C 4
C8	E 3	J10	B 6	R125	B 4
C9	E 2	J10	C 1	R126	D 4
C10	G 3	J11	B 4	R127	C 4
C11	G 2	J12	C 4	R128	C 4
C12	F 1	J12	D 2	R129	C 4
C13	F 2	J20	E 6	R130	C 4
C14	E 2	J22	D 5	R131	C 4
C15	F 2	J31	B 4	R132	C 4
C17	F 1	J32	C 5	R133	C 4
C18	F 2	J33	C 5	R134	D 6
C19	G 1	J35	F 6	R135	C 5
C20	F 1	J36	F 4	R138	C 4
C21	E 2			R140	C 5
C22	D 2	L1	F 2	R200	E 6
C23	E 3	L2	G 3	R202	E 5
C102	C 5	L100	C 5	R300	E 6
C103	B 5	L101	C 4	R301	E 6
C104	C 5	L102	C 4		
C105	C 6	L103	C 4	SR62	F 2
C106	C 5	L104	C 5		
C107	C 5	L200	C 6	T1	D 2
C108	C 5	L201	C 6	T100	D 5
C109	C 5	L202	C 5	T101	D 4
C110	C 5	L203	C 5		
C111	C 5	L204	F 6	T41	B 5
C112	C 5	L205	C 6		
C113	C 5	L210	C 6	Z1	D 3
C114	C 4	L211	C 6	Z2	D 3
C115	C 4	L212	F 6	Z3	F 2
C116	C 4	L215	F 6	Z4	F 2
C117	C 4	L216	C 5	Z5	F 2
C118	B 4			Z6	C 1
C119	C 4	NTC1	F 3	Z7	F 2
C120	C 5			Z8	F 2
C121	C 5	P1	C 1	Z9	F 3
C122	D 6	P2	F 1	Z10	C 2
C124	C 5	P3	C 1	Z1	F 3
C140	C 5	P100	B 4	Z12	C 2
C200	F 6			Z100	C 6
C202	F 4	Q1	E 2	Z101	C 5
C203	F 5	Q2	D 2		
C204	F 4	Q3	D 2		
C206	F 4	Q4	E 3		
C207	F 4	Q5	F 3		
C208	F 5	Q6	F 2		
C209	G 4	Q7	F 3		
C210	E 6	Q8	F 3		
C211	F 4	Q9	F 2		
C212	G 4	Q10	F 3		
C213	F 5	Q11	E 3		
C214	E 5	Q100	C 6		
C220	C 5	Q101	C 4		
C221	C 5				
C300	E 6	R1	E 1		
C400	D 2	R3	E 2		
C401	D 2	R4	E 2		
		R5	D 2		
D1	D 3	R6	D 2		
D2	D 3	R7	D 3		
D3	E 2	R8	E 2		
D4	E 2	R9	F 3		
D5	E 3	R10	E 3		
D6	F 1	R11	E 2		
D7	F 2	R12	E 2		
D8	G 3	R13	E 2		
D10	E 1	R14	E 2		
D11	F 2	R15	E 2		
D12	F 3	R16	C 3		
D13	E 2	R17	F 1		
D14	F 3	R18	C 2		
D15	F 1	R19	C 1		
D16	G 1	R20	C 1		
D104	B 4	R21	D 1		
D105	C 4	R22	F 2		
D106	C 5	R23	C 3		
D107	C 6	R24	C 2		
D108	C 5	R25	C 2		
D109	C 5	R26	F 1		
D110	C 4	R27	F 2		
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D112	D 5	R29	F 2		
D113	C 6	R30	F 2		
D114	C 4	R31	F 2		
D200	E 5	R32	C 2		
D201	F 5	R33	C 2		
D202	E 4	R34	F 3		
D203	E 5	R35	C 3		
D204	E 5	R36	F 3		
D205	F 5	R37	F 2		
D206	E 4	R38	C 3		
D207	E 5	R39	C 3		
D208	F 4	R40	C 2		
D209	F 4	R41	C 3		
D210	F 5	R42	C 2		
D212	E 5	R43	F 3		
D400	D 3	R44	E 1		
D401	D 3	R45	C 2		
		R46	C 2		
F1	D 1	R47	F 2		
F100	B 4	R48	C 3		
F200	E 4	R49	F 2		
F201	E 4	R50	F 3		
F202	E 4	R51	F 3		
F203	E 4	R52	E 3		
F204	E 4	R53	E 3		
F205	E 4	R54	E 3		
F206	E 4	R55	E 3		
F207	E 4	R56	E 2		
F210	E 5	R60	F 1		
		R61	F 1		
IC1	D 2	R101	B 5		
IC2	E 2	R102	B 5		
IC3	G 1	R103	B 4		
IC4	G 2	R104	C 6		
IC5	E 1	R105	C 6		
IC6	F 1	R106	C 6		
IC100	D 5	R107	C 5		
IC101	C 4	R108	C 5		
IC102	C 4	R109	C 5		
IC400	D 3	R110	C 5		
		R111	C 5		
J1	B 5	R112	C 5		
J2	B 6	R113	C 5		
J2	D 2	R114	C 5		
J3	G 5	R115	C 5		
J3	C 3	R116	C 5		
J4	E 5	R117	C 5		



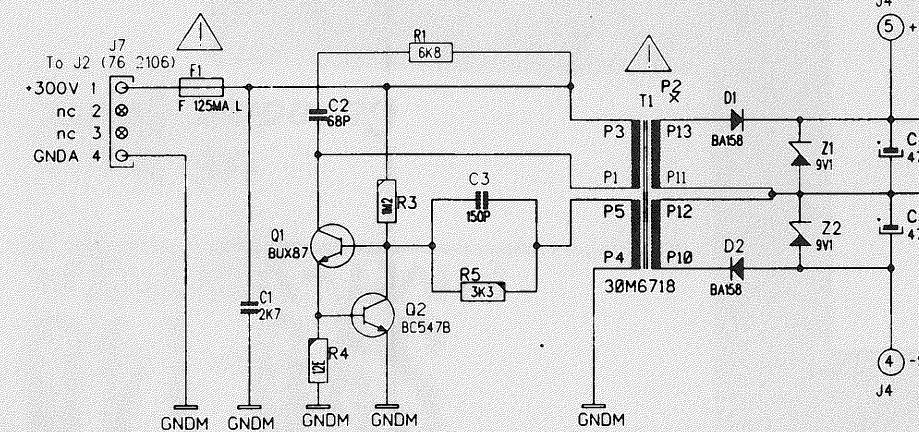
Name	SMPS	Article nr.
Date	15-04-1994	76 2106-4
Drawn	JVDY	Checked
		PGV

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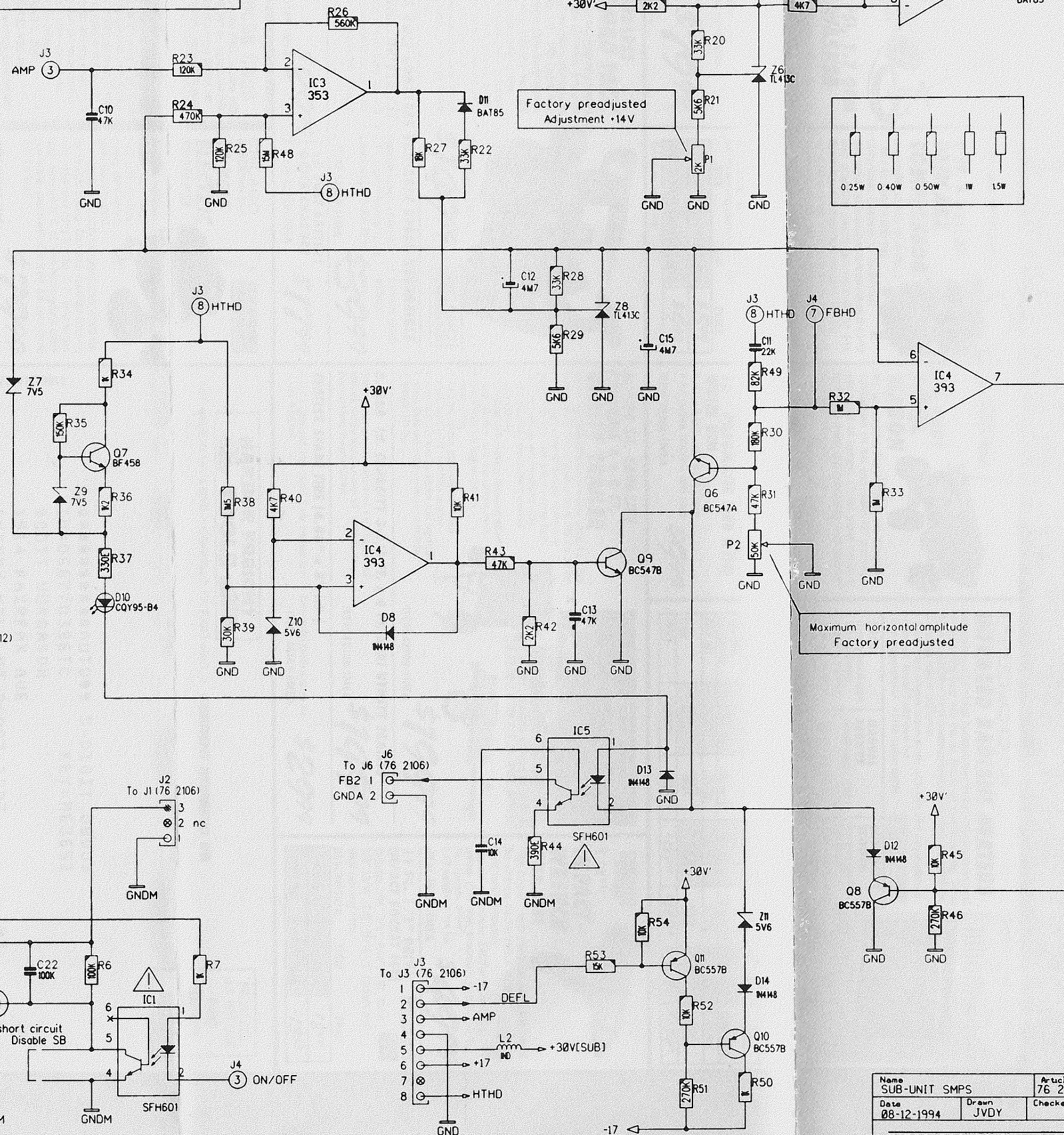


COMP. LOC.		COMP. LOC.	
C102	C 4	L215	G 2
C103	A 6	L216	H 4
C104	C 3		
C105	E 1	P100	E 5
C106	F 1		
C107	D 1	Q100	F 1
C108	E 2	Q101	E 4
C109	E 2		
C110	D 2	R101	A 5
C111	E 2	R102	A 5
C112	F 2	R103	A 6
C113	D 3	R104	E 1
C114	F 4	R105	F 1
C115	F 4	R106	F 1
C116	D 4	R107	E 2
C117	D 5	R108	E 2
C118	E 5	R109	E 2
C119	E 5	R110	E 2
C120	D 5	R111	F 2
C121	D 6	R112	F 2
C122	F 6	R113	D 2
C123	D 5	R114	E 2
C200	G 1	R115	E 2
C201	G 1	R116	D 3
C202	G 3	R117	E 3
C203	G 3	R118	E 3
C204	G 3	R119	D 4
C205	G 4	R120	E 4
C206	G 4	R121	F 4
C207	G 5	R122	F 4
C208	G 4	R123	D 4
C209	G 4	R124	D 5
C210	G 5	R125	D 5
C211	G 5	R126	D 5
C212	G 6	R127	D 5
C213	G 4	R128	F 5
C214	G 4	R129	F 5
C215	G 1	R130	D 5
C220	H 3	R131	D 5
C221	H 3	R132	D 5
C300	A 4	R133	F 6
		R134	F 6
		R135	D 2
D104	B 5	R136	D 5
D105	B 5	R137	D 5
D106	E 3	R138	D 5
D107	E 1	R200	B 4
D108	E 1	R201	G 5
D109	E 3	R300	A 4
D110	E 4	R301	A 4
D111	E 5		
D112	F 6	T100	F 1
D113	E 1	T101	F 2
D114	C 3		
D200	G 1	TH1	A 5
D201	G 3		
D202	G 3	Z100	B 5
D203	G 4	Z101	D 1
D204	G 5		
D205	G 4		
D206	G 3		
D207	G 5		
D208	G 5		
D209	G 2		
D210	G 2		
D212	G 4		
F100	B 6		
F200	G 3		
F201	G 3		
F202	G 4		
F203	G 5		
F204	G 4		
F205	G 5		
F206	G 6		
F207	G 2		
F210	G 4		
IC100	C 3		
IC101	C 5		
IC101	C 5		
IC101	E 3		
IC101	E 6		
IC102	C 6		
J1	B 5		
J2	B 6		
J3	A 3		
J4	B 4		
J6	E 3		
J7	H 5		
J10	A 1		
J11	F 2		
J12	B 3		
J20	B 1		
J22	F 2		
J31	E 2		
J32	F 2		
J33	G 1		
J35	G 1		
J36	G 3		
L100	D 1		
L101	D 4		
L102	E 4		
L103	E 5		
L104	F 2		
L200	G 5		
L201	G 6		
L202	G 3		
L203	G 3		
L204	G 4		
L205	G 5		
L210	H 3		
L211	H 3		
L212	G 1		

Name	SMPS	Article no.	76 2106-5
Date	08-12-1994	Drawn	JVDY
		Checked	PGV
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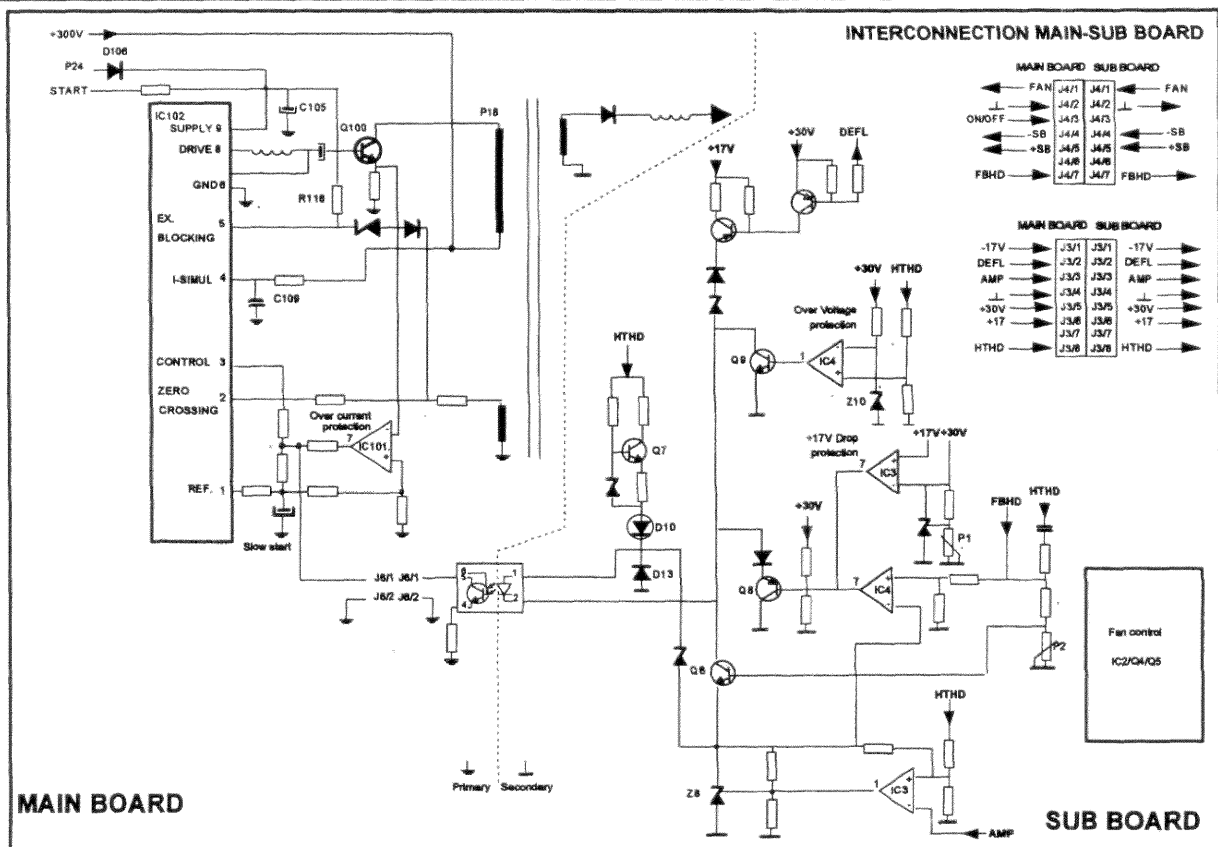
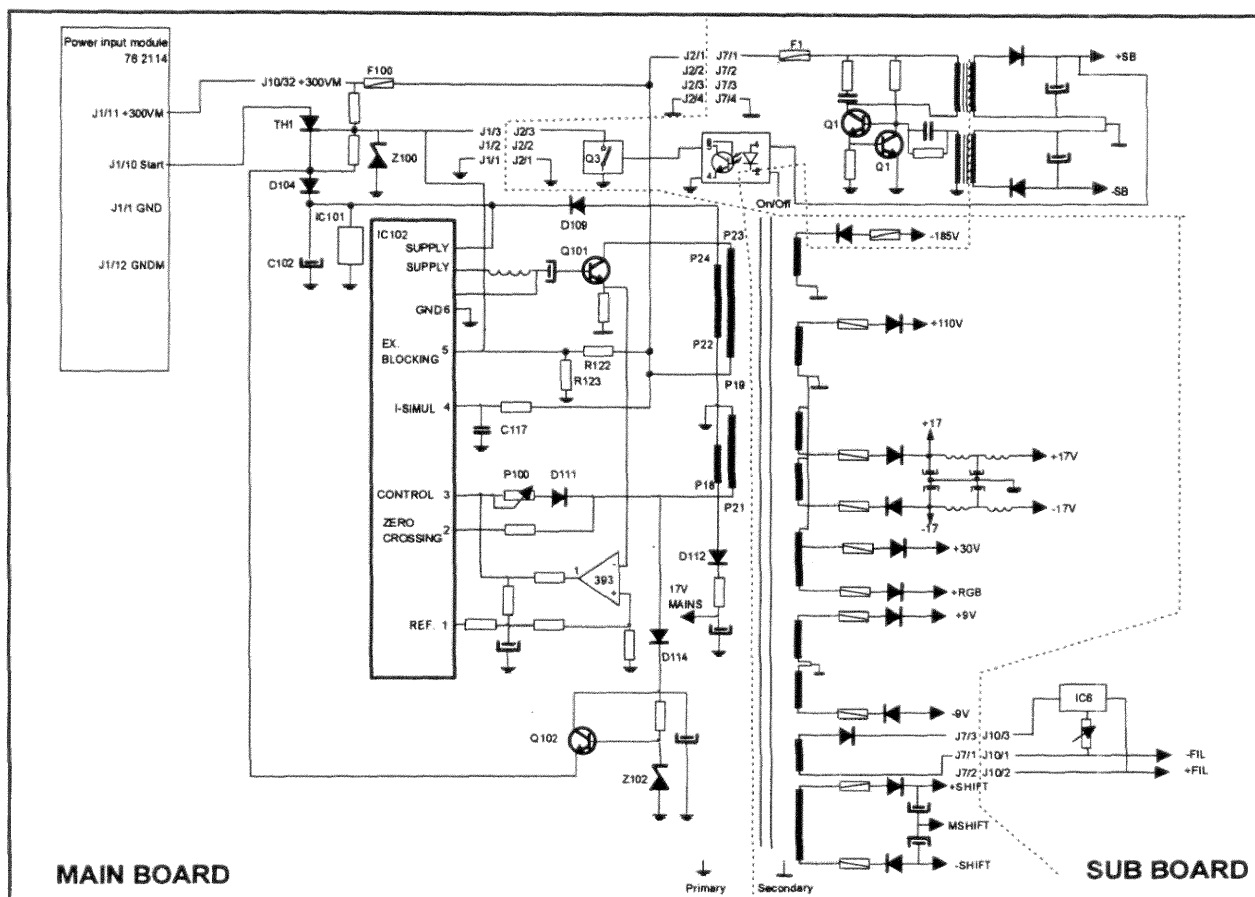
COMPONENTS MARKED WITH * OR Δ HAVE SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY. BEFORE REPLACING ANY OF THESE COMPONENTS, READ CAREFULLY THE SERVICE SAFETY PRECAUTIONS. DO NOT DEGRADE THE SAFETY OF THIS SET THROUGH IMPROPER SERVICING.



COMP.	LOC.	COMP.	LOC.
C1	A 6	R26	E 1
C2	B 5	R27	F 2
C3	B 6	R28	F 3
C4	C 5	R29	F 3
C5	C 6	R30	G 3
C6	A 1	R31	G 3
C7	C 1	R32	G 3
C8	B 2	R33	H 3
C9	A 2	R34	D 3
C10	D 2	R35	D 3
C11	G 3	R36	D 3
C12	F 2	R37	D 4
C13	F 4	R38	E 3
C14	F 5	R39	E 4
C15	G 3	R40	E 3
C17	C 3	R41	F 3
C18	G 1	R42	F 4
C19	A 4	R43	F 5
C20	B 4	R44	F 5
C21	C 1	R45	H 5
C22	D 6	R46	H 5
C23	B 2	R47	C 2
C400	C 5	R48	E 2
C401	C 5	R49	G 3
		R50	G 6
D1	C 5	R51	G 6
D2	C 6	R52	G 6
D3	C 1	R53	F 6
D4	B 2	R54	F 6
D5	B 2	R55	B 1
D6	H 1	R56	B 1
D7	H 1	R60	A 4
D8	E 4	R61	A 4
D10	D 4		
D11	F 2	SR62	B 3
D12	H 5		
D13	F 5	T1	B 5
D14	G 6		
D15	A 4	TP1	G 1
D16	A 3		
D400	C 4	Z1	C 5
D401	B 4	Z2	C 6
		Z3	C 2
F1	A 5	Z4	C 2
		Z5	C 2
IC1	D 6	Z6	G 2
IC2	A 1	Z7	D 3
IC3	B 3	Z8	F 3
IC3	A 3	Z9	D 3
IC3	E 2	Z10	E 4
IC4	H 1	Z11	G 5
IC4	A 3	Z12	B 3
IC4	B 3		
IC4	E 4		
IC4	H 3		
IC5	F 5		
IC6	A 4		
IC400	C 4		
J2	D 5		
J3	E 6		
J4	C 3		
J6	E 5		
J7	A 5		
J8	D 6		
J9	D 6		
J10	B 4		
J12	D 4		
L1	C 1		
L2	F 6		
NTC1	A 2		
P1	G 2		
P2	G 4		
P3	A 4		
Q1	A 6		
Q2	B 6		
Q3	C 6		
Q4	B 1		
Q5	C 2		
Q6	G 3		
Q7	D 3		
Q8	G 5		
Q9	F 4		
Q10	G 6		
Q11	G 6		
R1	B 5		
R3	B 6		
R4	B 6		
R5	B 6		
R6	D 6		
R7	E 6		
R8	B 1		
R9	B 1		
R10	B 1		
R11	A 2		
R12	C 2		
R13	C 2		
R14	C 2		
R15	C 2		
R16	G 1		
R17	H 1		
R18	F 1		
R19	G 1		
R20	G 1		
R21	G 2		
R22	F 2		
R23	D 1		
R24	D 2		
R25	E 2		

SM POWER SUPPLY+StBy SUB MODULE

76 2106
76 2106S



TECAHNICAL DESCRIPTION SWITCHED MODE POWER SUPPLY (76 2106).

Introduction.

On the main board of this module we find the generation of all stable voltages , we mean voltages independent on the line frequency, and the variable +HTHD voltage (referred to as the second SMPS).

This second SMPS is linked via the subunit with the horizontal deflection board as the +HTHD voltage (horizontal scan voltage) is linearly proportional with the line frequency.

Because the 'second' SMPS utilizes the rectified voltage from the winding P22-P24, this SMPS totally depends on the 'first' one' , or in other words, if the first SMPS is down , the second one 'follows' .

The ON/OFF voltage delivered by the controller board can stop or start up these Switched Mode Power Supplies.

The subunit comprises the DC-fan control, the regulation circuit for the +HTHD, its Under- and Overvoltage protection circuits, the +17volts drop protection and the stand-by power supply.

Generation of the line frequency independent voltages.

The mains voltage is rectified on the Mains Filter unit (76 2114) and the +300 volts is now the supply voltage for the power switches Q100 and Q101 on the main board.

We assume that the thyristor TIC106C is conducting (its gate is not clamped at ground level, see later).

The positive halfwave of the mains voltage (START) charges C102 via D104 . The gate of the thyristor is set at 11 volts with the zener Z100 through R101 from the +300volts.

As soon as the capacitor voltage of C102 reaches approximately 12 volts, the IC can start up by driving the base of the power switch.

The diode D104 stops conducting as its anode is at about $(11 + 0.6)$ volts.

The thyristor gets blocked as well, because its cathode equals the gate voltage.

In the meantime the IC102 has started up and the voltage at pin 9 receives its supply voltage now from the winding 24-22 of the T2 transformer via D109.

The push-pull outputs, pins 7 and 8, drive the Q101 power switch and during the off time of the latter the accumulated energy in the primary winding is transferred to the secondary capacitors via the rectifying diodes (flyback principle).

The feedback winding 21-22 provides two informations for the control IC :

Firstly, the waveform is sent to pin 2 where the **zero passages** are detected, useful to drive the power switch on at the the exact moment.

The base drive is delayed until the energy in the transformer has been completely transferred to the secondary side. By this measure, the current through the power switch is reduced to a minimum.

Secondly, the negative amplitude is rectified by D111 and compared with the reference 4 volts that is available at pin 1.

The error voltage is now sent to pin 3 and serves as a control voltage to adjust the duty cycle and frequency of the switcher.

The same windings also serves as a help at starting up. This windings provides energy the moment the P22-P24 winding does not. The rectified voltage passes to pin 9 up to the moment that pin has reached 12volts.

The current through the power switch is at all times checked and if too high (in the event of a short on the secondary side) the comparator 393 (IC101) output drops the error voltage in order to adapt the duty cycle of the switcher.

Note that a "special" winding is provided, delivering **+17M**, or, a voltage related to the **Mains** ground and not the chassis ground. This voltage is utilized on the EHT board, because the drive circuit for the power switcher is Mains ground and not Chassis ground. (see description EHT board).

Generation of the +HTHD voltage (scan voltage).

This voltage is linked with the horizontal deflection board as it has to be adapted to the scanning frequency. A feedback voltage (FBHD) is for that reason arriving on the subunit.

This feedback voltage, at contact J4(7) of the subunit, is sent to the base of the error amplifier Q6. The potentiometer P2 allows an adjustment of this feedback, or in other words, the horizontal width can be aligned with P2.

The emitter of Q6 is set at a reference zener voltage, adjustable with the voltage at the regulating pin of Z8. This voltage is the result of the output of the DC-amplifier- buffer 353, combined with the +HTHD voltage.

By this measure, we reduce the range of the horizontal width at high scanning frequencies. Indeed, at standard video frequency we need much more range to overscan.

The collector current of the regulating transistor Q6 flows into the opto-coupler IC5 and the phototransistor of this insulating device is now regulating the DC voltage at pin 3 of IC100, in order to stabilize the +HTHD voltage for one typical line frequency and amplitude setting.

Q7 is a 5mA current generator and D10 a **green** LED to visualise the +HTHD voltage.

Overvoltage protection.

Pin 2 of the 393 (IC4) is set at 5.6 volts with Z10 and, the other input, pin 3 is the scan voltage divided by R38/R39.

As soon this input exceeds the zener voltage, the output switches high and saturates transistor Q9. The +HTHD voltage is dropped to a low level.

The original overvoltage protection is now is causing an undervoltage protection.

Undervoltage protection.

The stabilized zener voltage with Z8 is used as reference voltage for the comparator 393, pin 6. Now, the other pin 5 is the +HTHD voltage.

If the pin 5 drops below the reference voltage, the output switches low, and the transistor Q8 saturates, pulling again pin 2 of IC5 low.

Protection against too low +17 volts.

If, for some reasons, the +17 volts (and all the other voltages as well) are, even temporarily, too low, it is then advised to shut down the +HTHD voltage (coming from the other SMPS).

Pin 6 is preadjusted, ex factory, at approx. 14 volts with P1

This happens with the comparator in IC3 and its output pin 7 saturates again Q8.

Temporary shut down at switching.

The "DEFL" info from the HOR DEFL board can switch on Q10 via Q11 and also pull down pin 2 of IC5. This is necessary the moment the relays switch the two windings of the scan coils from series to parallel or vice versa.

Stand-by / ON-OFF switching.

An oscillator is built up around Q1/Q2 and the transformer T1.

Q1 gets its base current via R3. The collector current of the latter flows in the winding 1-3 and induces a voltage in the winding 5-4 'encouraging' the base current.

As soon the emitter voltage of Q1 can drive the Q2 and saturate it, this transistor clamps the base of Q1 at ground level and cuts off Q1. The cycle starts all over again.

Two opposite polarity SB voltages (+/- 9 volts) are available at the secondary side.

a) Stand-by mode (OFF).

The voltage at contact 3 of the J4 connector ('OFF') is in this case 'high' and this means for the optocoupler IC1 that the phototransistor is not conducting.

Q3 is thus saturated as R6 can provide the required base-emitter current.

The collector of Q3 is 'low'. Furthermore, pin 5 of IC102 is below its "active level" via the diode D105 disabling the drive output.

As a conclusion, only the standby voltages +/- 9 SB voltages are available.

b) Operational mode (ON).

The I/O block of the controller board (collector of a transistor) pulls now contact 3 of J4 at a low level to light the LED in the opto-coupler IC1.

Now, the phototransistor of the latter is saturated and brings the base of Q3 at nearly ground level. This means now for this transistor an OFF state.

The zener Z100 on the motherboard can now install +11 volts at the gate of the thyristor allowing the charge of the capacitor C102.

DC Fan control of the fans.

The speed of the fans is regulated by means of a sensor (NTC resistor) mounted close to the heatsink of the SMPS board.

IC2 is an integrated circuit regulating the speed of the fans by adapting the duty cycle of the output drive for the power transistor Q4. L1 and C7 filters the output voltage.

The feedback is applied to pin 5 which is protected against arcing with D4/D5.

MC34063 is a switching regulator. An oscillator trimmed with C6 is applied together with a dc voltage to an RS-flipflop via an AND gate. That DC voltage now is the result of a comparator output receiving an internal reference voltage of 1.25 volts and the feedback voltage at pin 5 (comp). Consequently, the duty cycle depends on the DC voltage that is built up as follows :

- it is determined by the output voltage via R13 / R14 / R11 in order to stabilize the latter for a well-determined value of the NTC resistor.
- it is equally influenced by any change of the NTC resistor itself, sensing the heatsink of the SMPS board.

The minimum voltage is set by Z5 at approximately 7.5 volts and the maximum speed by Z4 + Z4. at 15 volts.

The maximum current output is limited by R10, and an RC feedback straight from the output to pin 5 provides a more regular speed at any time.

Power supply for the EHT generator.

The EHT generator is supplied directly from the rectified mains voltage. The +300M volts is leaving the board at the contacts 31/32 of the J8A connector for the EHT board (see description of that board)

By above measure, we eliminate the influence of the EHT load on the performance of the power supply, and the maximum peak current of the EHT generator is increased.

IMPORTANT

The SM POWER SUPPLY has to be adjusted when the projector displays a picture of the internal generated testpattern or of an input signal at standard line- and frame frequency.

PREPARATION

Select the internal generated test pattern or an input source at standard frequency (refer to owner's and installation manual).

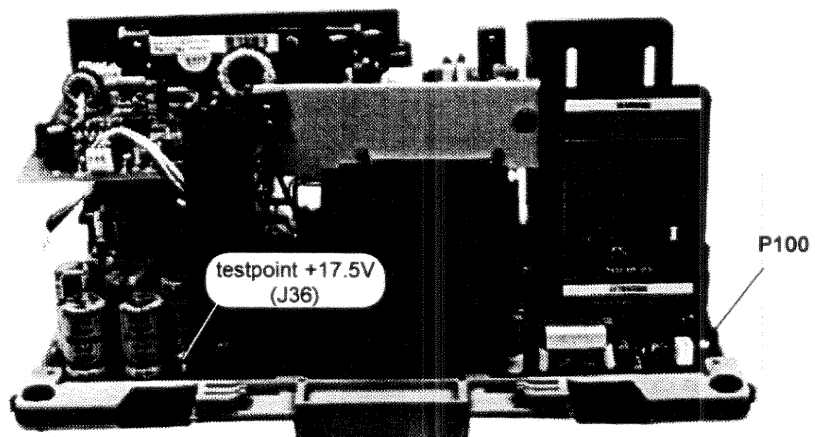
Put the BRIGHTNESS and CONTRAST level in mid-position (refer to owner's manual).

ADJUSTMENTS

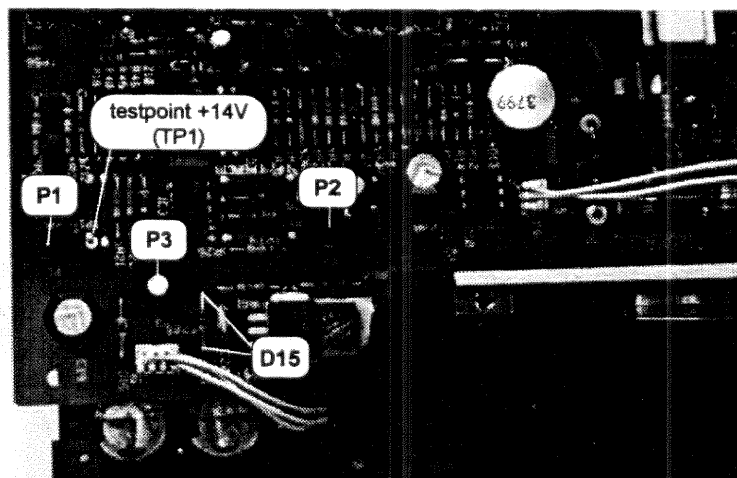
Adjustment on main board

a) Adjusting Vout P100

Connect a voltmeter to the provided test point (+17.5V).
Adjust potentiometer P100 for +17.5V on testpoint.



Adjustments on sub-board



b) Adjusting +14V P1

Important: P1 is factory pre-adjusted. A readjustment is only necessary after a replacement of a defective component in the +17V drop circuit.

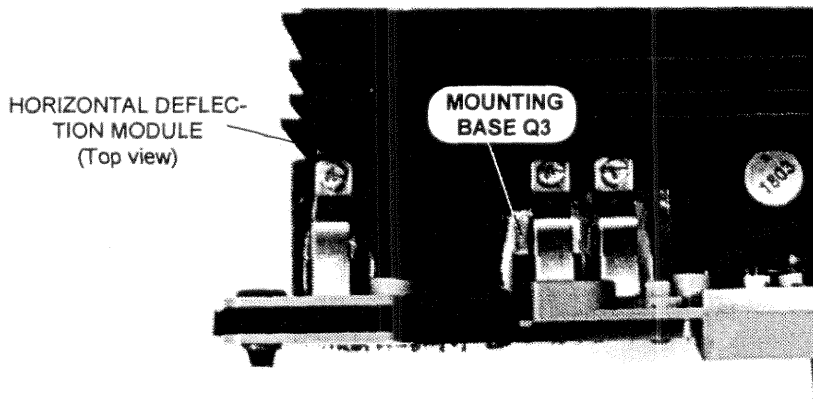
Adjustment procedure: Connect a voltmeter to the testpoint TP1.
Adjust potentiometer P1 for +14V on that TP1.

c) Adjusting MAX HOR AMPL P2

Adjust the Horizontal Amplitude of the displayed picture by means of the RCU800 on its maximum (bar scale on screen indicates 99). (Refer to the owner's manual to select the corresponding menu).

Connect a voltmeter to the collector (Collector connected to mounting base) of transistor Q3 (BDV65C) on the Hor. Defl. board.

Adjust potentiometer P2 for +48V (HTHD) on collector.



d) Adjusting picture heater voltage P3

Adjust potentiometer P3 for +6.75V across diode D15.

SM POWER SUPPLY+StBy

SUB MODULE

76 2106
76 2106S

PARTS LISTING 76 2106 CPL

SIT.	ITEM NO.	DESCRIPTION	QUANTITY	ITEM NO.	SIT.	DESCRIPTION	
30	R133036	SPR L 6 D 6 D 2.4 C	3	C122	R111477	C EL RA 100M Z 25E2 85	1
50	R133039	SPR L 8 D 4 D 1.2 C	6	C124	R1127475	C CE MI 4N7K 63E2	1
122	R133063	Q ACC ISO MICA SOT93	2	C200	R111649	C EL RA 47M T350SKT 85	1
224	R133074	Q ACC ISO SIL600 W 30	0,07	C201	R111649	C EL RA 47M T350SKT 85	1
225	R133074	Q ACC ISO SIL600 W 30	0,08	C202	R1114909	C EL RA1000M M 50E3 105	1
				C203	R111564	C EL RA 220M M200E4 105	1
70	R314516	F ACC HLDR 6A 5X20 PC/HSG	1	C204	R1114909	C EL RA1000M M 50E3 105	1
1050	R315302	J PIN PR D1.3L 5.5+3	1	C206	R1114708	C EL RA2200M M 16E3 105	1
				C207	R1114708	C EL RA2200M M 16E3 105	1
1040	R348019	CBL ACC TIE B L100 W2.5	2	C208	R111575	C EL RA 100M M315E4 105	1
123	R348069	GRMT T3 D10	1	C209	R1114909	C EL RA1000M M 50E3 105	1
120	R348086	CBL ACC SLCSE D 8.9	1	C210	R1114689	C EL RA 470M M 16E2 105	1
400	R34829802	SLVU SHR D3,2/1,6 BLK 20	1	C211	R1114708	C EL RA2200M M 16E3 105	1
				C212	R1114708	C EL RA2200M M 16E3 105	1
213	R3619125	SCR D965 M 3 X 6 PS B	1	C213	R111716	C CE MI 680P 102E3 HV	1
306	R3619145	SCR D965 M 3 X 10 PS B	1	C214	R111575	C EL RA 100M M315E4 105	1
22	R3620226	SCR D84 M 3 X 8 SI	1	C215	R111716	C CE MI 680P 102E3 HV	1
21	R3626696	SCR D921 M 3 X 8 SI	2	C220	R111489	C EL RA 470M T 35E2 85	1
305	R3626696	SCR D921 M 3 X 8 SI	1	C221	R111489	C EL RA 470M T 35E2 85	1
111	R3631049	SCR D933 M 3 X 6 XIC	5	C300	R1147009	C CE DI 4N7M400E5 Y	1
211	R3631049	SCR D933 M 3 X 6 XIC	1				
130	R3631059	SCR D933 M 3 X 8 XIC	5	D104	R131646	D R 1N4007 10201A DO41	1
214	R3631059	SCR D933 M 3 X 8 XIC	4	D105	R131621	D S 1N4148 075150 DO35	1
304	R3631059	SCR D933 M 3 X 8 XIC	2	D106	R131906	D R BYV96E 1021A5 SOD57	1
223	R3631079	SCR D933 M 3 X 12 XIC	4	D107	R131646	D R 1N4007 10201A DO41	1
215	R3631089	SCR D933 M 3 X 16 XIC	2	D108	R131637	D R BA158 600400 DO7	1
110	R367600	NUT BLOC M 3	3	D109	R131637	D R BA158 600400 DO7	1
210	R367600	NUT BLOC M 3	4	D110	R131646	D R 1N4007 10201A DO41	1
303	R367600	NUT BLOC M 3	2	D111	R131637	D R BA158 600400 DO7	1
20	R3676091	SPR L17 H 5,5 M 3 BIN	1	D112	R131906	D R BYV96E 1021A5 SOD57	1
1010	R367699	RVT CHB D2.38L6.35 P A	6	D113	R131637	D R BA158 600400 DO7	1
				D114	R131646	D R 1N4007 10201A DO41	1
1000	R722276	LOCK PJ49 PCB UN CPL	1	D200	R131913	D R BY229 10207A TO220	1
				D201	R131927	D R BY229 60007A TO220	1
200	R802631	HTSNK PJ49 SMP PART 2	1	D202	R131927	D R BY229 60007A TO220	1
100	R803214	HTSNK PJ51 SMP PART 1	1	D203	R131927	D R BY229 60007A TO220	1
121	R804832	Q ACC SPG 1XM3 LONG	2	D204	R131927	D R BY229 60007A TO220	1
220	R804833	Q ACC SPG 2X 3.1 LONG	2	D205	R131913	D R BY229 10207A TO220	1
221	R804834	Q ACC SPG 2XM3 LONG	2	D206	R131927	D R BY229 60007A TO220	1
300	R805072	FRM PJ51 G12 HTSNK T SCR N	1	D207	R131906	D R BYV96E 1021A5 SOD57	1
302	R805075	FRM PJ51 G12 HTSNK SPRING	1	D208	R131927	D R BY229 60007A TO220	1
301	R805078	FRM PJ51 G12 HTSNK CPL	1	D209	R131927	D R BY229 60007A TO220	1
				D210	R131927	D R BY229 60007A TO220	1
	R762106S UN SMP PJ51 G1200 +STBY		1	D212	R131927	D R BY229 60007A TO220	1
C102	R111478	C EL RA 220M Z 25E2 85	1	F100	R314147	F 5X20 F 3A15 H RU/VDE	1
C103	R111578	C EL RA 100M M400E4 85	1	F200	R314188	F TR5 T 4A L RU/VDE	1
C104	R1114879	C EL RA 100M M 35E2 85	1	F201	R314188	F TR5 T 4A L RU/VDE	1
C105	R111477	C EL RA 100M Z 25E2 85	1	F202	R314189	F TR5 T 6A3 L UL/CSA	1
C106	R1150051	C PPMERA 2N2J152E9 HV	1	F203	R314189	F TR5 T 6A3 L UL/CSA	1
C107	R113724	C POMERA 100N K 63E2	1	F204	R314187	F TR5 T 3A15 L RU/VDE	1
C108	R114090	C POMERA 1M M 63E2	1	F205	R314188	F TR5 T 4A L RU/VDE	1
C109	R115934	C PP RA 5N6J 63E2	1	F206	R314188	F TR5 T 4A L RU/VDE	1
C110	R112740	C CE MI 1N2K100E2	1	F207	R314186	F TR5 T 2A L RU/VDE	1
C111	R112238	C NPO MI 47P G 63E2	1	F210	R314186	F TR5 T 2A L RU/VDE	1
C112	R115932	C PP RA 4N7J 63E2	1				
C113	R111468	C EL RA 470M Z 16E2 85	1	I100	R132787	U 4601 TDA SIP9 P	1
C114	R111477	C EL RA 100M Z 25E2 85	1	I101	R134114	U 393 LM DIP8 P	1
C115	R1150051	C PPMERA 2N2J152E9 HV	1	I102	R132787	U 4601 TDA SIP9 P	1
C116	R113724	C POMERA 100N K 63E2	1				
C117	R115936	C PP RA 6N8J 63E2	1	J	Z34217210	WU UL1007 AWG24 ST RD 100	1
C118	R114090	C POMERA 1M M 63E2	1	J 1	Z3484033	CD CT FTMT P 3 190	1
C119	R115934	C PP RA 5N6J 63E2	1	J 2	Z3484042	CD CT FTMT P 4 190	1
C120	R112739	C CE MI 1N K100E2	1	J 3	R3484082	CD CT FTMT P 8 150	1
C121	R111477	C EL RA 100M Z 25E2 85	1	J 4	R3484074	CD CT FTMT P 7 170	1

SM POWER SUPPLY+StBy

SUB MODULE

76 2106

76 2106S

J 6	R3484022	CD CT	FTMT P 2 240	1	R110	R101145	R CF H 5K6 J 0W25	1
J 7	Z3484033	CD CT	FTMT P 3 190	1	R111	R103226	R MO H150E J 1W5	1
J 10	R313525	J EUR2C	MBS P64 E1C2S 1,6	1	R112	R100136	R CF V 1K J 0W25 E2	1
J 12	R3484058	CD CT	FTMT P 5 220	1	R113	R101128	R CF H220E J 0W25	1
J 20	R314068	J EUR3C	MBS P96 E1C2S 1,6	1	R114	R101129	R CF H270E J 0W25	1
L100	R302108	CORE TUBE	3.5 /1.3 X 3	1	R115	R101136	R CF H 1K J 0W25	1
L101	R302108	CORE TUBE	3.5 /1.3 X 3	1	R116	R101160	R CF H100K J 0W25	1
L102	R302102	CORE TUBE	4.95/1.3 X40.5	1	R117	R101135	R CF H820E J 0W25	1
L103	R3061322	CH AX NS	10 UH	1	R118	R101120	R CF H 47E J 0W25	1
L104	R3061322	CH AX NS	10 UH	1	R119	R102499	R MF H E33J 0W6	1
L200	R305913	CH MNS AX	12 UH 3A	1	R120	R101217	R MF H 27E J 0W6 E4	1
L201	R305913	CH MNS AX	12 UH 3A	1	R121	R103600	R WW H E1 K 4W	1
L202	R305913	CH MNS AX	12 UH 3A	1	R122	R101265	R MF H270K J 0W6 E4	1
L203	R305913	CH MNS AX	12 UH 3A	1	R123	R101143	R CF H 3K9 J 0W25	1
L204	R305913	CH MNS AX	12 UH 3A	1	R124	A551674	R MF H430K F 0W6	1
L205	R305913	CH MNS AX	12 UH 3A	1	R125	R101149	R CF H 12K J 0W25	1
L210	R305913	CH MNS AX	12 UH 3A	1	R126	R103226	R MO H150E J 1W5	1
L211	R305913	CH MNS AX	12 UH 3A	1	R127	R101146	R CF H 6K8 J 0W25	1
L212	R305913	CH MNS AX	12 UH 3A	1	R128	R101136	R CF H 1K J 0W25	1
L215	R305913	CH MNS AX	12 UH 3A	1	R129	R101136	R CF H 1K J 0W25	1
L216	R305913	CH MNS AX	12 UH 3A	1	R130	R101128	R CF H220E J 0W25	1
P100	R106829	R TCE V	10K K 0W5 S10SS	1	R131	R100137	R CF V 1K2 J 0W25 E2	1
PC	R780117	PCD PJ51	G1200 SMP	1	R132	R100145	R CF V 5K6 J 0W25 E2	1
Q100	R132913	Q BUP101	N P TO218	1	R133	R1011403	R MF H 2K F 0W25	1
Q101	R132913	Q BUP101	N P TO218	1	R134	R1011907	R CFFH E1 J 0W4	1
R101	R101267	R MF H390K	J 0W6 E4	1	R135	R101127	R CF H180E J 0W25	1
R102	R101144	R CF H 4K7	J 0W25	1	R138	R101127	R CF H180E J 0W25	1
R103	R101266	R MF H330K	J 0W6 E4	1	R200	R104656	R HV H 1M2 J 0W5 3500	1
R104	R102499	R MF H E33J	0W6	1	R202	R1011907	R CFFH E1 J 0W4	1
R105	R101217	R MF H 27E	J 0W6 E4	1	R300	R104672	R HV H 5M6 J 0W5 3500	1
R106	R103600	R WW H E1	K 4W	1	R301	R104672	R HV H 5M6 J 0W5 3500	1
R107	R101265	R MF H270K	J 0W6 E4	1	T100	R774356	T PJ56 G802 SMP VAR	1
R108	R101136	R CF H 1K	J 0W25	1	T101	R7743227	T PJ49 SMP G1200 FIX	1
R109	R101145	R CF H 5K6	J 0W25	1	TH 1	R1322101	Q TIC106D TH P TO66	1
					Z100	R131740	D ZEN 12V 0W5 C DO34	1
					Z101	R131787	D ZEN 51V 0W5 C DO35	1

PARTS LISTING 76 2106S

SIT.	ITEM NO.	DESCRIPTION	QUANTITY	SIT.	ITEM NO.	DESCRIPTION	QUANTITY
120	R1330291	Q ACC ISO MICA TO220	2	130	R804674	Q ACC SPG 1XM3 SHORT	1
121	R1330292	Q ACC ISO BSHG TO220	2	C 1	R112830	C CE DI 2N7S400E3	1
60	R133039	SPR L 8 D 4 D 1.2 C	6	C 2	R1128111	C CE DI 68P M102E3	1
132	R133063	Q ACC ISO MICA SOT93	1	C 3	R112815	C CE DI 150P M400E3	1
20	R133072	Q ACC HTSNK TO220	1	C 4	R111468	C EL RA 470M Z 16E2 85	1
70	R3132862	J MD1 MBT P 2 E1SN	1	C 5	R111468	C EL RA 470M Z 16E2 85	1
220	R348019	CBL ACC TIE B L100 W2.5	2	C 6	R1159141	C PP RA 820P J100E2	1
21	R3631059	SCR D933 M 3 X 8 XIC	1	C 7	R111479	C EL RA 470M Z 25E2 85	1
111	R3631059	SCR D933 M 3 X 8 XIC	5	C 8	R111489	C EL RA 470M T 35E2 85	1
131	R3631059	SCR D933 M 3 X 8 XIC	1	C 9	R113720	C POMERA 47N K 63E2	1
122	R3631069	SCR D933 M 3 X 10 XIC	1	C 10	R113720	C POMERA 47N K 63E2	1
201	R3631069	SCR D933 M 3 X 10 XIC	1	C 11	R114154	C POMERA 22N K400E2	1
22	R3661026	NUT D934 M 3 I	1	C 12	R111550	C EL RA 4M7M 50E2 85	1
124	R3661026	NUT D934 M 3 I	1	C 13	R113720	C POMERA 47N K 63E2	1
202	R3661026	NUT D934 M 3 I	1	C 14	R1137121	C POMERA 10N K100E2	1
123	R367502	WSHR D6798 A 3.2 S Z	1	C 15	R111550	C EL RA 4M7M 50E2 85	1
110	R367600	NUT BLOC M 3	3	C 17	R111531	C EL RA 10M M 35E2 85	1
10	R721850	R ACC CLIPS TCE V PROTECT	2	C 18	R1137121	C POMERA 10N K100E2	1
100	R803213	HTSNK PJ51 SMP PART 3 SUB	1	C 19	R111468	C EL RA 470M Z 16E2 85	1
200	R803237	FRM PJ51 SMP FIX	1	C 20	R112762	C CE MI 4N7U100E2	1
				C 21	R112740	C CE MI 1N2K100E2	1
				C 22	R113724	C POMERA 100N K 63E2	1
				C 23	R111489	C EL RA 470M T 35E2 85	1
				C400	R113730	C POMERA 330N K 63E2	1

SM POWER SUPPLY+StBy

SUB MODULE

76 2106
76 2106S

C401	R113724	C POMERA 100N K 63E2	1	R 10	R1011907	R CFFH E1 J 0W4	
D 1	R131637	D R BA158 600400 DO7		R 11	R101148	R CF H 10K J 0W25	
D 2	R131637	D R BA158 600400 DO7		R 12	R101155	R CF H 39K J 0W25	
D 3	R131950	D R BYV27 15002A SOD57	1	R 13	R101149	R CF H 12K J 0W25	
D 4	R131621	D S 1N4148 075150 DO35		R 14	R101144	R CF H 4K7 J 0W25	
D 5	R131621	D S 1N4148 075150 DO35		R 15	R101138	R CF H 1K5 J 0W25	
D 6	R131621	D S 1N4148 075150 DO35		R 16	R101144	R CF H 4K7 J 0W25	
D 7	R1316361	D Y BAT85 030200 DO35		R 17	R101156	R CF H 47K J 0W25	
D 8	R131621	D S 1N4148 075150 DO35		R 18	R101140	R CF H 2K2 J 0W25	
D 10	R131667	D LED D3 T GRN	1	R 19	R101144	R CF H 4K7 J 0W25	
D 11	R1316361	D Y BAT85 030200 DO35		R 20	R101154	R CF H 33K J 0W25	
D 12	R131621	D S 1N4148 075150 DO35		R 21	R101145	R CF H 5K6 J 0W25	
D 13	R131621	D S 1N4148 075150 DO35		R 22	R101154	R CF H 33K J 0W25	
D 14	R131621	D S 1N4148 075150 DO35		R 23	R101161	R CF H120K J 0W25	
D 15	R131906	D R BYV96E 1021A5 SOD57	1	R 24	R101168	R CF H470K J 0W25	
D 16	R131906	D R BYV96E 1021A5 SOD57	1	R 25	R101161	R CF H120K J 0W25	
D400	R131646	D R 1N4007 10201A DO41		R 26	R101169	R CF H560K J 0W25	
D401	R131646	D R 1N4007 10201A DO41		R 27	R101151	R CF H 18K J 0W25	
F 1	R314519	F ACC HLDR 5X20 PC/ UL	1	R 28	R101154	R CF H 33K J 0W25	
F1 F	R314142	F 5X20 T 0A125L RU/VDE	1	R 29	R101145	R CF H 5K6 J 0W25	
I 1	R131691	U 601G-3 SFH DIP6 P	1	R 30	R101163	R CF H180K J 0W25	
I 2	R137625	U 34063 DIP8 P	1	R 31	R101156	R CF H 47K J 0W25	
I 3	R134116	U 353 LF DIP8 P	1	R 32	R101172	R CF H 1M J 0W25	
I 4	R134114	U 393 LM DIP8 P	1	R 33	R101172	R CF H 1M J 0W25	
I 5	R131691	U 601G-3 SFH DIP6 P	1	R 34	R101236	R MF H 1K F 0W6	
I 6	R134026	U 317T TO220 P	1	R 35	R101162	R CF H150K J 0W25	
I400	R134010	U 7815 TO220 P	1	R 36	R101137	R CF H 1K2 J 0W25	
J 2	R313943	J CT H MBS P 3 M2SN	1	R 37	R101130	R CF H330E J 0W25	
J 3	R313928	J CT H MBT P 8 M2SN	1	R 38	R104658	R HV H 1M5 J 0W5 3500	
J 4	R313927	J CT H MBT P 7 M2SN	1	R 39	R1025541	R MF H 30K G 0W25	1
J 6	R313922	J CT H MBT P 2 M2SN	1	R 40	R101144	R CF H 4K7 J 0W25	
J 7	R313944	J CT H MBS P 4 M2SN	1	R 41	R101148	R CF H 10K J 0W25	
J 10	R313923	J CT H MBT P 3 M2SN	1	R 42	R101140	R CF H 2K2 J 0W25	
J 12	R313925	J CT H MBT P 5 M2SN	1	R 43	R101156	R CF H 47K J 0W25	
L 1	R305909	CH TOR V 1500 UH 2A	1	R 44	R101131	R CF H390E J 0W25	
L 2	R306222	CH TOR V 80 UH 2A	1	R 45	R101148	R CF H 10K J 0W25	
NTC1	R105016	R NTC 2K7 0W25	1	R 46	R101165	R CF H270K J 0W25	
P 1	R106827	R TCE V 2K K 0W5 S10SS	1	R 47	R101148	R CF H 10K J 0W25	
P 2	R106832	R TCE V 50K K 0W5 S10SS	1	R 48	R104688	R HV H 27M J 0W5 3500	1
P 3	R106724	R TCE H200E K 0W5 S10TS	1	R 49	R101159	R CF H 82K J 0W25	
PC	R780116	PCS PJ51 G1200 SMP SUB	1	R 50	R101136	R CF H 1K J 0W25	
Q 1	R132935	Q BUX87 N P TO126	1	R 51	R101165	R CF H270K J 0W25	
Q 2	R1314071	Q BC547B N SS TO92	1	R 52	R101148	R CF H 10K J 0W25	
Q 3	R1314071	Q BC547B N SS TO92	1	R 53	R101150	R CF H 15K J 0W25	
Q 4	R132909	Q BD652 DP P TO220	1	R 54	R101148	R CF H 10K J 0W25	
Q 5	R131413	Q BC557 P SS TO92	1	R 55	R101132	R CF H470E J 0W25	
Q 6	R1314072	Q BC547A N SS TO92	1	R 56	R101132	R CF H470E J 0W25	
Q 7	R131471	Q BF458 N P TO126	1	R 60	R1011284	R MF H200E F 0W25	
Q 8	R1314131	Q BC557B P SS TO92	1	R 61	R101135	R CF H820E J 0W25	
Q 9	R1314071	Q BC547B N SS TO92	1	SR62	R1011246	R CFFH100E J 0W35	1
Q 10	R1314131	Q BC557B P SS TO92	1	T 1	R306718	T PJ49 SMP STAND-BY	1
Q 11	R1314131	Q BC557B P SS TO92	1	TP 1	R315302	J PIN PR D1.3L 5.5+3	1
R 1	R101346	R CF H 6K8 J 1W	1	Z 1	R131706	D ZEN 9V1 0W5 C DO41	1
R 3	R104656	R HV H 1M2 J 0W5 3500	1	Z 2	R131706	D ZEN 9V1 0W5 C DO41	1
R 4	R1011134	R MF H 12E J 0W25	1	Z 3	R131767	D ZEN 6V8 0W5 B DO35	1
R 5	R101142	R CF H 3K3 J 0W25		Z 4	R131767	D ZEN 6V8 0W5 B DO35	1
R 6	R101160	R CF H100K J 0W25		Z 5	R131742	D ZEN 6V8 0W5 C DO35	
R 7	R101136	R CF H 1K J 0W25		Z 6	R134031	U 431C TL TO92 P	1
R 8	R101140	R CF H 2K2 J 0W25		Z 7	R131756	D ZEN 7V5 0W5 C DO35	
R 9	R101130	R CF H330E J 0W25		Z 8	R134031	U 431C TL TO92 P	1
				Z 9	R131756	D ZEN 7V5 0W5 C DO35	
				Z 10	R131734	D ZEN 5V6 0W5 B DO35	
				Z 11	R131744	D ZEN 5V6 0W5 C DO35	
				Z 12	R131790	D ZEN 33V 1W C DO41	1


SM POWER SUPPLY+StBy

SUB MODULE

76 2106

76 2106S

PRODUCT SAFETY NOTICE

Components identified by  have SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY. Before replacing any of these components, read carefully the service safety precautions.

