BARCO

BARCO Projection Systems

SECTION F

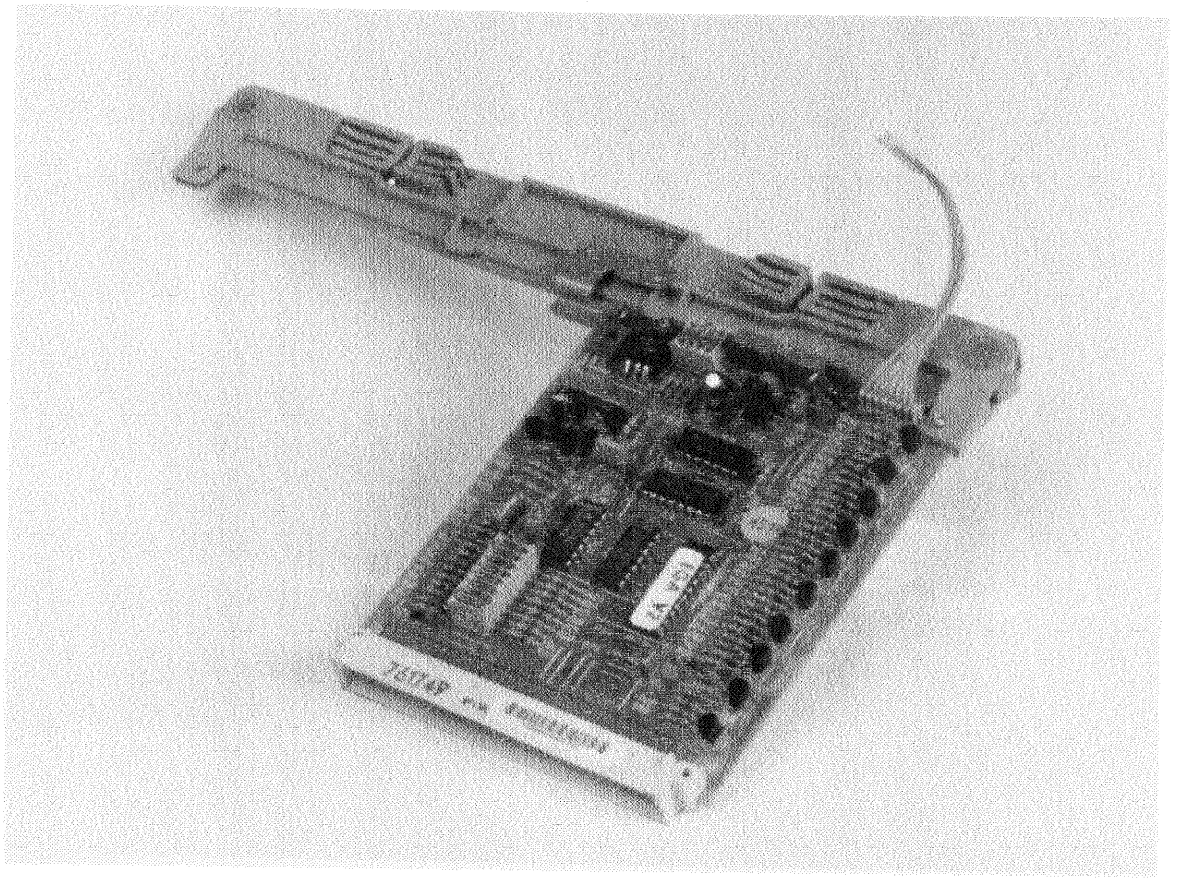
service sheet

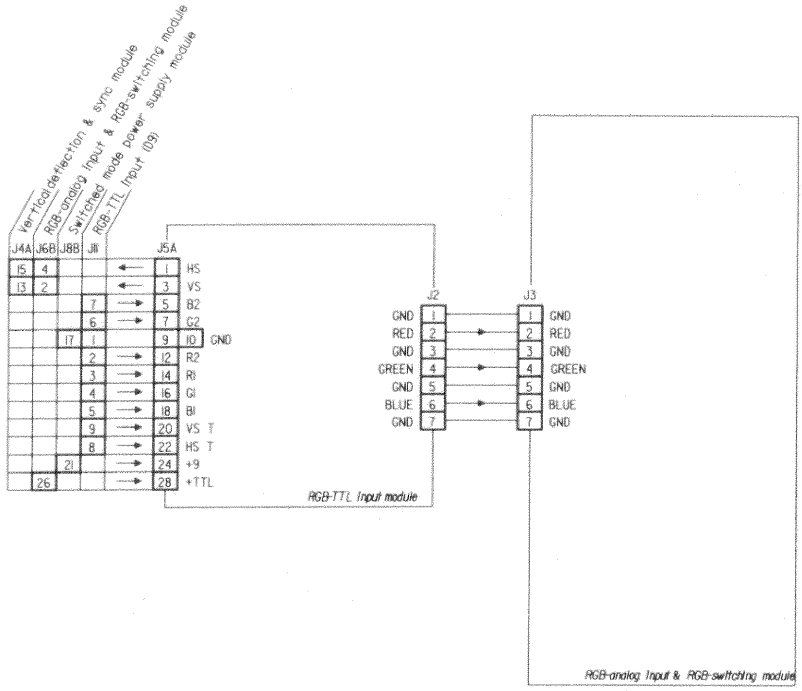
F

Noordlaan 5 B-8720 Kuurne - Belgium Telex 85.305 Tel. (056)36.82.11 Telefax (056)35.16.51

RGB TTL INPUT MODULE

76 1749





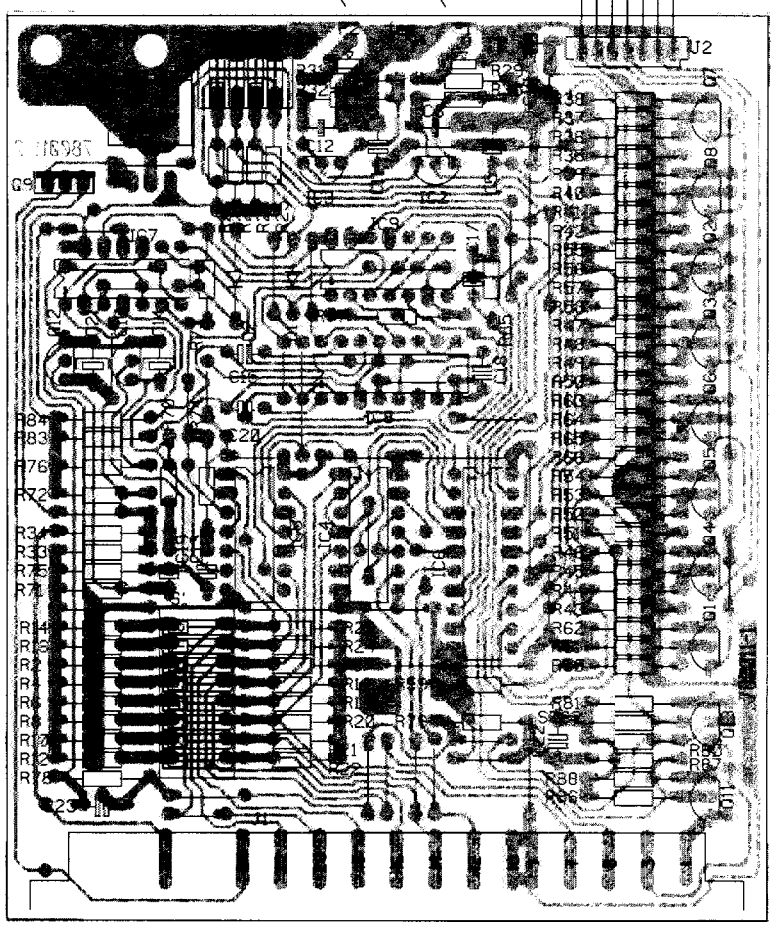
Modifications reserved

Name	Article nr.
Interconnection RGB-TTL Input module	76i749
Date: 15/09/1990	Drawn: PG
	Checked: SSG

BARCO PROJECTION SYSTEMS

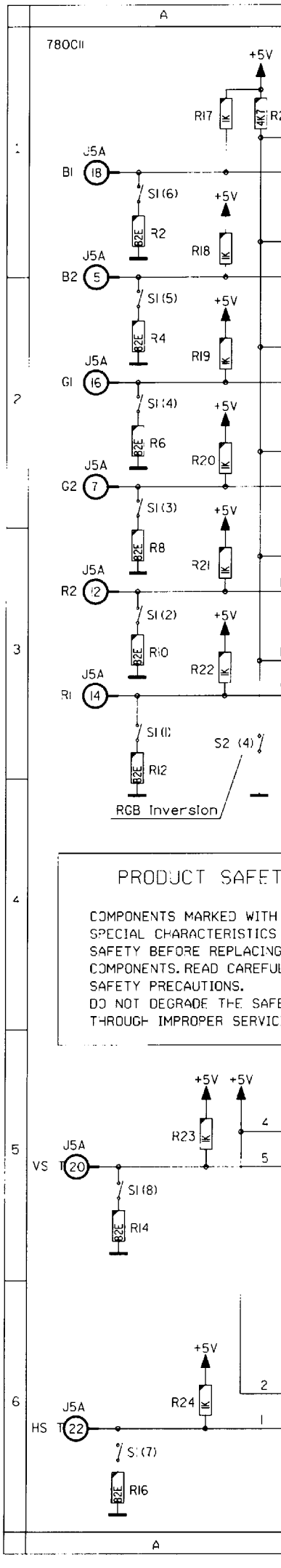
KEY FOR DIAGRAM ON FOLDOUT F-2

BARCO



Component	location	Component	location
C5	E 2	R2	C 1
C6	E 2	R4	C 1
C7	E 2	R6	C 1
C10	E 2	R8	C 1
C11	E 2	R10	C 1
C12	E 2	R12	C 1
C13	C 1	R14	C 1
C14	D 1	R16	C 1
C15	D 2	R17	C 2
C17	D 2	R18	C 2
C18	D 2	R19	C 2
C19	C 1	R20	C 2
C20	D 2	R21	C 2
C21	D 1	R22	C 2
C22	C 2	R23	C 2
C23	C 1	R24	C 2
		R25	D 2
D1	D 2	R26	D 2
D2	D 2	R27	D 2
		R28	D 2
IC1	E 1	R29	E 2
IC2	E 2	R30	E 2
IC3	E 2	R31	E 2
IC4	C 2	R32	E 2
IC5	C 2	R33	C 1
IC6	C 2	R34	C 1
IC7	D 1	R35	E 3
IC8	D 2	R36	E 3
IC9	D 2	R37	E 3
		R38	E 3
J1	C 2	R39	E 3
J2	E 3	R40	E 3
		R41	D 3
P1	E 2	R42	D 3
P2	E 2	R43	C 3
		R44	C 3
Q1	C 3	R45	C 3
Q2	D 3	R46	C 3
Q3	D 3	R47	D 3
Q4	C 3	R48	D 3
Q5	D 3	R49	D 3
Q6	D 3	R50	D 3
Q7	E 3	R51	C 3
Q8	E 3	R52	D 3
Q9	E 1	R53	D 3
Q10	D 1	R54	D 3
Q11	C 3	R55	D 3
Q12	D 1	R56	D 3
Q13	C 3	R57	D 3
		R58	D 3
S1	C 1	R59	C 2
S2	E 2	R60	C 3
		R61	C 3
SR82	C 2	R62	C 3
		R63	D 3
		R64	D 3
		R65	D 3
		R66	D 3
		R70	D 1
		R71	C 1
		R72	D 1
		R73	D 1
		R74	D 1
		R75	C 1
		R76	D 1
		R77	D 2
		R78	C 1
		R79	C 2
		R80	C 3
		R81	C 3
		R83	D 1
		R84	D 1
		R85	D 2
		R86	C 2
		R87	C 3
		R88	C 2

COMP.	LOC.	COMP.	LOC.
C5	G 1	R53	D 2
C6	G 1	R54	E 2
C7	G 1	R55	E 2
C10	G 1	R56	E 2
C11	G 2	R57	E 2
C12	G 2	R58	E 2
C13	C 6	R59	D 1
C14	C 6	R60	D 1
C15	E 6	R61	D 1
C17	F 6	R62	E 1
C18	D 5	R63	E 1
C19	C 5	R64	E 1
C20	E 6	R65	E 1
C21	C 5	R66	E 1
C22	F 4	R70	C 5
C23	E 4	R71	C 5
		R72	C 4
D1	D 5	R73	D 5
D2	D 5	R74	C 6
		R75	C 6
IC1	F 1	R76	C 6
IC2	F 1	R77	D 6
IC3	F 2	R78	E 4
IC4	B 2	R79	F 5
IC4	B 2	R80	F 4
IC4	B 3	R81	F 4
IC4	B 3	R83	D 6
IC4	H 1	R84	D 6
IC4	H 1	R85	F 6
IC5	B 1	R86	F 6
IC5	B 1	R87	F 6
IC5	H 1	R88	G 6
IC5	H 1		
IC5	B 5	S1	A 3
IC5	B 6	S1	A 1
IC6	C 2	S1	A 2
IC6	H 1	S1	A 2
IC6	H 1	S1	A 2
IC7	H 2	S1	A 3
IC7	H 2	S1	A 5
IC7	C 6	S1	A 6
IC7	E 4	S2	A 3
IC7	D 5	S2	C 4
IC7	C 4	S2	C 4
IC8	H 2	S2	D 5
IC8	H 2		
IC8	E 5	SR82	F 4
IC9	H 2		
IC9	E 5		
IC9	H 2		
J2	H 3		
P1	F 2		
P2	F 2		
Q1	E 1		
Q2	E 2		
Q3	E 3		
Q4	E 3		
Q5	E 2		
Q6	E 1		
Q7	E 4		
Q8	E 4		
Q9	F 1		
Q10	C 6		
Q11	G 6		
Q12	C 5		
Q13	F 5		
R2	A 1		
R4	A 2		
R6	A 2		
R8	A 3		
R10	A 3		
R12	A 3		
R14	A 5		
R16	A 6		
R17	A 1		
R18	A 1		
R19	A 2		
R20	A 2		
R21	A 3		
R22	A 3		
R23	A 5		
R24	A 6		
R25	A 1		
R26	C 3		
R27	C 3		
R28	C 3		
R29	F 1		
R30	G 1		
R31	F 2		
R32	G 2		
R33	F 1		
R34	F 1		
R35	D 4		
R36	D 4		
R37	D 4		
R38	E 4		
R39	E 4		
R40	E 4		
R4	E 4		
R42	F 4		
R43	D 3		
R44	D 3		
R45	D 3		
R46	E 3		
R47	E 3		
R48	E 3		
R49	E 3		
R50	E 3		
R51	D 2		
R52	D 2		



Name	Article nr.
RGB-TTL input module	76 1749
Date: 07/06/1991	Drawn: PGOE
	Checked: SSG

BARCO PROJECTION SYSTEMS

COMP.	LOC.
R53	D 2
R54	E 2
R55	E 2
R56	E 2
R57	E 2
R58	E 2
R59	D 1
R60	D 1
R61	D 1
R62	E 1
R63	E 1
R64	E 1
R65	E 1
R66	C 5
R70	C 5
R71	C 4
R72	D 5
R73	C 6
R74	C 6
R75	C 6
R76	D 6
R77	E 4
R78	F 5
R79	F 4
R80	F 4
R81	D 6
R82	D 6
R83	F 6
R84	F 6
R85	F 6
R86	G 6
R87	G 6
R88	A 3
SI	A 1
SI	A 2
SI	A 2
SI	A 2
SI	A 3
SI	A 5
SI	A 6
S2	A 3
S2	C 4
S2	C 4
S2	D 5
SR82	F 4

KEY ON FOLDOUT-F-1

78001I

PRODUCT SAFETY NOTICE

COMPONENTS MARKED WITH * OR ⚠ 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

RGB inversion

Yellow/Brown

Green in blue

Intensity

Green in Blue

CS/HVsync switch

CGA/EGA.CGA

Csync

82SI52 (ega_V2)

74F86 = 74S86

J2
From RGB-switching
1 Gnd
2 Red
3 Gnd
4 Green
5 Gnd
6 Blue
7 Gnd

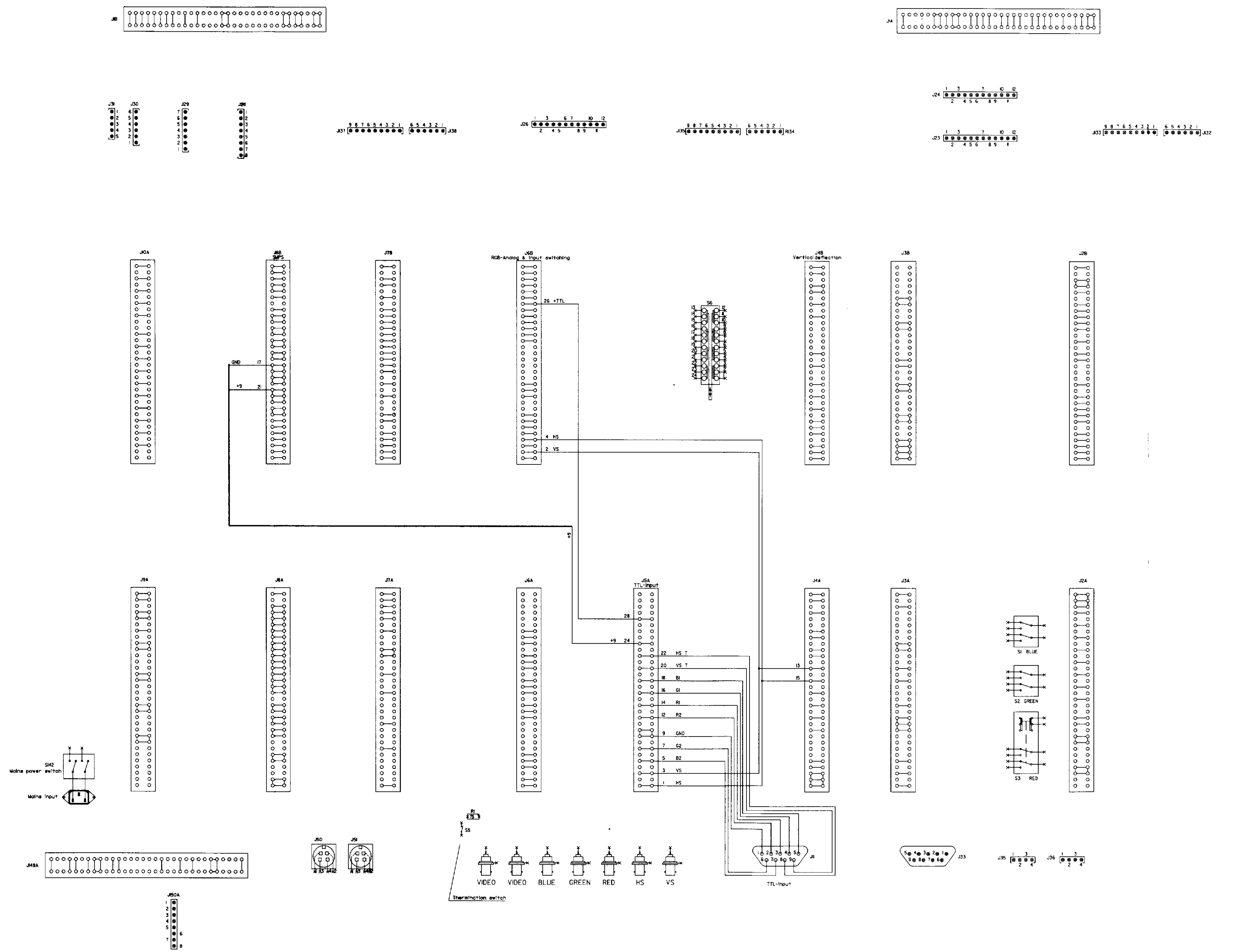
J5A
To frame
1 HS
3 VS
5 B2
7 G2
9 GND
10 GND
12 R2
14 RI
16 GI
18 BI
20 VS T
22 HS T
24 +9
28 +TTL

0.25W 0.50W 1W 1.5W

Name: RGB-TTL input module	Article nr.: 761749 00
Date: 15/04/1991	Drawn: PGOE / Checked: SSG

BARCO PROJECTION SYSTEMS

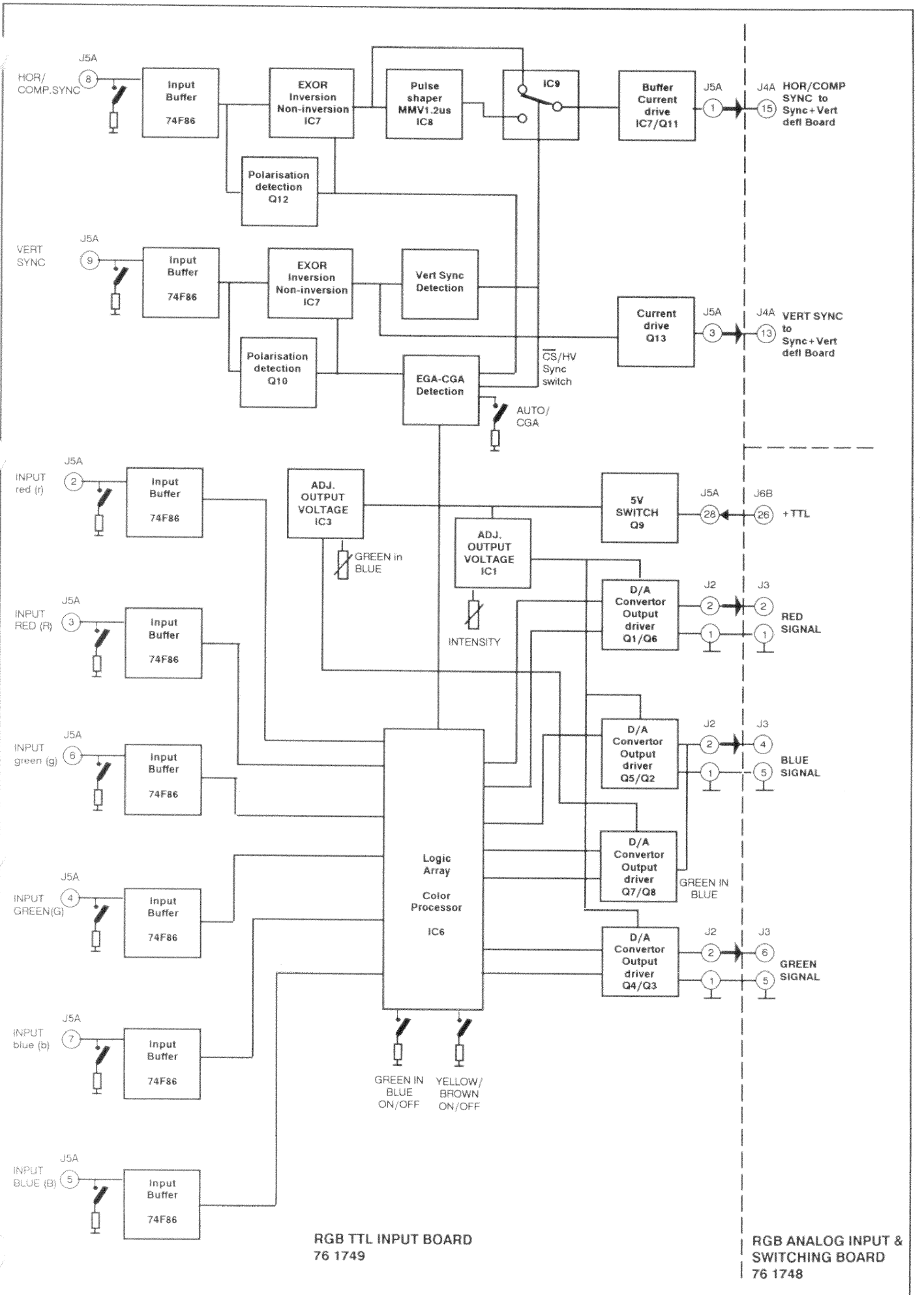
Main frame interconnection
Input RGB-TTL module



Modifications reserved

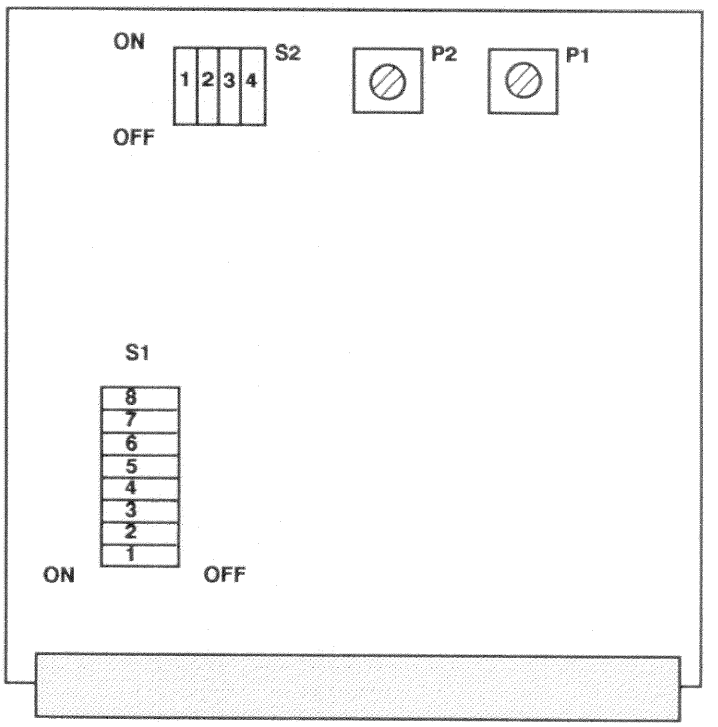
Name		Article nr.
Interconnection RGB-TTL		76 1749
Date	Drawn	Checked
08/07/1991	PGOE	SSG

BARCO PROJECTION SYSTEMS


HOR/ COMP.SYNC
J5A
8
Input Buffer 74F86
EXOR Inversion Non-inversion IC7
Pulse shaper MMV1.2us IC8
IC9
Buffer Current drive IC7/Q11
J5A
1
J4A
15
HOR/COMP SYNC to Sync+Vert defl Board
Polarisation detection Q12
VERT SYNC
J5A
9
Input Buffer 74F86
EXOR Inversion Non-inversion IC7
Vert Sync Detection
Current drive Q13
J5A
3
J4A
13
VERT SYNC to Sync+Vert defl Board
Polarisation detection Q10
EGA-CGA Detection
CS/HV Sync switch
AUTO/ CGA
INPUT red (r)
J5A
2
Input Buffer 74F86
ADJ. OUTPUT VOLTAGE IC3
GREEN in BLUE
ADJ. OUTPUT VOLTAGE IC1
INTENSITY
5V SWITCH Q9
J5A
28
J6B
26
+TTL
INPUT RED (R)
J5A
3
Input Buffer 74F86
D/A Convertor Output driver Q1/Q6
J2
2
1
J3
2
1
RED SIGNAL
INPUT green (g)
J5A
6
Input Buffer 74F86
D/A Convertor Output driver Q5/Q2
J2
2
1
J3
4
5
BLUE SIGNAL
Logic Array Color Processor IC6
D/A Convertor Output driver Q7/Q8
GREEN IN BLUE
INPUT GREEN(G)
J5A
4
Input Buffer 74F86
D/A Convertor Output driver Q4/Q3
J2
2
1
J3
6
5
GREEN SIGNAL
INPUT blue (b)
J5A
7
Input Buffer 74F86
GREEN IN BLUE ON/OFF
YELLOW/ BROWN ON/OFF
INPUT BLUE (B)
J5A
5
Input Buffer 74F86
RGB TTL INPUT BOARD
76 1749
RGB ANALOG INPUT & SWITCHING BOARD
76 1748

RGB TTL INPUT MODULE 76 1749

BOARD SETTINGS



Line termination switches

S1 ON = Line terminated on75 Ohm
S1 OFF = Line terminated on 1 kOhm

S1/1 Input RED1
S1/2 Input Red2
S1/3 Input Green2
S1/4 Input GREEN1
S1/5 Input Blue2
S1/6 Input BLUE1
S1/7 Input Hor. Sync
S1/8 Input Vert. Sync

Input polarity inversion

S2/4 On = inversion of the input signal
S2/4 Off = non-inversion of the input signal

Yellow/Brown choice (in CGA mode)

S2/3 Off = display of detected yellow
S2/3 On = display of detected yellow as brown tinted yellow

Blue in Green

S2/2 Off = Blue in green mode disabled
S2/2 On = An amount of Blue, adjustable with P2, is added in the Green output (improvement of the legibility of the blue characters).

EGA-CGA automatic detection

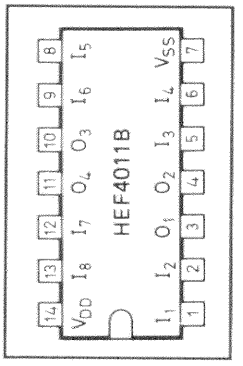
S2/1 On = automatic detection EGA/CGA
S2/1 Off = forced in CGA mode

Intensity adjustment (EGA mode)

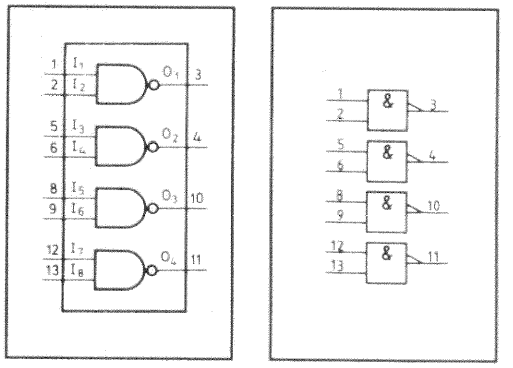
P1 adjusts the currents produced by the secondary sources, this is, adjusting the analog levels or intensity

QUADRUPLE 2-INPUT NAND GATE 4011

Pin configuration

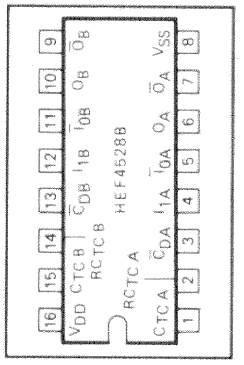


Logic symbol

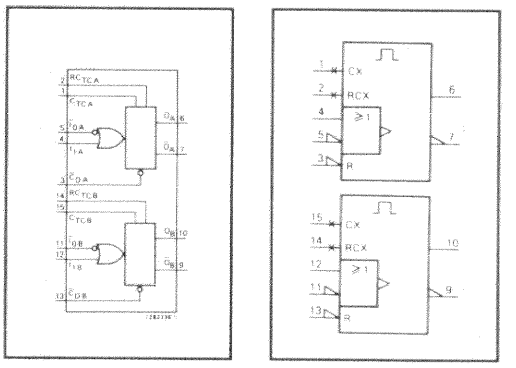


DUAL MONOSTABLE MULTIVIBRATOR 4098B (4528B)

Pin configuration



Logic symbol



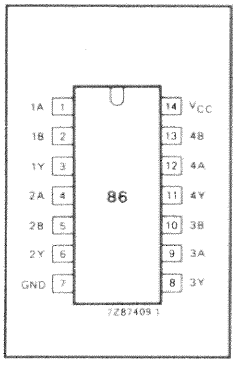
Function table

inputs			outputs	
$\overline{I}_0$	I_1	$\overline{C}_D$	O	$\overline{O}$
↘	L	H	⎍	⎍
H	↘	H	⎍	⎍
X	X	L	L	H

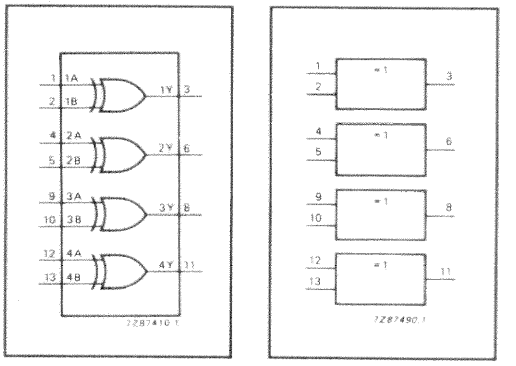
H = HIGH state (the more positive voltage)
L = LOW state (the less positive voltage)
X = state is immaterial
↗ = positive-going transition
↘ = negative-going transition
⎍ = positive or negative output pulse; width is determined by C_t and R_t

QUAD 2-INPUT EXCLUSIVE-OR GATE 74HCT86

Pin configuration



Logic symbol



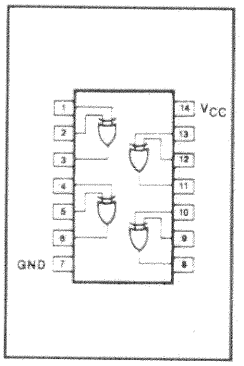
Function table

Inputs		Outputs
nA	nB	nY
L	L	L
L	H	H
H	L	H
H	H	L

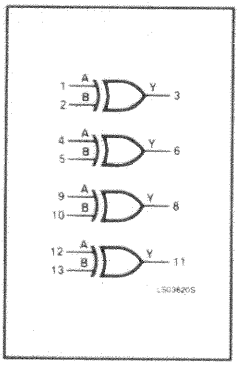
H = HIGH voltage level
L = LOW voltage level

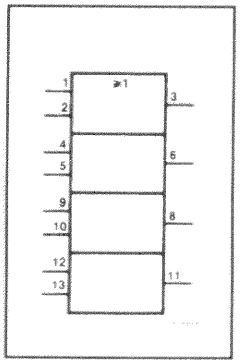
QUAD 2-INPUT EXCLUSIVE-OR GATE 74F86

Pin configuration



Logic symbol





Function table

Inputs		Outputs
A	B	Y
L	L	L
L	H	H
H	L	H
H	H	L

H = HIGH voltage level
L = LOW voltage level

RGB TTL INPUT MODULE 76 1749

INTRODUCTION.

This input boards handles TTL level signal and is CGA (Color Graphics Array) aswell as EGA (Enhanced Graphics Array) compatible.

The switching between the two modes is automatic as the polarity of the vertical sync is a mean for identification.

A custom programmed FPLA (Field programmable Logic Array) performs the automatic switching.

There is an automatic selection between the horizontal / vertical sync and composite sync.

RED, GREEN AND BLUE SIGNAL FLOW.

The six inputs can be terminated at 75 Ohm (output of a line driver) or terminated at 1kOhm (open collector output). Furthermore, the polarity can be inverted by setting of the dip-switches S2.

All inputs are guided to the FPLA (ega-v2) where the switching occurs.

Pin 7 of the latter receives for that purpose the voltage 'ega' from the automatic detection circuit (output pin 3 of IC7).

a) CGA mode :

In this case the vertical sync is positive. The FPLA ignores the 'red' and 'blue' signals and accepts the R, G, B and Intensity inputs. The output pins 12, 14 and 15 control the current drivers Q1, Q4 and Q5.

Yellow/Brown switch S2(3) : When the FPLA detects yellow (RED and GREEN both high), and when the switch is closed, the primary Red is activated (Q1) and at the same time the secondary Green (Q3). This results in a brown tinted yellow in stead of yellow.

If the switch is open, yellow is displayed.

b) EGA mode :

In the EGA mode the vertical sync is negative.

The FPLA now utilizes all inputs and the outputs can drive all transistors Q1 - Q8.

Depending on the combinations of the primary and secondary colors (eg. R and r) we can obtain 4 different analog levels.

With the aid of P1 we can adjust the currents produced by the secondary sources, this is, adjust the analog levels or intensity.

The Yellow/Brown switch is now disabled.

BLUE IN GREEN .

As to improve the legibility of the blue characters, potentiometer P2 allows to add some amount of blue in the green output. Therfore, the switch S2(2) must be in the 'on' position.

POWER SUPPLY OF THE BOARD.

The stabilizers IC1-IC3 get their input voltage via the switching Q9. The latter is switched on by the +TTL voltage from the 'UN RGB Input and RGB Switching' board.

TTL SYNCHRONIZATION PULSES.

a) Automatic polarity switching :

The vertical and horizontal sync pulses are applied to Q12 and Q10 through a capacitor.

Assume the vertical pulses are positive. Q12 is conducting during the short time the pulses are positive.

As the collector voltage is integrated, we find a 'low' on the collector, or, a low input for pin 5 of IC7. The positive pulses are not inverted at the output and sent to the monostable in IC8.

In the event of negative pulses, the voltage on the collector is 'high' and the negative pulses are inverted now.
The same applies for the horizontal pulses.

b) CGA / EGA automatic detection :

When the polarity of both sync signals is positive (CGA) , the inputs 1 and 2 of the exclusive-or gate IC7 are both low.

The output, pin 3, is low and this 'ega' information is sent to the FPLA.

On the other hand, when the vertical pulses are negative (EGA) and the horizontal pulses positive, the output switches 'high', because the two inputs of the exclusive-or gate do not have equal potential.

Because of some non-standard computer output boards, we have provided the user a switch in order to force the CGA mode (switch S2(I) open.

c) Horizontal pulses and selection hor sync/comp. sync.

The horizontal pulses are sent to the positive triggering input, pin 12 of the monostable in IC8.

Shaped pulses, having a width of approximately 1.2 uS are available at pin 10 and proceed to pin 2 of IC9.

The other input of this NAND-gate is the output of the monostable (pin 6) of IC8. The time constant of this monostable is roughly 3 times a raster period.

When vertical pulses are sent to the trigger input, pin 5, the mentioned output switches 'high' and as the time constant is 3 times a raster, the output remains high. In that case the H Sync pulses of pin 10 (IC8) can proceed to pin 3 from where they are re-introduced to pin 9 of another NAND gate.
If we find these Hor Sync pulses at the output pin 10 depends on the status

of pin 8 which is connected to pin 4.

Now, as soon there are vertical pulses, the output 6 of IC8 is high (see above) and consequently 7 is low. Pin 4 of the NAND gate is thus high which means for that the horizontal pulses at pin 8 proceed to the base of Q11.

A similar explanation applies when there are no vertical pulses and obviously the sync is a composite one.

Indeed, in this case the composite sync follows the following path : pin 8 of IC7 / and resptively pins 6, 4 , 8 , 10 to arrive on the base of Q11.

As we can see, the selection between separate hor./ vert. and composite sync is based upon the availability of the separate vertical sync pulses.

The vert. sync , if applied, and the hor/comp. sync lines are both connected with the vertical sync board.

RGB TTL INPUT MODULE

76 1749

ITEM NO.	SIT.	DESCRIPTION
11 3724	C..5	C POMEFF 100K K5 63
11 1500	C..6	C ELPRMI 47M M5 10
11 3724	C..7	C POMEFF 100K K5 63
11 1500	C.10	C ELPRMI 47M M5 10
11 3724	C.11	C POMEFF 100K K5 63
11 1500	C.12	C ELPRMI 47M M5 10
11 3732	C.13	C POMEFF 470K K5 63
11 1531	C.14	C ELPRMI 10M M5 35
11 2232	C.15	C NPO MI 15P G5 63
11 2235	C.17	C NPO MI 27P G5 63
11 2242	C.18	C NPO MI 100P J5 63
11 3732	C.19	C POMEFF 470K K5 63
11 3732	C.20	C POMEFF 470K K5 63
11 1510	C.21	C ELPRMI 22M M5 25
11 3724	C.22	C POMEFF 100K K5 63
11 2235	C.23	C NPO MI 27P G5 63
13 1621	D..1	D 1N4148 SWITCH
13 1621	D..2	D 1N4148 SWITCH
13 4001	I..1	U 7805 +05V/1A STAB
13 4028	I..2	U 317LZ +1+37V/0A1 STAB
13 4028	I..3	U 317LZ +1+37V/0A1 STAB
13 7432	I..4	U 74S86 4X EXC OR GATE
13 7432	I..5	U 74S86 4X EXC OR GATE
32 8034	I..6	IC SOFT EGA-V2 137533
13 7549	I..7	U 74HCT86 4X2IEXC OR GATE
13 7332	I..8	U 4528B 2XMONOST MULTIV
13 7302	I..9	U 4011B 4X 2I NAND GATE
13 7532		U 82S153 TS PR LOGIC ARRAY
31 3525	J1..	J EURO MBS P64
10 6825	P..1	R TCE V500E K 0W5 S10SS3386H
10 6825	P..2	R TCE V500E K 0W5 S10SS3386H
78 0011	PC..	PCB PJ 49 TTL INP
13 14181	Q..1	Q BC559B P 30 / 0A1
13 14181	Q..2	Q BC559B P 30 / 0A1
13 14181	Q..3	Q BC559B P 30 / 0A1
13 14181	Q..4	Q BC559B P 30 / 0A1
13 14181	Q..5	Q BC559B P 30 / 0A1
13 14181	Q..6	Q BC559B P 30 / 0A1
13 14181	Q..7	Q BC559B P 30 / 0A1
13 14181	Q..8	Q BC559B P 30 / 0A1
13 14446	Q..9	Q BD237 N 80 / 2A
13 14295	Q.10	Q BC549B N 30 / 0A1
13 14181	Q.11	Q BC559B P 30 / 0A1
13 14295	Q.12	Q BC549B N 30 / 0A1
13 14181	Q.13	Q BC559B P 30 / 0A1
10 1123	R..2	R CF H 82E J 0W25
10 1123	R..4	R CF H 82E J 0W25
10 1123	R..6	R CF H 82E J 0W25
10 1123	R..8	R CF H 82E J 0W25
10 1123	R.10	R CF H 82E J 0W25
10 1123	R.12	R CF H 82E J 0W25
10 1123	R.14	R CF H 82E J 0W25
10 1123	R.16	R CF H 82E J 0W25
10 1136	R.17	R CF H 1K J 0W25
10 1136	R.18	R CF H 1K J 0W25
10 1136	R.19	R CF H 1K J 0W25
10 1136	R.20	R CF H 1K J 0W25
10 1136	R.21	R CF H 1K J 0W25
10 1136	R.22	R CF H 1K J 0W25

ITEM NO.	SIT.	DESCRIPTION
10 1136	R.23	R CF H 1K J 0W25
10 1136	R.24	R CF H 1K J 0W25
10 1144	R.25	R CF H 4K7 J 0W25
10 1144	R.26	R CF H 4K7 J 0W25
10 1144	R.27	R CF H 4K7 J 0W25
10 1144	R.28	R CF H 4K7 J 0W25
10 1126	R.29	R CF H150E J 0W25
10 1128	R.30	R CF H220E J 0W25
10 1126	R.31	R CF H150E J 0W25
10 1128	R.32	R CF H220E J 0W25
10 1144	R.33	R CF H 4K7 J 0W25
10 1136	R.34	R CF H 1K J 0W25
10 1139	R.35	R CF H 1K8 J 0W25
10 1137	R.36	R CF H 1K2 J 0W25
10 1131	R.37	R CF H390E J 0W25
10 1129	R.38	R CF H270E J 0W25
10 1129	R.39	R CF H270E J 0W25
10 1131	R.40	R CF H390E J 0W25
10 1135	R.41	R CF H820E J 0W25
10 1139	R.42	R CF H 1K8 J 0W25
10 1139	R.43	R CF H 1K8 J 0W25
10 1131	R.44	R CF H390E J 0W25
10 1131	R.45	R CF H390E J 0W25
10 1129	R.46	R CF H270E J 0W25
10 1129	R.47	R CF H270E J 0W25
10 1131	R.48	R CF H390E J 0W25
10 1132	R.49	R CF H470E J 0W25
10 1139	R.50	R CF H 1K8 J 0W25
10 1139	R.51	R CF H 1K8 J 0W25
10 1131	R.52	R CF H390E J 0W25
10 1131	R.53	R CF H390E J 0W25
10 1129	R.54	R CF H270E J 0W25
10 1129	R.55	R CF H270E J 0W25
10 1131	R.56	R CF H390E J 0W25
10 1132	R.57	R CF H470E J 0W25
10 1139	R.58	R CF H 1K8 J 0W25
10 1139	R.59	R CF H 1K8 J 0W25
10 1131	R.60	R CF H390E J 0W25
10 1131	R.61	R CF H390E J 0W25
10 1129	R.62	R CF H270E J 0W25
10 1129	R.63	R CF H270E J 0W25
10 1131	R.64	R CF H390E J 0W25
10 1132	R.65	R CF H470E J 0W25
10 1139	R.66	R CF H 1K8 J 0W25
10 1143	R.70	R CF H 3K9 J 0W25
10 1148	R.71	R CF H 10K J 0W25
10 1146	R.72	R CF H 6K8 J 0W25
10 1143	R.73	R CF H 3K9 J 0W25
10 1148	R.74	R CF H 10K J 0W25
10 1148	R.75	R CF H 10K J 0W25
10 1144	R.76	R CF H 4K7 J 0W25
10 1138	R.77	R CF H 1K5 J 0W25
10 1143	R.78	R CF H 3K9 J 0W25
10 1152	R.79	R CF H 22K J 0W25
10 1149	R.80	R CF H 12K J 0W25
10 1128	R.81	R CF H220E J 0W25
10 1168	R.83	R CF H470K J 0W25
10 1155	R.84	R CF H 39K J 0W25
10 1143	R.85	R CF H 3K9 J 0W25
10 1149	R.86	R CF H 12K J 0W25
10 1152	R.87	R CF H 22K J 0W25
10 1128	R.88	R CF H220E J 0W25
32 4184	S..1	SWITCH DIL 1A 8P T
32 4188	S..2	SWITCH DIL 1A 4P T
10 11129	SR82	R CFFH 10E J 0W25

RGB TTL INPUT MODULE 76 1749

ART.NO.	DESCRIPTION	QUANTITY
10 11129	R CFFH 10E J 0W25	*1
10 6825	R TCE V500E K 0W5 S10SS3386	*2
13 14181	Q BC559B P 30 / 0A1	10
13 14295	Q BC549B N 30 / 0A1	2
13 14446	Q BD237 N 80 / 2A	*1
13 1621	D 1N4148 SWITCH	2
13 4001	U 7805 +05V/1A STA	*1
13 4028	U 317LZ +1+37V/0A1 STA	2
13 7302	U 4011B 4X 2I NAND GAT	1
13 7332	U 4528B 2XMONOST MULTI	1
13 7432	U 74S86 4X EXC OR GAT	2
13 7532	U 82S153 TS PR LOGIC ARRA	1
13 7549	U 74HCT86 4X2IEXC OR GAT	1
31 3525	J EURO MBS P64	*1
32 4184	SWITCH DIL 1A 8P T	*1
32 4188	SWITCH DIL 1A 4P T	*1
32 8034	IC SOFT EGA-V2 13753	*1
36 20216	SCREW DIN84 M 3 X 6 MP-	1
36 61026	NUT DIN934 M 3 HEXAGO	1
36 7434	RIVET P AL AL AD32ABS D2,	1
36 7435	RIVET P AL AL AD34ABS D2,	1
36 7448	RIVET P AL AL AD36ABS D2,	1
36 7502	WASHER DIN6798 A 3,2	1
36 7699	RIVET CHOBERT D2,38 L6,35	1
72 2285	LOCK PJ 49 PCB CPL TTL	*1
76 1749A	UN INP PJ 49 GR800 TTL	1
76 1749D	UN INP PJ 49 GR800 TTL	1
80 2877	LOCK PJ 49 PCB TTL PRINT	1

*** NUMBERS REFERRING TO PICTURE**