NUOVA BELL GAMES

SKILL FLIGHT

MANUAL

S K I L L - F L I G H T

Durchführung des SELBSTTESTS und Auslesen der Buchhaltungsdaten.
Der schwarze Knopf auf der Innenseite der Kassentür dient zum Weiterschalten in die nächsten Teststufen.
Der rote Knopf ist zum Löschen der einzelnen Spieleinstellungen und der Buchhaltungsdaten.
Mit der Kredittaste können die Werte neu eingestellt werden.

Funktion:					TESTSTUFE	(Anzeige auf dem BALL IN PLAY Display)
1	x	drücken	=	Lampentest	-	
2	x	drücken	=	Display-Test	-	
3	x	drücken	=	Spulentest	-	Spulen-Nr. in Spieler Displays
4	x	drücken	=	Soundmodultest	-	
5	x	drücken	=	Kontakttest	blinkende 0	= alle Kontakte offen
6	x	drücken	=	1. FREISPIEL	01	
7	x	drücken	=	2. FREISPIEL	02	
8	x	drücken	=	3. FREISPIEL	03	
9	x	drücken	=	Tages-High Score	04	
10	x	drücken	=	gespeicherte Kredite	05	
11	x	drücken	=	Gesamtspiele	06	
12	x	drücken	=	Freispiele	07	
13	x	drücken	=	Freispiele in %n	08	
14	x	drücken	=	wie oft Tages-High Score übertroffen	09	
15	x	drücken	=	1,- DM Einwurf	10	
16	x	drücken	=	5,- DM Einwurf	11	
17	x	drücken	=	2,- DM Einwurf	12	
18	x	drücken	=	Anzahl der erreichten SPECIALS	13	
19	x	drücken	=	Spielzeit gesamt	14	
20	x	drücken	=	Anzahl der Service Kredite	15	
21	x	drücken	=	Einstellung Freispiel/Freikugel bei **"SPECIAL"**	16	03 = Freispiel 02 = Extra Ball 01 = 50.000 Punkte 00 = keine Funktion
22	x	drücken	=	Einstellung Freispiel/Freikugel bei Überschreiten **"HIGH SCORE"**	17	03 = Freispiel 02 = Extra Ball 01 = 25.000 Punkte 00 = keine Funktion
				In Verbindung mit den Testschritten 16 und 17 ist DIP SW 29 auf ON zu stellen, damit mehr als 1 Replay gewährt wird.		
23	x	drücken	=	Soundeinstellung	18	00 = 01 = 02 = 03 = Musik aus Attract Mode
24	x	drücken	=	Anzahl d. Freispiele bei Erreichen des High Scores	19	03 = 3 Freispiele 02 = 2 Freispiele 01 = 1 Freispiel 00 = kein Freispiel
25	x	drücken	=	Rückstellung in Normalspiel (Einschalttest)	-	

Bitte denken Sie daran, daß die Spielfeldneigung mindestens 6° sein soll. Sind die Beinschrauben angezogen? Ist die Kugel-Tiltvorrichtung optimal eingestellt? Ist der Münzeinwurf geprüft?

Einstellmöglichkeiten am Flipper

"S K I L L F L I G H T"

mit Hilfe der DIP Schalter 1 - 32

Schalter Nr.	Normal-einstell.	
1	OFF)	1,- DM Einwurf (links)
2	OFF)	
3	OFF)	Hier: 1,-DM = 1 Kredit
4	OFF)	
5	OFF)	Andere Kredite siehe Anlage "Game Adjustmen
6	OFF	Special linke + rechte Kugelauslaufbahn
		Beleuchtet nachdem "Landing Bonus Special" gegeben wurde
		ON: Zur gleichen Zeit, wie "Landing Bonus Special" beleuchtet
7	ON	One Million Target
		Wird im 3. Ball kurz beleuchtet
		OFF: Wird nicht gegeben
8	OFF	Landing Bonus Special
		Beleuchtet nach 39.000 Bonuspunkten. Rücksprung auf 20.000 Bonuspunkte. Beim nochmaligen Erreichen von 39.000 Bonus punkten wird 1 Special gegeben.
		ON: Special wird mit Erreichen von 39.000 Bonuspunkten gegeben.
9	OFF)	2,- DM Einwurf (rechts)
10	ON)	
11	OFF)	Hier: 2,-DM = 3 Kredite
12	OFF)	
13	OFF)	Andere Kredite siehe Anlage "Game Adjustmen
14	ON	Looping Bonus
		Zählt bis 23.000 Bonuspunkte (12 K + 11 K)
		OFF: Zählt bis 12.000 Bonuspunkte
15	OFF	Helikopter Target
		Start mit beleuchtetem 15 K Licht
		ON: Start bei 0
16	ON	Game over Verhalten
		Licht- und Sound-Effekte
		OFF: Keine Effekte
17	OFF)	5,- DM Einwurf (mitte)
18	ON)	
19	OFF)	Hier: 5,-DM = 10 Kredite
20	ON)	Andere Kredite siehe Anlage "Game Adjustmen
21	OFF	Looping Multiplier
		Wird nicht für den nächsten Ball gespeicher
		ON: Wird gespeichert

Schalter Nr.	Normal-einstell.	
22	ON	**Runway Rampen Memory** Die Bereitschaft, die Kugeln zu halten, wird für den nächsten Ball gespeichert. OFF: Wird nicht gespeichert.
23	ON	**Memory der 3 roten + 3 blauen Targets** Beleuchtete Targets werden für den nächsten Ball gespeichert. OFF: Werden nicht gespeichert.
24	ON	**Ruhezeit der 1. Kugel in einem der Runway-Löcher** Kugel wird nach ca. 30 Sek. ausgeworfen, wenn keine 2. Kugel deponiert wurde. Auf der Kreditanzeige findet währenddessen ein blinkender "Count Down" von 10 bis 0 statt. OFF: Kugel bleibt bis Spielende im Runway-Loch liegen, wenn keine 2. Kugel deponiert wurde
25 26	ON) ON)	**Maximale Kredite** Hier: 40 OFF) OFF) = 10 ON) OFF) = 15 OFF) ON) = 25
27	ON	**Kreditanzeige** Kredit wird angezeigt. OFF: Wird nicht angezeigt.
28	ON	**Match** Match ein. OFF: Match aus.
29	ON	**Freispiele pro Spiel** Alle Freispiele werden gegeben. OFF: Nur 1 Freispiel pro Spiel.
30	ON	**Looping Bonus Feature** Bonus wird gegeben. OFF: Wird nicht gegeben.
31 32	OFF) OFF)	**Kugeln pro Spiel** Hier: 3 Kugeln ON) ON) = 2 OFF) ON) = 4 ON) OFF) = 5

W I C H T I G E R H I N W E I S

Das Spiel kann nur gestartet werden, wenn sich alle 3 Kugeln in der Outhole-Kugelrinne befinden !!!

GAME ADJUSTMENTS

A. Back Box Game Adjustments:
Each game has thirty-two switches located on A4, the MPU module, located in the back box, that allow play to be customized to the location. Credits per coin, credit display, and baser per game, are selectable by means of the switches. The switches are contained in four-sixteen lead packages numbered S1-8, S9-16, S17-24, and S25-32 for easy identification. The "ON" toggle position is marked on the assembly. **Turn off power before making adjustments.**

Credits/Coin Adjustments:
The credits per coin are selectable by means of S17-S20 for coin chute #2 (Center). The switch settings and resultant credits/coin are as follows:

S20	S19	S18	S17	Credits/Coin
OFF	OFF	OFF	OFF	Same as Coin Chute #1 Settings
OFF	OFF	OFF	ON	1/1 Coin
OFF	OFF	ON	OFF	2/1 Coin
OFF	OFF	ON	ON	3/1 Coin
OFF	ON	OFF	OFF	4/1 Coin
OFF	ON	OFF	ON	5/1 Coin
OFF	ON	ON	OFF	6/1 Coin
OFF	ON	ON	ON	7/1 Coin
ON	OFF	OFF	OFF	8/1 Coin
ON	OFF	OFF	ON	9/1 Coin
ON	OFF	ON	OFF	10/1 Coin
ON	OFF	ON	ON	11/1 Coin
ON	ON	OFF	OFF	12/1 Coin
ON	ON	OFF	ON	13/1 Coin
ON	ON	ON	OFF	14/1 Coin
ON	ON	ON	ON	15/1 Coin

The credits given are selectable by means of switches 1-5 incl., for coin chute #1 and switches 9-13 incl., for coin chute #3. Thirty-one different credit ratios are available for each coin chute. The switch settings and resultant credits/coin are listed below.

CREDITS/COIN ADJUSTMENTS

COIN CHUTE #1 (HINGE SIDE) OR #3 (RIGHT SIDE)	SWITCHES 5	4	3	2	1	CREDITS	CREDITS	CREDITS	CREDITS	CREDITS	TOTAL CREDITS/C
	13	12	11	10	9						
	OFF	OFF	OFF	OFF	OFF	1/1 Coin					
	OFF	OFF	OFF	OFF	ON	2/1 Coin					
	OFF	OFF	OFF	ON	OFF	3/1 Coin					
	OFF	OFF	OFF	ON	ON	4/1 Coin					
	OFF	OFF	ON	OFF	OFF	5/1 Coin					
	OFF	OFF	ON	OFF	ON	6/1 Coin					
	OFF	OFF	ON	ON	OFF	7/1 Coin					
	OFF	OFF	ON	ON	ON	8/1 Coin					
	OFF	ON	OFF	OFF	OFF	9/1 Coin					
	OFF	ON	OFF	OFF	ON	12/1 Coin					
	OFF	ON	OFF	ON	OFF	14/1 Coin					
	OFF	ON	OFF	ON	ON	1/2 Coins*					
	OFF	ON	ON	OFF	OFF	2/2 Coins*					
	OFF	ON	ON	OFF	ON	3/2 Coins*					
	OFF	ON	ON	ON	OFF	4/2 Coins*					
	OFF	ON	ON	ON	ON	5/2 Coins*					
	ON	OFF	OFF	OFF	OFF	6/2 Coins*					
	ON	OFF	OFF	OFF	ON	7/2 Coins*					
	ON	OFF	OFF	ON	OFF	8/2 Coins*					
	ON	OFF	OFF	ON	ON	9/2 Coins*					
	ON	OFF	ON	OFF	OFF	12/2 Coins*					
	ON	OFF	ON	OFF	ON	14/2 Coins*					
	ON	OFF	ON	ON	OFF	1/1st Coin	2/2nd Coin				3/2
	ON	OFF	ON	ON	ON	0/1st Coin*	1/2nd Coin	1/3rd Coin	1/4th Coin		3/4
	ON	ON	OFF	OFF	OFF	0/1st Coin*	1/2nd Coin	0/3rd Coin**	2/4th Coin		3/4
	ON	ON	OFF	OFF	ON	1/1st Coin	1/2nd Coin	1/3rd Coin	2/4th Coin		5/4
	ON	ON	OFF	ON	OFF	1/1st Coin	2/2nd Coin	1/3rd Coin	3/4th Coin		7/4
	ON	ON	OFF	ON	ON	1/1st Coin	2/2nd Coin	2/3rd Coin	2/4th Coin		7/4
	ON	ON	ON	OFF	OFF	0/1st Coin***	0/2nd Coin***	1/3rd Coin			1/3
	ON	ON	ON	OFF	ON	0/1st Coin**	0/2nd Coin**	0/3rd Coin**	1/4th Coin		1/4
	ON	ON	ON	ON	OFF	0/1st Coin****	0/2nd Coin****	0/3rd Coin****	0/4th Coin****	1/5th Coin	1/5
	ON	ON	ON	ON	ON	0/1st Coin***	0/2nd Coin***	1/3rd Coin	0/4th Coin****	1/5th Coin	2/5

*No Credits until 2nd coin is dropped.
**No Credits until 4th coin is dropped.
***No Credits until 3rd coin is dropped.
****No Credits until 5th coin is dropped.

LANDING SPECIAL	SW 8
LIBERAL SPECIAL 39.000 points + one target	ON
CONSERVATIVE SPECIAL lit at 39.000 point but the player win after ather 39.000 (Bonus second time start with 20.000 lit)	OFF —
LANDING SPECIAL ADVANCE WITH:	RED TARGETS BLUE TARGETS EXTRA BALL HOLE HELICOPTER TARGET
LANDING MULTIPLIER ADVANCE WITH	EXTRA BALL HOLE
SPECIAL OUTLANE	SW 6
LIBERAL lit with landing special	ON
CONSERVATIVE lit after landing special	OFF —
LOOPING BONUS	SW 14
LIBERAL arrive at 23.000	ON —
CONSERVATIVE arrive at 12.000	OFF
LOOPING BONUS ADVANCE WITH	THE TWO
STARS ON TOP	
LOOPING MULTIPLIER ADVANCE	
WHEN YOU PUSH THE TWO STARS	
LOOPING BONUS	SW 30
LIBERAL give the points when the ball go in hole	ON —
CONSERVATIVE don't give the points	OFF
GAME OVER ATTRACT ADJUSTMENT	SW 16.
SOUND AND LIGHT	
YES	ON —
NO	OFF

LOOPING MULTIPLIER	SW 21
LIBERAL rest in memory for the next ball	ON
CONSERVATIVE start again	OFF —
HELICOPTER TARGET	SW 15
CONSERVATIVE start to 0	ON
LIBERAL start to 15K Life	OFF —
3 RED TARGETS AND 3 BLUE TARGETS	SW 23
LIBERAL the targets lites rest in memory for next ball	ON —
CONSERVATIVE don't rest in memory	OFF
NUMBER OF GAMES REPLAYS PER GAME ADJUSTMENT	SW 29
LIBERAL all replay earned will be collected	ON
CONSERVATIVE only 1 replay per player per game	OFF —
QUALIFY RAMP FOR CAPTURE REST IN MEMORY FOR NEXT BALL	SW 22
YES	ON —
NO	OFF
ONE MILLION TARGET (IS CAMING 3° BALL ONLY)	SW 7
YES LIBERAL	ON —
NO CONSERVATIVE	OFF

IMPORTANT

FOR START THE GAME THE 3 BALLS

MUST BE IN OUTHOLE

SW 24 Timer Rollover ON —

SOLENOID DRIVER LOCATION

TRANSISTOR	DESCRIPTION	JACK	PIN NO	TEST NUMBER
4	2° OUT HOLE	PL 1	2	01
3	KNOCKER	CAB	3	02
9	BUMPER LEFT	PL 2	6	03
10	BUMPER RIGHT	PL 2	11	04
12	BUMPER DOWN	PL 2	12	05
11	SLING SHOOT LEFT	PL 2	13	06
16	" " RIGHT	PL 2	14	07
5	SAUCER	PL 1	5	08
2	1° OUT HOLE	PL 1	8	09
8	RAMP LEFT	PL 2	5	10
13	RAMP RIGHT	PL 2	3	11
14	ONE MILLION DROP TARGET	PL 2	2	12
18	GATE	PL 2	15	13
15	RELE'	———	—	14

LAMP DRIVER LOCATION

SCR	DESCRIPTION
13	1K LANDING BONUS
28	2K " "
43	3K " "
58	4K " "
14	5K " "
29	6K " "
44	7K " "
59	8K " "
15	9K " "
30	10K " "
45	20K " "
61	30K " "
60	SPECIAL LANDING BONUS
53	FLIGHT AGAIN
71	OUTLINE SPECIAL LEFT
56	OUTLINE SPECIAL RIGHT
22	BLUE TARGET RIGHT
21	BLUE TARGET CENTER
36	BLUE TARGET RIGHT
34	RED TARGET RIGHT
49	RED TARGET CENTER
64	RED TARGET LEFT
72	EXTRA BALL
57	BUMPER LEFT
42	BUMPER RIGHT
27	BUMPER CENTER

SCR	DESCRIPTION
18	15K HELICOPTER TARGET
33	30K " "
48	50K " "
66	65K " "
51	95K " "
63	SPECIAL HELICOPTER TARGET
17	X 2 LOOPING MULTIPLIER
32	X 3 " "
47	X 4 " "
62	X 5 " "
1	1K LOOPING BONUS
4	2K " "
7	3K " "
10	4K " "
2	5K " "
5	6K " "
8	7K " "
11	8K " "
3	9K " "
6	10K " "
9	11K " "
12	12K " "
16	X 2 LANDING MULTIPLIER
31	X 3 " "
46	X 4 " "
50	4 COVERS RED ON PALYFIELD
69	HELICOPTER MOTOR
41	TOP ILLUMINATION PLAYFIELD
38	SKILL BACKGLASS
25	LIGHT ON TOP CABINET
26	2 LIGHT ON FRONT BACKGLASS
40	FLIGHT BACKGLASS
39	ONE MILLION TARGET

mit Shontank

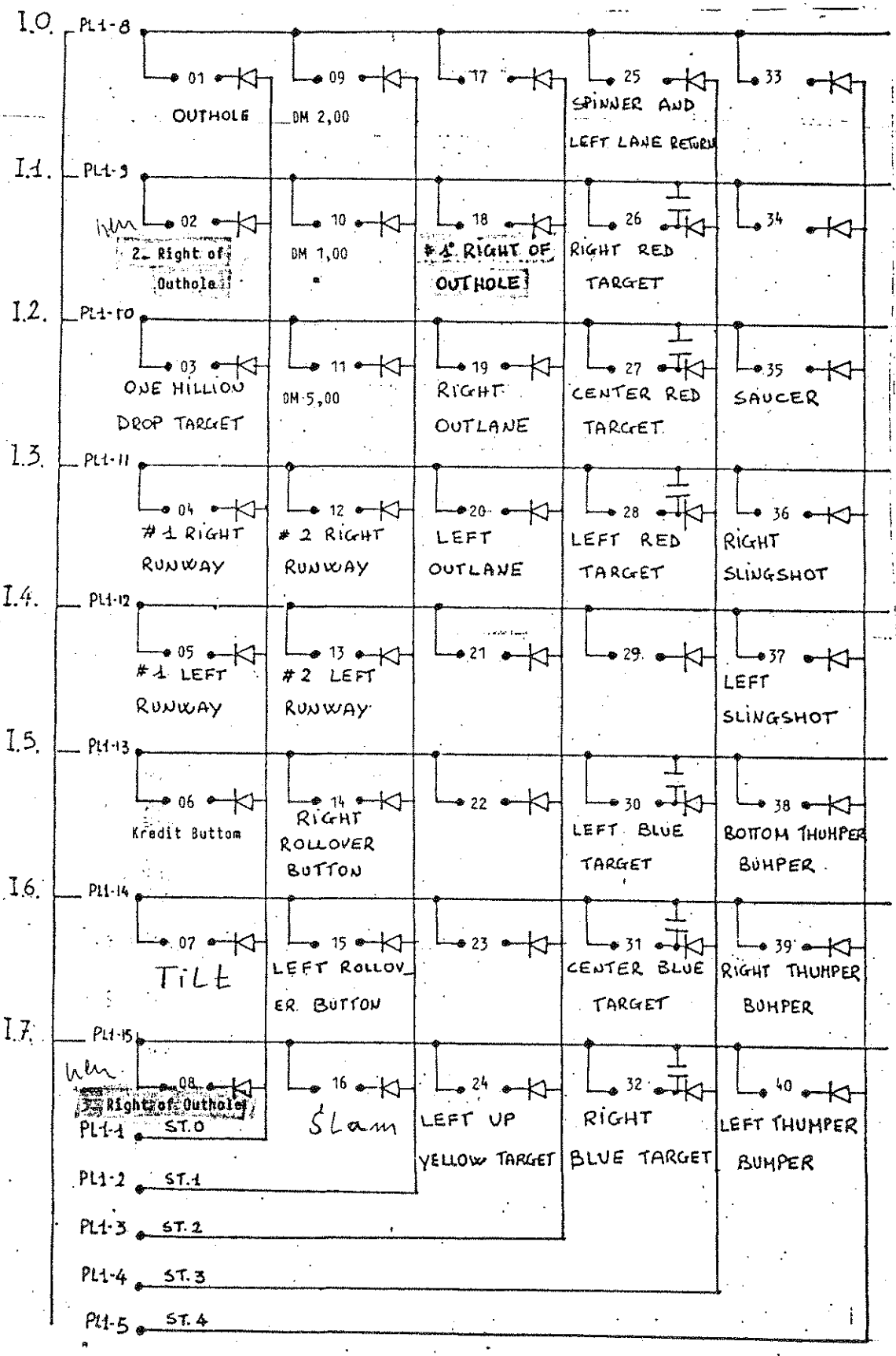
WIRE COLOR

PL1-1 WHITE/RED PL1-4 WHITE/YELLOW PL1-9 YELLOW/BROWN PL1-12 BROWN

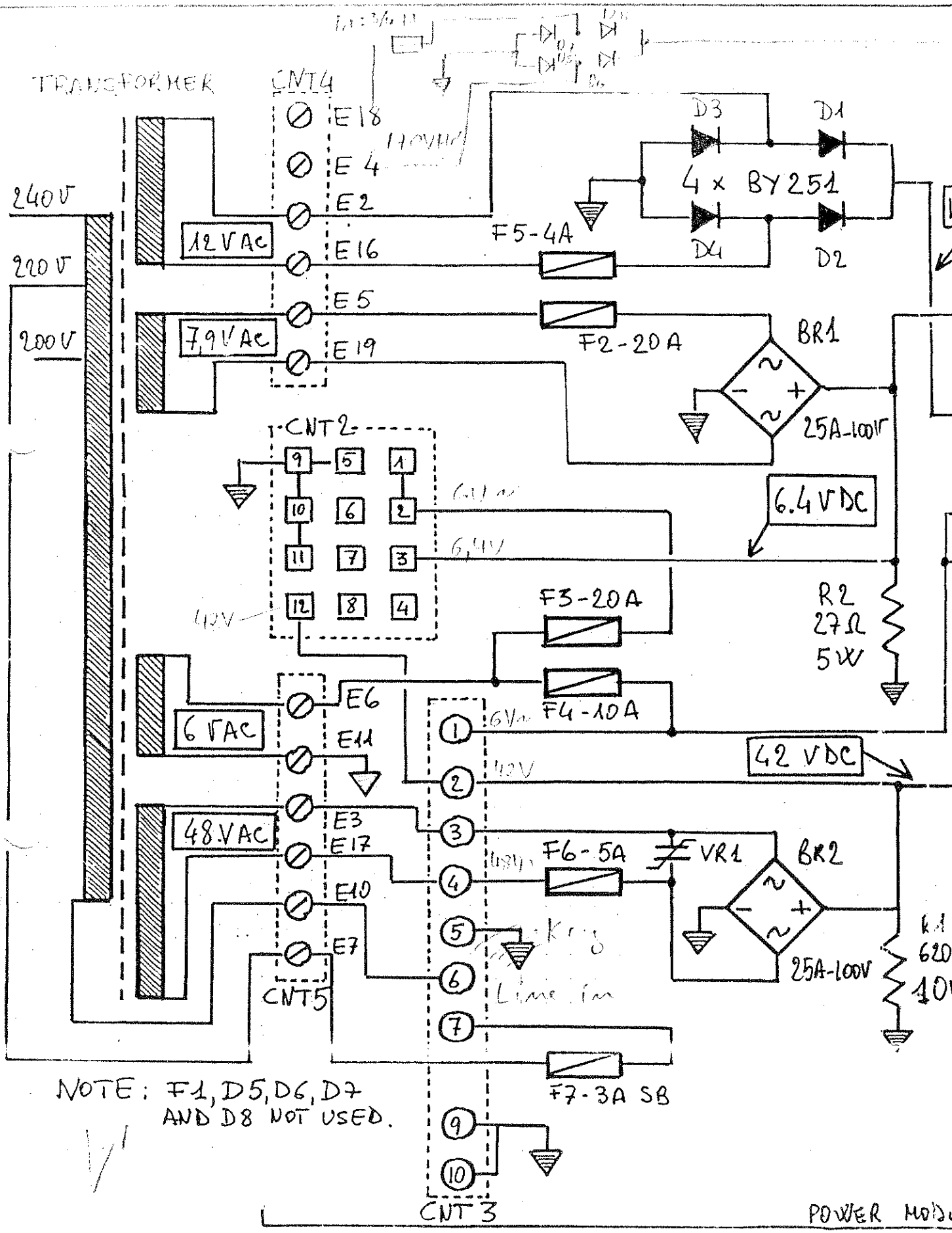
PL1-2 ORANGE PL1-5 YELLOW/RED -10 GRAY/BLACK PL1-13 BROWN/RED

PL1-3 GRAY/YELLOW PL1-8 PINK/ORANGE PL1-11 ORANGE/BLACK PL1-14 GRAY/RED

PL1-15 WHITE/BLACK



WIRING DIAGRAM PLAYFIELD


TRANSFORMER
CNT4
E18
E4
E2
E16
E5
E19
240V
220V
200V
12VAC
7.9VAC
F5-4A
F2-20A
D3
D1
4 x BY251
D4
D2
BR1
25A-100V
CNT2
9
5
1
10
6
2
11
7
3
12
8
4
6.4VDC
F3-20A
F4-10A
R2
27Ω
5W
6VAC
E6
E11
42VDC
48VAC
E3
E17
E10
E7
CNT5
1
2
3
4
5
6
7
F6-5A
VR1
BR2
25A-100V
F7-3A SB
9
10
CNT3
NOTE: F1, D5, D6, D7
AND D8 NOT USED.

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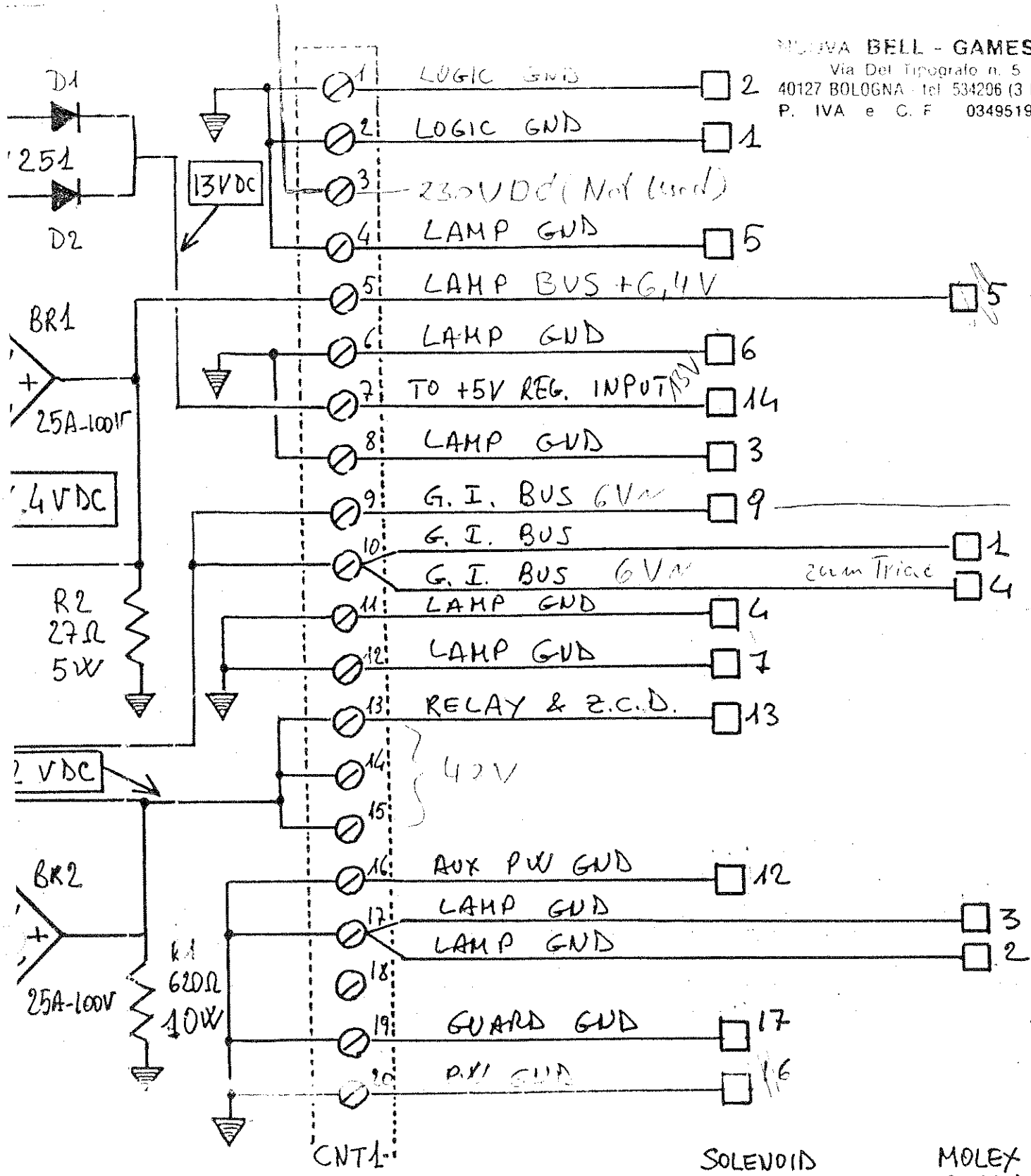
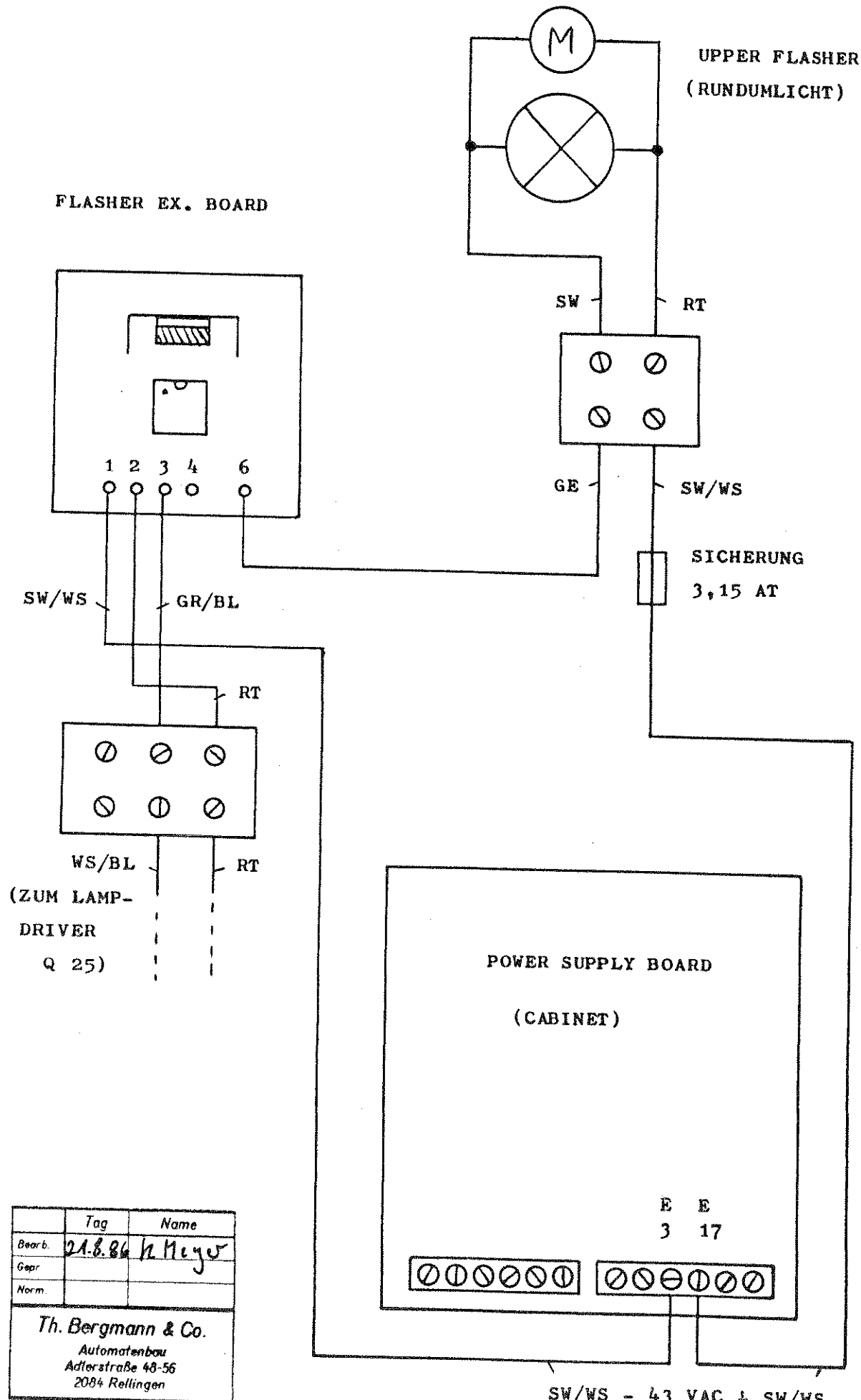
P. IVA e C. F. 03495190



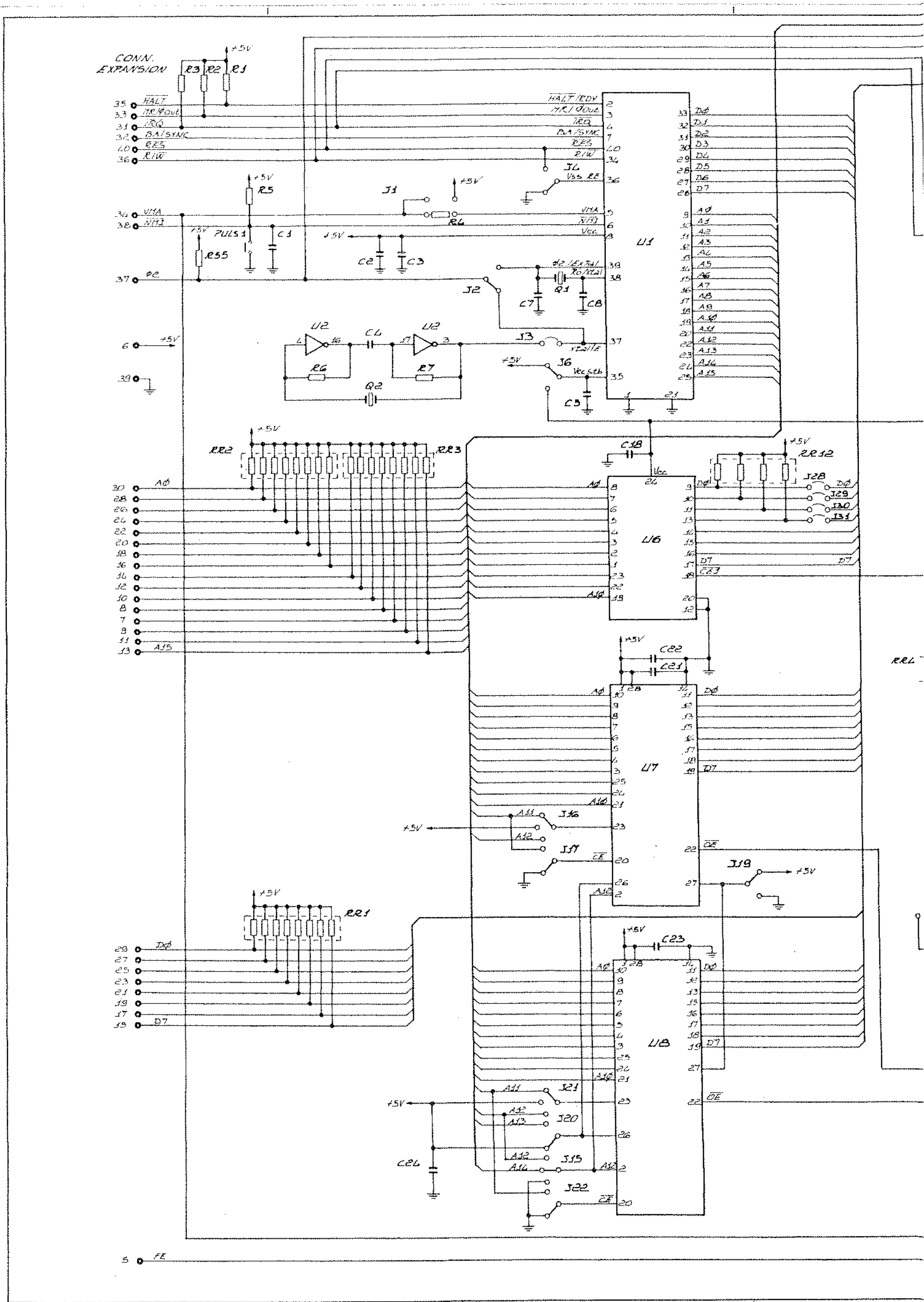
POWER MODULE PM 148.2

F L A S H E R L I G H T A S S E M B L Y

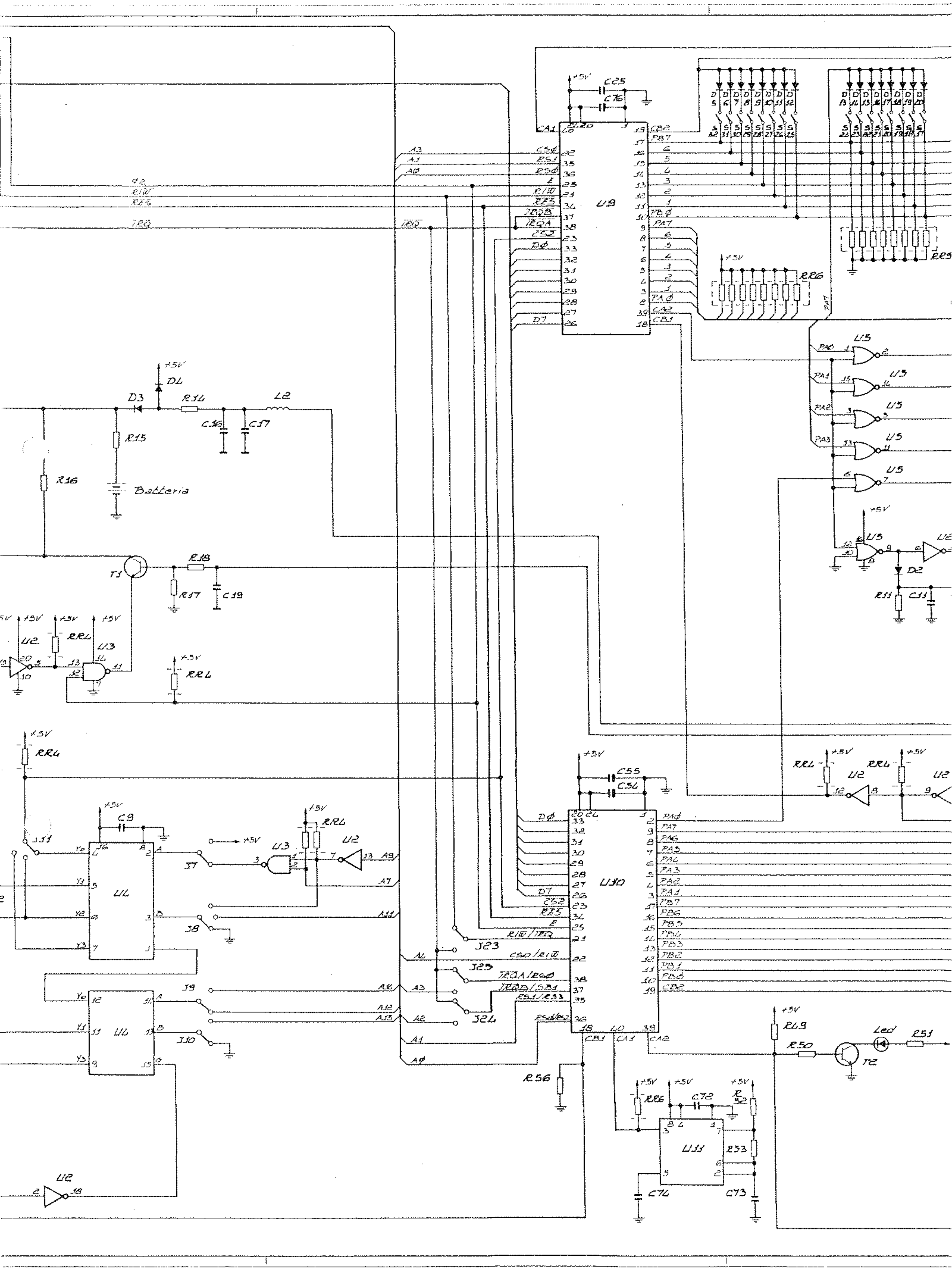


	Tag	Name
Bearb.	21.8.86	H. Meyer
Gepr.		
Norm.		

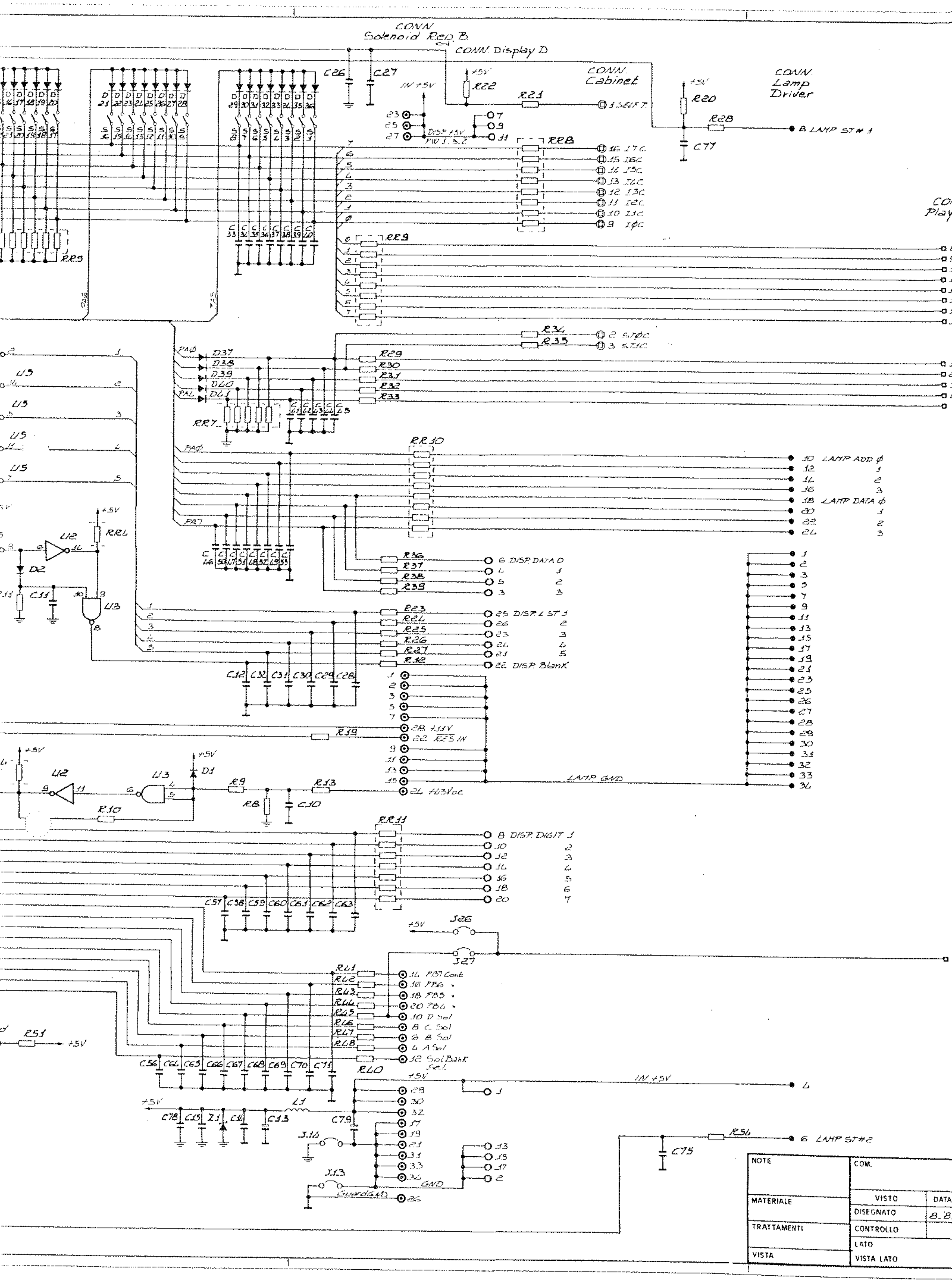
Th. Bergmann & Co.
Automatenbau
Adlerstraße 48-56
2084 Rellingen

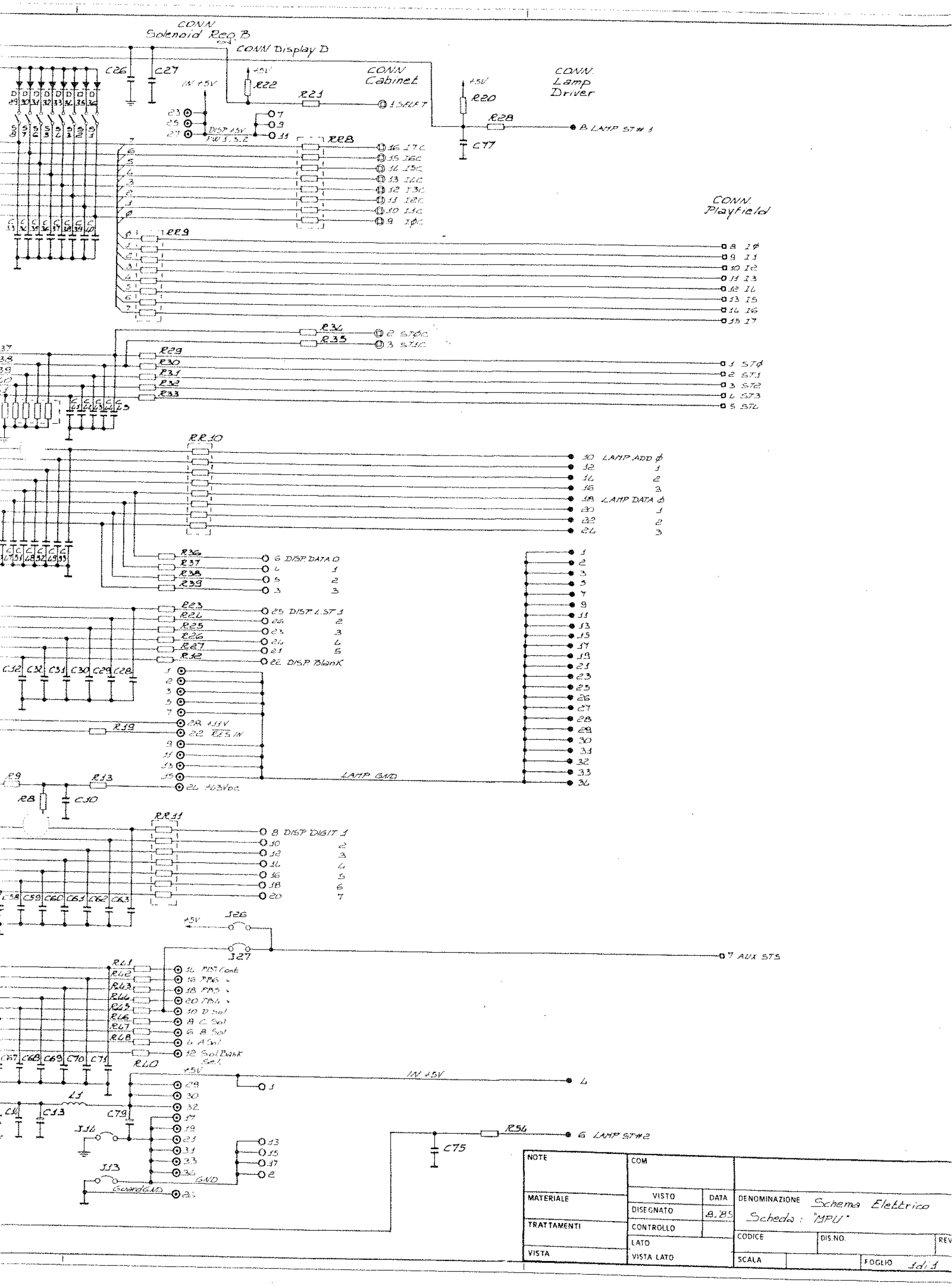


CONN.
EXPANSION
R3 R2 R1
+5V
HALT
MR/Φout
IRQ
BA/SYNC
RES
R/W
VMA
NMI
ΦE
FE
R5
R4
R55
PULS1
C1
C2
C3
J1
J2
J3
J4
J6
C4
C5
C7
C8
Q1
Q2
R6
R7
U1
U2
U6
U7
U8
RR1
RR2
RR3
RR12
C18
C21
C22
C23
C24
J15
J16
J17
J19
J20
J21
J22
J28
J29
J30
J31
HALT/RDY
MR/Φout
Vss RE
Vcc
Φ2/ExTal
Xo/Xtal
XTal/E
Vcc Stb
D0 D1 D2 D3 D4 D5 D6 D7
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15
CE
OE
CE3

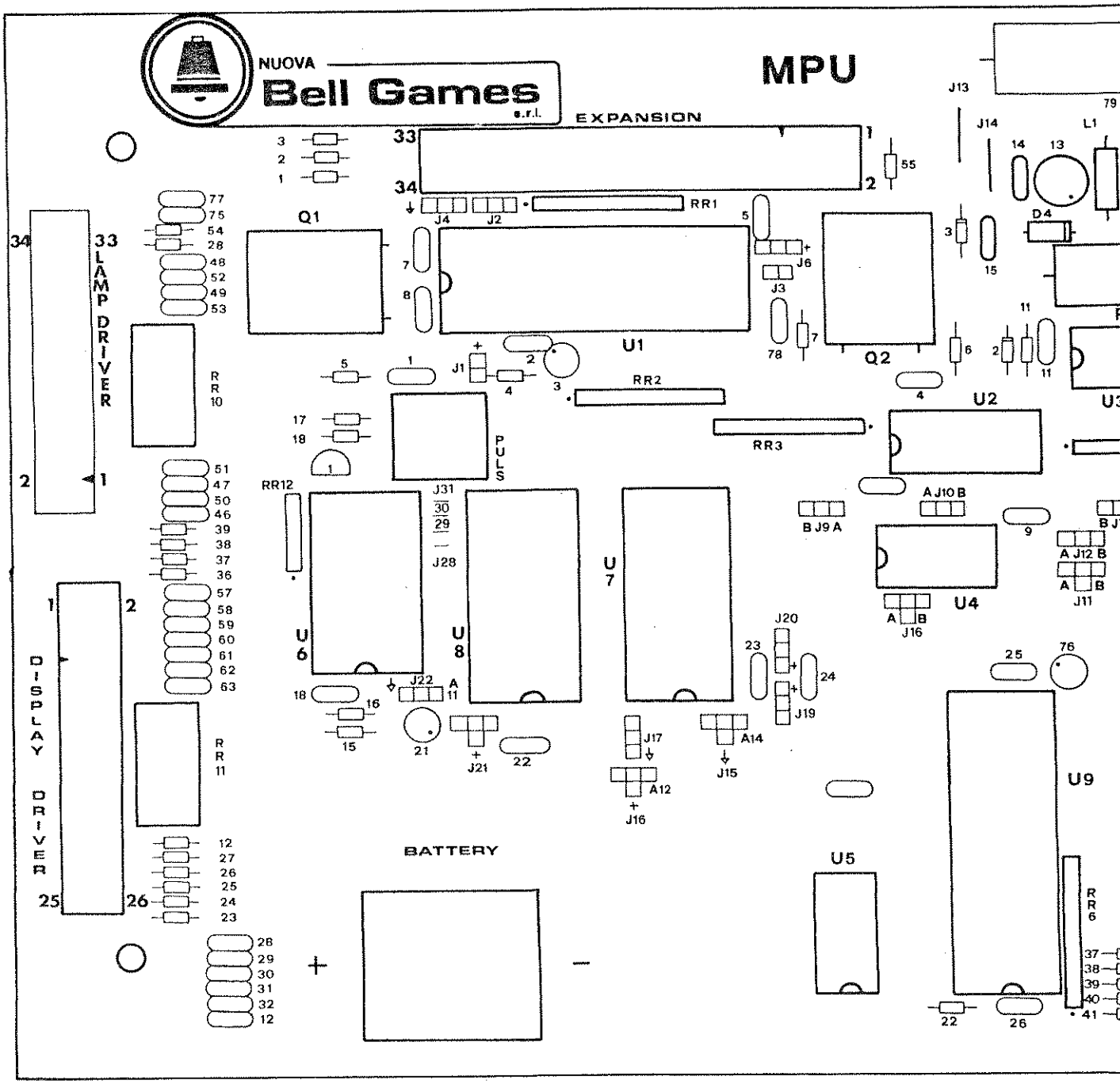


U9
U10
U11
U4
U5
U2
U3
T1
T2
D3
D4
D2
R14
R15
R16
R17
R18
R50
R51
R53
R56
C16
C17
C19
C25
C55
C72
C73
C74
L2
Batteria
Led
RR4
RR5
RR6
J7
J8
J9
J10
J11
J23
J24
+5V


CONN Solenoid Reg. B
CONN. Display D
CONN. Cabinet
CONN. Lamp Driver
1 SELF T.
8 LAMP ST # 1
DISP +5V PW S. S. E
RR5
RR7
RR8
RR9
RR10
RR11
10 LAMP ADD ø
18 LAMP DATA ø
6 DISP DATA 0
25 DISP L ST 1
22 DISP Blank
28 +13V
22 RES IN
24 +63Vdc
LAMP GND
8 DISP DIGIT 1
14 PB7 Cont
16 PB6
18 PB5
20 PB4
10 D Sol
8 C Sol
6 B Sol
4 A Sol
12 Sol Bank Sel.
IN +5V
GND
GuardGND
6 LAMP ST#2
NOTE
COM.
VISTO
DATA
MATERIALE
DISEGNATO
TRATTAMENTI
CONTROLLO
LATO
VISTA
VISTA LATO



CONN Solenoid Reg B
CONN Display D
CONN Cabinet
CONN. Lamp Driver
CONN. Playfield
LAMP ADD
LAMP DATA
DISP DATA
DISP. L ST
DISP. Blank
LAMP GND
DISP DIGIT
AUX STS
IN +5V
GND
Guard GND
LAMP ST#1
LAMP ST#2
NOTE
COM
MATERIALE
VISTO
DATA
DENOMINAZIONE
Schema Elettrico
Scheda : "MPU"
DISEGNATO
8.85
TRATTAMENTI
CONTROLLO
CODICE
DIS.NO.
REV
LATO
VISTA
VISTA LATO
SCALA
FOGLIO
1 di 1


NUOVA
Bell Games
s.r.l.
MPU
EXPANSION
LAMP DRIVER
DISPLAY DRIVER
BATTERY
PULS
Q1
Q2
U1
U2
U3
U4
U5
U6
U7
U8
U9
RR1
RR2
RR3
RR12
RR
RR
RR
J1
J2
J3
J4
J6
J11
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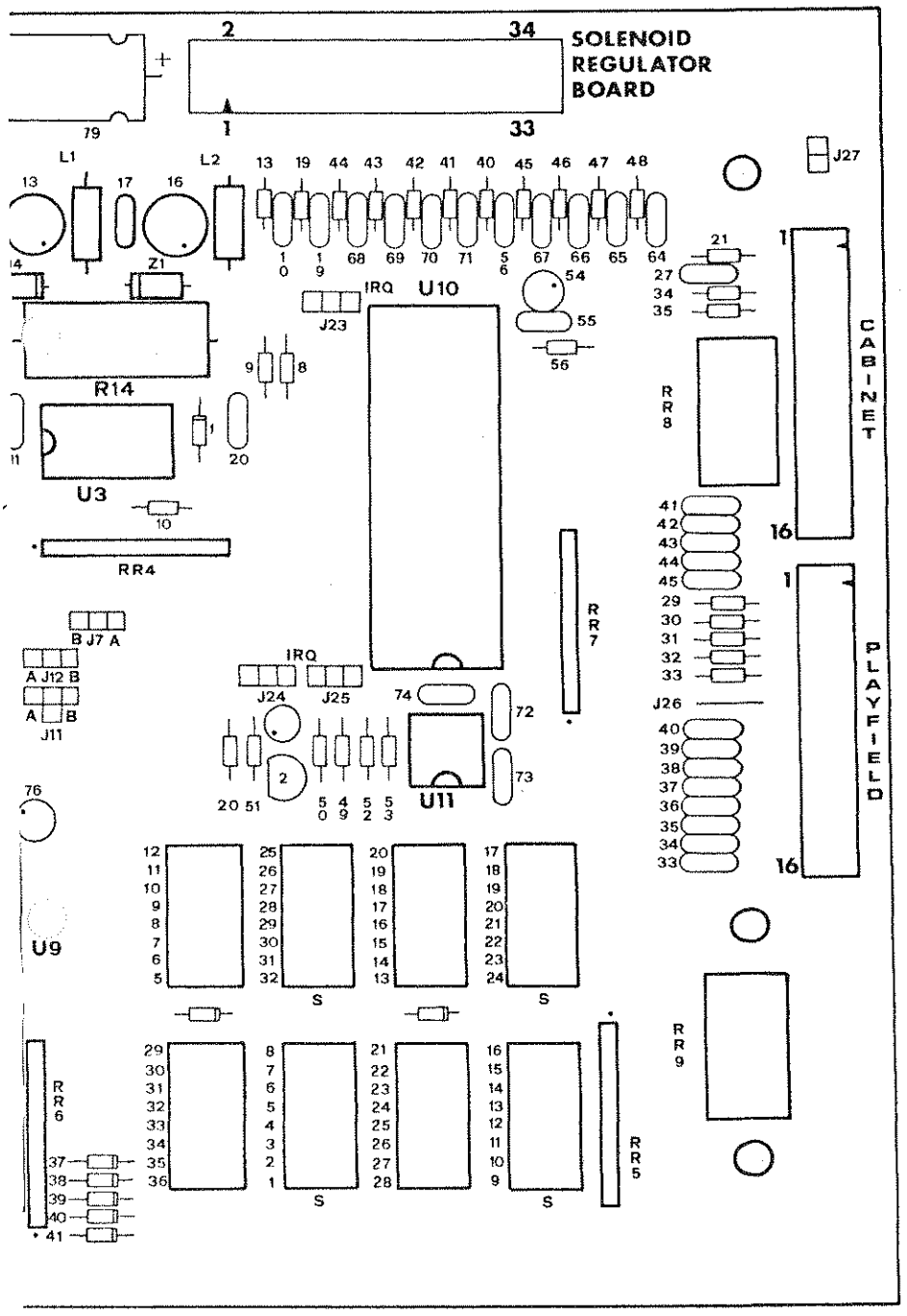
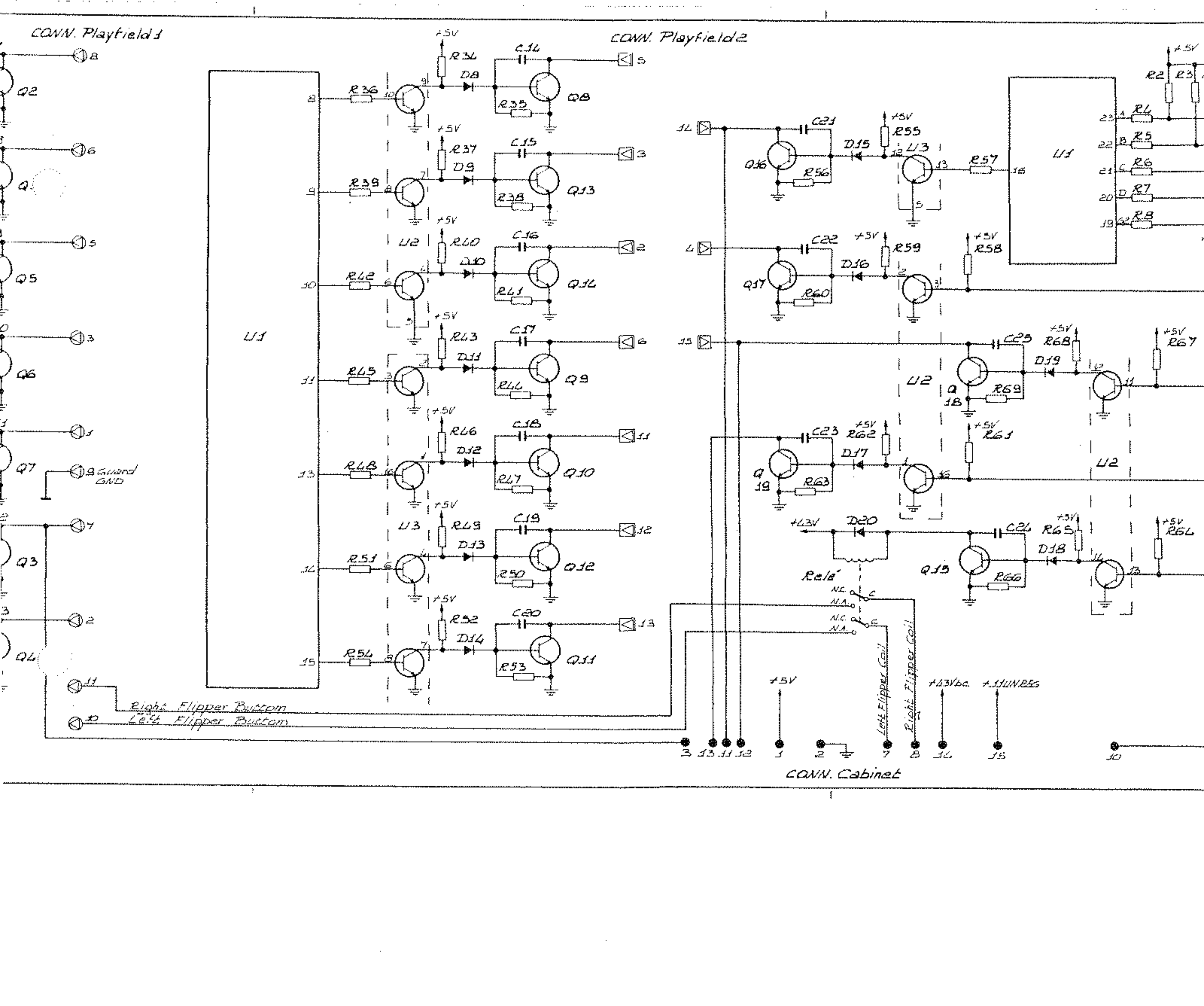
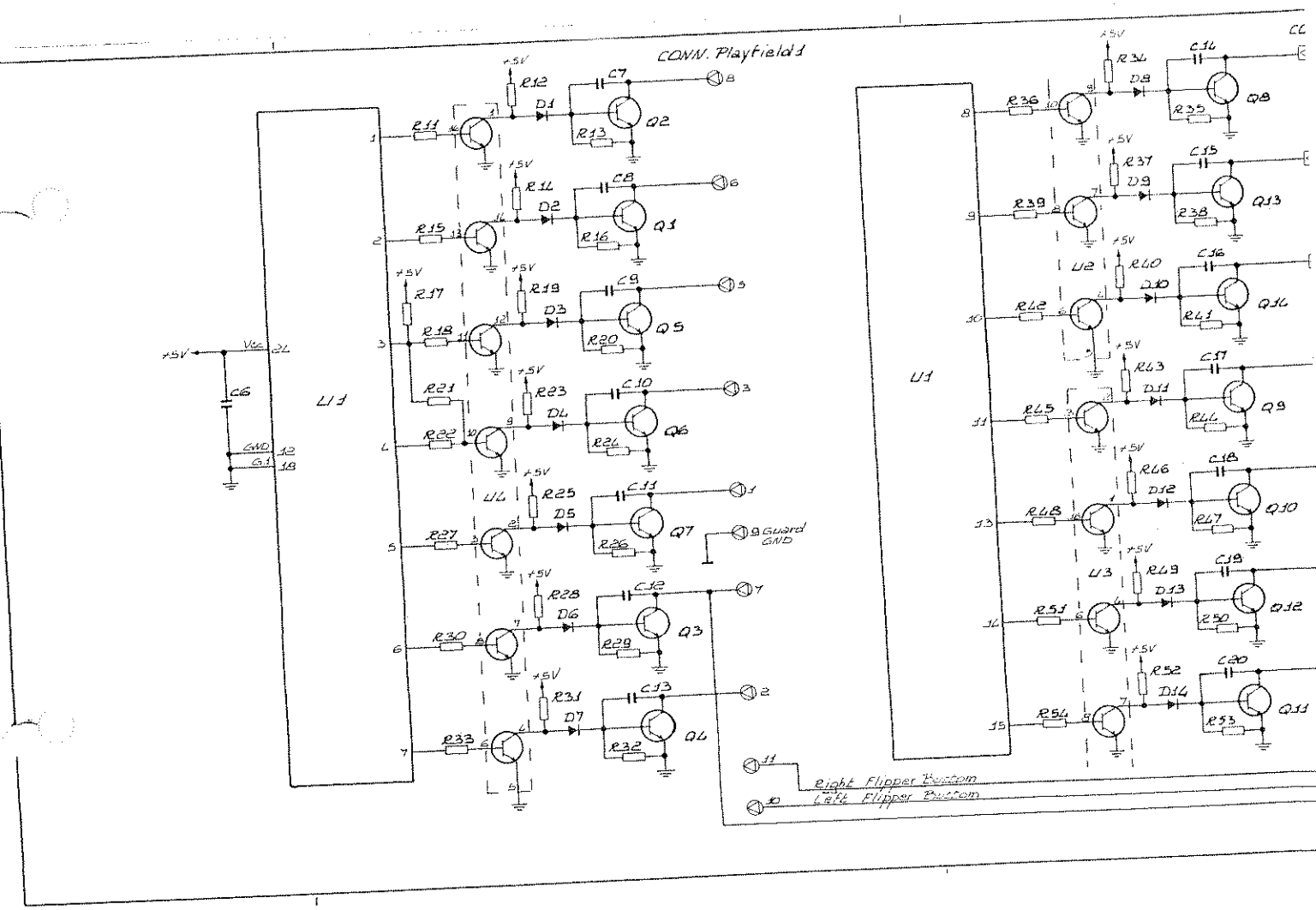
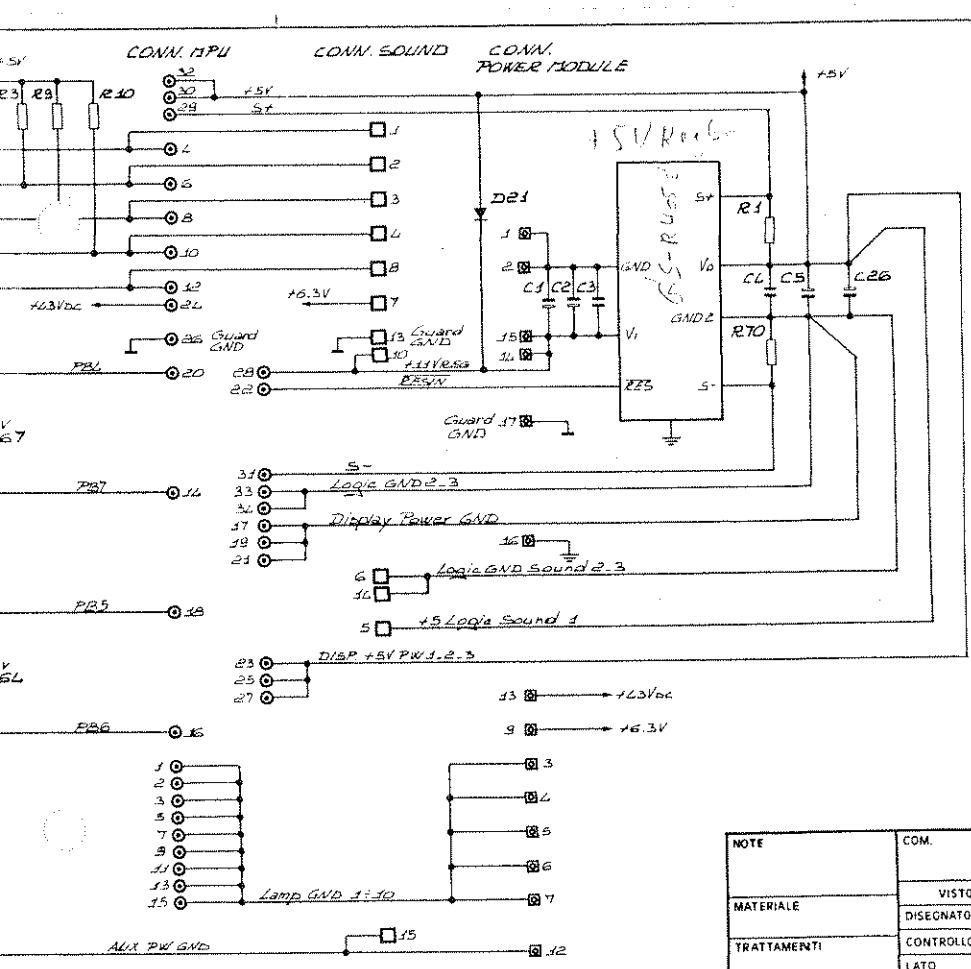
J20
J21
J22
J28
J31
D4
L1


SOLENOID
REGULATOR
BOARD
2
34
1
33
79
L1
L2
J27
U10
U11
U3
U9
R14
RR4
RR5
RR6
RR7
RR8
RR9
Z1
IRQ
J23
J24
J25
J26
J11
J12
J7
CABINET
PLAYFIELD
16
S

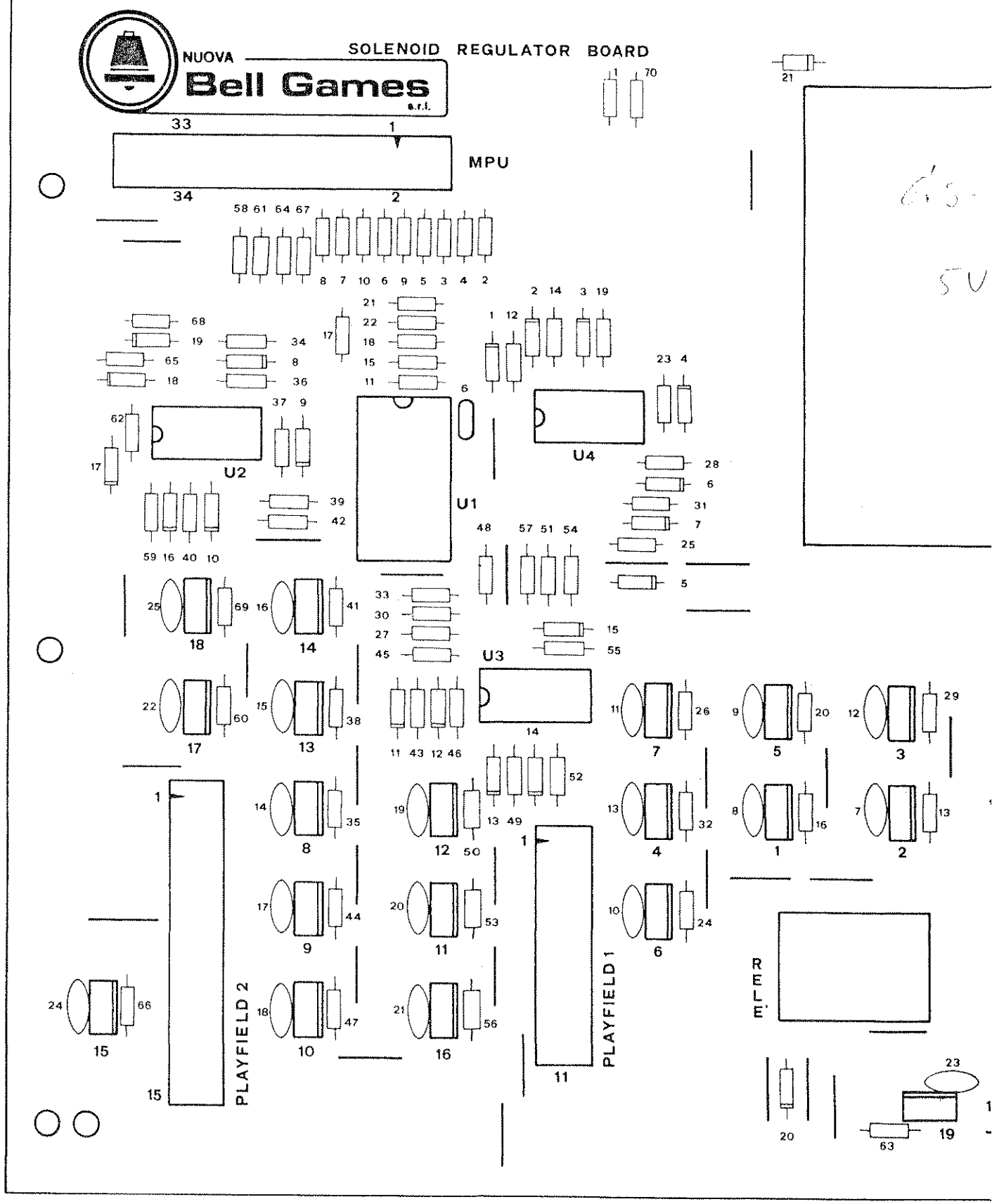


CONN. Playfield 1
CONN. Playfield 2
U1
U2
U3
9 Guard GND
Right Flipper Button
Left Flipper Button
Relè
Left Flipper Coil
Right Flipper Coil
+5V
CONN. Cabinet

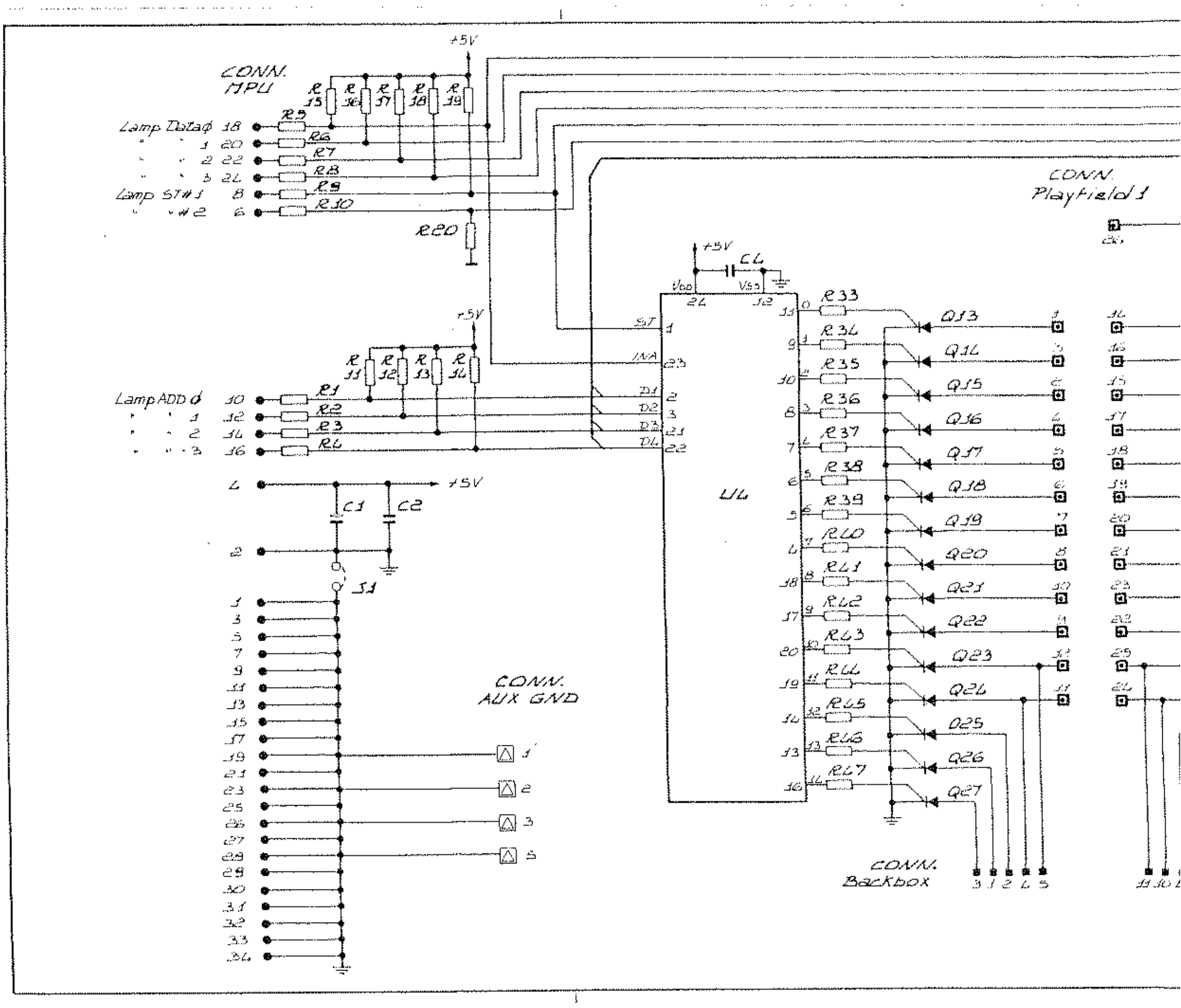

CONN. Playfield 1
U1
U2
U3
U4
+5V
Vcc
GND
G1
C6
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
R25
R26
R27
R28
R29
R30
R31
R32
R33
R34
R35
R36
R37
R38
R39
R40
R41
R42
R43
R44
R45
R46
R47
R48
R49
R50
R51
R52
R53
R54
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
Q13
Q14
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
C19
C20
Guard
GND
Right Flipper Button
Left Flipper Button



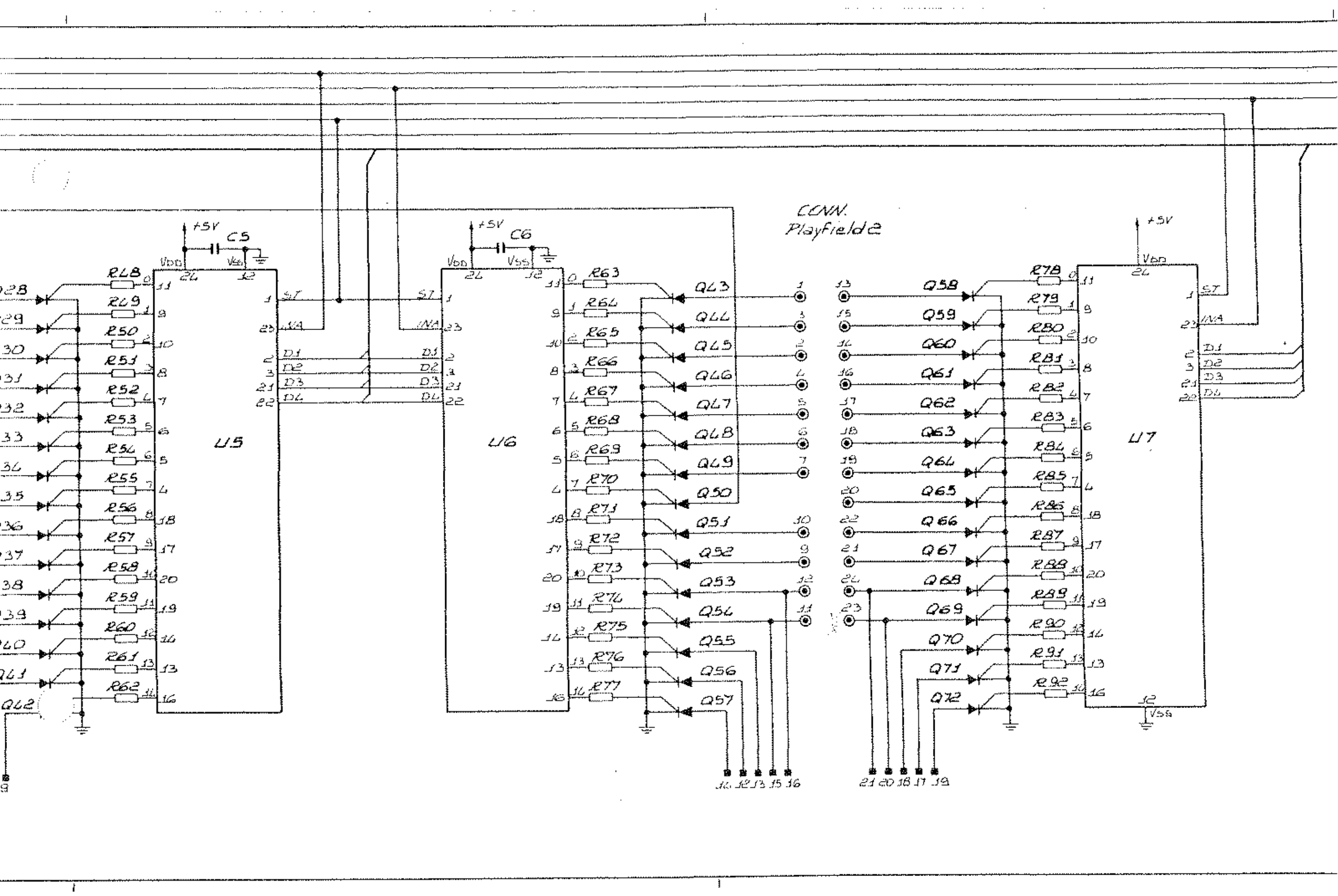
NOTE	COM.			
MATERIALE	VISTO	DATA	DENOMINAZIONE Schema Elettrico Scheda: "Solenoid Regulator Board"	
	DISEGNATO	B. 85		
TRATTAMENTI	CONTROLLO		CODICE	DIS.NO / REV
	LATO			
VISTA	VISTA LATO		SCALA	FOGLIO 1 di 1


NUOVA
Bell Games
s.r.l.
SOLENOID REGULATOR BOARD
MPU
U1
U2
U3
U4
PLAYFIELD 1
PLAYFIELD 2
RELAY

C1
C3
C2
C26
C5
C4
1
15
CABINET
1
15
SOUND
1
17
POWER MODULE



CONN.
MPU
Lamp Data ϕ
Lamp ST#1
CONN.
Playfield 1
Lamp ADD ϕ
+5V
U4
CONN.
AUX GND
CONN.
Backbox


CONN.
Playfield2
+5V
C5
C6
U5
U6
U7
VDD
VSS
ST
INA
D1
D2
D3
D4
R48
R49
R50
R51
R52
R53
R54
R55
R56
R57
R58
R59
R60
R61
R62
R63
R64
R65
R66
R67
R68
R69
R70
R71
R72
R73
R74
R75
R76
R77
R78
R79
R80
R81
R82
R83
R84
R85
R86
R87
R88
R89
R90
R91
R92
Q42
Q43
Q44
Q45
Q46
Q47
Q48
Q49
Q50
Q51
Q52
Q53
Q54
Q55
Q56
Q57
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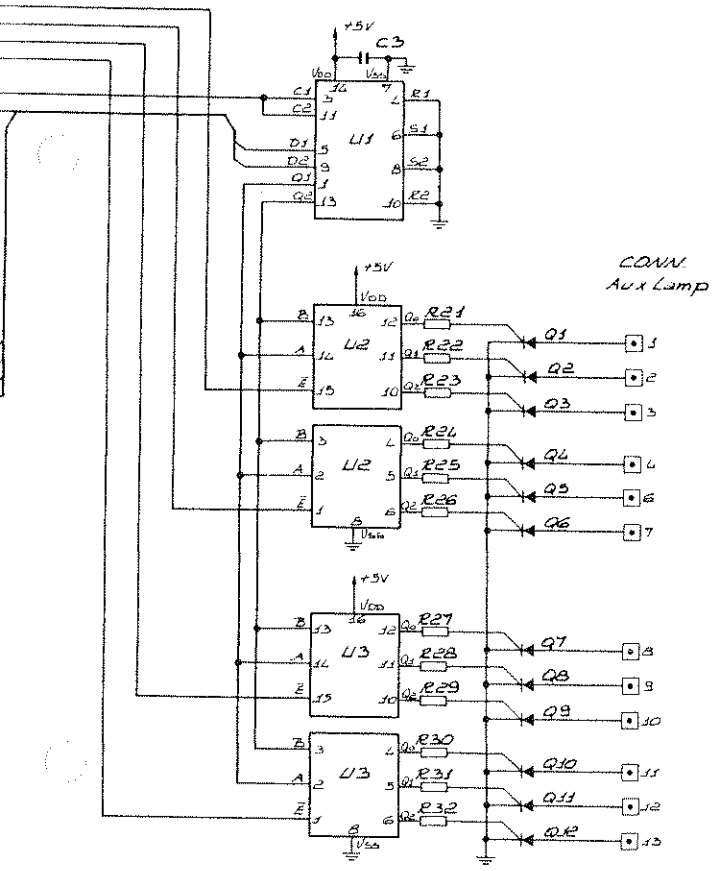
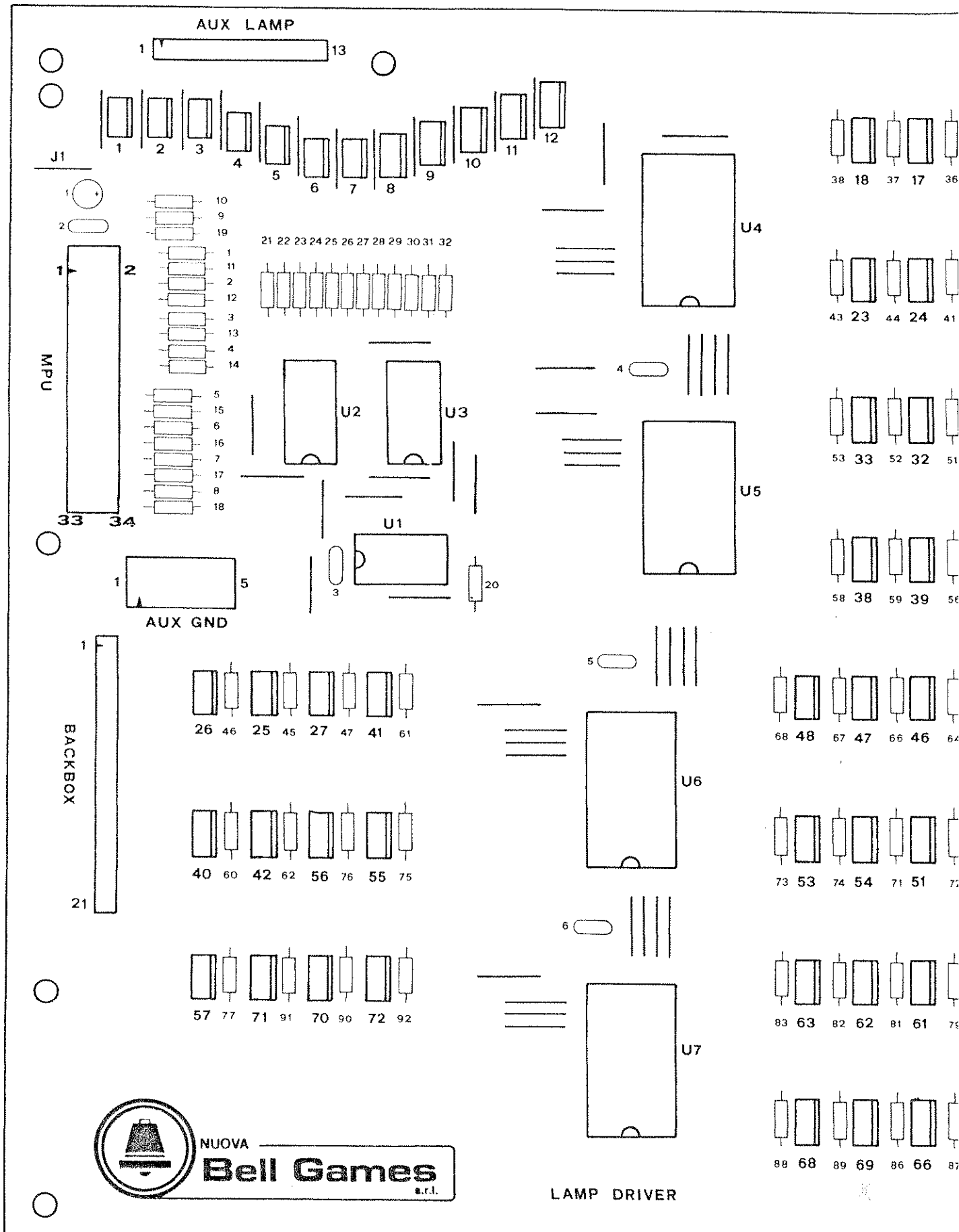
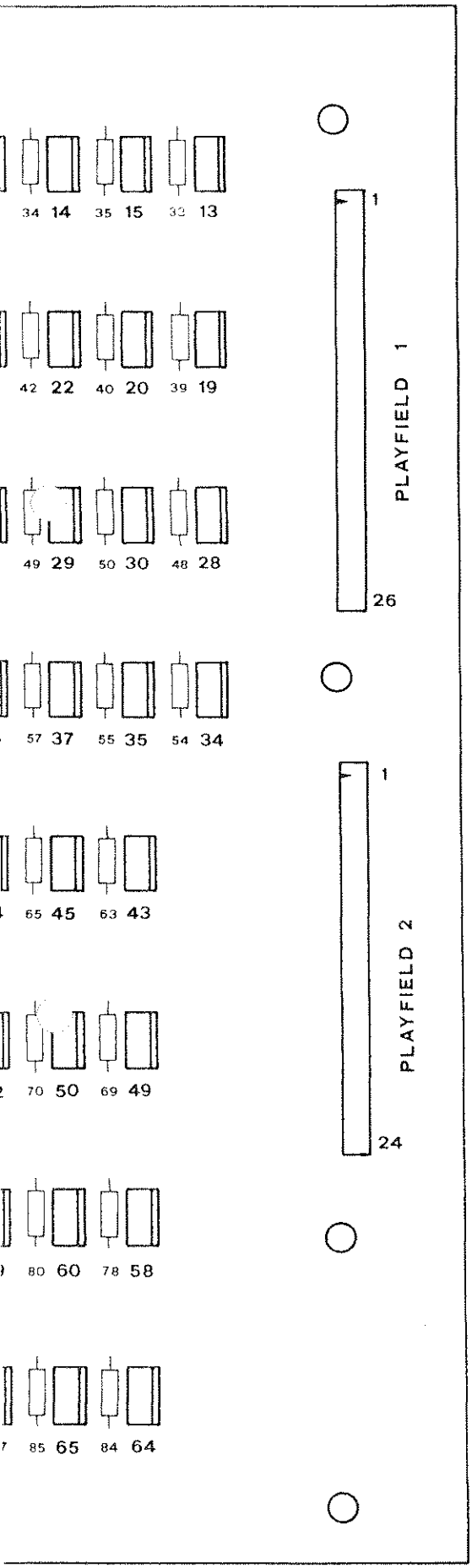
Q61
Q62
Q63
Q64
Q65
Q66
Q67
Q68
Q69
Q70
Q71
Q72



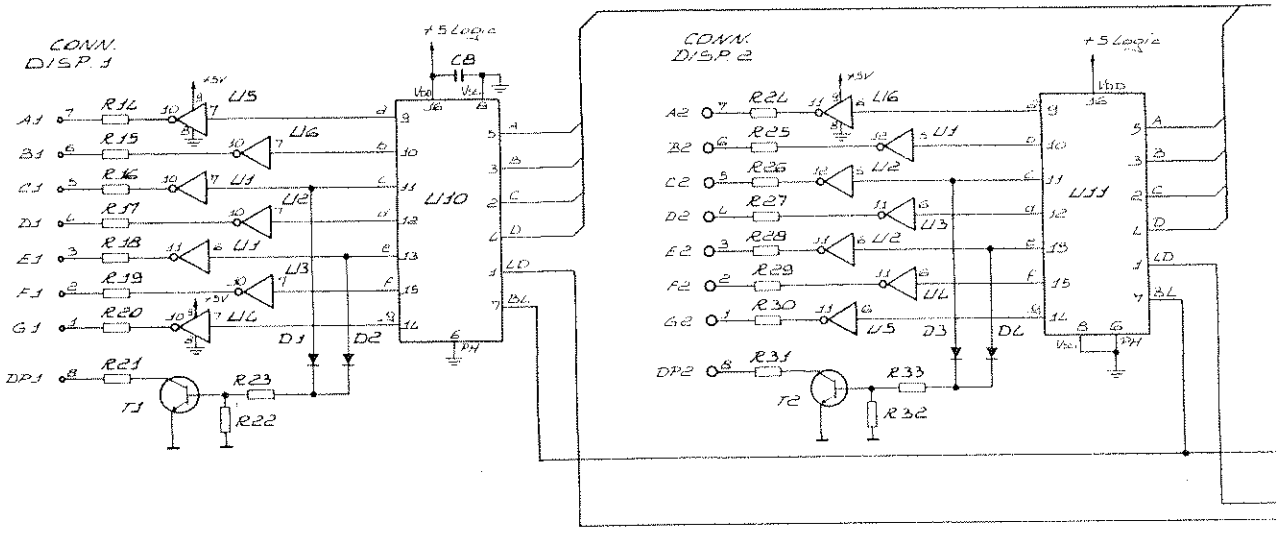
NOTE	COM.		
MATERIALE	VISTO	DATA	DENOMINAZIONE Schema Elettrico Scheda : "Lamp Driver"
	DISEGNATO	8.'85	
TRATTAMENTI	CONTROLLO		CODICE / DIS.NO / REV
VISTA	LATO / VISTA LATO		SCALA / FOGLIO 1 di 1

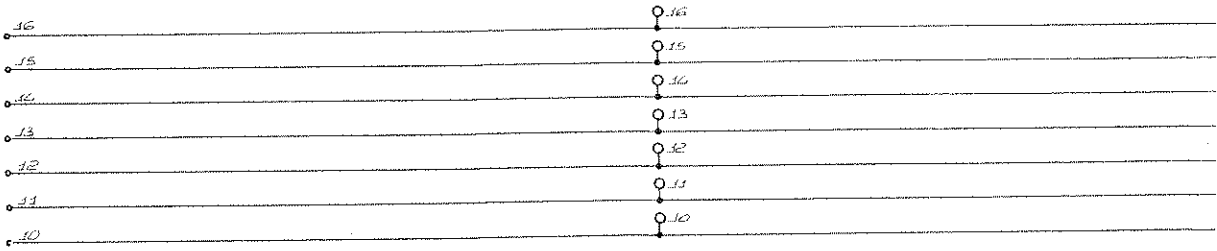

AUX LAMP
1
13
J1
1
2
3
4
5
6
7
8
9
10
11
12
MPU
1
2
33
34
10
9
19
1
11
2
12
3
13
4
14
5
15
6
16
7
17
8
18
21 22 23 24 25 26 27 28 29 30 31 32
U1
U2
U3
U4
U5
U6
U7
20
AUX GND
1
5
BACKBOX
1
21
26 46 25 45 27 47 41 61
40 60 42 62 56 76 55 75
57 77 71 91 70 90 72 92
38 18 37 17 36
43 23 44 24 41
53 33 52 32 51
58 38 59 39 56
68 48 67 47 66 46 64
73 53 74 54 71 51 72
83 63 82 62 81 61 79
88 68 89 69 86 66 87
NUOVA
Bell Games
s.r.l.
LAMP DRIVER

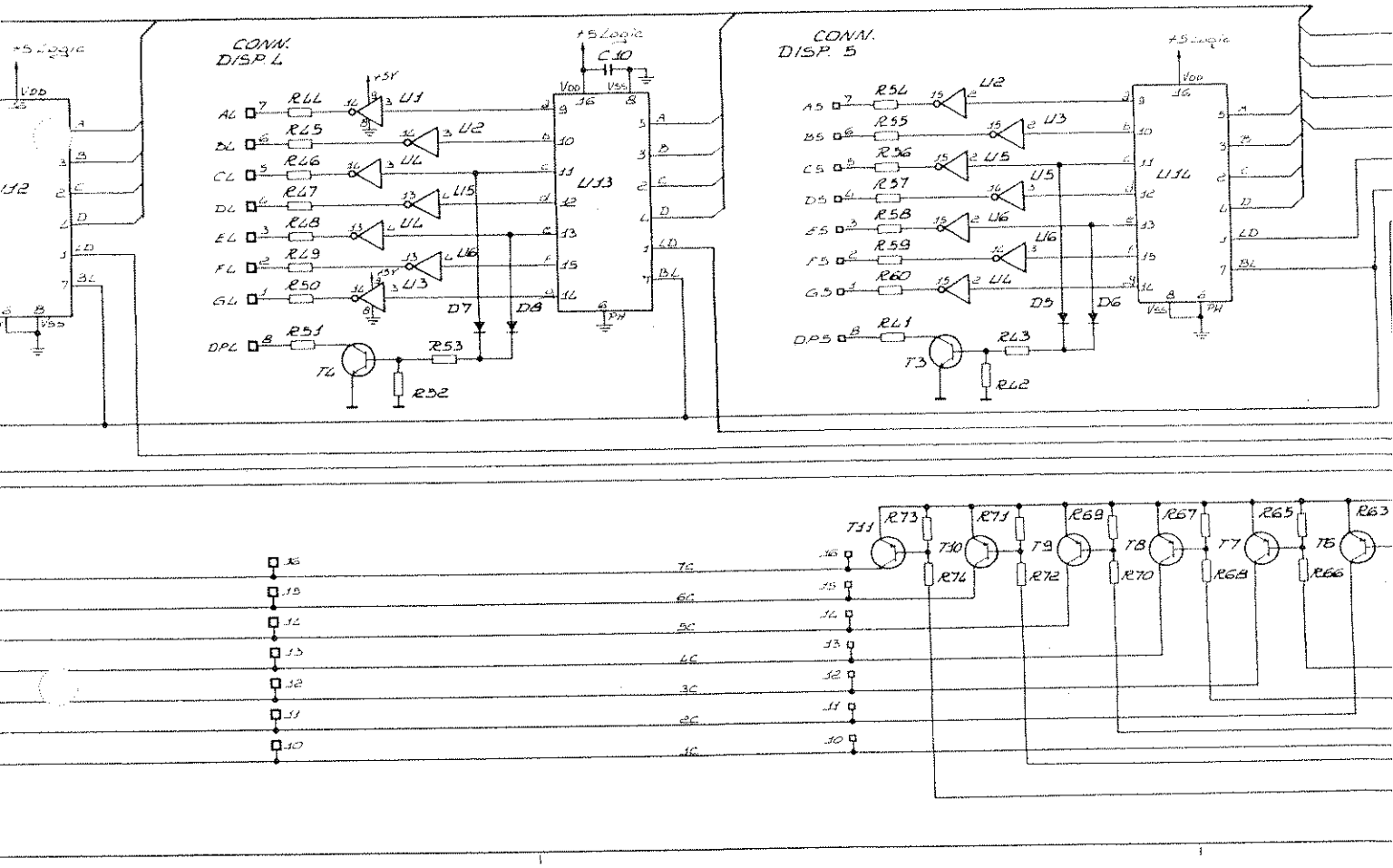

34 14
35 15
33 13
42 22
40 20
39 19
49 29
50 30
48 28
57 37
55 35
54 34
65 45
63 43
70 50
69 49
80 60
78 58
85 65
84 64
1
PLAYFIELD 1
26
1
PLAYFIELD 2
24

1. SP

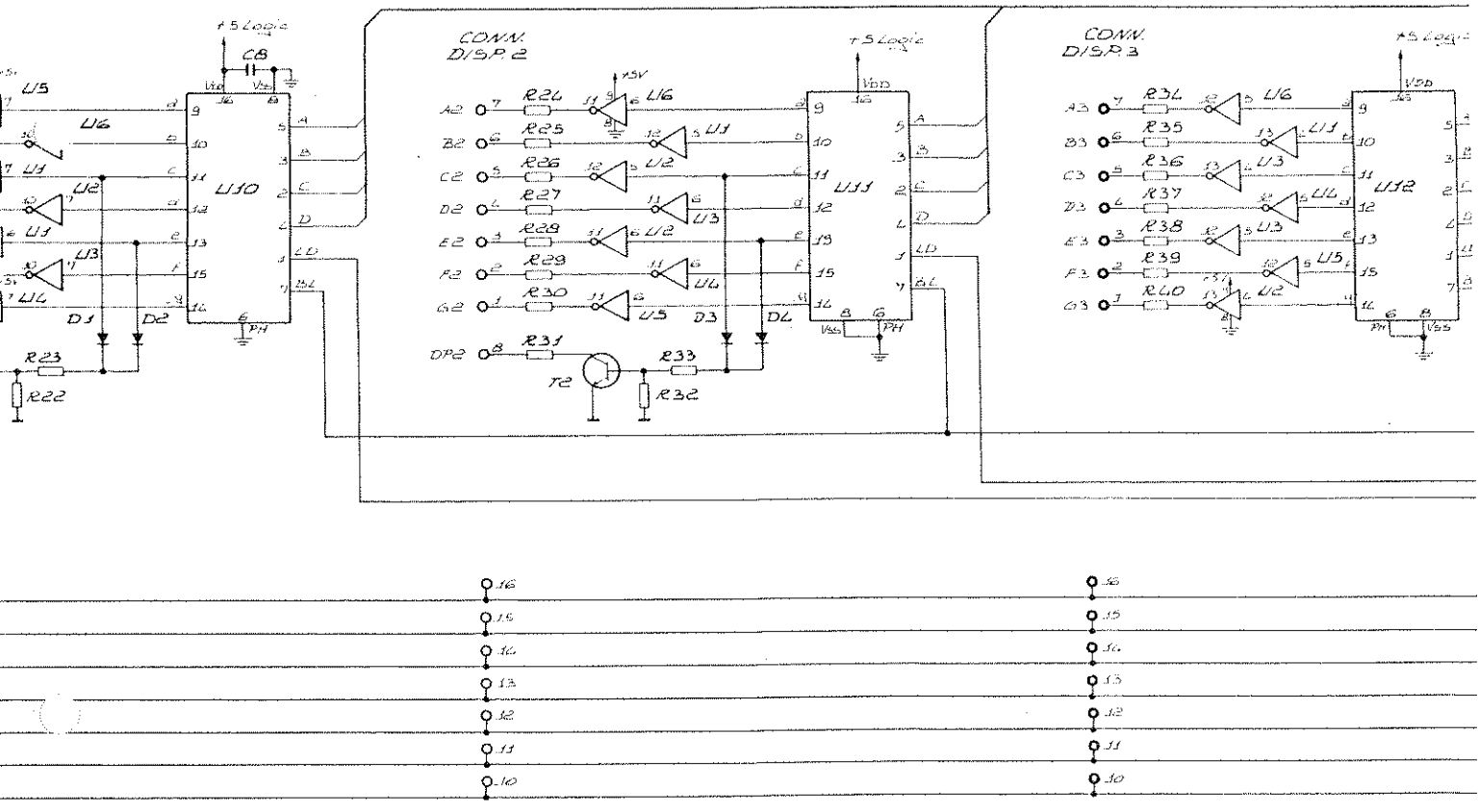
2. SP


CONN.
DISP. 1
+5 Logic
C8
U10
U5
U6
U1
U2
U3
U4
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
T1
D1
D2
A1
B1
C1
D1
E1
F1
G1
DP1
CONN.
DISP. 2
+5 Logic
U11
U6
U1
U2
U3
U4
U5
R24
R25
R26
R27
R28
R29
R30
R31
R32
R33
T2
D3
D4
A2
B2
C2
D2
E2
F2
G2
DP2

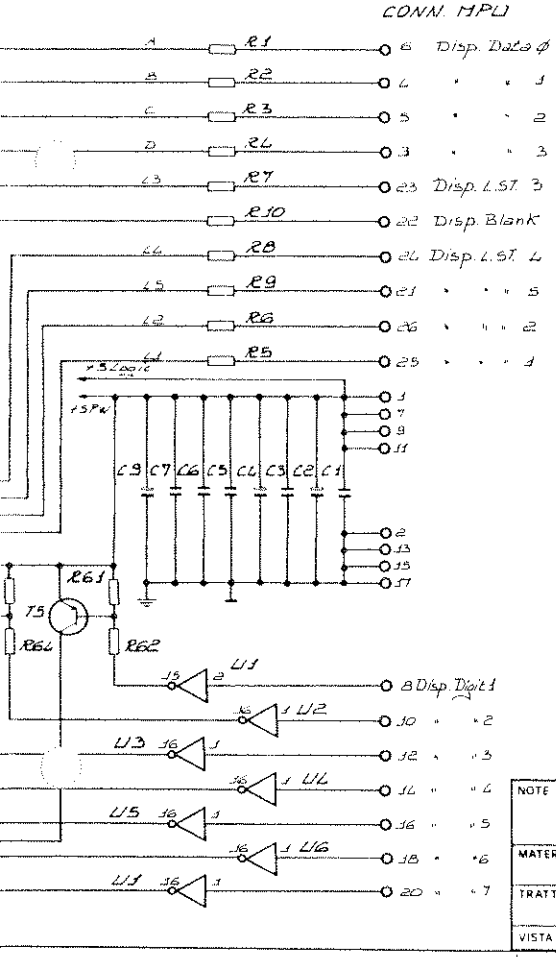

16
15
14
13
12
11
10


CONN.
DISP. L
CONN.
DISP. 5
+5 Logic
C30
R44
R45
R46
R47
R48
R49
R50
R51
R52
R53
R54
R55
R56
R57
R58
R59
R60
R61
R62
R63
U1
U2
U4
U5
U6
U3
U12
U13
U14
T1
T2
T3
D7
D8
D5
D6
AL
BL
CL
DL
EL
FL
GL
DPL
AS
BS
CS
DS
ES
FS
GS
DPS
LD
BL

T11
T10
T9
T8
T7
T6
R73
R71
R69
R67
R65
R63
R74
R72
R70
R68
R66

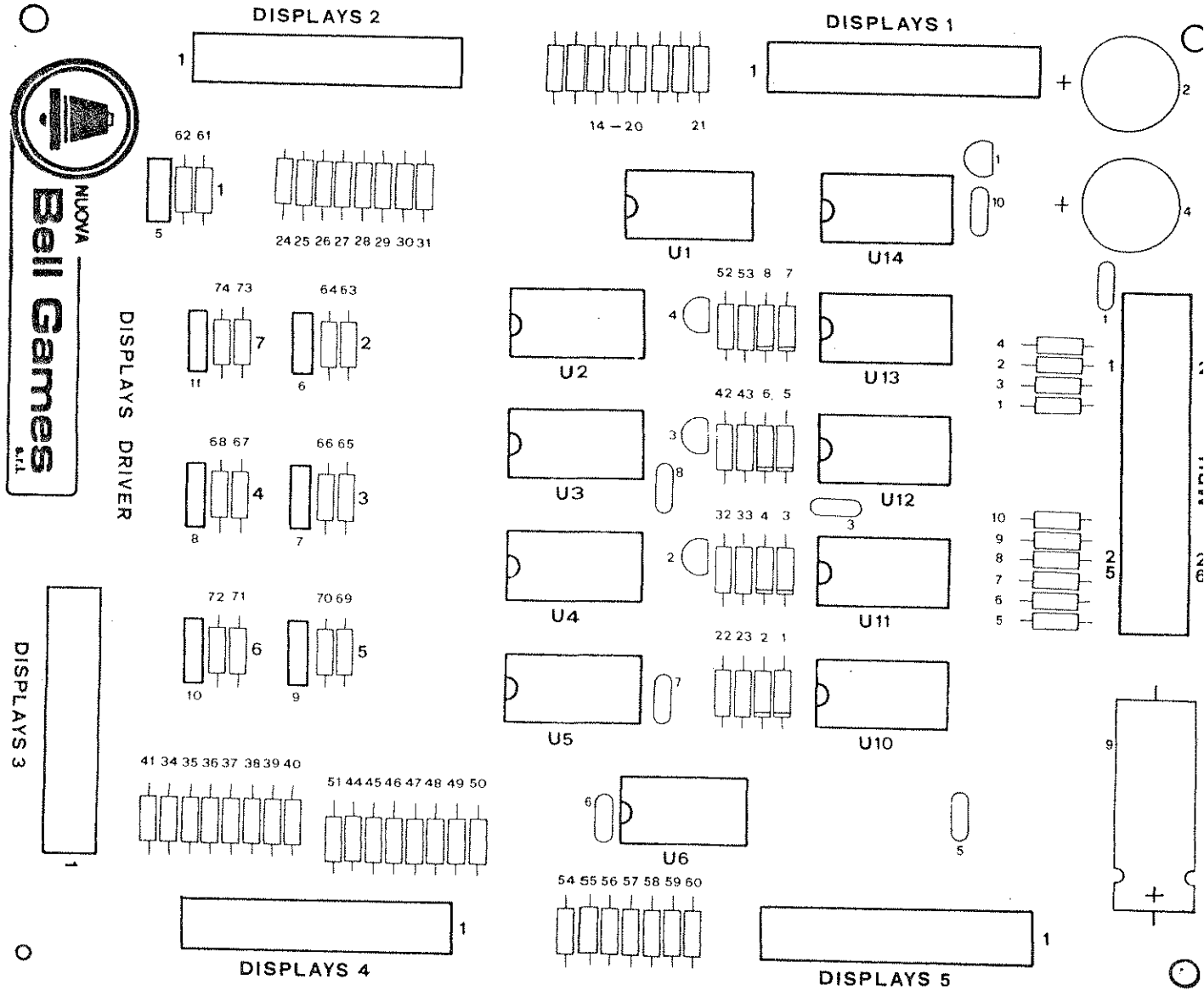

+5 Logic
C8
U5
U6
U4
U2
U1
U3
U7
U10
D1
D2
R23
R22
CONN.
D/S.P.2
+5V
R26
R25
R26
R27
R28
R29
R30
R31
R33
R32
U6
U1
U2
U3
U4
U5
T2
A2
B2
C2
D2
E2
F2
G2
DP2
U11
D3
DL
CONN.
D/S.P.3
R34
R35
R36
R37
R38
R39
R40
U12
A3
B3
C3
D3
E3
F3
G3

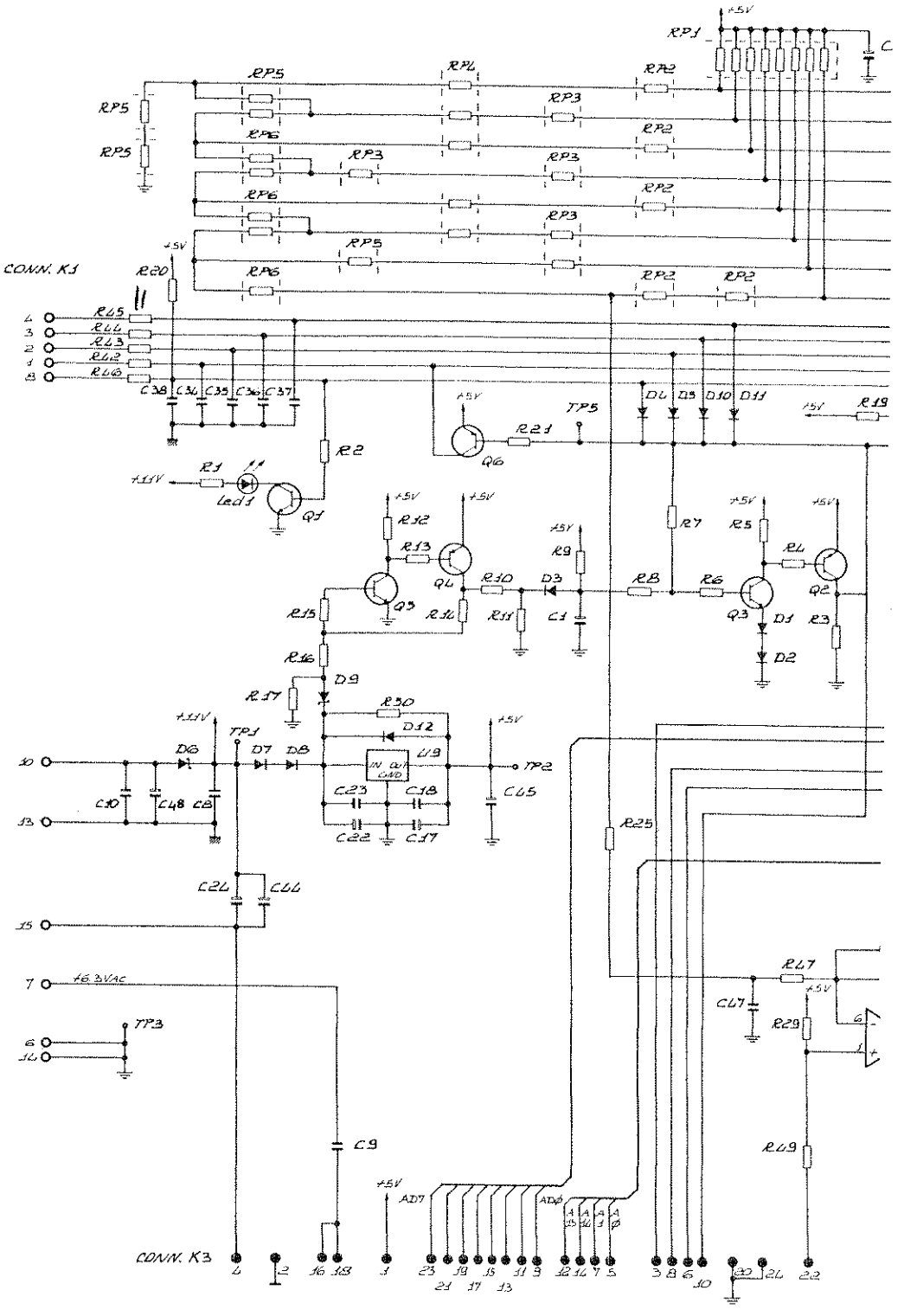
16
15
14
13
12
11
10

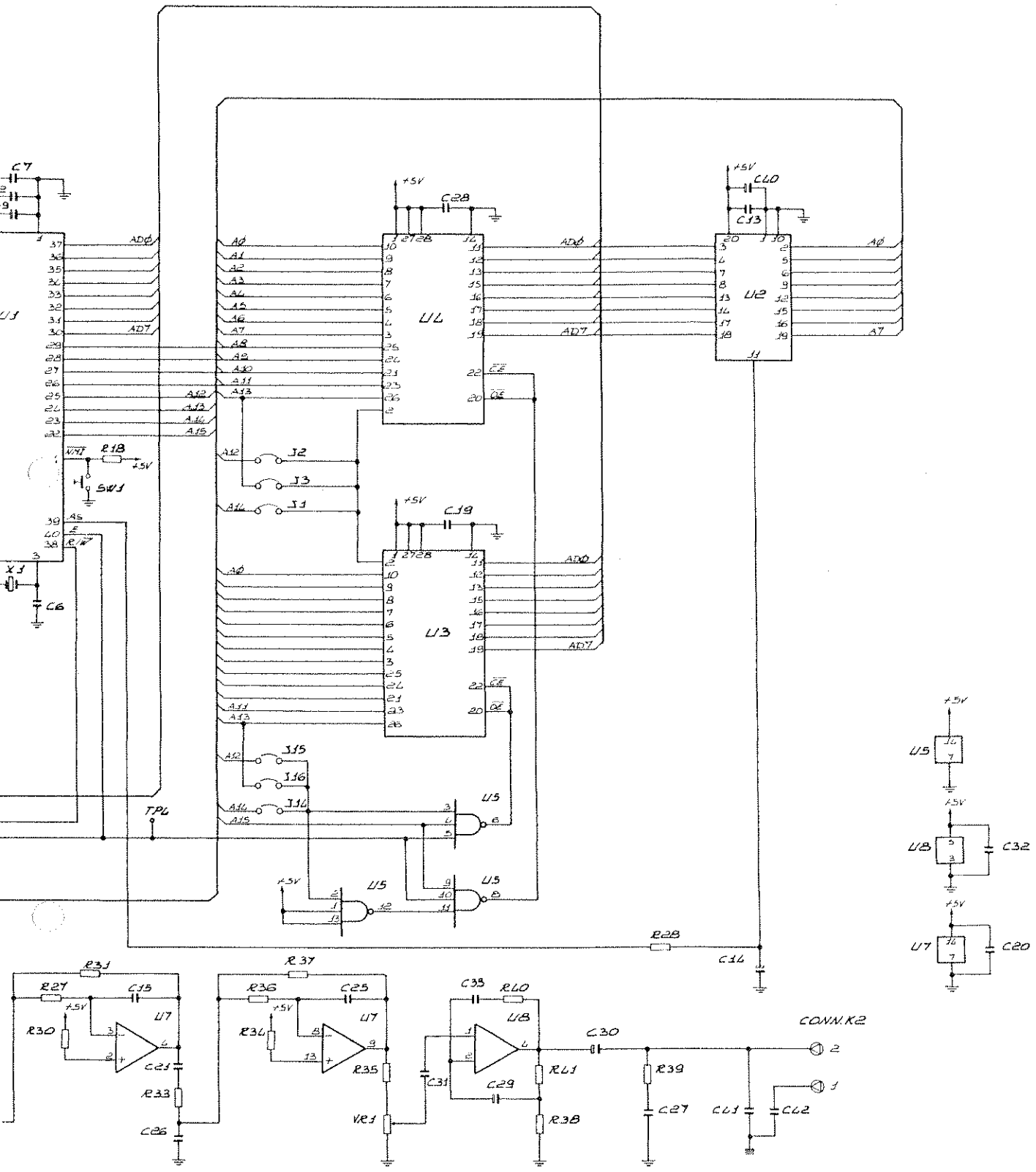


NOTE	COM.			
MATERIALE	VISTO	DATA	DENOMINAZIONE Schema Elettrico	
	DISEGNATO	8.85	Scheda: "Display Driver"	
TRATTAMENTI	CONTROLLO		CODICE	DIS NO / REV
	LATO			
VISTA	VISTA LATO		SCALA	FOGLIO 1di 1

Display Driver

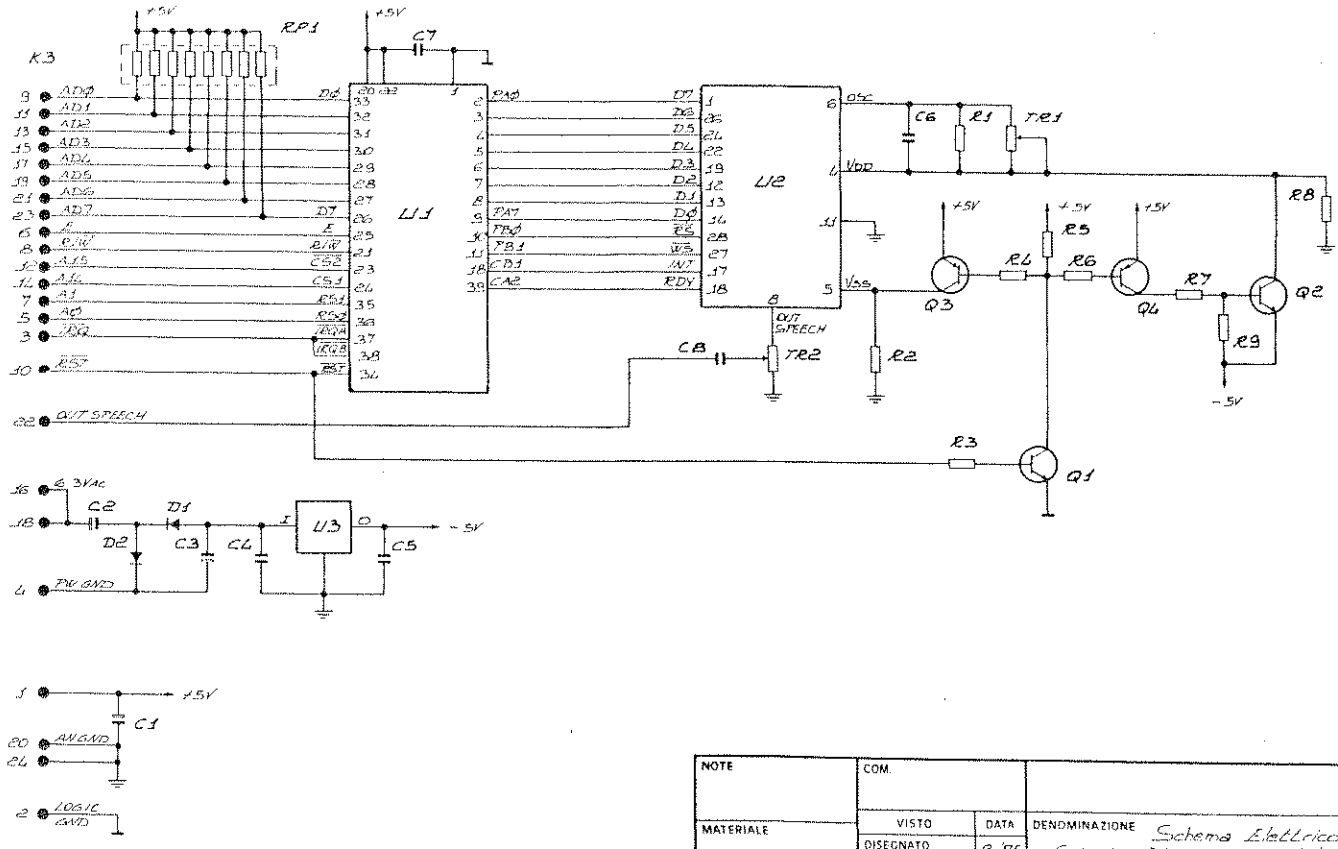



CONN. K1
CONN. K3
+5V
+11V
+46.3VAC
RP1
RP2
RP3
RP5
RP6
R20
R45
R44
R43
R42
R46
C38
C34
C35
C36
C37
R2
R1
Led1
Q1
R21
Q6
TP5
D4
D5
D10
D11
R19
R12
R13
Q4
Q5
R10
D3
R9
R8
R7
R5
R4
Q2
Q3
D1
D2
R3
R15
R14
R11
C1
R16
D9
R17
R18
D12
U3
IN OUT
GND
TP2
TP1
D6
D7
D8
C10
C48
C8
C23
C18
C22
C17
C45
C24
C44
R25
R47
C47
R29
R49
C9
TP3
AD7
AD0
CONN. K3



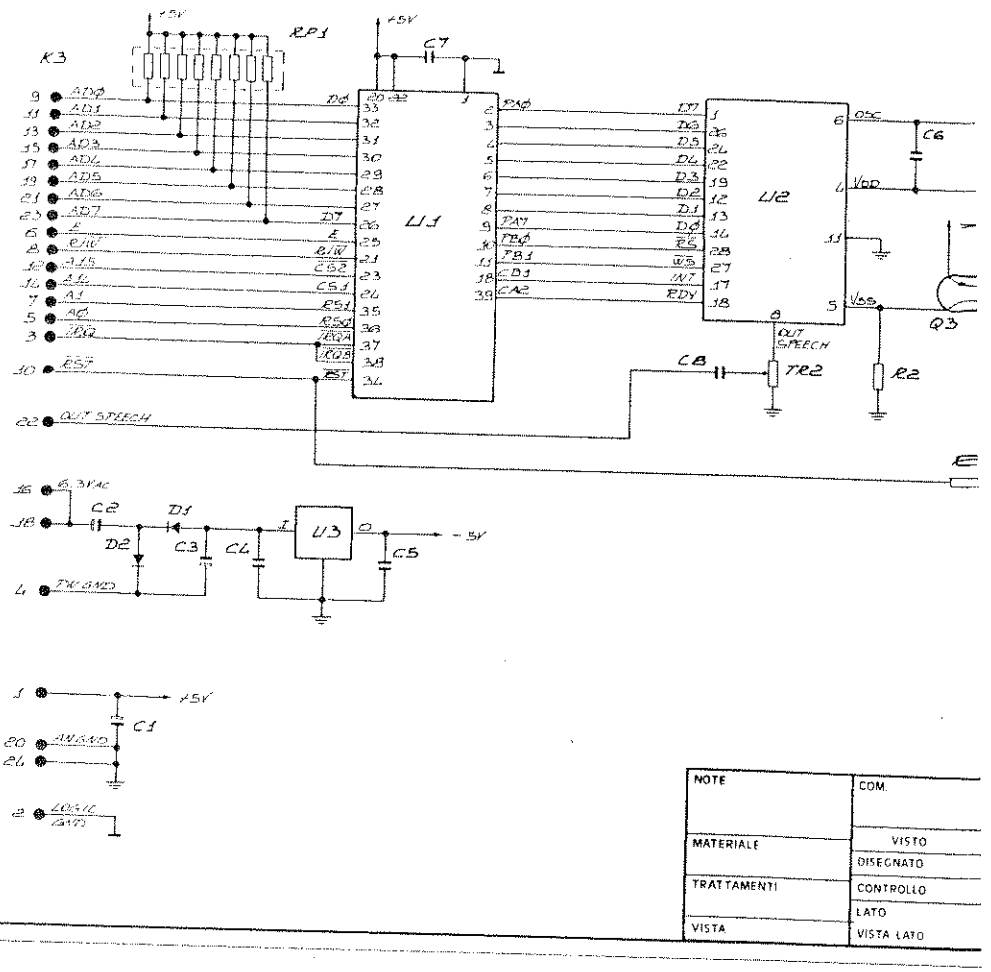
NOTE	COM.			
MATERIALE		VISTO	DATA	DENOMINAZIONE Schema Elettrico Scheda: "Sound Module"
		DISEGNATO	9..85	
TRATTAMENTI		CONTROLLO		CODICE / DIS NO / REV
		LATO		
VISTA		VISTA LATO		SCALA / FOGLIO 1di 1

Speech



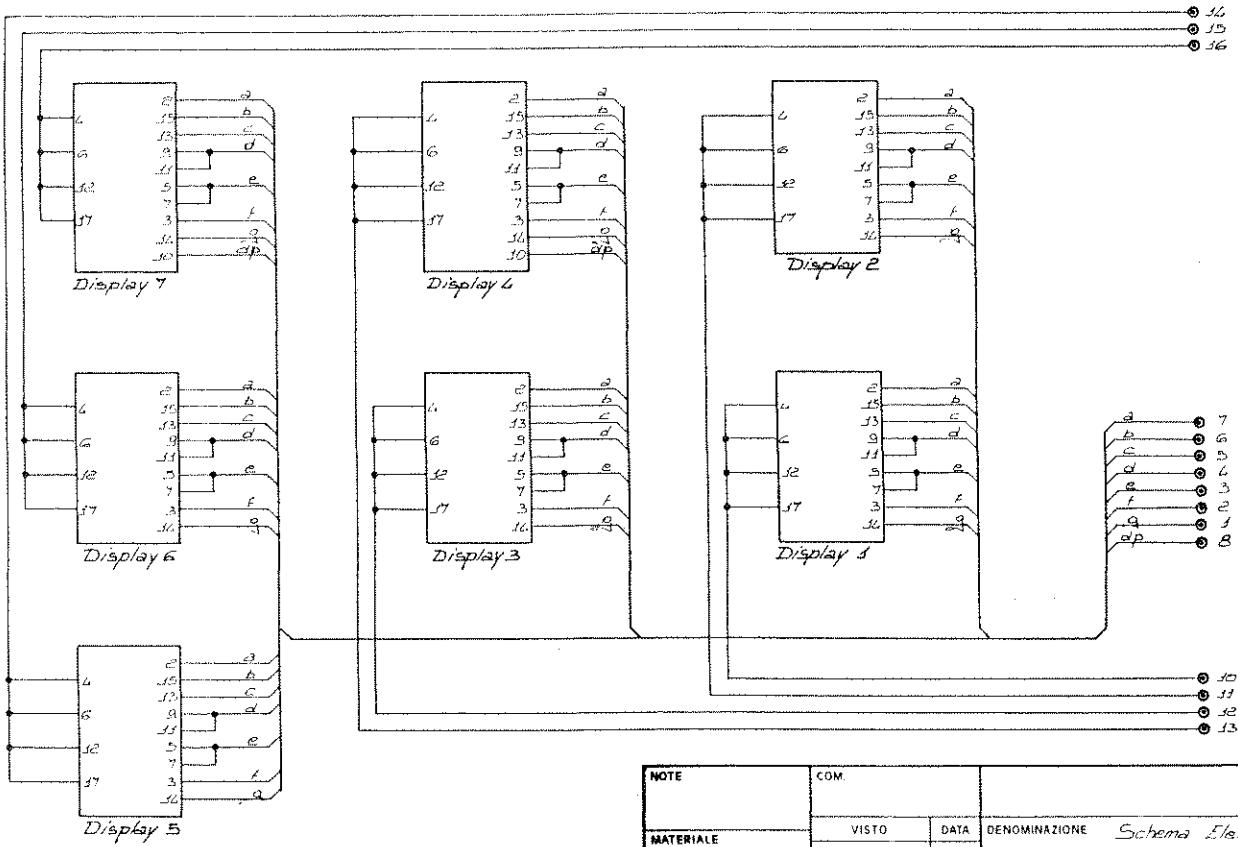
NOTE	COM.		
MATERIALE	VISTO	DATA	DENOMINAZIONE Schema Elettrico Scheda: "Speech Module"
	DISEGNATO	8.95	
TRATTAMENTI	CONTROLLO		CODICE / DIS NO
VISTA	LATO / VISTA LATO		SCALA / FOGLIO 1 di 1

Speech

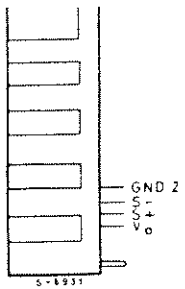


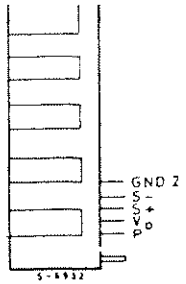
NOTE	COM.
MATERIALE	VISTO
	DISEGNATO
TRATTAMENTI	CONTROLLO
	LATO
VISTA	VISTA LATO

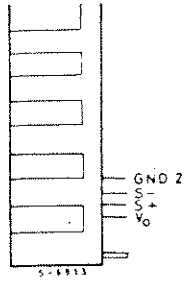
Display



NOTE	COM.			
MATERIALE	VISTO	DATA	DENOMINAZIONE	Schema Elettrico
	DISEGNATO	B-'85		Scheda "Display Board"
TRATTAMENTI	CONTROLLO		CODICE	DIS NO.
VISTA	LATO VISTA LATO		SCALA	FOGLIO 1 di 1







PIN FUNCTIONS

PIN	FUNCTION
INH - Inhibit	TTL compatible input. A logic high level signal on this pin disables the module. To be connected to ground when not used.
RT - Reset Output	Available on GS-R405S only. Reset voltage is high (5 V) when output voltage reaches nominal value (5 V) and it is generated with a fixed 100 ms delay.
V_i - Input voltage	Unregulated DC voltage input. Maximum voltage must not exceed 48 V. Recommended maximum operating voltage is 46 V.
GND_1 - Ground	Common ground for input voltage.
GND_2 - Ground	Common ground of high current path. The case of the module must be isolated from ground.
S^- - Sensing Negative	For connection to remote load, this pin senses the actual ground of the load itself. To be connected to GND_2 when not used.
S^+ - Sensing Positive	For connection to remote loads this pin allows voltage sensing on the load itself. To be connected to V_O when not used.

connected between this pin and S- can adjust the outp
voltage.

MODULE OPERATION

The GSR400 series is a family of step down switching mode voltage regulators.

Unregulated DC input voltage must be higher than nominal output voltage by, at least, 3 V. Minimum input voltage is therefore 8 V for GS-R405S and GS-R405; maximum input voltage is 48 V for all the types.

Output voltage is fixed or adjustable (GS-R400V). Maximum current delivered by the output pin is 4 A. A minimum output current of 200 mA is required for proper module operation. In no load condition the module still works, but switching frequency varies and electrical characteristics are slightly modified VS. specifications.

To prevent output over currents at switch on, a soft start function is provided. Nominal output voltage is approached gradually in about 25 ms.

The module can be inhibited by a TTL, N MOS and C MOS compatible voltage applied to the INH pin. When this voltage is at high level, module is switched off: if inhibit signal goes fr high to low level, the module restarts softly Maximum DC voltage applicable to this pir 15 V. When remote control (inhibit) of the mod is not used, the INH pin must be connected ground.

The remote load sensing is another feature p vided in all the models.

This function is performed by two pins (S^+, S that can monitor the voltage directly across load when this load is connected to the moc by long wires: voltage drop on these wires automatically compensated.

The case of the module is internally connec to S^-. Therefore the case must be alw isolated from ground.

The switching frequency of the module is KHz. To prevent EMI, the module is contai in a metal box that provides, in the meanti shielding and heatsink.

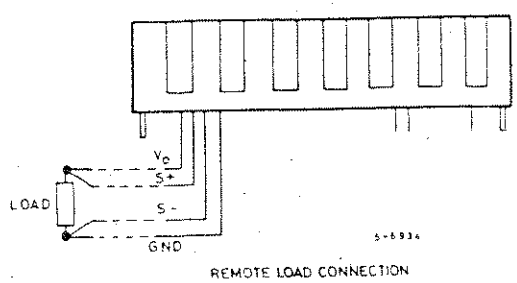
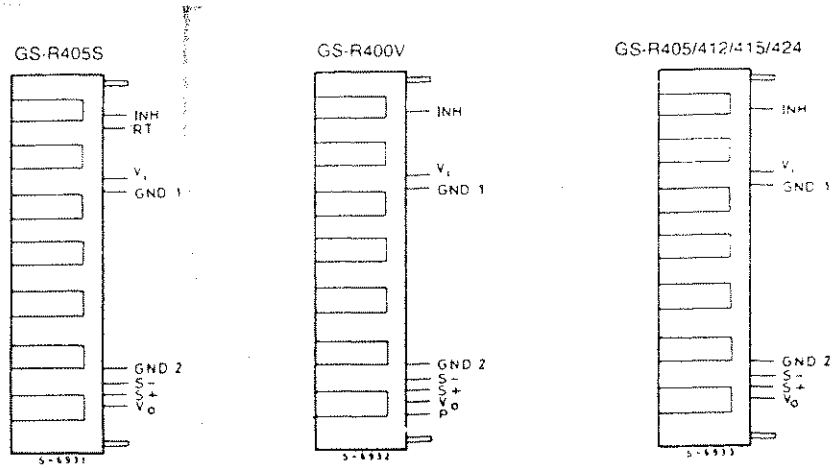


Fig. 1 - Shows how to connect the module to remote or nearby loads

CONNECTION DIAGRAM (lateral view)



PIN FUNCTIONS

PIN	FUNCTION
INH - Inhibit	TTL compatible input. A logic high level signal on this pin disables the module. To be connected to ground when not used.
RT - Reset Output	Available on GS-R405S only. Reset voltage is high (5 V) when output voltage reaches nominal value (5 V) and it is generated with a fixed 100 ms delay.
V_i - Input voltage	Unregulated DC voltage input. Maximum voltage must not exceed 48 V. Recommended maximum operating voltage is 46 V.
GND_1 - Ground	Common ground for input voltage.
GND_2 - Ground	Common ground of high current path. The case of the module must be isolated from ground.
S^- - Sensing Negative	For connection to remote load, this pin senses the actual ground of the load itself. To be connected to GND_2 when not used.
S^+ - Sensing Positive	For connection to remote loads this pin allows voltage sensing on the load itself. To be connected to V_O when not used.

PIN FUNCTIONS (Continued)

PIN	FUNCTION
V_O - Output voltage	Regulated and stabilized DC voltage is available on this pin Max output current is 4 A. The device is protected against short circuit of this pin to ground or to supply.
P - Output Voltage Regulation	Available on GS-R400V only. A variable resistor (18 KΩ max connected between this pin and S^+ can adjust the output voltage.

MODULE OPERATION

The GSR400 series is a family of step down switching mode voltage regulators.

Unregulated DC input voltage must be higher than nominal output voltage by, at least, 3 V. Minimum input voltage is therefore 8 V for GS-R405S and GS-R405; maximum input voltage is 48 V for all the types.

Output voltage is fixed or adjustable (GS-R400V). Maximum current delivered by the output pin is 4 A. A minimum output current of 200 mA is required for proper module operation. In no load condition the module still works, but switching frequency varies and electrical characteristics are slightly modified VS. specifications.

To prevent output over currents at switch on, a soft start function is provided. Nominal output voltage is approached gradually in about 25 ms.

The module can be inhibited by a TTL, N MOS and C MOS compatible voltage applied to the INH pin. When this voltage is at high level, th module is switched off: if inhibit signal goes fro high to low level, the module restarts softly. Maximum DC voltage applicable to this pin 15 V. When remote control (inhibit) of the modu is not used, the INH pin must be connected ground.

The remote load sensing is another feature pr vided in all the models.

This function is performed by two pins (S^+, S^- that can monitor the voltage directly across th load when this load is connected to the modu by long wires: voltage drop on these wires automatically compensated.
The case of the module is internally connecte to S^-. Therefore the case must be alway isolated from ground.

The switching frequency of the module is 10 KHz. To prevent EMI, the module is containe in a metal box that provides, in the meantim shielding and heatsink.

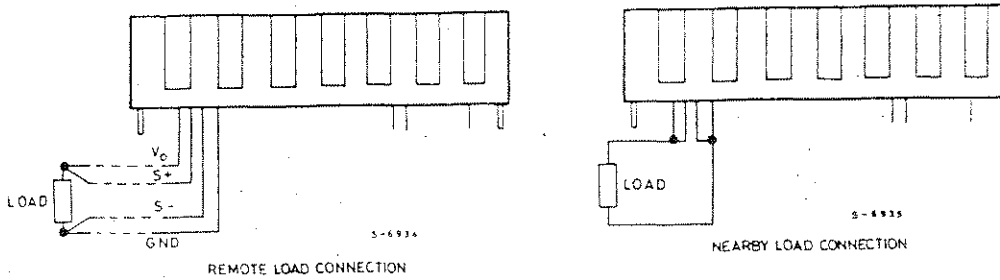
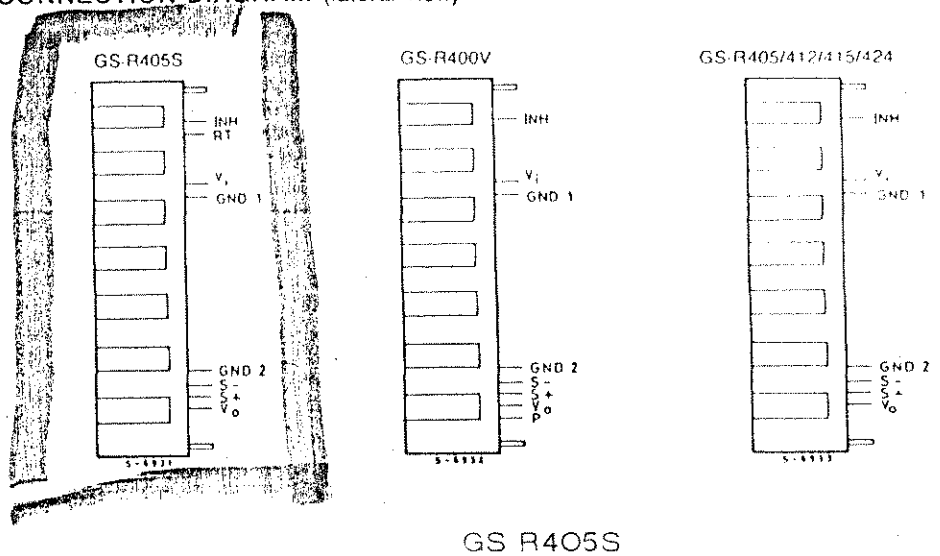


Fig. 1 - Shows how to connect the module to remote or nearby loads

CONNECTION DIAGRAM (lateral view)



GS R405S

PIN FUNCTIONS

PIN	FUNCTION
INH - Inhibit	TTL compatible input. A logic high level signal on this pin disables the module. To be connected to ground when not used.
RT - Reset Output	Available on GS-R405S only. Reset voltage is high (5 V) when output voltage reaches nominal value (5 V) and it is generated with a fixed 100 ms delay.
V_i - Input voltage	Unregulated DC voltage input. Maximum voltage must not exceed 48 V. Recommended maximum operating voltage is 46 V.
GND_1 - Ground	Common ground for input voltage.
GND_2 - Ground	Common ground of high current path. The case of the module must be isolated from ground.
S^- - Sensing Negative	For connection to remote load, this pin senses the actual ground of the load itself. To be connected to GND_2 when not used.
S^+ - Sensing Positive	For connection to remote loads this pin allows voltage sensing on the load itself. To be connected to V_O when not used.