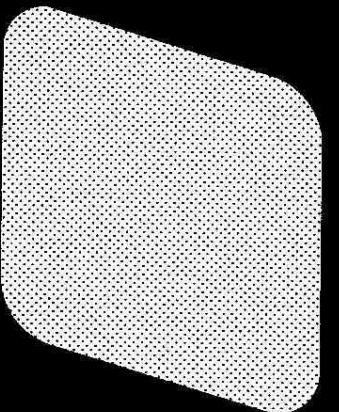
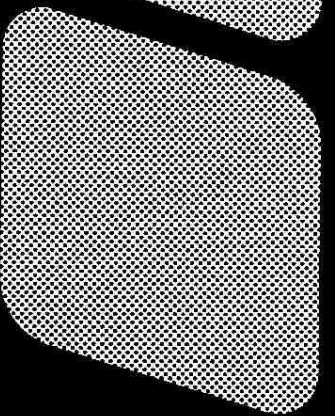
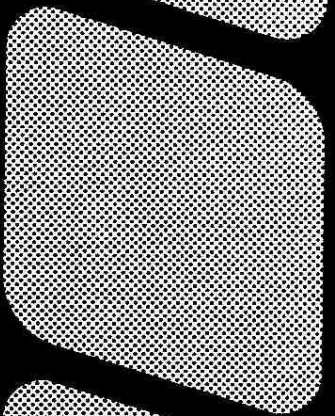
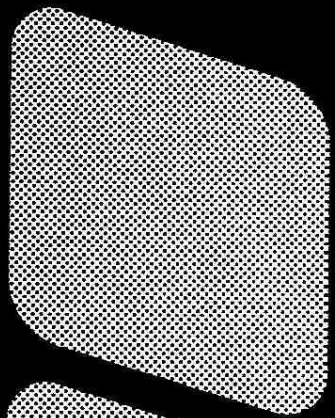
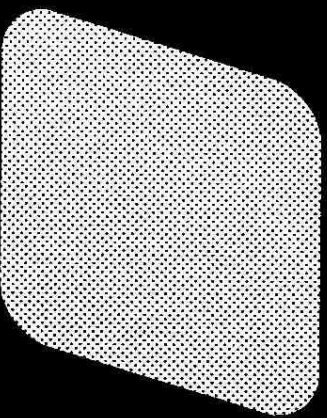


**SCHEMATIC  
DIAGRAM**



# **C R U M A R**<sup>®</sup>

*Musical Instruments*



**mod.  
T 3**



FEMALE CONNECTOR SYMBOL (es. J 2/1)



PLUG IN CONNECTOR SYMBOL



WIRE SOLDERING POINT



TEST POINT ( T P... )



CONNECTING POINT (ON p.c.b.)



METALLIC FILM RESISTOR 1%

ALL resistors 1/4w unless otherwise indicated

ALL tabswitches shown in OFF position

ALL keyswitches shown in OFF position

See part list for component part numbers

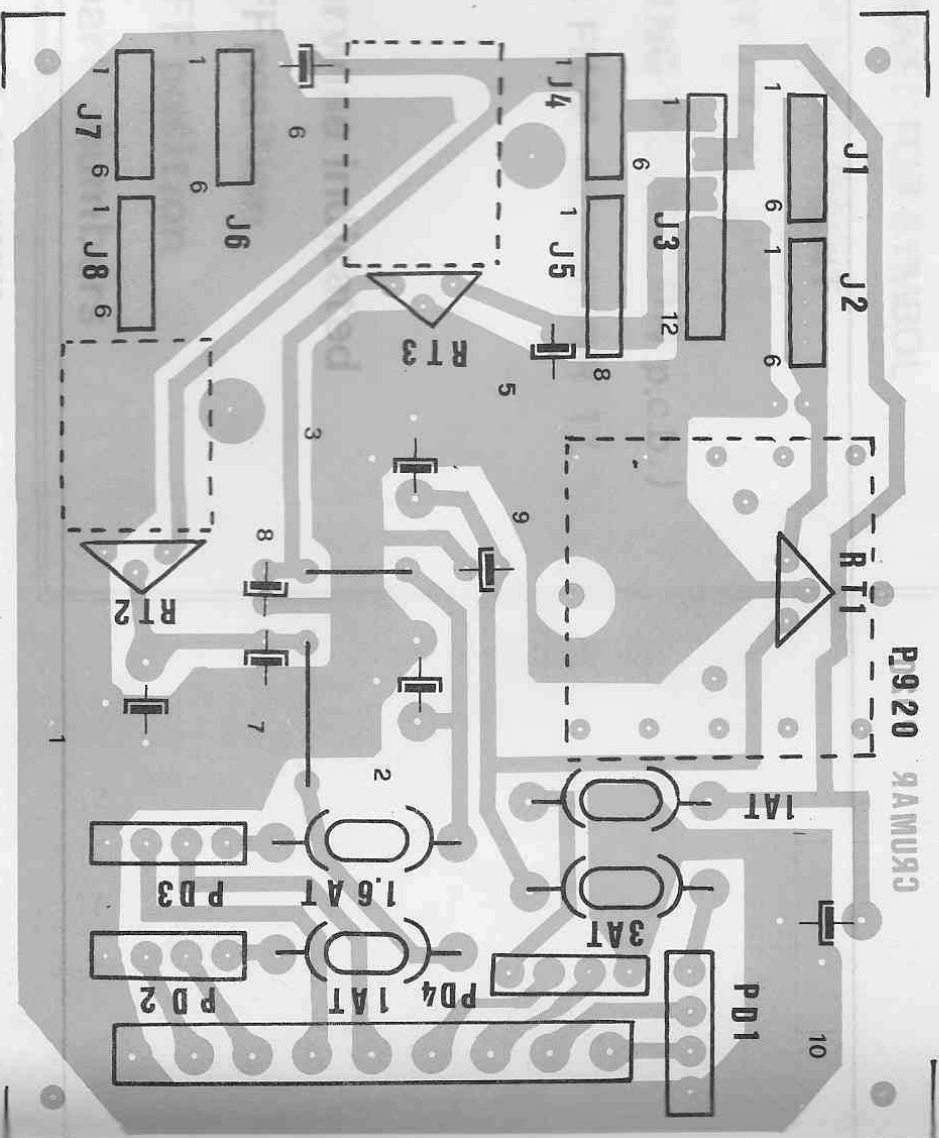
GRUMAR RESERVES THE RIGHT TO CHANGE  
SPECIFICATIONS AND DESIGNS, WITHOUT  
NOTICE AND LIABILITY.

**SCHEMATIC  
DIAGRAM**

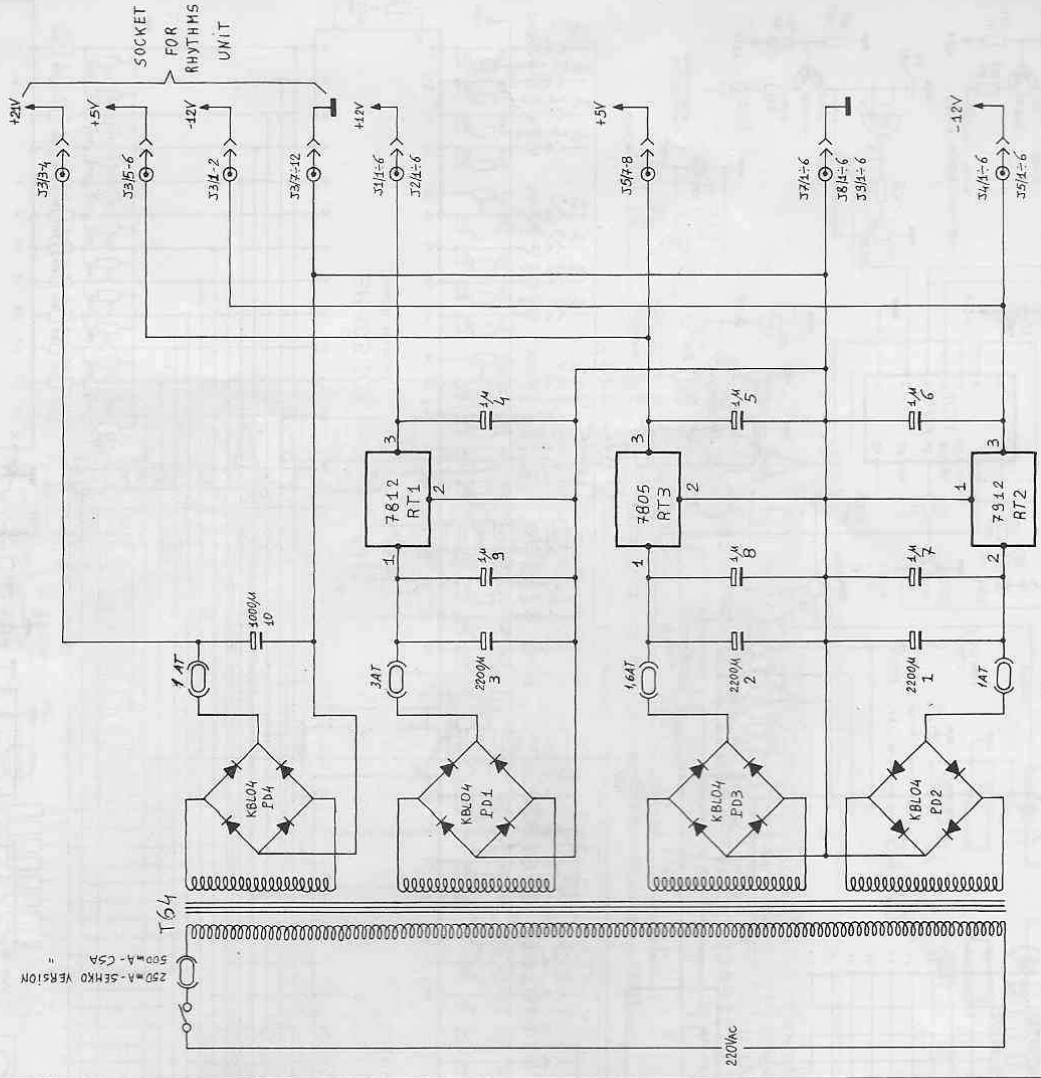
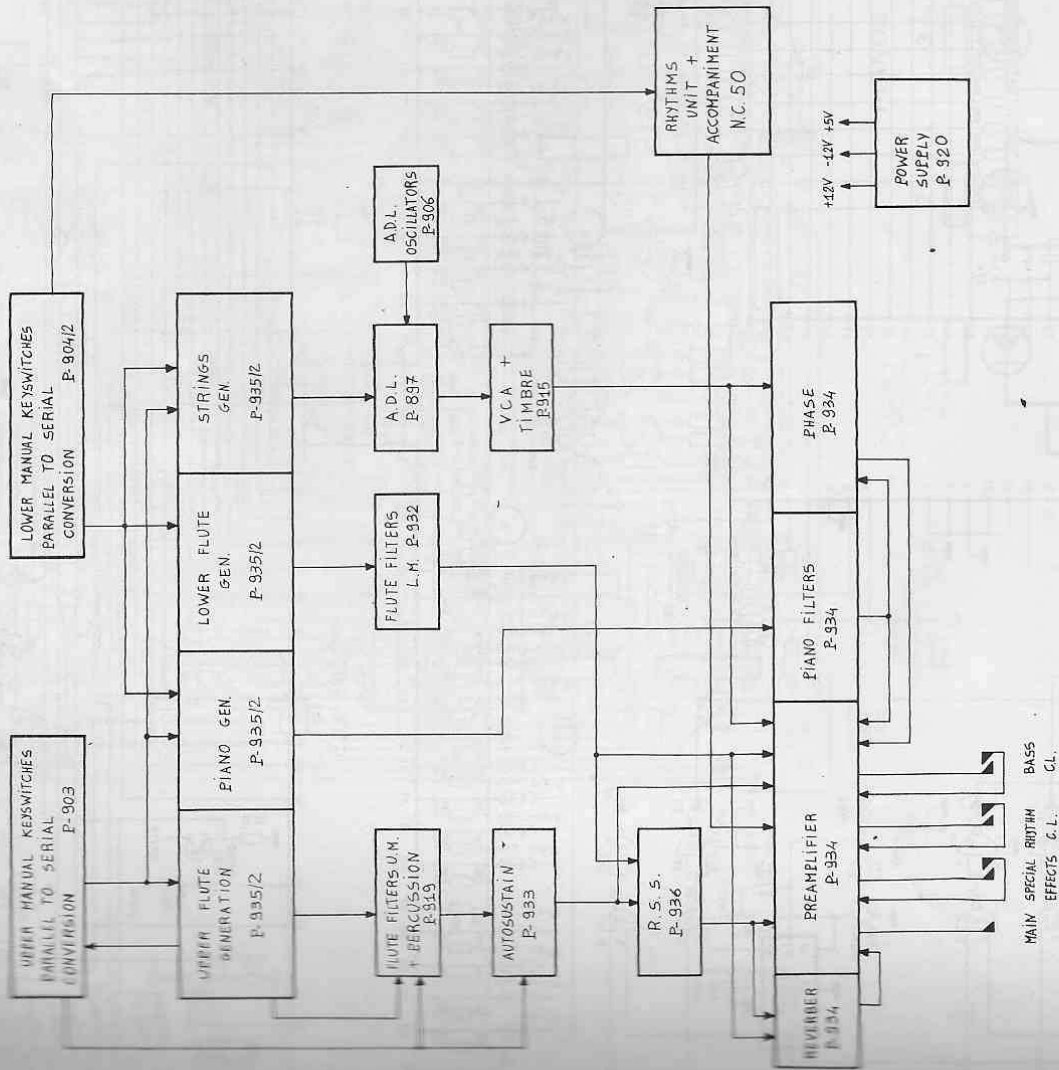
*mod.*  
**T 3**

# INDEX

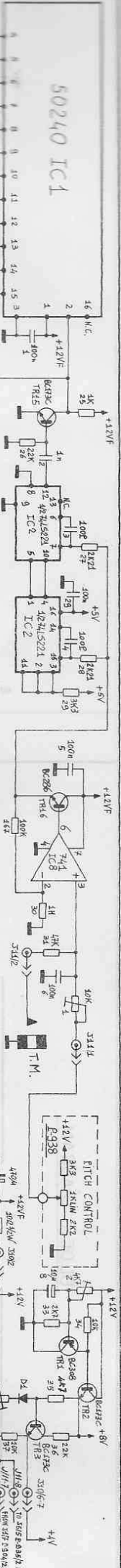
DWG 1 (P-920)	= POWER SUPPLY
DWG 2 (P-935/2)	= FLUTES - PIANO - STRINGS GENERATION
DWG 2 (P-927)	= PIANOS SWITCHES
DWG 2 (P-938)	= POTENTIOMETER BOARD
DWG 3 (P-903)	= UPPER MANUAL KEYSWITCHES
DWG 3 (P-904/2)	= LOWER MANUAL KEYSWITCHES
DWG 4 (P-919)	= FLUTE FILTERS UPPER MANUAL
DWG 4 (P-922)	= AUTO SUSTAIN - PRESETS SWITCHES
DWG 4 (P-926)	= PERCUSSION SWITCHES
DWG 5 (P-932)	= FLUTE FILTERS LOWER MANUAL
DWG 5 (P-921)	= FLUTE L.M. - CANCEL UP - LOW SWITCHES
DWG 5 (P-937)	= VOLUME CONTROLS
DWG 6 (P-933)	= AUTO SUSTAIN
DWG 6 (P-936)	= R.S.S.
DWG 6 (P-925)	= R.S.S. SWITCHES
DWG 6 (P-922)	= AUTO SUSTAIN - PRESETS SWITCHES
DWG 7 (P-906)	= A.D.L. OSCILLATORS
DWG 7 (P-897)	= DELAY LINES
DWG 7 (P-915)	= STRINGS SWITCHES
DWG 7 (P-937)	= VOLUME CONTROLS
DWG 7 (P-929)	= STRINGS CONTROLS
DWG 8 (P-923)	= BASS SWITCHES
DWG 8 (P-938)	= POTENTIOMETER BOARD
DWG 8 (P-930)	= PEDALBOARD
DWG 8 (P-931)	= PEDALBOARD KEYSWITCHES
DWG 9 (P-934)	= FINAL PREAMPLIFIERS
DWG 9 (P-924)	= PHASE SWITCHES
DWG 9 (P-927)	= PIANOS SWITCHES
DWG 9 (P-937)	= VOLUME CONTROLS
DWG 9 (P-938)	= POTENTIOMETER BOARD



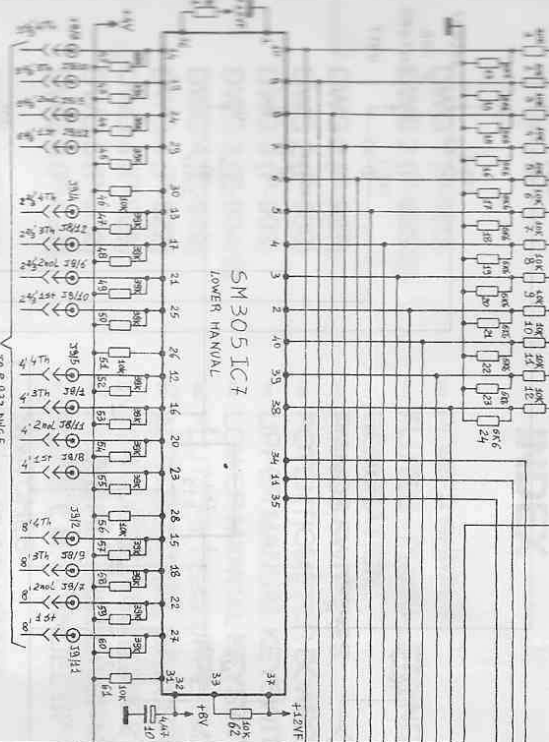
# BLOCK DIAGRAM



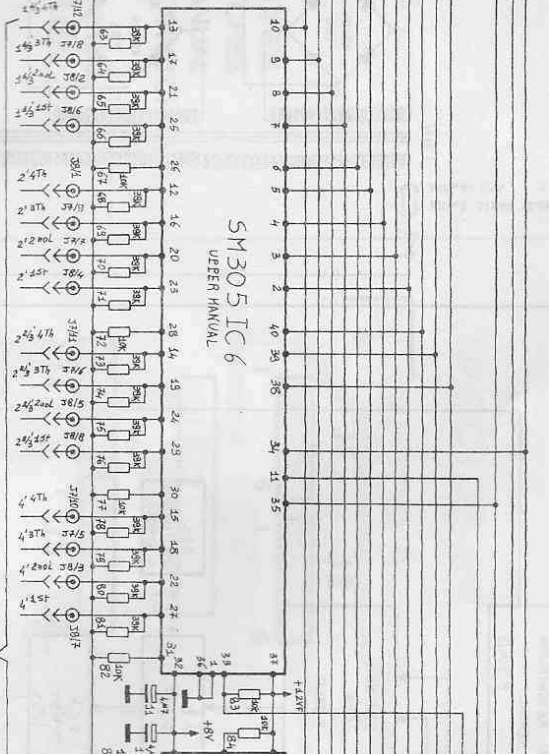
50240 IC1



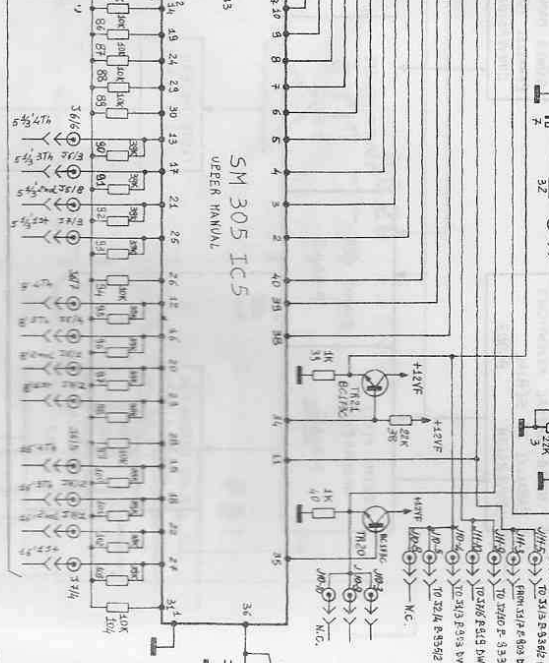
SM305 IC7  
LOWER MANUAL



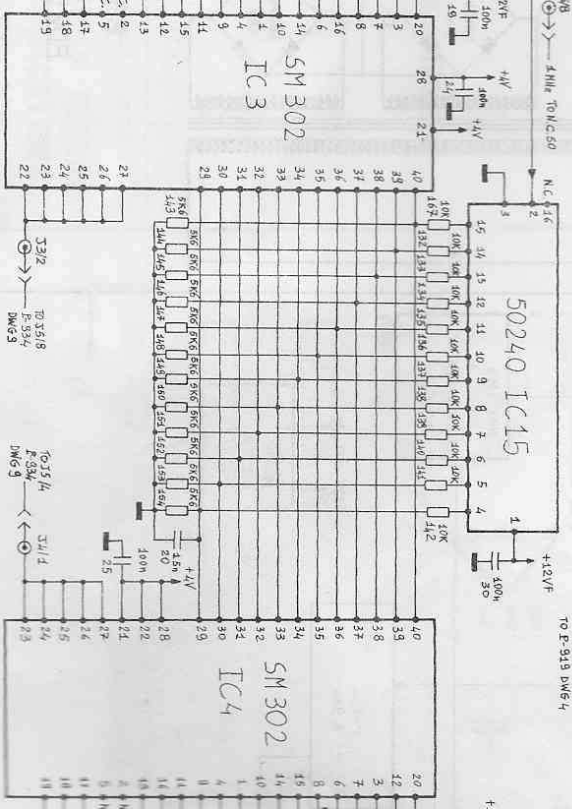
SM305 IC6  
UPPER MANUAL



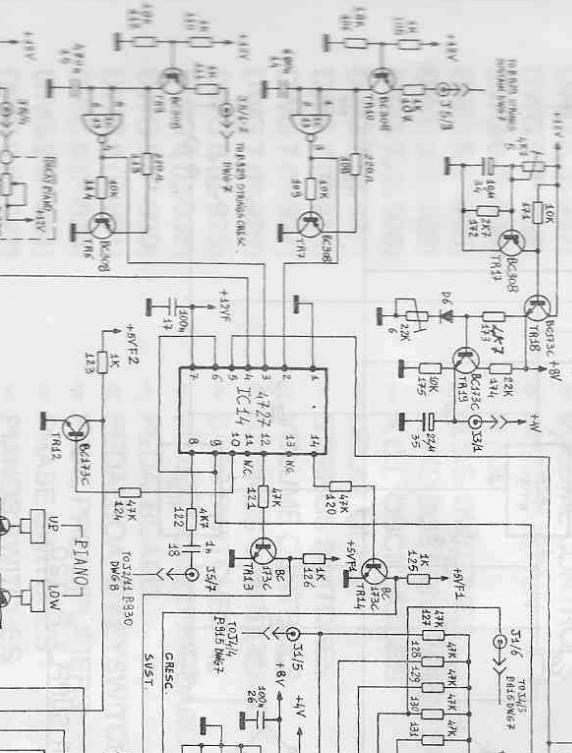
SM305 IC5  
UPPER MANUAL



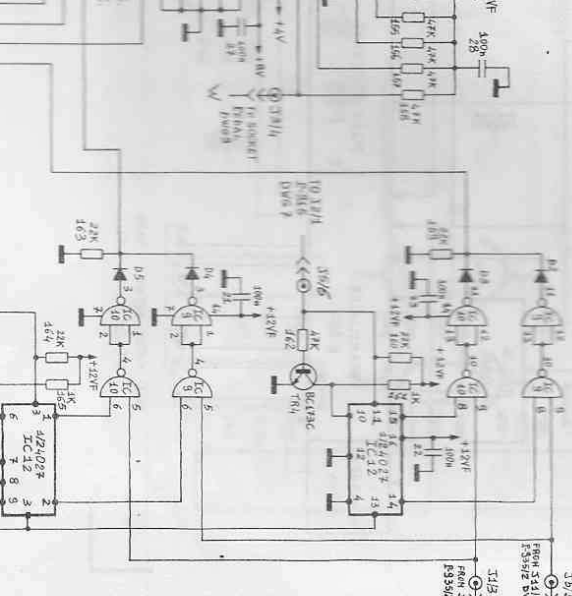
50240 IC15



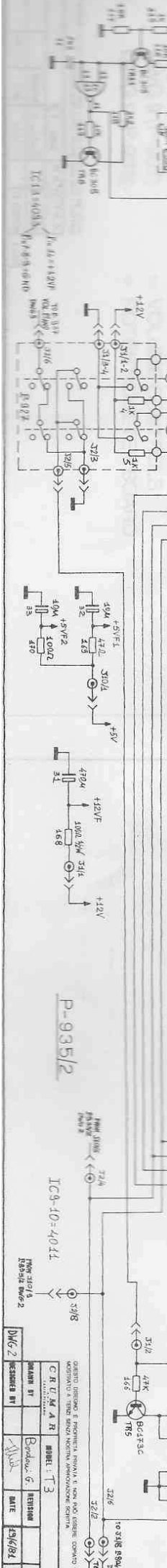
SM302 IC3



SM302 IC4

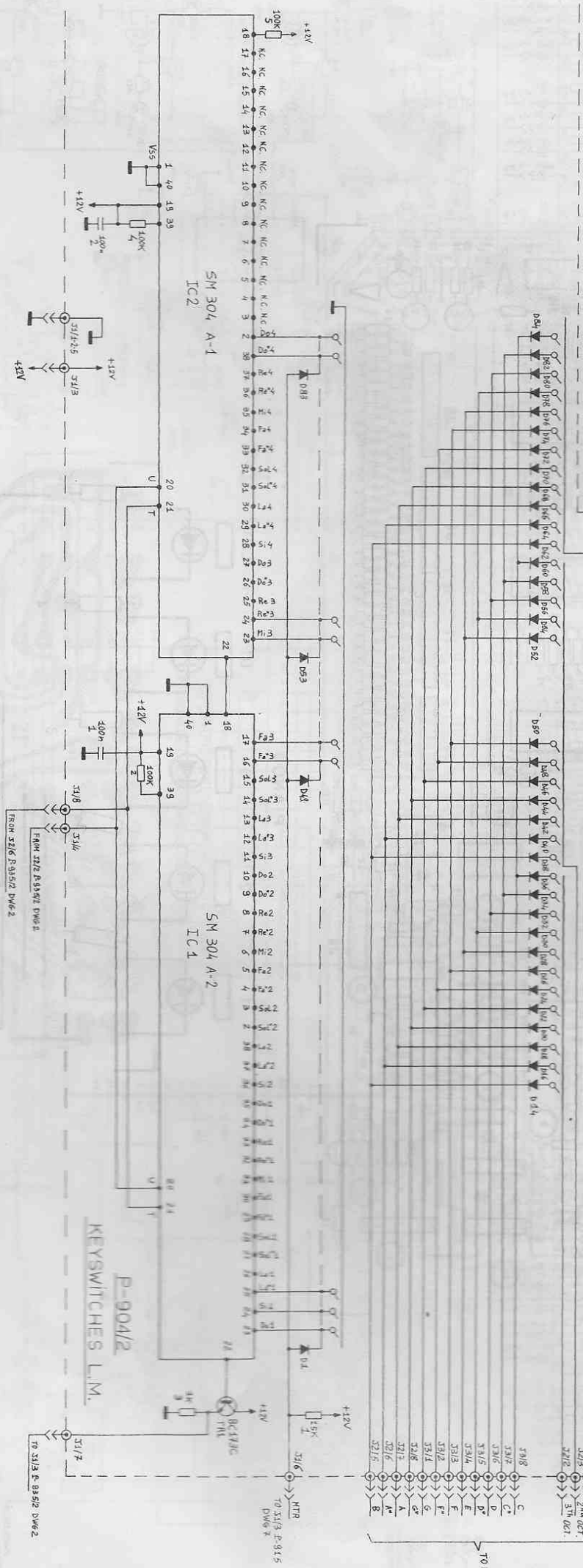
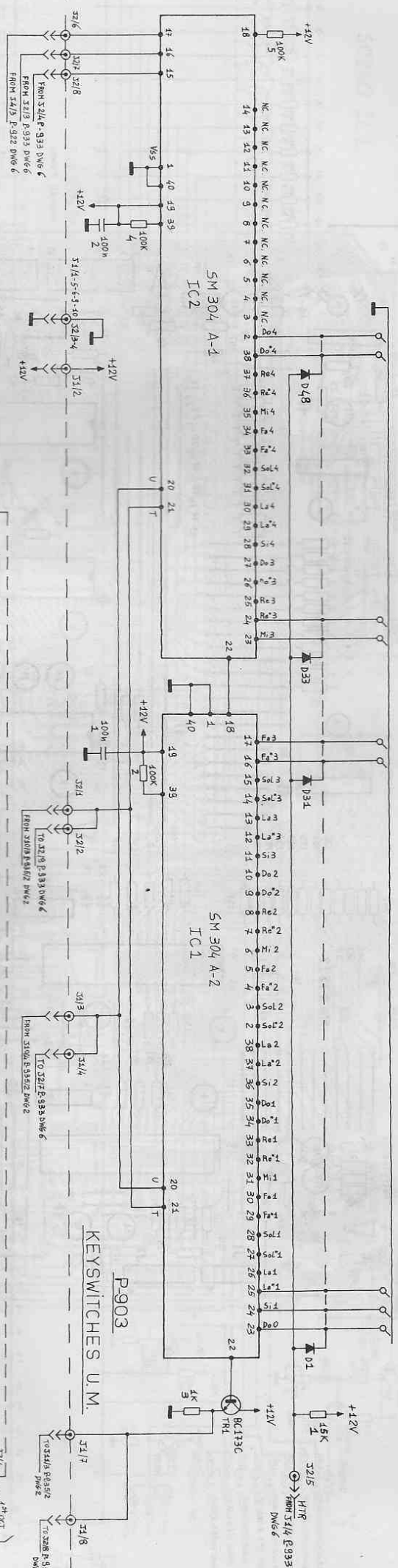


P-935/2



DESIGNER	PROF. P. M. A. R.
REVISOR	G.
DATE	25/6/84
REVISION	1
REVISION	2
REVISION	3
REVISION	4
REVISION	5
REVISION	6
REVISION	7
REVISION	8
REVISION	9
REVISION	10
REVISION	11
REVISION	12
REVISION	13
REVISION	14
REVISION	15
REVISION	16
REVISION	17
REVISION	18
REVISION	19
REVISION	20
REVISION	21
REVISION	22
REVISION	23
REVISION	24
REVISION	25
REVISION	26
REVISION	27
REVISION	28
REVISION	29
REVISION	30
REVISION	31
REVISION	32
REVISION	33
REVISION	34
REVISION	35
REVISION	36
REVISION	37
REVISION	38
REVISION	39
REVISION	40
REVISION	41
REVISION	42
REVISION	43
REVISION	44
REVISION	45
REVISION	46
REVISION	47
REVISION	48
REVISION	49
REVISION	50





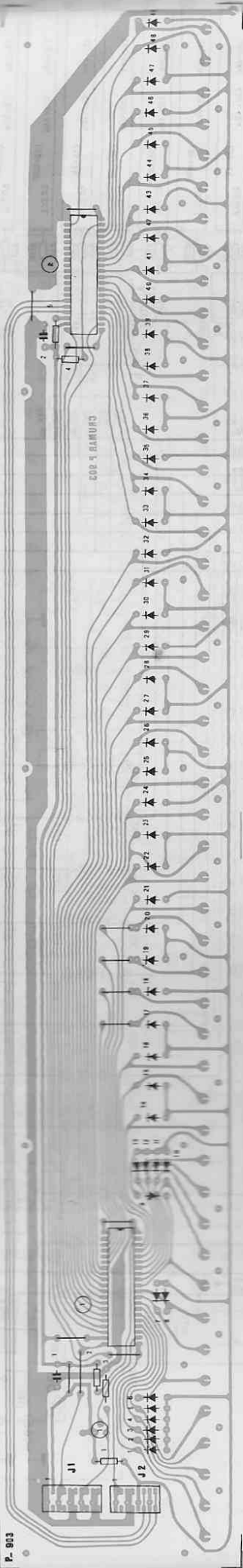
ОПИСАНИЕ РАБОТЫ И ПОДРОБНОЕ ОПИСАНИЕ КОМПОНЕНТОВ

С. И. Л. А. Р. КОДЕЛ: Т3

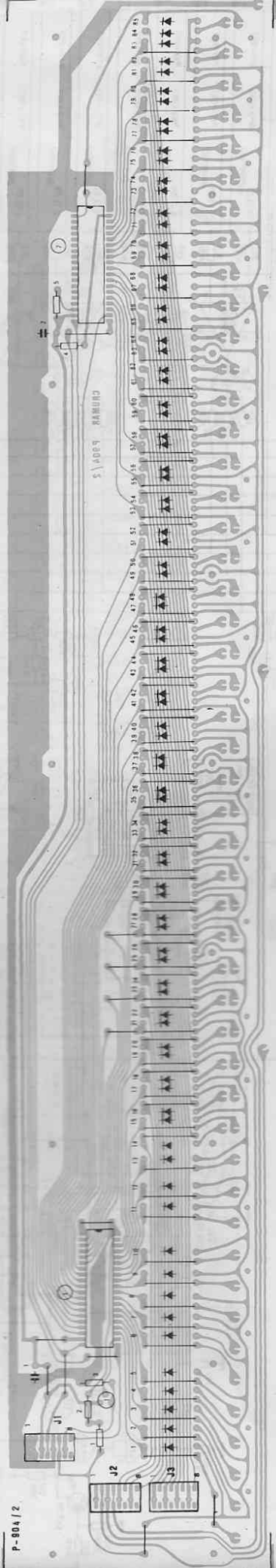
МАТЕРИАЛ	ВТ	КОЛ-ВО	КОДЕС	КОЛ-ВО
МКС 3	УСТАНОВКИ	ВТ	МАТ	186/81

МАШИНА И ТИПЫ СХЕМ НАПРАВЛЕННЫЕ СОВЕТЫ





P-903



P-904/2

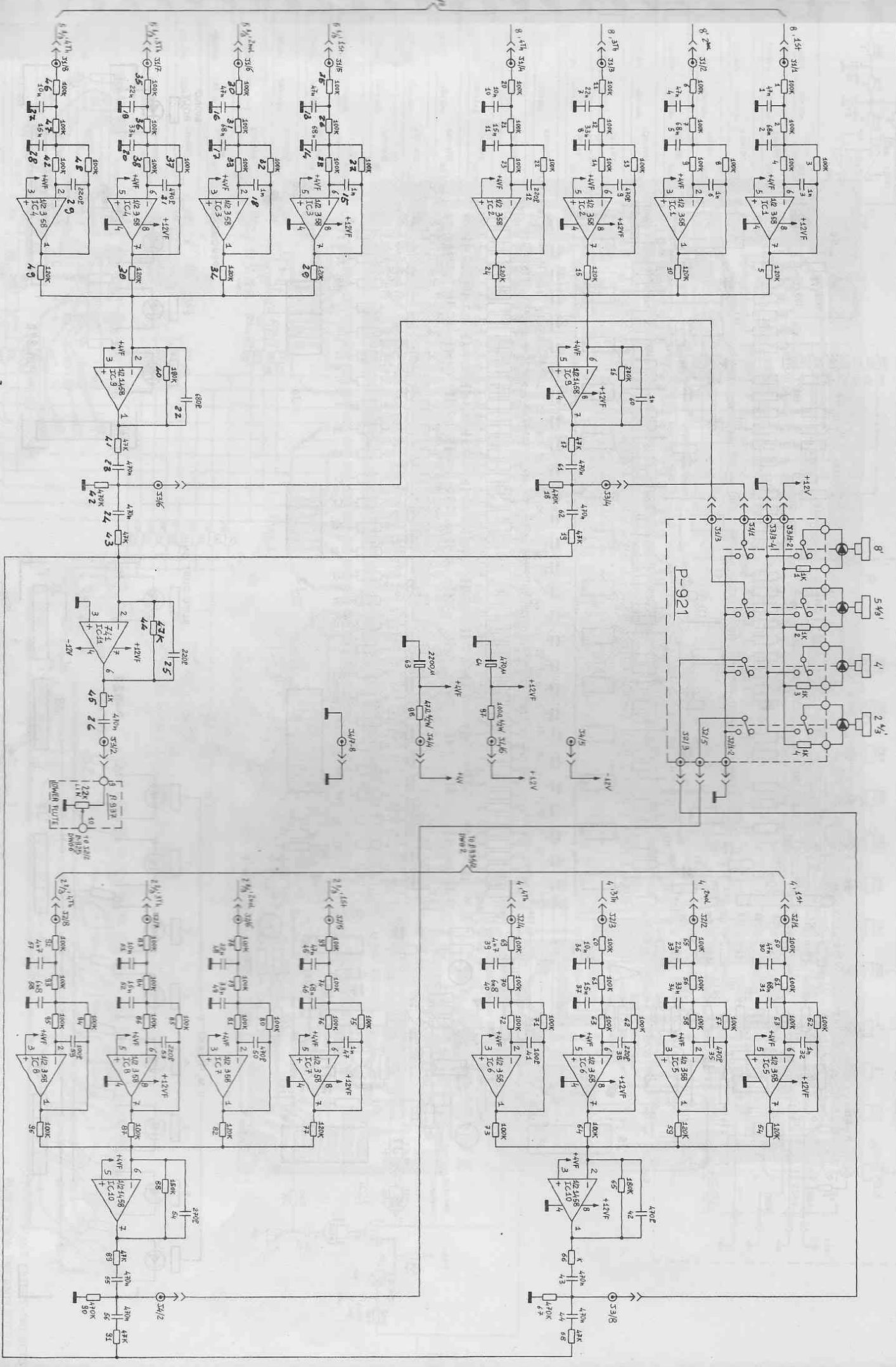
DESIGN (REVISED) IN ACCORDANCE WITH MIL-STD-883C METHOD 2000. APPROVED FOR RELEASE BY NSA/CSS/DP/DIR

DATE	BY	REVISION
10/15/63	W.A.S.	1
11/15/63	W.A.S.	2
12/15/63	W.A.S.	3
1/15/64	W.A.S.	4
2/15/64	W.A.S.	5
3/15/64	W.A.S.	6
4/15/64	W.A.S.	7
5/15/64	W.A.S.	8
6/15/64	W.A.S.	9
7/15/64	W.A.S.	10
8/15/64	W.A.S.	11
9/15/64	W.A.S.	12
10/15/64	W.A.S.	13
11/15/64	W.A.S.	14
12/15/64	W.A.S.	15
1/15/65	W.A.S.	16
2/15/65	W.A.S.	17
3/15/65	W.A.S.	18
4/15/65	W.A.S.	19
5/15/65	W.A.S.	20
6/15/65	W.A.S.	21
7/15/65	W.A.S.	22
8/15/65	W.A.S.	23
9/15/65	W.A.S.	24
10/15/65	W.A.S.	25
11/15/65	W.A.S.	26
12/15/65	W.A.S.	27
1/15/66	W.A.S.	28
2/15/66	W.A.S.	29
3/15/66	W.A.S.	30
4/15/66	W.A.S.	31
5/15/66	W.A.S.	32
6/15/66	W.A.S.	33
7/15/66	W.A.S.	34
8/15/66	W.A.S.	35
9/15/66	W.A.S.	36
10/15/66	W.A.S.	37
11/15/66	W.A.S.	38
12/15/66	W.A.S.	39
1/15/67	W.A.S.	40
2/15/67	W.A.S.	41
3/15/67	W.A.S.	42
4/15/67	W.A.S.	43
5/15/67	W.A.S.	44
6/15/67	W.A.S.	45
7/15/67	W.A.S.	46
8/15/67	W.A.S.	47
9/15/67	W.A.S.	48
10/15/67	W.A.S.	49
11/15/67	W.A.S.	50
12/15/67	W.A.S.	51
1/15/68	W.A.S.	52
2/15/68	W.A.S.	53
3/15/68	W.A.S.	54
4/15/68	W.A.S.	55
5/15/68	W.A.S.	56
6/15/68	W.A.S.	57
7/15/68	W.A.S.	58
8/15/68	W.A.S.	59
9/15/68	W.A.S.	60
10/15/68	W.A.S.	61
11/15/68	W.A.S.	62
12/15/68	W.A.S.	63
1/15/69	W.A.S.	64
2/15/69	W.A.S.	65

CLASSIFICATION: CONFIDENTIAL  
 CONTROL NO: 6  
 MODEL: T3  
 DATE: 11/15/63  
 BY: W.A.S.  
 REVISION: 1





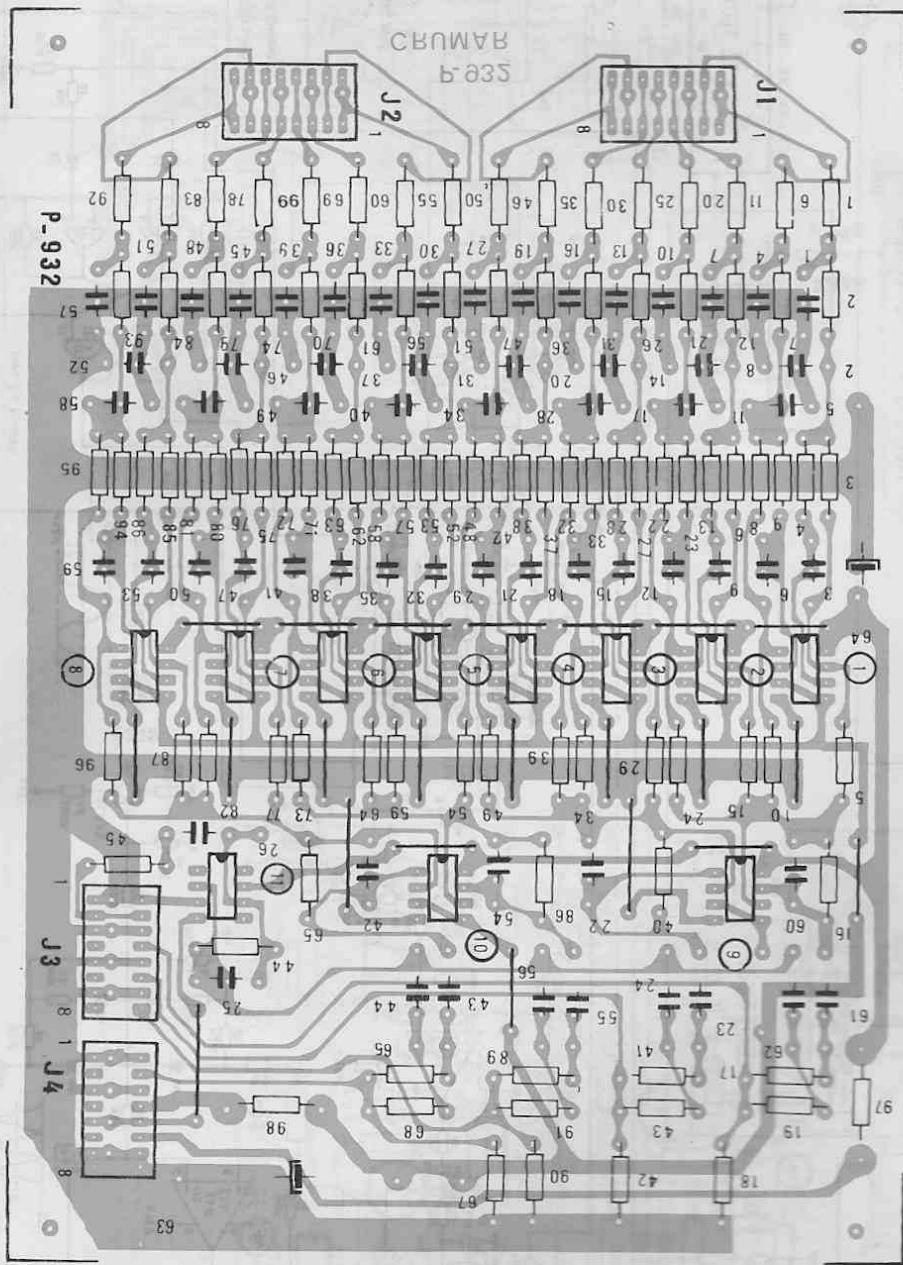


P-932

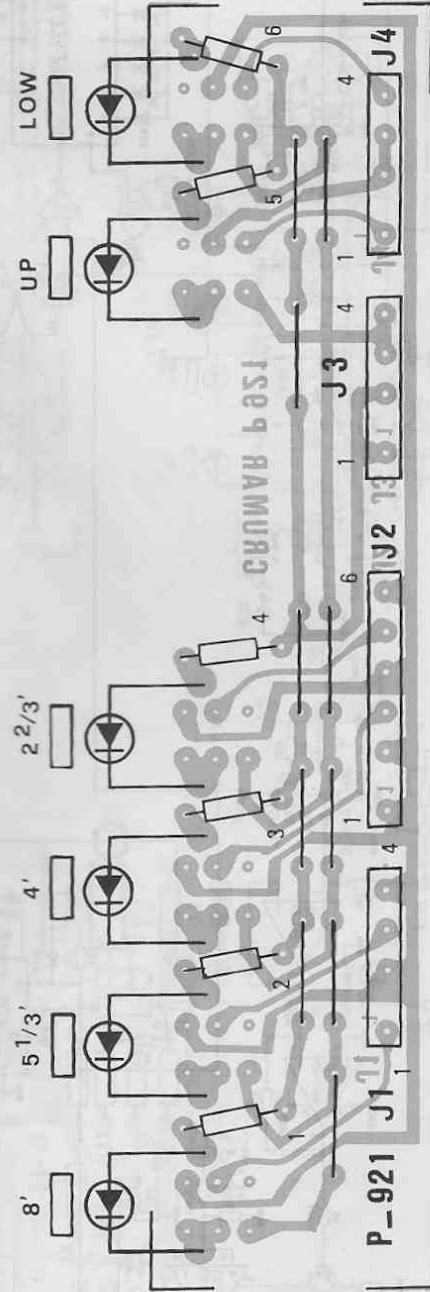
ОДЕЛЪТЪ ЗА ПРОЕКТИРАНЕ И КОНСТРУИРАНЕ НА МЕДИЦИНСКИ АПАРАТИ  
 МОДИФИЦИРАНЕ И ТЕСТОВЕ НА МЕДИЦИНСКИ АПАРАТИ  
 ДИЗАЙН НА МЕДИЦИНСКИ АПАРАТИ

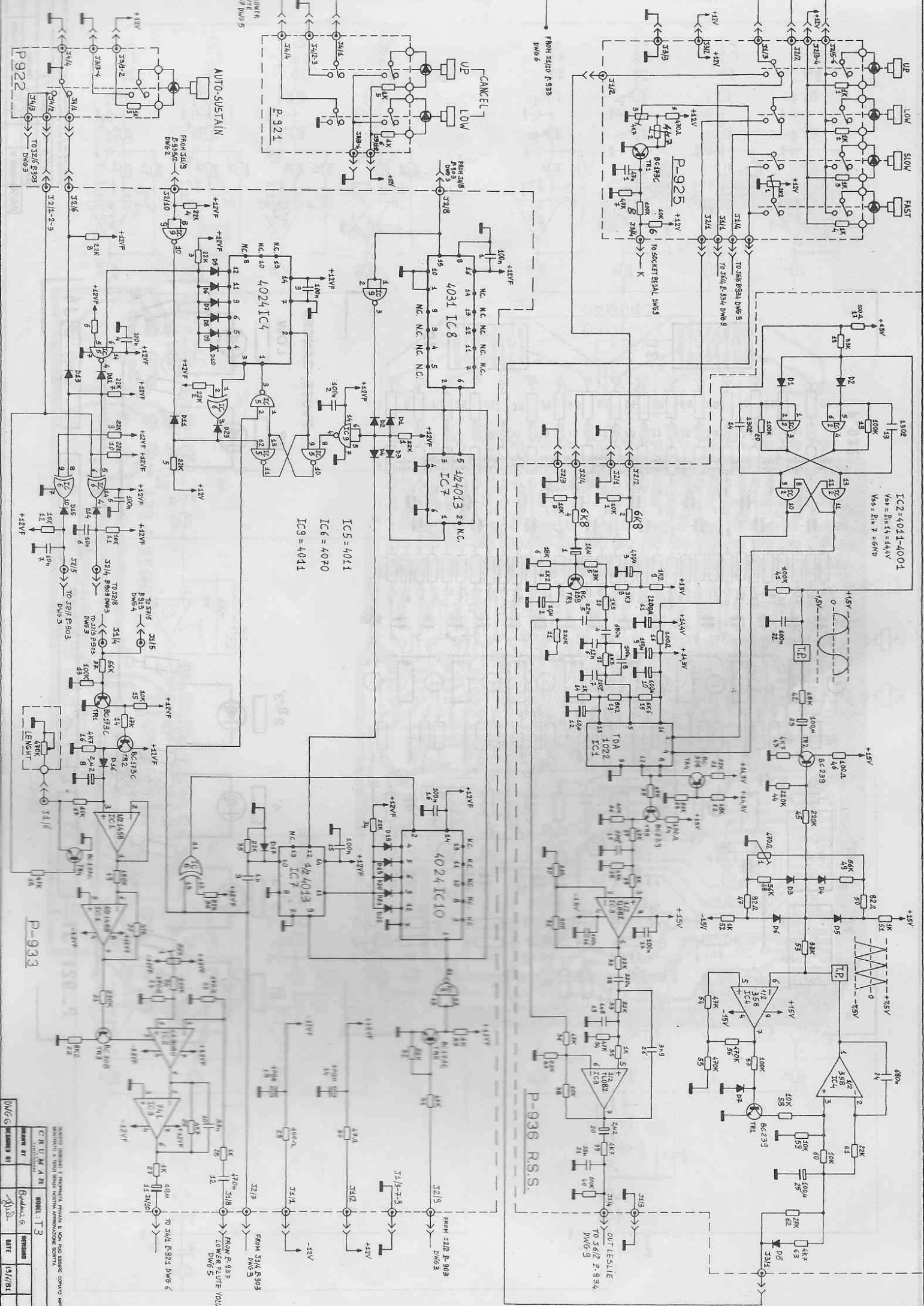
ДИЗАЙНЕР	ПРОЕКТИРАТЕЛ	ОДОБИЛ	ДАТА
И.И.И.	И.И.И.	И.И.И.	И.И.И.

МАСШТАБ: 1:1  
 КОЛИЧЕСТВО: 100  
 ДИЗАЙНЕР: И.И.И.  
 ПРОЕКТИРАТЕЛ: И.И.И.  
 ОДОБИЛ: И.И.И.  
 ДАТА: И.И.И.



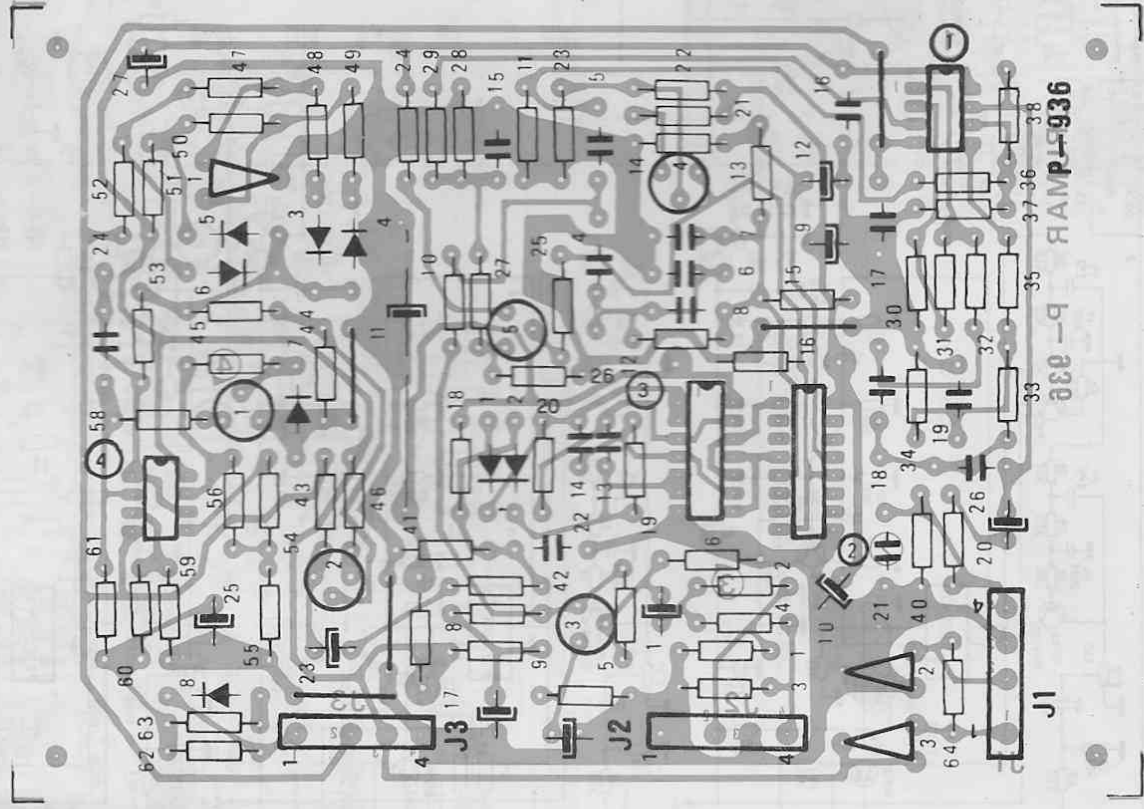
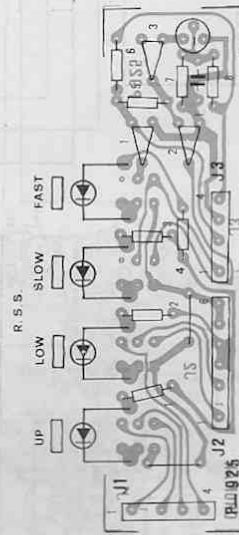
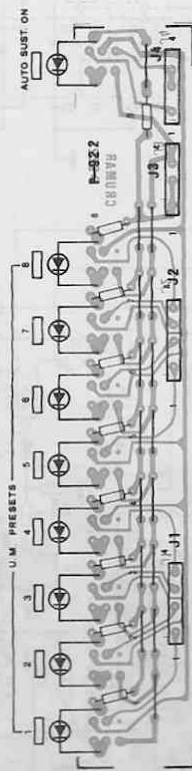
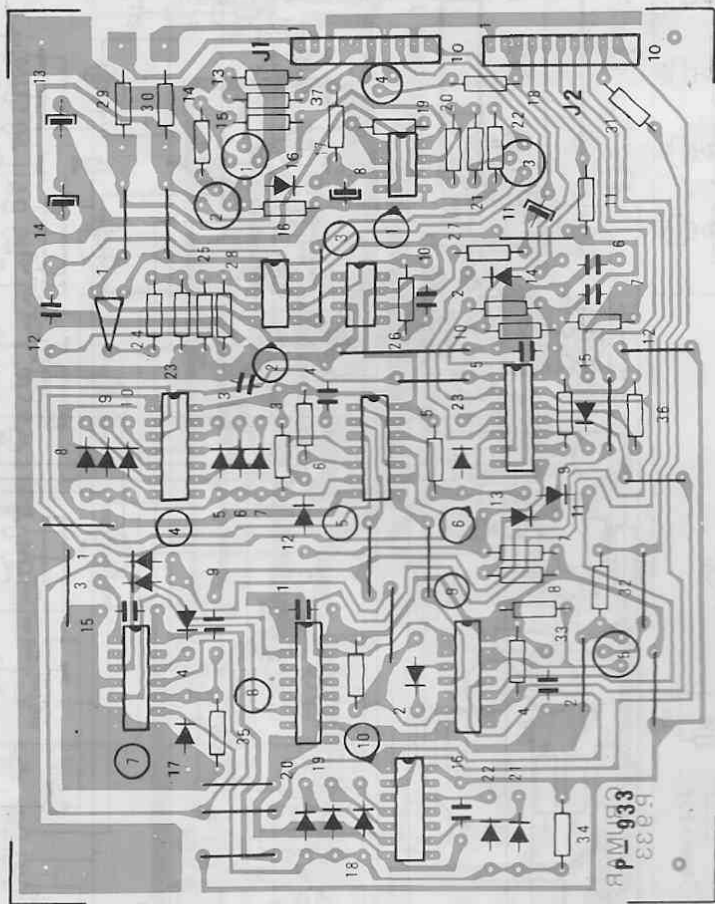
FLUTE CANCEL





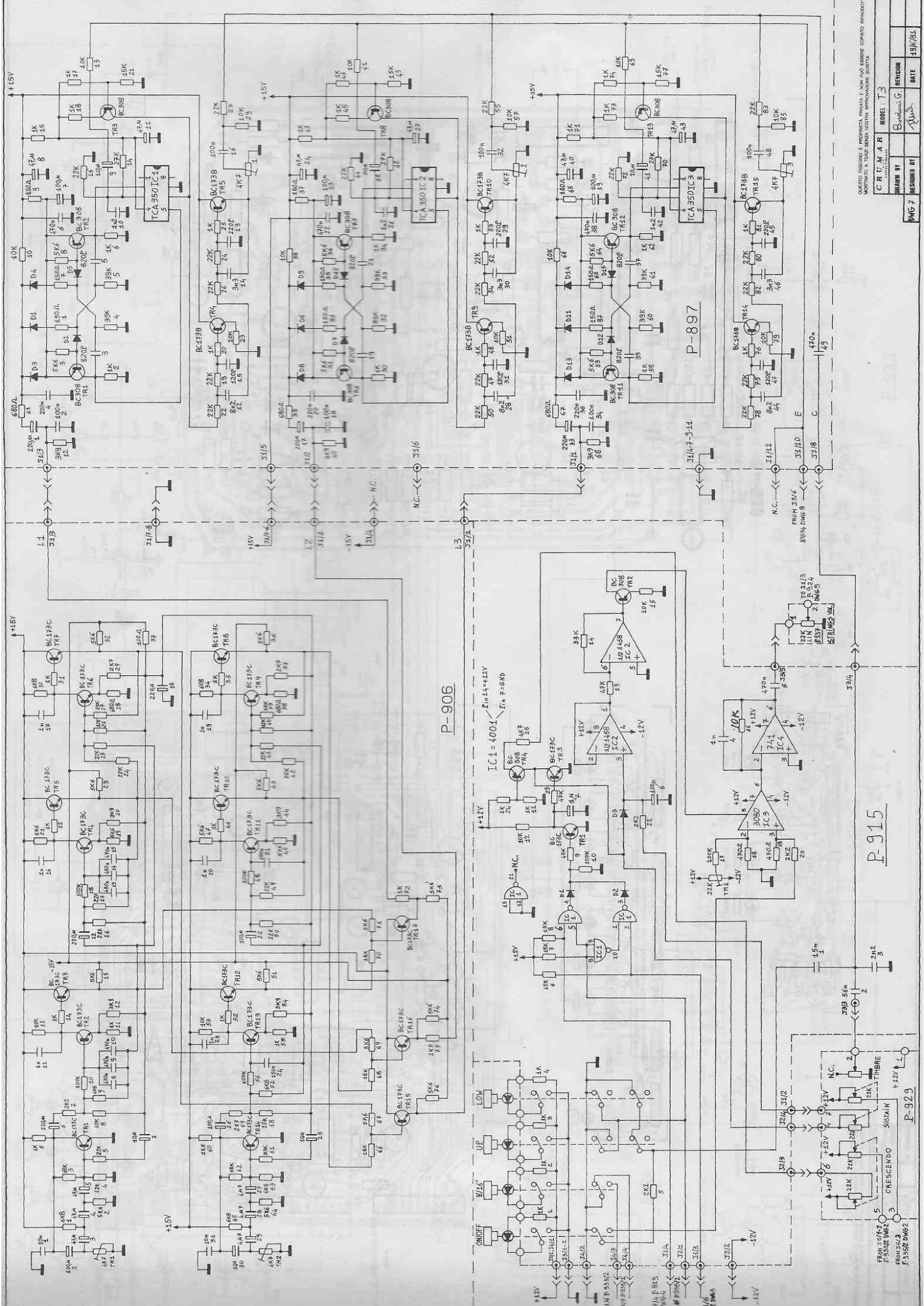
DATE	19/7/81
REVISION	
DESIGNED BY	G. G.
CHECKED BY	
APPROVED BY	
DRWG NO	

C.T.U.M.A.R. MODEL: T3  
 19/7/81



QUESTO PRODOTTO È PROPIETÀ PRIVATA E NON PUÒ ESSERE COPIATO, RIPRODOTTO, ADATTATO A UNO SENZA AUTORIZZAZIONE SCRITTA.

C.R.E.M.A.R.	MODEL: T3	REVISION	DATE
DESIGNER: BT	DESIGNED BY: [Signature]	REVISION: 6	DATE: 25/6/82
DRWG. NO.			



QUESTO PRODOTTO È PROPIETÀ INTELLETTUALE DI UNO DEI SOCI DELLA  
 UNIVERSITÀ DI TRIESTE. TUTTI I DIRITTI RISERVATI. SOTTILETTI  
 CR 17 MAR 1981  
 REVISIONI: 13  
 AUTORE: G. Bazzoli  
 INCHIEDE DA: [Signature]  
 DATA: 19/6/81  
 DWG 7

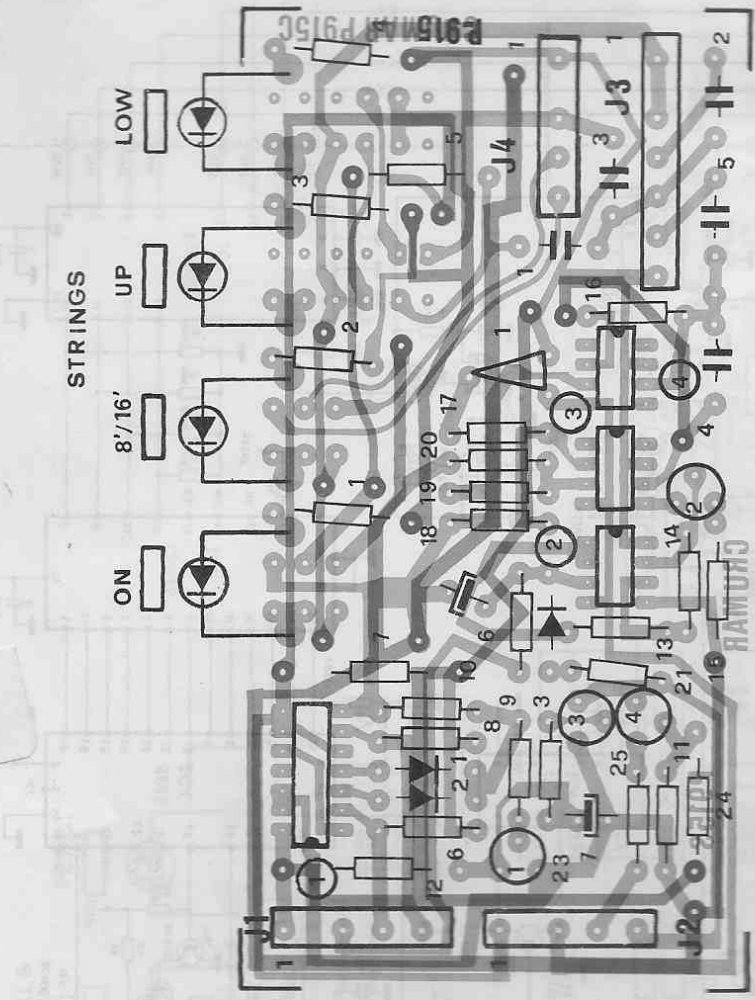
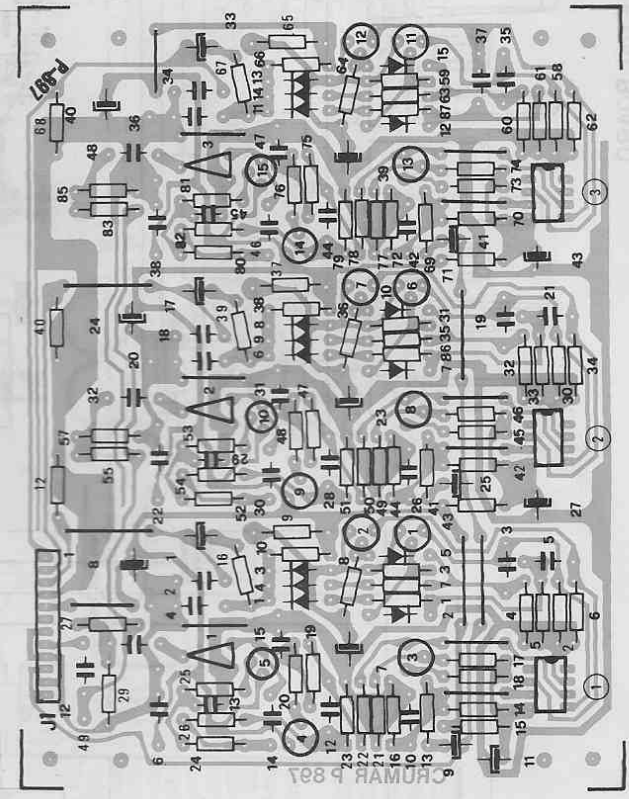
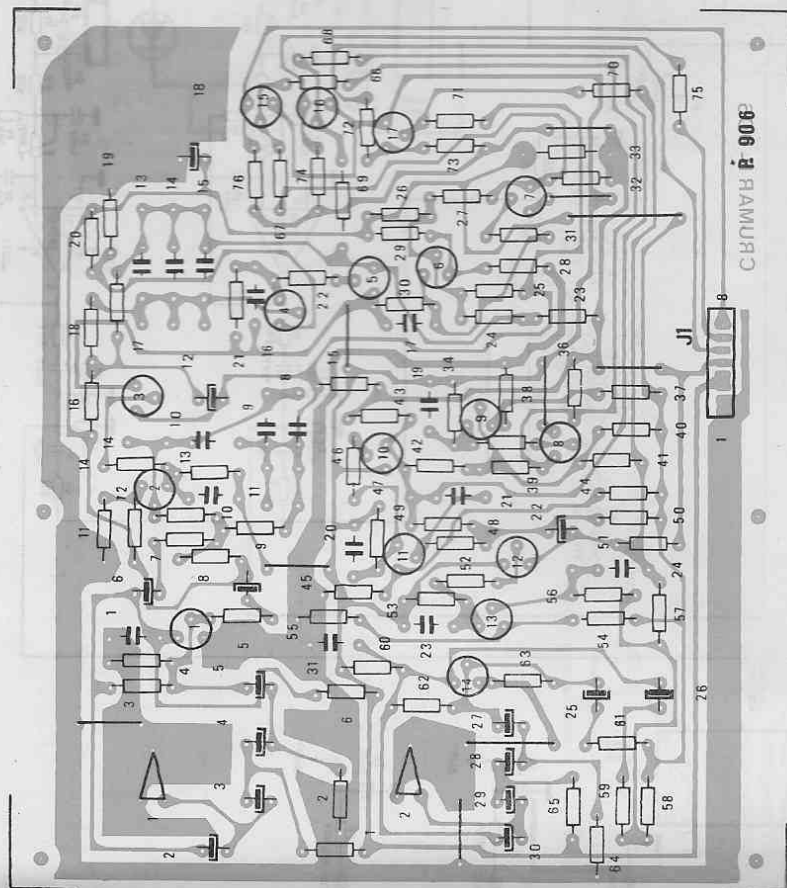
P-915

P-929

P-906

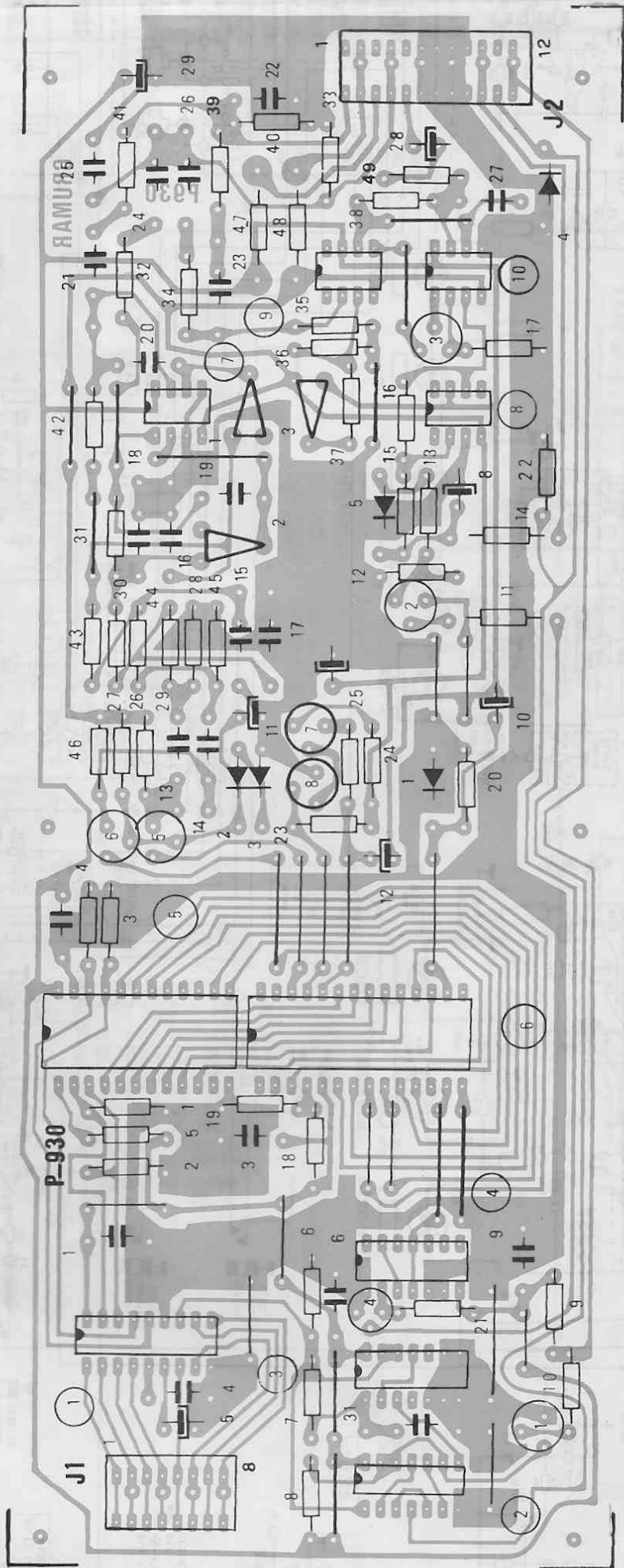
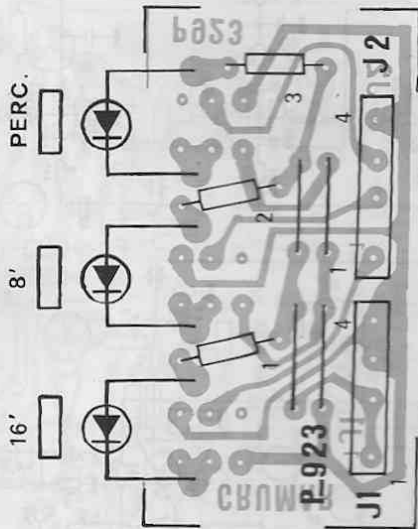
P-897

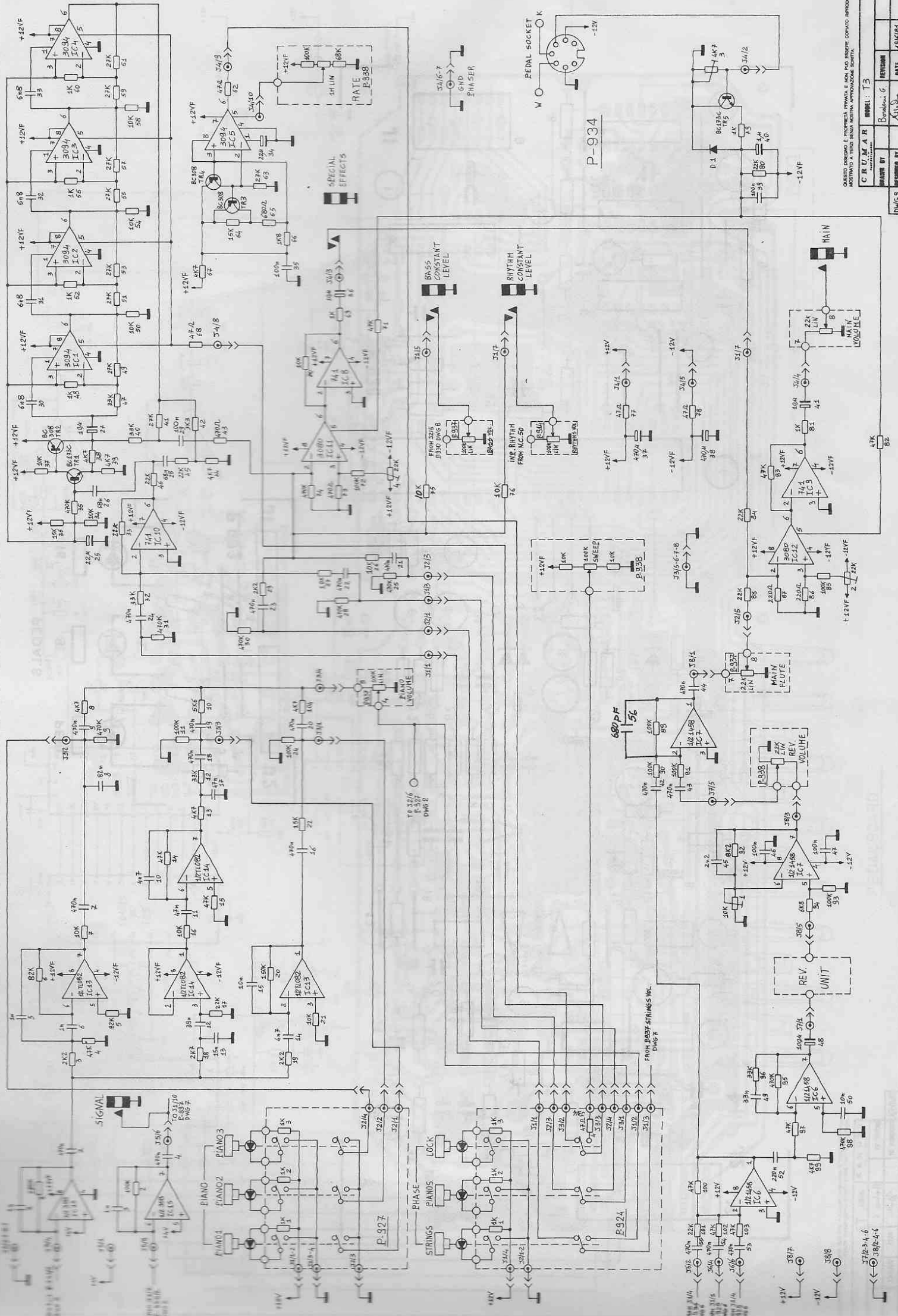






PEDALS

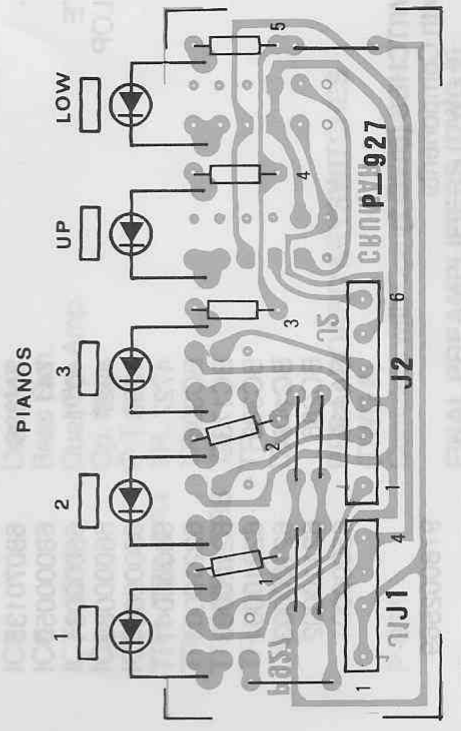
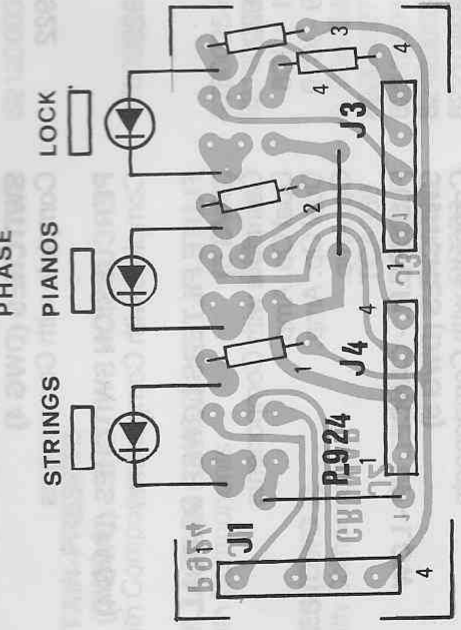
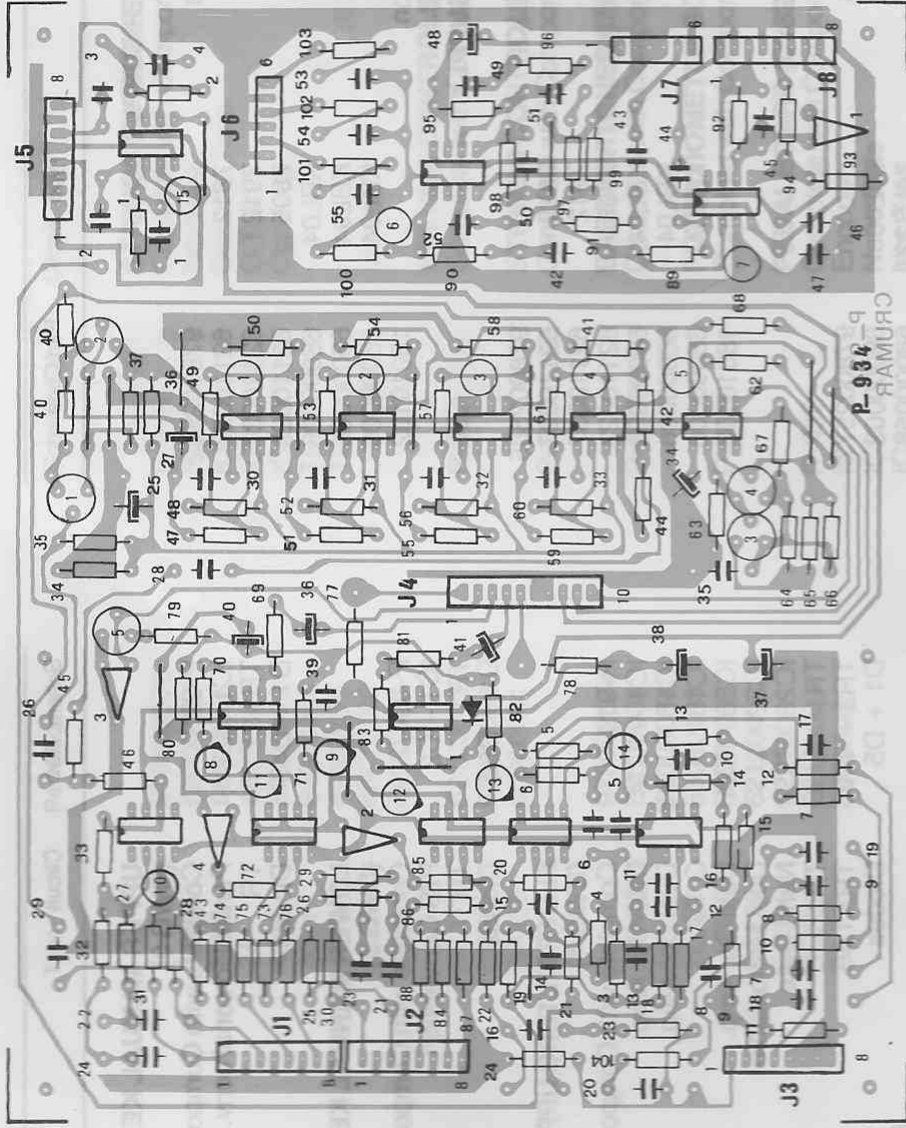




QUESTO CIRCUITO È PRODOTTO IN ITALIA E NON HA NESSUN DUBBIO IMPRODOTTO  
 AUTENTICO A TUTTI GLI EFFETTI. AUTENTICO A TUTTI GLI EFFETTI.

C. P. U. M. A. R. MODEL: T3  
 DRAWN BY: [Signature]  
 REVISION: 6  
 DATE: 19/8/84  
 DWG: 3

37/2-3,4-6  
 37/2-4-6





**MODEL T3**

**ELECTRONIC COMPONENT LIST**

Schem. Ref.	Circuit	Type	Part Code
-------------	---------	------	-----------

P-933	<b>AUTO-SUSTAIN (DWG 6)</b> Complete with Components		978002575
IC1	Dual Op. Amp.	1458	68000053
IC2	O.T.A.	3080	68000066
IC3	Op. Amp.	741	68030141
IC4 - IC10	Binary Counter	4024	68010122
IC5 - IC9	Nand Gate	4011	68000034
IC6	Exclusive Or	4070	68000070
IC7	D Flip-Flop	4013	68010136
IC8	Static Shift Register	4031	68010164

TR1-TR2-TR4-TR5-TR3		BC173C	62120003
		BC308	62210001
D1 ÷ D23	Diodes	BA130	65000001

P-936	<b>R.S.S. (DWG 6)</b> Complete with Components		978002578
IC1	ADL	TDA1022	68000084
IC2	Nand Gate	4011	68000034
IC3	Dual Op. Amp.	TL082	68030163
IC4	Dual Op. Amp.	LM358	68000093
TR1 ÷ TR3	TR	BC239	62120003
TR4	TR	BC308	62210001
TR5	TR	BC239	62120003
D1 ÷ D8	Diodes	BA130	65000001

P-925	<b>R.S.S. SWITCHES (DWG 6)</b> Complete with Components		978002567
TR1	TR.	BC173C	62120003

P-922	<b>AUTO-SUSTAIN-PRESETS SWITCHES (DWG 6)</b> Complete with Components		978002564
-------	--------------------------------------------------------------------------	--	-----------

P-906	<b>A.D.L. OSCILLATORS (DWG 7)</b> Complete with Components		978002548
TR1 ÷ TR17	TR.	BC173C	62120003

P-897	<b>DELAY LINES (DWG 7)</b> Complete with Components		978002586
IC1 + IC9	A.D.L.	TCA350	68000007
TR1 + TR10	TR.	BC308	62210001
TR4 - TR8	TR.	BC173C	62120003
TR6 ÷ TR8	TR.	BC308	62210001
TR9 - TR10	TR.	BC173C	62120001
TR11 ÷ TR13	TR.	BC308	62210001
TR14 - TR15	TR.	BC173C	62120003
D1 ÷ D15	Diodes	BA130	65000001

Schem. Ref.	Circuit	Type	Part Code
-------------	---------	------	-----------

P-915	<b>STRINGS SWITCHES (DWG 7)</b> Complete with Components		978002557
IC1	Nor Gate	4001	68000020
IC2	Dual Op. Amp.	1458	68000053
IC3	O.T.A.	3080	68000066
IC4	Op. Amp.	741	68000059
TR1		BC173C	62120003
TR2		BC308	62210001
D1 ÷ D3	Diodes	BA130	65000001

P-937	<b>VOLUME CONTROLS (DWG 7)</b> Complete with Components		978002580
-------	------------------------------------------------------------	--	-----------

P-929	<b>STRINGS CONTROLS (DWG 7)</b> Complete with Components		978002571
-------	-------------------------------------------------------------	--	-----------

P-923	<b>BASS SWITCHES (DWG 8)</b> Complete with Components		978002565
-------	----------------------------------------------------------	--	-----------

P-938	<b>POTENTIOMETER BOARD (DWG 8)</b> Complete with Components		978002581
-------	----------------------------------------------------------------	--	-----------

P-930	<b>PEDALBOARD (DWG 8)</b> Complete with Components		978002572
IC1	Encoder	74C922	68000110
IC2	Nand Gate	4011	68000034
IC3	Nor Gate	4001	68000020
IC4	Divider	4727	68000041
IC5	Decoder	CD4515	68010162
IC6	Bass Gen.	3615	68000106
IC7 - IC10	Dual Op. Amp.	1458	68000053
IC8	Op. Amp.	741	68000059
IC9	O.T.A.	3080	68000066
TR1-TR2-TR4	TR.	BC173C	62120003
TR3	TR.	BC308	62210001
TR5-TR6-TR8	TR.	BC308	62210001
TR7	TR.	BC173C	62120003
D1 ÷ D5	Diodes	BA130	65000001

P-931	<b>PEDALBOARD KEYSWITCHES (DWG 8)</b> Complete with Components		978002573
-------	-------------------------------------------------------------------	--	-----------

P-934	<b>FINAL PREAMPLIFIERS (DWG 9)</b> Complete with Components		978002576
IC1 ÷ IC5	O.T.A.	3094	68000098
IC6 - IC7	Dual Op. Amp.	1458	68000053
IC8 ÷ IC10	Op. Amp.	741	68030141

**MODEL T3**

**ELECTRONIC COMPONENT LIST**

Schem. Ref.	Circuit	Type	Part Code
-------------	---------	------	-----------

P-915	<b>STRINGS SWITCHES (DWG 7)</b> Complete with Components		978002557
IC1	Nor Gate	4001	68000020
IC2	Dual Op. Amp.	1458	68000053
IC3	O.T.A.	3080	68000066
IC4	Op. Amp.	741	68000059
TR1		BC173C	62120003
TR2		BC308	62210001
D1 ÷ D3	Diodes	BA130	65000001

P-937	<b>VOLUME CONTROLS (DWG 7)</b> Complete with Components		978002580
-------	------------------------------------------------------------	--	-----------

P-929	<b>STRINGS CONTROLS (DWG 7)</b> Complete with Components		978002571
-------	-------------------------------------------------------------	--	-----------

P-923	<b>BASS SWITCHES (DWG 8)</b> Complete with Components		978002565
-------	----------------------------------------------------------	--	-----------

P-938	<b>POTENTIOMETER BOARD (DWG 8)</b> Complete with Components		978002581
-------	----------------------------------------------------------------	--	-----------

P-930	<b>PEDALBOARD (DWG 8)</b> Complete with Components		978002572
IC1	Encoder	74C922	68000110
IC2	Nand Gate	4011	68000034
IC3	Nor Gate	4001	68000020
IC4	Divider	4727	68000041
IC5	Decoder	CD4515	68010162
IC6	Bass Gen.	3615	68000106
IC7 - IC10	Dual Op. Amp.	1458	68000053
IC8	Op. Amp.	741	68000059
IC9	O.T.A.	3080	68000066
TR1-TR2-TR4	TR.	BC173C	62120003
TR3	TR.	BC308	62210001
TR5-TR6-TR8	TR.	BC308	62210001
TR7	TR.	BC173C	62120003
D1 ÷ D5	Diodes	BA130	65000001

P-931	<b>PEDALBOARD KEYSWITCHES (DWG 8)</b> Complete with Components		978002573
-------	-------------------------------------------------------------------	--	-----------

P-934	<b>FINAL PREAMPLIFIERS (DWG 9)</b> Complete with Components		978002576
IC1 ÷ IC5	O.T.A.	3094	68000098
IC6 - IC7	Dual Op. Amp.	1458	68000053
IC8 ÷ IC10	Op. Amp.	741	68030141