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SERVICE MANUAL

53A-541

UNIVERSAL COUNTER TIMER CARD

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REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
	541SA1	1	BOTTOM BOARD FOR 53A-541	0026	541SA1
	541SA2	1	TOP BOARD FOR 53A-541	0026	541SA2
	53A-729	2	ADAPTER CABLE BNC MALE TO SMB SNAP-ON PLUG	0026	53A-729
	53A-729-010	2	OPT 10 10 FT CABLE LENGTH	0026	53A-729-010

541SA1 BOTTOM BOARD FOR 53A-541

REV 8803-03-K

REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
C03,041,042,05,07,1051,1061,1131 1141,1161,96	20128-10006	11	CAP FXD CER .1UF 20% 50VDCW	0058	C322C104M5U5CA
C55	21018-15009	1	CAP FXD ELECT 150UF 75% -10% 16VDCW	0025	NLW150-16
C77	22022-10008	1	CAP FXD TA 10UF 10-20% 20-25VDCW	0106	199D106X9025CA1
CR77	32000-04148	1	DIODE SILICON 75V 1A 5%	0078	1N4148
DS01	32000-00103	1	DIODE LIGHT EMITTING RED 50MA	0039	550-0103
DS111,112,113,114	32000-02003	4	DIODE LIGHT EMITTING RED WITH RESISTOR 0	0039	547-2003
E1	40401-00541	1	EJECTOR STAMP 53A-541 STYLE B BLUE	0026	40401-00541
E2	40401-10059	1	EJECTOR STAMP UDC STYLE D BLUE	0026	40401-10059
E3	45050-03289	1	DCL LED 4POS DRW 00000-00555 1-85	0026	45050-03289
E4	45050-03248	1	DCL LED 4POS BLK DRW 00000-00478	0026	45050-03248
E51,61,71,81,91	92201-00001	5	STAND-OFF 4-40 X .562	0183	1638-440-A
E52,53,62,63,72,73,82,83,92,93	92300-00440	10	WASHER SPLITRING 4-40 3-16 OD	0137	4R
E54,55,64,65,74,75,84,85,94,95	92300-75440	10	SCREW PHIL PNHD 4-40X.25 ZINC	0137	4-40X.25 PHIL PNHD
F07	42202-52003	1	FUSE SUB-MIN 3AMP	0061	251003
F107,117	42202-52001	2	FUSE SUB-MIN 2AMP	0061	251002
J05,55,95	45001-12100	3	CONNECTOR SIP 12 PIN	0026	45001-12100
L1061	27051-33007	1	INDUCTOR 3.3UH 10% 150MW	0175	1840-18
PCB	41530-54100	1	P.C. BOARD VERSION 4L 8803	0026	41530-54100
R771	10117-47004	1	4.7K RES COMP 1-4W 5%	0087	R25J-4.7K-5%
R772	10117-33004	1	3.3K RES COMP 1-4W 5%	0087	R25J-3.3K-5%
R773	10117-33003	1	330 OHM RES COMP 1-4W 5%	0087	R25J-330-5%

541SA1 BOTTOM BOARD FOR 53A-541

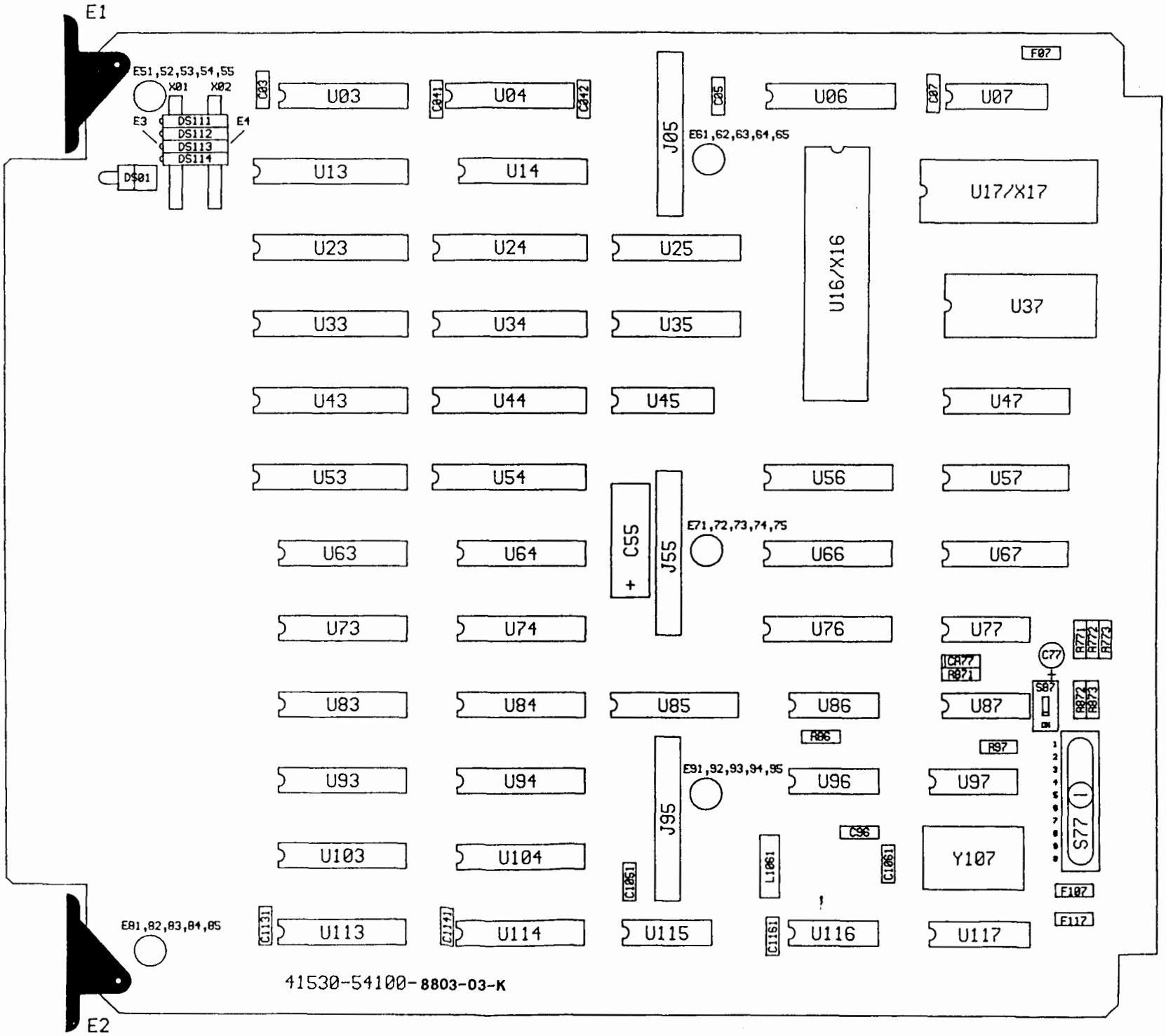
REV 8803-03-K

REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
R86	10117-10007	1	1M RES COMP 1-4W 5%	0087	R25J-1M-5%
R871	10117-68005	1	68K RES COMP 1-4W 5%	0087	R25J-68K-5%
R872	10117-33005	1	33K RES COMP 1-4W 5%	0087	R25J-33K-5%
R873	10117-51004	1	5.1K RES COMP 1-4W 5%	0087	R25J-5.1K-5%
R97	10117-10005	1	10K RES COMP 1-4W 5%	0087	R25J-10K-5%
S77	42050-10010	1	SWITCH 10POS.	0101	C42315-A61-A11
S87	42050-10101	1	SWITCH DIP 1POS SPST	0093	JS-8794-01
U03,04,103,104,113,114,63,64,73 74,83,84,93,94	71209-74593	14	IC TTL LS 8-BIT BINARY	0107	74LS593
U06,25,47,56	73005-74574	4	IC HCT OCTAL TRISTATE LATCH NON-INVERT	0107	74HCT574
U07,45	79008-74138	2	IC HCT 3-TO-8 LINE DECDR DEMULTIPLEXER	0107	74HCT138
U115,97	77816-07432	2	IC HCT QUAD 2-INPUT OR GATE	0088	74HCT32
U116	76606-07400	1	IC HCT QUAD 2-INPUT NAND GATE	0088	74HCT00
U117	71208-74390	1	IC HCMOS DUAL 4-BIT DECADE COUNTER	0107	74HC390
U13,23,33,43,53	73001-74652	5	IC HCT TRANSCEIVER WITH LATCHES	0107	74HCT652
U14	73309-74244	1	IC HCT OCTAL BUFFER NON-INVERTING	0107	74HCT244
U16	79802-00080	1	IC CMOS CENTRAL PROCESSOR UNIT 4 MHZ	0173	TMPZ84C00AP
U17	79813-00018	1	PROGRAMMED PROM U17 53A-541	0026	79813-00018
U24,34,44,54	79805-00128	4	IC CMOS 2K X 8 STATIC RAM 45NS	0218	CY7C128-45PC
U35	79814-00051	1	PAL PROGRAMMED EP310-2 REV A 53A-541	0026	79814-00051
U37	79805-06116	1	IC CMOS 2K-WORD BY 8-BIT STATIC RAM 300NS	0398	UM6116-2

541SA1 **BOTTOM BOARD FOR 53A-541**

REV 8803-03-K

REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
U57	73309-74240	1	IC HCT OCTAL BUFFER INVERTING	0088	74HCT240
U66	79814-00038	1	PAL PROGRAMMED EP310-2 REV A 53A-541	0026	79814-00038
U67	79814-00039	1	PAL PROGRAMMED EP310-2 REV B 53A-541	0026	79814-00039
U76	79814-00025	1	PAL PROGRAMMED EP310-2 REV A 53A-541	0026	79814-00025
U77	73300-07406	1	IC TTL HEX INVERTER BUFFER-DRIVER	0107	7406
U85	79814-00040	1	PAL PROGRAMMED EP310-2 REV A 53A-541	0026	79814-00040
U86	78404-07414	1	HC HEX SCHMITT INVERTING BUFFER	0088	74HC14
U87	78403-07414	1	IC HCT HEX SCHMITT INVERTING BUFFER	0088	74HCT14
U96	76905-07402	1	IC HCT QUAD 2-INPUT NOR GATE	0088	74HCT02
X01,02	45010-08100	2	SOCKET SIP 8 PIN	0032	CAS-08VSC-12B
X16	45012-40100	1	SOCKET 40-PIN DIP LOW PRO	0089	ICN-406-S5-G
X17	45012-28100	1	SOCKET 28-PIN DIP LOW PRO	0089	ICN286-S5-G
Y107	89499-20007	1	CRYSTAL OSC 20.000MHZ 5PPM ADJ	0365	7400D4A1 20.0000


E1
E51,52,53,54,55
X01
X02
E3
E4
DS111
DS112
DS113
DS114
DS01
C03
U03
C041
U04
C042
J05
C05
U06
C07
U07
F07
E61,62,63,64,65
U13
U14
U17/X17
U23
U24
U25
U16/X16
U33
U34
U35
U37
U43
U44
U45
U47
U53
U54
U56
U57
C55
J55
E71,72,73,74,75
U63
U64
U66
U67
U73
U74
U76
U77
C77
R771
R772
R773
CA77
R871
S87
R872
R873
U83
U84
U85
U86
U87
R86
R97
J95
E91,92,93,94,95
U93
U94
U96
U97
S77
C96
C1051
L1061
C1061
Y107
F107
F117
U103
U104
E81,82,83,84,85
C1131
U113
C1141
U114
U115
C1161
U116
U117
41530-54100-8803-03-K
E2

541SA2 TOP BOARD FOR 53A-541

REV 8710-03-K

REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
C04,05,1022,1023,1131,1151,44 522,624,742,955	20128-10006	11	CAP FXD CER .1UF 20% 50VDCW	0058	C322C104M5U5CA
C1021,142,521,622,92,952,954	22022-10008	7	CAP FXD TA 10UF 10-20% 20-25VDCW	0106	199D106X9025CA1
C1031,831,921	21528-10003	3	CAP FXD MICA 100PF 5% 500VDCW	0012	DM5FY101J03
C141,15,841,941,951,953	20128-47006	6	CAP FXD CER .47UF 20% 50VDCW	0075	RPE123Z5U474M50V
C221,621	21528-20004	2	CAP FXD MICA 2000PF 5% 500VDCW	0012	DM-19-202J
C31,81	25028-20002	2	CAP VAR CER 2.3-20PF	0057	9308
C41,91	25072-22006	2	CAP FXD POLYSTY .22UF 10% 250VDCW	0106	730P224X9250
C42,82	21528-10002	2	CAP FXD MICA 10PF 5% 100VDCW	0012	DM15-100D
C741,942,943	21528-30001	3	CAP FXD MICA 3PF .5 PF TOL 500VDCW	0025	CD5CC030C03
CR1021,1022,1023,1024,521,522 621,622,623,624,631,632,633,634 921,922	32000-04148	16	DIODE SILICON 75V 1A 5%	0078	1N4148
J1011,31,41,51,71,81,91	45002-51053	7	CONNECTOR SMB RT. ANGLE PC BD MOUNT	0287	R114665
K32,421,422,72,82,92	83000-20006	6	RELAY REED SPDT 500OHMS 3.8V 1	0111	220-001-5M
L1031,1051,1052,23	27051-00200	4	INDUCTOR WIDE-BAND FERRITE CHOKE	0042	VK 200 10-3B
P05,55,95	45002-03107	3	CONNECTOR 12PIN WAFERASSY DOUBLEHEADER	0133	1102-14-112-107
PCB	41530-54101	1	P.C. BOARD VERSION 4L 8710	0026	41530-54101
R02,031	15117-10004	2	1K RES VAR CER 22TRN 1W 100PPM	0105	43P-102
R032,1122,1131,1132	15117-10005	4	10K RES VAR CER 22TRN 1W 100PPM	0105	43P-103
R041,046	14036-20005	2	20K RES FILM 1-4W .1% 25PPM	0035	RN55E2002B

541SA2 TOP BOARD FOR 53A-541

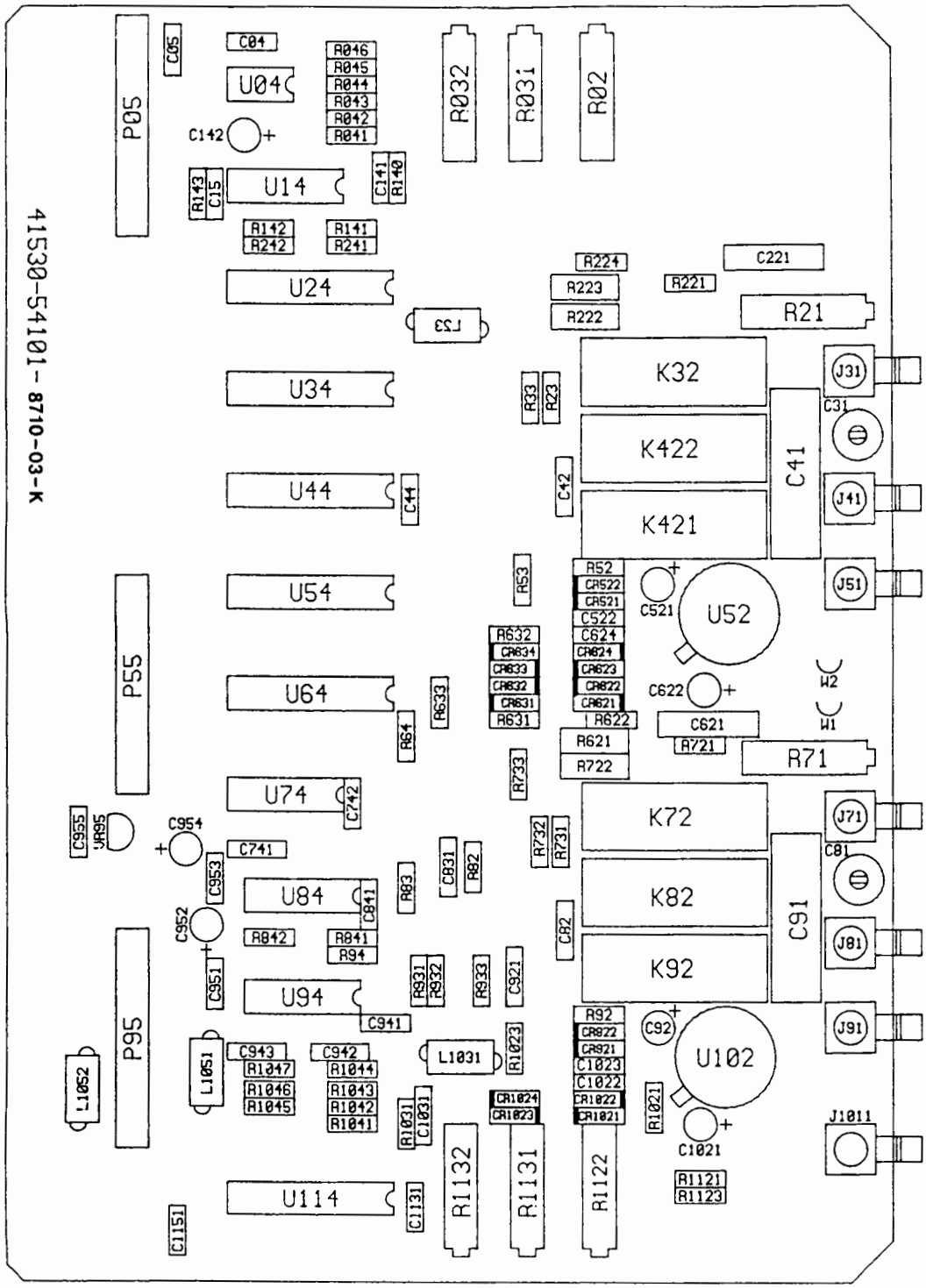
REV 8710-03-K

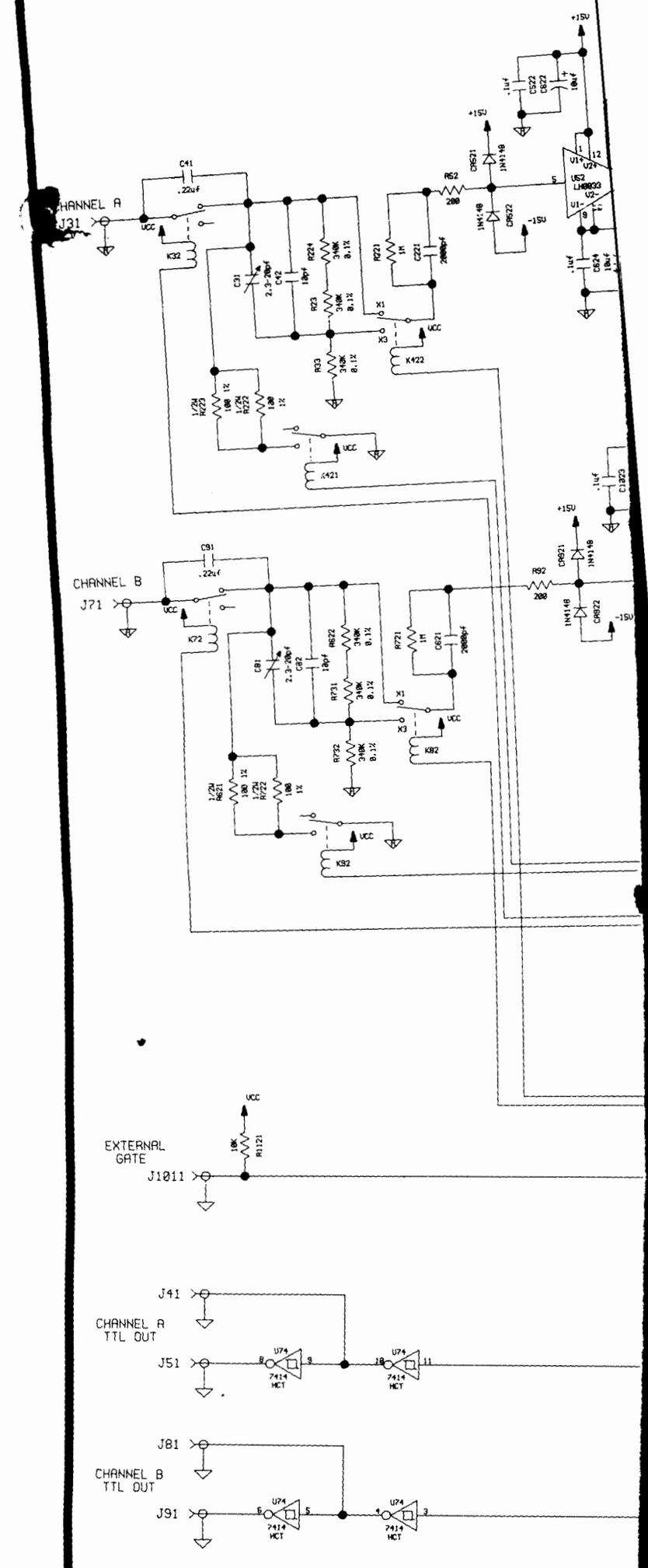
REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
R042,043,044,045,142,242	14036-10005	6	10K RES FILM 1-4W .1% 25PPM	0035	RN55E1002B
R1021,1023,53,631,632,733	14024-30104	6	3.01K RES FILM 1-4W 1% 100PPM	0035	RN55D3011F
R1031,1044,1047,82,842,933	10117-27005	6	27K RES COMP 1-4W 5%	0087	R25J-27K-5%
R1041,633,64	10117-10002	3	10 OHM RES COMP 1-4W 5%	0087	R25J-10-5%
R1042,1045,140,143,94	10117-10003	5	100 OHM RES COMP1-4W 5%	0087	R25J-100-5%
R1043,1046,841	10117-39003	3	390 OHM RES COMP 1-4W 5%	0087	R25J-390-5%
R1121	10117-10005	1	10K RES COMP 1-4W 5%	0087	R25J-10K-5%
R1123	10117-10004	1	1K RES COMP 1-4W 5%	0087	R25J-1K-5%
R141,241	10117-33003	2	330 OHM RES COMP 1-4W 5%	0087	R25J-330-5%
R21,71	15117-20003	2	200 OHM RES VAR CER 22TRN 1W 100PPM	0105	43P-201
R221,721	10117-10007	2	1M RES COMP 1-4W 5%	0087	R25J-1M-5%
R222,223,621,722	14054-10003	4	100 OHM RES FILM 1-2W 1% 100PPM	0035	RN60D1000F
R224,23,33,622,731,732	14036-34006	6	340K RES FILM 1-4W .1% 25PPM	0035	RN55E3403B
R52,92	10117-20003	2	200 OHM RES COMP 1-4W 5%	0087	R25J-200-5%
R83,931,932	10117-68005	3	68K RES COMP 1-4W 5%	0087	R25J-68K-5%
U04	52200-00001	1	REFERENCE 10V 20MA 0-25 PPM	0082	REF01DP
U102,52	61000-00033	2	OP AMP FAST BUFFER AMP	0078	LH0033CG
U114	79814-00024	1	PAL PROGRAMMED EP310-2 REV B 53A-541	0026	79814-00024
U14	61000-00347	1	OP AMP FET QUAD	0078	LF347
U24	20100-07528	1	IC DUAL D-A 8-BIT	0011	AD7528JN
U34,44	73005-74574	2	IC HCT OCTAL TRISTATE LATCH NON-INVERT	0107	74HCT574
U54,64	79814-00023	2	PAL PROGRAMMED EP310-2 REV A 53A-541	0026	79814-00023

541SA2 **TOP BOARD FOR 53A-541**

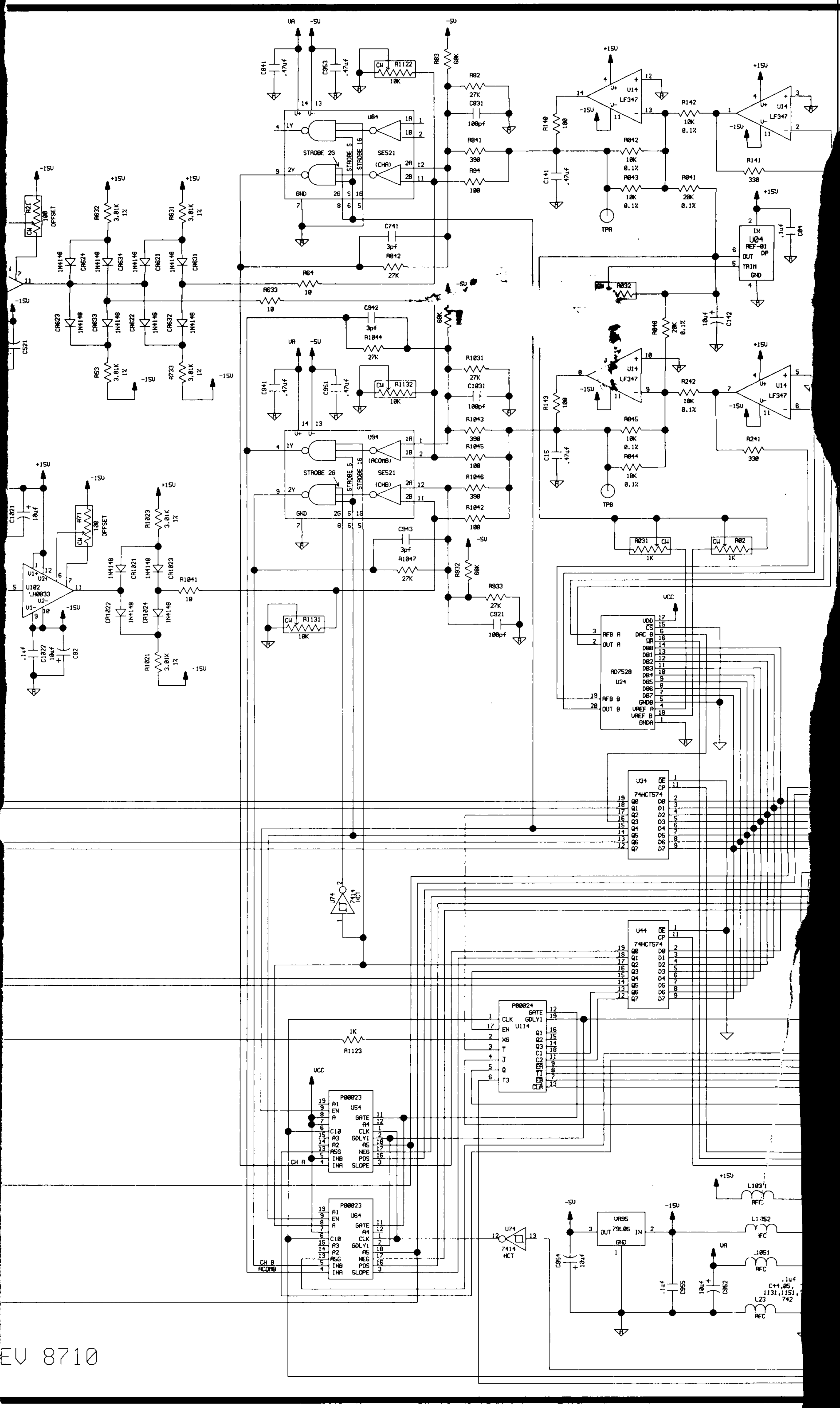
REV 8710-03-K

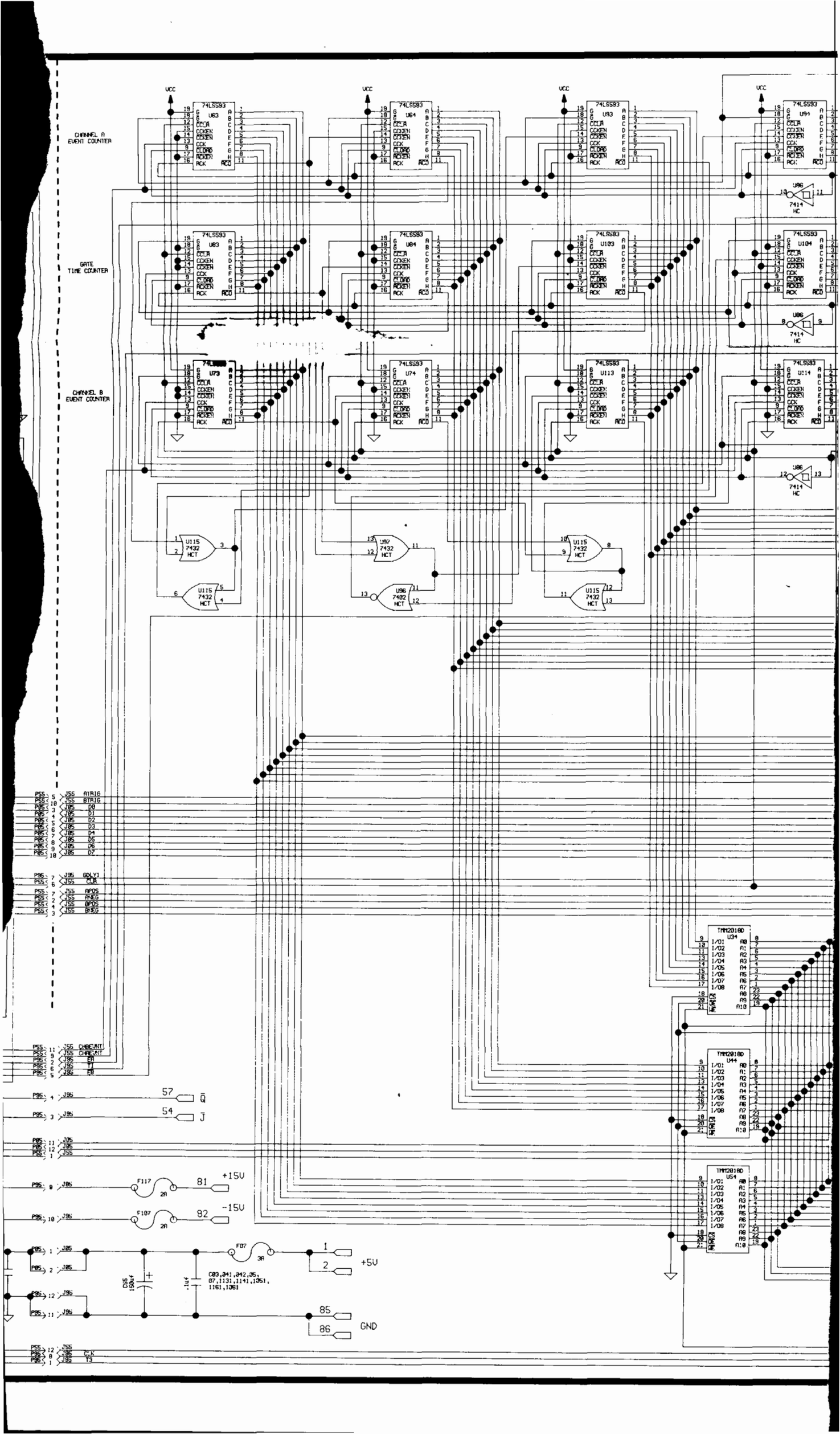
REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
U74	78403-07414	1	IC HCT HEX SCHMITT INVERTING BUFFER	0088	74HCT14
U84,94	61010-00521	2	IC HIGH SPEED DUAL COMPARATOR	0092	NE521N
VR95	52000-17905	1	VOLTAGE REGULATOR -5V 100MA 5%	0074	MC79L05ACP
W1,2	90000-06022		WIRE 22 GA UNINSULATED	0017	QQ-W-343D

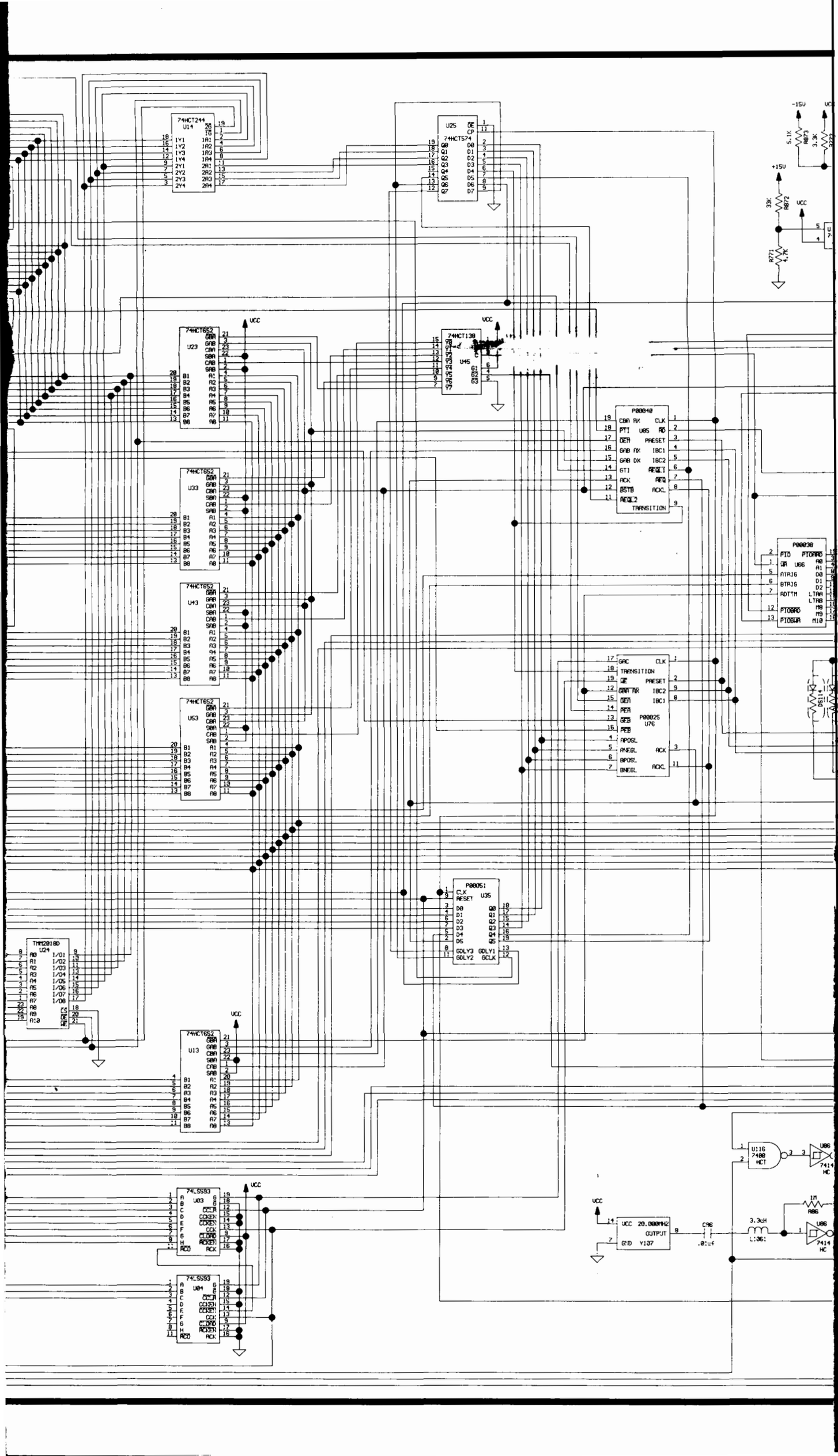

41530-54101- 8710-03-K
P05
P55
P95
U04
U14
U24
U34
U44
U54
U64
U74
U84
U94
U114
U52
U102
R032
R031
R02
R21
R71
K32
K422
K421
K72
K82
K92
C41
C91
C31
C81
J31
J41
J51
J71
J81
J91
J1011
C142
C521
C622
C1021
L1031
L1051
L1052
R1132
R1131
R1122

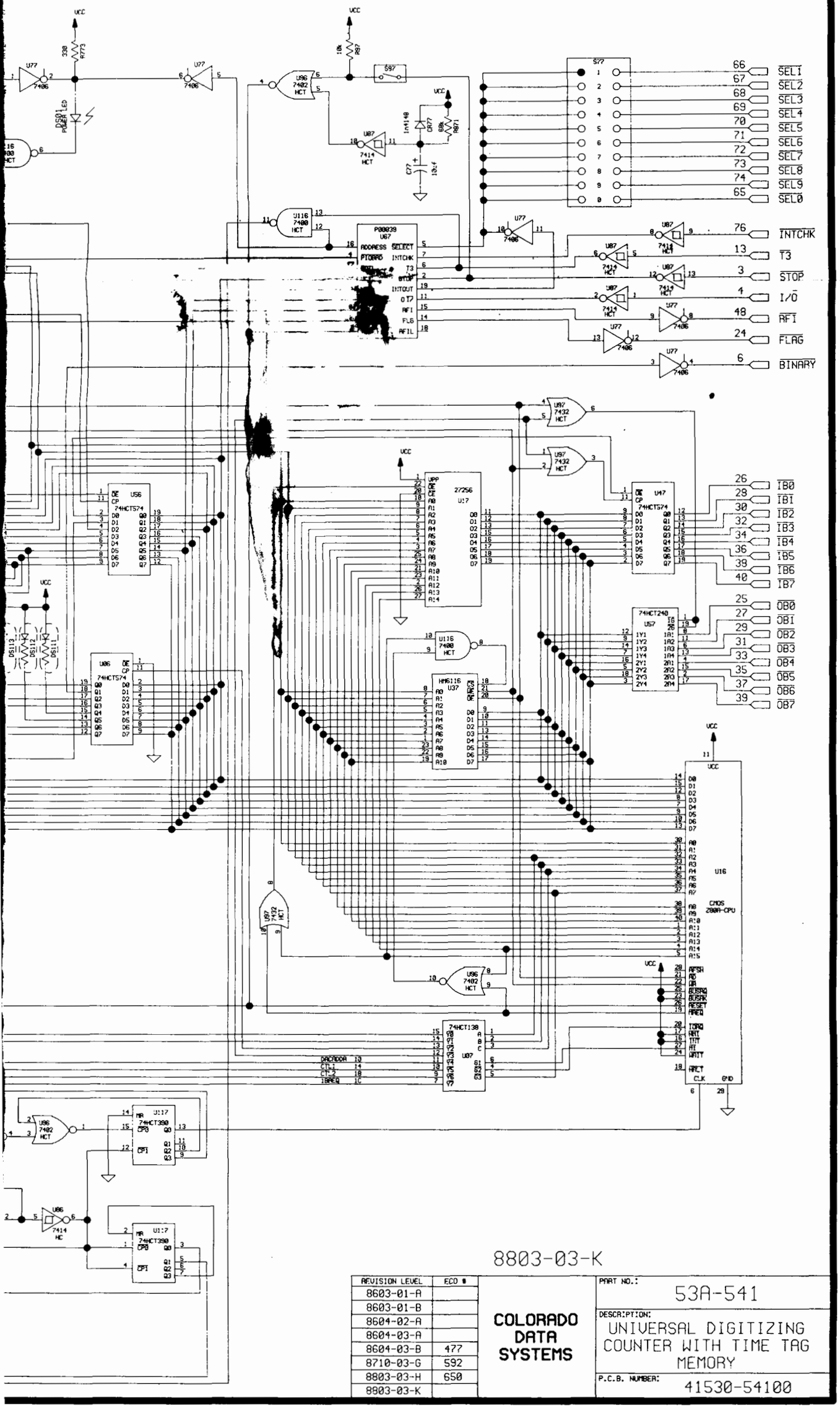

CHANNEL A
J31
C41
.22uf
K32
C31
2.3-20pf
C42
18pf
R224
340K 0.1%
R23
340K 0.1%
R33
340K 0.1%
R223
1M
C221
2000pf
X1
X3
K422
R52
200
CR521
1N4148
CR522
1N4148
+15V
-15V
.1uf
C522
C622
10uf
U52
LH0033
R229
1/2W 100 1%
R222
100 1%
K421
CHANNEL B
J71
C91
.22uf
K72
C81
2.3-20pf
C82
18pf
R822
340K 0.1%
R731
340K 0.1%
R732
340K 0.1%
R721
1M
C821
2000pf
K82
R92
200
CR921
1N4148
CR922
1N4148
C1023
K92
VCC
EXTERNAL
GATE
J1011
10K
R1121
J41
CHANNEL A
TTL OUT
J51
U74
7414
HCT
J81
CHANNEL B
TTL OUT
J91

541SA2 R


VA
-5V
+15V
-15V
VCC
C841 .47uf
C953 .47uf
R1122 CW 10K
R83 68K
R82 27K
C831 100pf
R841 390
R94 100
U84
SE521
(CHA)
STROBE 2G
STROBE S
STROBE 16
1Y
2Y
1A
1B
2A
2B
GND
2G
S
1G
U14
LF347
R140 100
C141 .47uf
R142 10K 0.1%
R042 10K 0.1%
R043 10K 0.1%
R041 20K 0.1%
R141 330
TPA
U04
REF-01
DP
IN
OUT
TRIM
GND
C04 .1uf
R032
R046 20K 0.1%
C142 10uf
C741 3pf
R842 27K
R64 10
R633 10
C942 3pf
R1044 27K
R21 CW 100 OFFSET
R632 3.01K 1%
R631 3.01K 1%
1N4148
CR624
CR634
CR621
CR631
CR623
CR633
CR622
CR632
R53 3.01K 1%
R733 3.01K 1%
C521
C941 .47uf
C951 .47uf
R1132 CW 10K
R1031 27K
C1031 100pf
R1043 390
R1045 100
R1046 390
R1042 100
U94
(ACOMB)
(CHB)
R143 100
C15 .47uf
R045 10K 0.1%
R044 10K 0.1%
TPB
R242 10K 0.1%
R241 330
C943 3pf
R1047 27K
R932 68K
R933 27K
C921 100pf
R031 CW 1K
R02 CW 1K
U102
LH0033
V1+
V2+
V1-
V2-
C1021 10uf
R71 CW 100 OFFSET
C1022 .1uf 10uf
C92
R1023 3.01K 1%
CR1021
CR1023
CR1022
CR1024
R1021 3.01K 1%
R1041 10
R1131 CW 10K
AD7528
U24
VDD
CS
DAC B
WR
DB0
DB1
DB2
DB3
DB4
DB5
DB6
DB7
GNDB
VREF A
VREF B
GNDA
RFB A
OUT A
RFB B
OUT B
U34
74HCT574
OE
CP
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
D0
D1
D2
D3
D4
D5
D6
D7
U44
U74
7414 HCT
P00024
U114
CLK
EN
XG
T
J
Q
T3
GATE
GDLY1
C1
C2
EA
T1
EB
CLR
1K
R1123
P00023
U54
U64
A1
A
C10
A3
A2
ASG
INB
INA
A4
A5
NEG
POS
SLOPE
CH A
CH B
ACOMB
VR95
79L05
OUT
IN
C954 10uf
C955 .1uf
C952 10uf
L1031 RFC
L1352 RFC
L1051 RFC
L23 RFC
.1uf
C44,05,
1131,1151,
742
EV 8710


CHANNEL A EVENT COUNTER
GATE TIME COUNTER
CHANNEL B EVENT COUNTER
VCC
74LS593
U83
U84
U93
U94
U103
U104
U73
U74
U113
U114
U86
7414 HC
U115 7432 HCT
U97 7432 HCT
U86 7402 HCT
P55 5 J55 ATRIG
P55 10 J55 BTRIG
P95 3 J95 D0
P95 4 J95 D1
P95 5 J95 D2
P95 6 J95 D3
P95 7 J95 D4
P95 8 J95 D5
P95 9 J95 D6
P95 10 J95 D7
P95 7 J95 GDLY1
P55 6 J55 CLR
P55 7 J55 APOS
P55 2 J55 ANEG
P55 4 J55 BPOS
P55 3 J55 BNEG
P55 11 J55 CHBEVNT
P55 9 J55 CHAEVNT
P95 2 J95 E1
P95 6 J95 E2
P95 5 J95 E3
P95 4 J95
57
Q̄
P95 3 J95
54
J̄
P95 11 J95
P95 12 J95
P95 1 J55
P95 9 J95
F117
2A
81
+15V
P95 10 J95
F107
2A
92
-15V
P95 1 J95
P95 2 J95
C85 150uf
.1uf
F07
3A
C83,841,842,85, 87,1131,1141,1051, 1161,1081
1
2
+5V
P95 12 J95
P95 11 J95
85
86
GND
P55 12 J55
P95 8 J95 CLK
P95 1 J95 Y3
TMM2018D
U34
U44
U54
I/O1
I/O2
I/O3
I/O4
I/O5
I/O6
I/O7
I/O8
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
WE
OE
CS


74HCT244
U14
74HCT574
U25
74HCT652
U23
U33
U43
U53
U13
74HCT138
U45
P00040
P00038
P00025
U76
P00051
U35
TMM2018D
U24
74LS393
U03
U04
U116
7400
HCT
7414
HC
VCC
-15V
+15V
20.000MHZ
OUTPUT
Y137
3.3uH
L1361
.01uf
C96
5.1K
R873
3.3K
33K
R872
4.7K
R771



8803-03-K

REVISION LEVEL	ECO #
8603-01-A	
8603-01-B	
8604-02-A	
8604-03-A	
8604-03-B	477
8710-03-G	592
8803-03-H	650
8903-03-K	

COLORADO DATA SYSTEMS

PART NO.: 53A-541

DESCRIPTION: UNIVERSAL DIGITIZING COUNTER WITH TIME TAG MEMORY

P.C.B. NUMBER: 41530-54100

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