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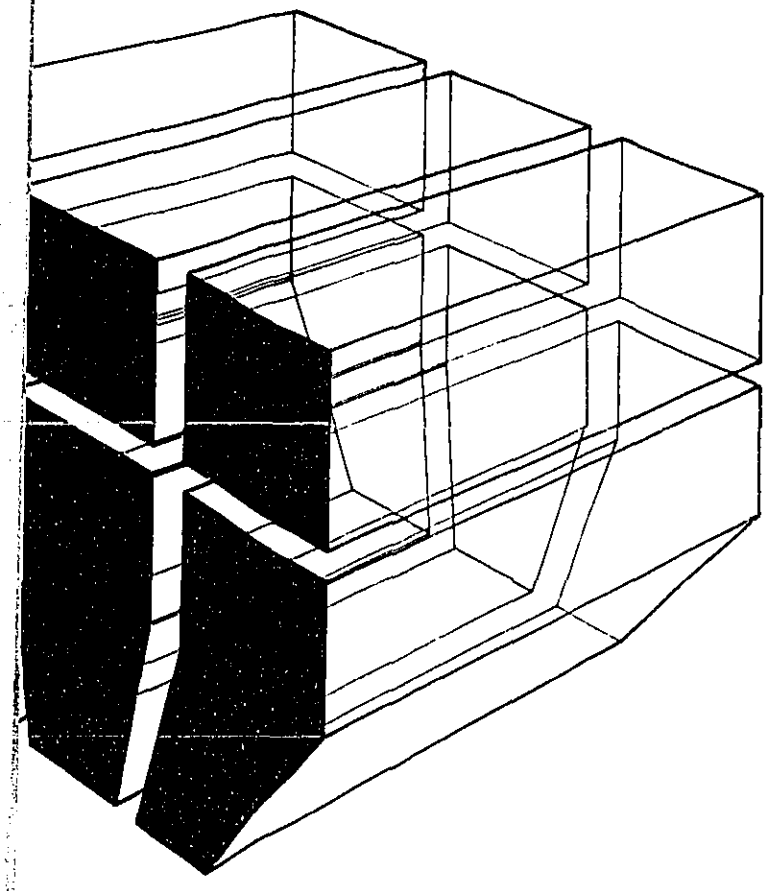
TECHNICAL REPORT N-41
June 1979

Prediction of the Noise Impact Within and Adjacent to Army Facilities

TRUE-INTEGRATING ENVIRONMENTAL NOISE MONITOR AND SOUND EXPOSURE LEVEL METER VOLUME II: WIRING AND PARTS LISTS, PARTS LAYOUTS, AND SCHEMATICS



by
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monitors

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides the complete hardware construction of the CERL environmental noise monitor. Included are: (1) a task block diagram of the unit, (2) a parts list and diagram of the front panel, (3) a parts list and diagram of the power supply circuit, (4) a list of the back plane wiring, (5) parts list, layout, and schematics of the PC boards, and (6) wiring list for cables and connectors.

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FOREWORD

This research was conducted for the Directorate of Military Programs, Office of the Chief of Engineers (OCE), under Project 4A762720A896, "Environmental Quality for Construction and Operation of Military Facilities"; Task 03, "Pollution Control Technology"; Work Unit 001, "Prediction of the Noise Impact Within and Adjacent to Army Facilities." The QCR number is 1.03.011. Mr. F. P. Beck, DAEN-MPE-I, is the OCE Technical Monitor.

The work was performed by the Environmental Division (EN), U.S. Army Construction Engineering Research Laboratory (CERL). Dr. R. K. Jain is Chief of EN.

COL J. E. Hays is Commander and Director of CERL, and Dr. L. R. Shaffer is Technical Director.

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TABLES

FIGURES

BOARDS

TRUE-INTEGRATING ENVIRONMENTAL
NOISE MONITOR AND SOUND-
EXPOSURE LEVEL METER
VOLUME II: MONITOR CONSTRUCTION --
PARTS, LAYOUT, AND SCHEMATICS

1 INTRODUCTION

Background

The Environmental Protection Agency (EPA) has recommended the day-night average level (L_{dn}) as the measure to use for assessing normal environmental noise, and the C-weighted day-night level (L_{Cdn}) as the measure for assessing impulsive noises (for example, from artillery, armor, sonic boom, etc.). Explicit in the EPA's recommendation is a requirement to directly integrate the instantaneous square of the sound pressure as a function of time. In a practical sense, this direct integration can be approximated for most continuous noise sources by integration the output of a root-mean-square (RMS) detector (for example, like the detector employed in the normal sound-level meter). However, in the case of highly impulsive noises, and especially for single events, the integration of an RMS detector output may yield erroneous results because the quantity found is the impulse response of the detector itself, rather than the true square of the pressure as a function of time.

The Construction Engineering Research Laboratory (CERL) has designed and constructed monitors for its own use and for the Federal EPA; in addition, CERL has studied the features of commercial noise monitors for the Federal EPA[1] and participated in the National Academy of Science efforts to define noise assessment procedures for Federal activities.[2] These studies have made apparent certain physical characteristics within the design of the monitor for measuring Army-specific noises (see Volume I).

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1 P. D. Schomer and A. J. Averbuch, Analysis of Environmental Noise Monitors, Technical Report N-21/ADA040005 (U.S. Army Construction Engineering Research Laboratory [CERL], April 1977).

2 Guidelines for Preparing Environmental Impact Statements on Noise, Report of Working Group 69 on Environmental Impact of Noise, Committee on Hearing, Bioacoustics, and Biomechanics, Assembly of Behavioral and Social Sciences (National Research Council of the National Academy of Sciences, 1977).

Purpose

The purpose of this report is to describe the construction, and provide parts lists, layout, and schematics for the CERL environmental noise monitor.

Outline of Report

Chapter 2 provides a block diagram of the monitor. Chapter 3 provides a parts list and diagram of the front panel. Chapter 4 provides a parts list of the monitor's power supply circuit. Chapter 5 is a list of the monitor's back plane wiring components, and Chapter 6 provides a parts list, parts layout, and schematics for the PC Boards. Chapter 7 is a list of the monitor's cable and connector wiring.

2 BLOCK DIAGRAM OF MONITOR

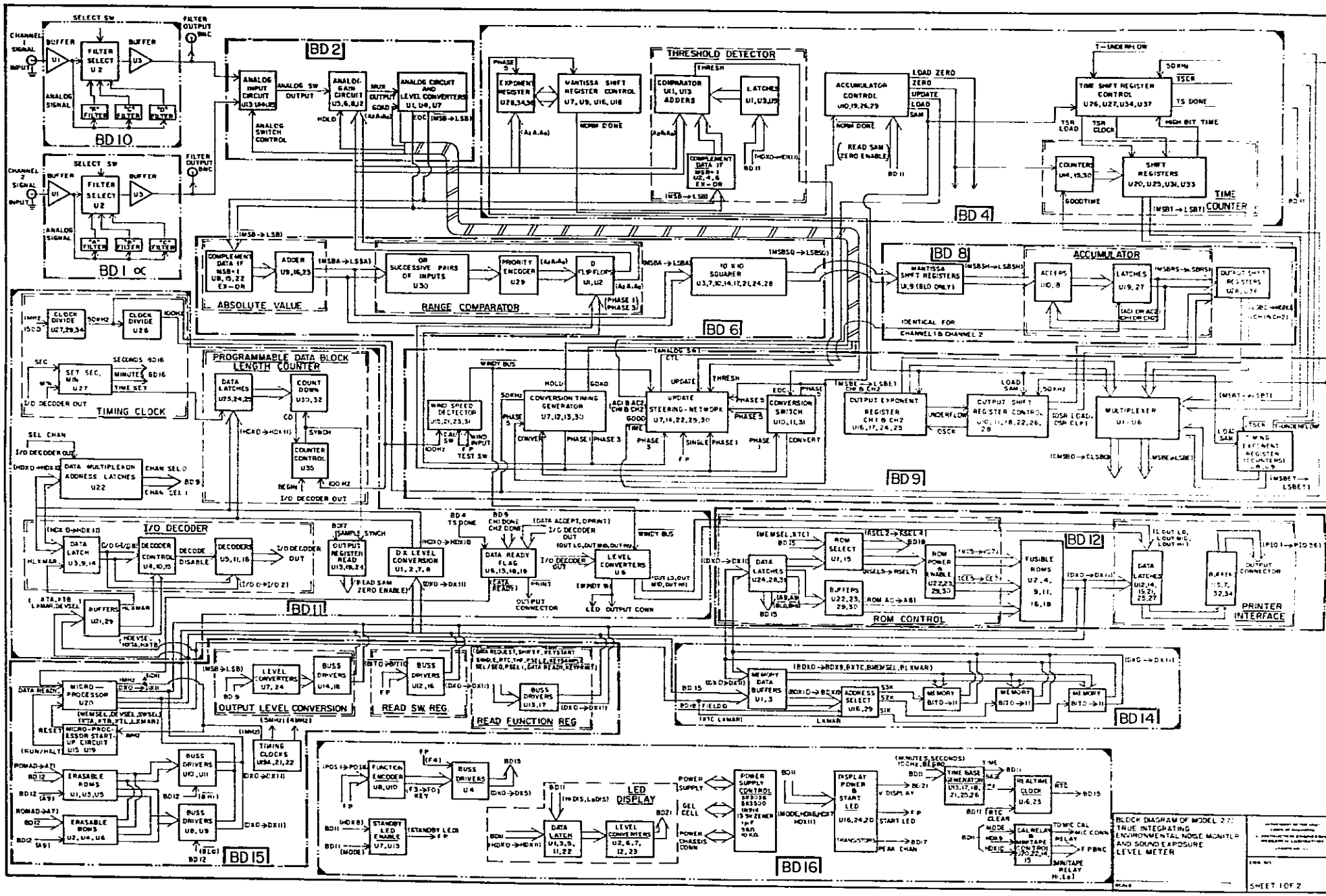


Figure 1. Block diagram of Model 270 true integrating environmental noise monitor and sound exposure level meter.

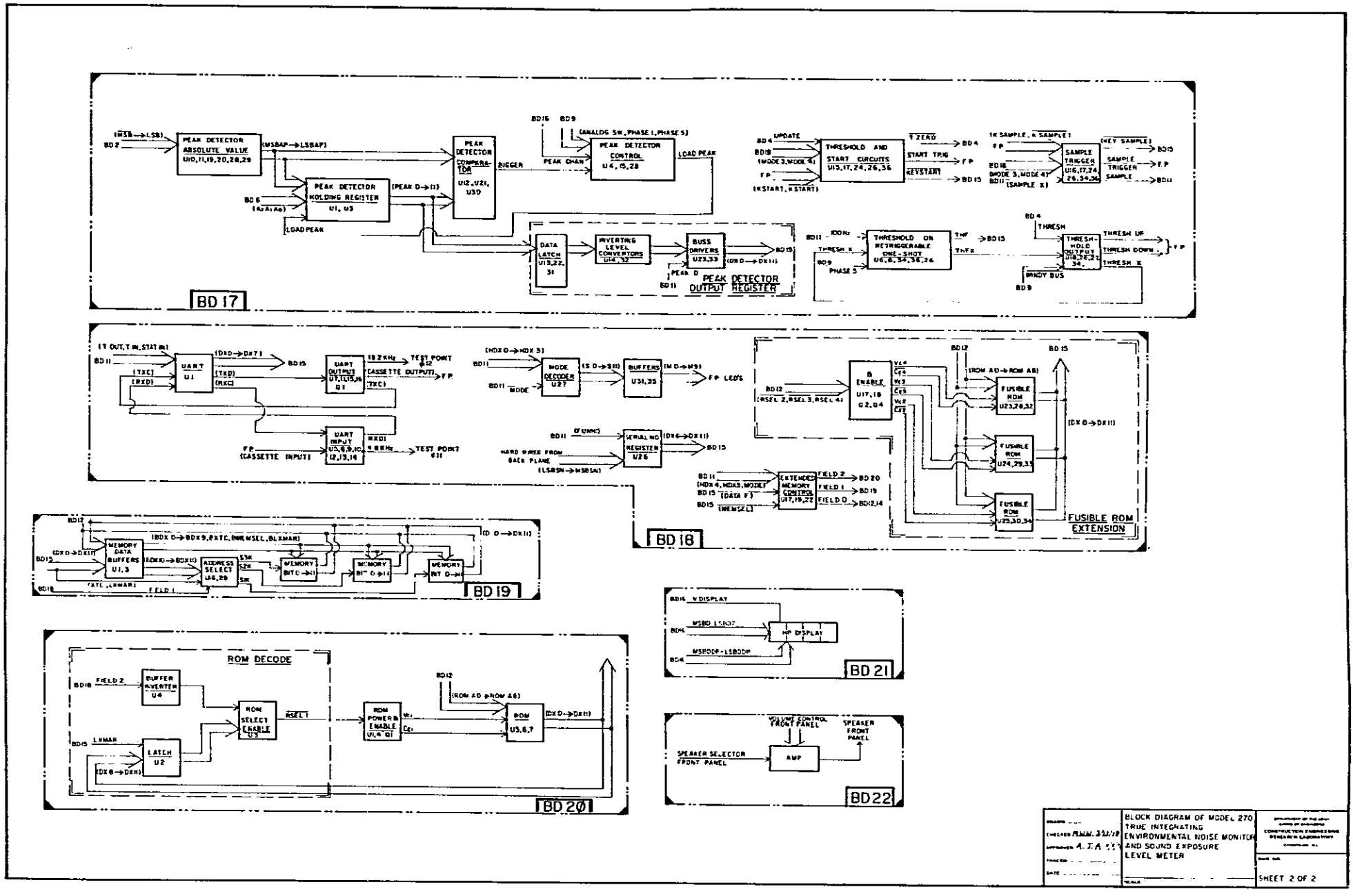


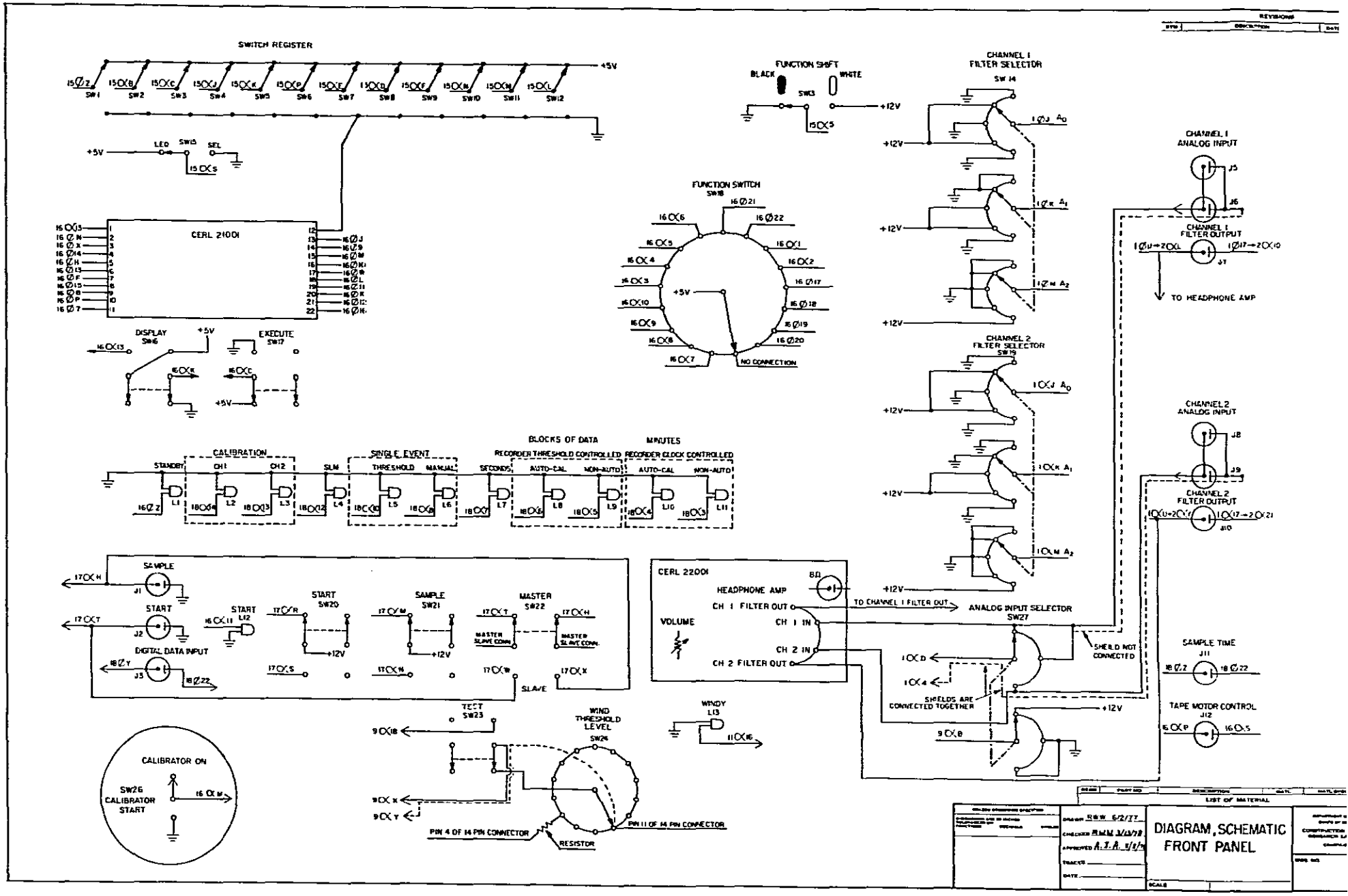
Figure 1. (cont'd).

3 FRONT PANEL -- PARTS LIST AND SCHEMATIC

Table 1

Front Panel -- Parts List

Diagram Reference	Part Type and Manufacturer Number
SW1-SW13, SW15	SPDT switch ALCO MTE-106D
SW14, SW19, SW27	3 pole 2-5 pos non-shorting rotary switch CENTRALAB PSA-207
SW16, SW17, SW20, SW21, SW23	DPDT spring-loaded switch ALCO MTE-206R
SW18, SW24, SW26	non-shorting 2-17 pos rotary switch Mallory 32117J
SW22	DPDT switch ALCO MTE-206N
L1	yellow led Monsanto MV5352
L2-L13	red led Monsanto MV5752
J1, J2, J11	non-insulated BNC connector Amphenol 74868 UG-1094/U
J3, J5-J10	insulated BNC connector Amphenol 31-10
J12	Viking THORKOM TFR09-101P
CERL 21001	PC Board No. 21001 display
CERL 22001	PC Board No. 22001 headphone amp
R1	100 K potentiometer

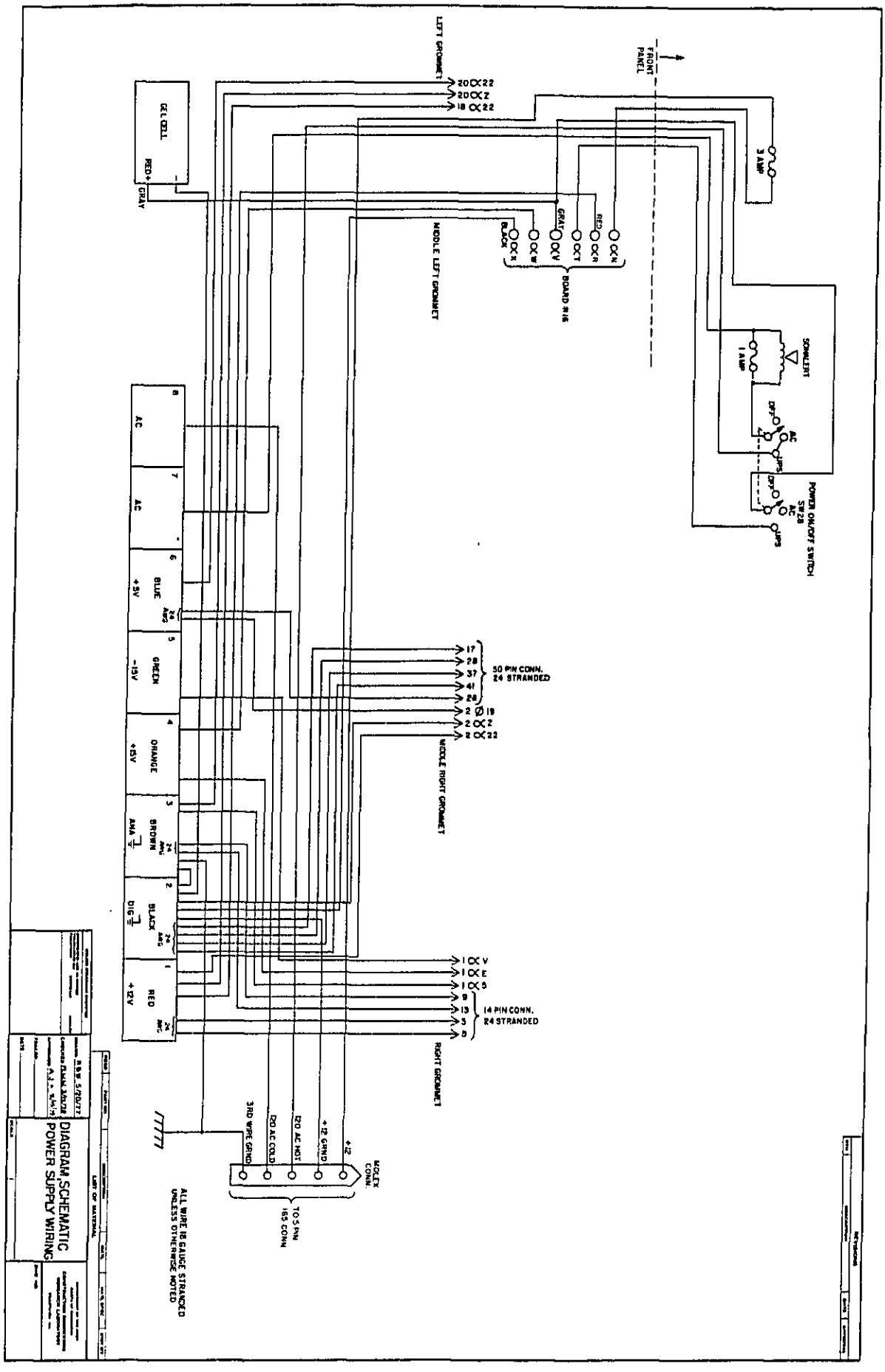

SWITCH REGISTER
+5V
LED
SW15
SEL
CERL 2100I
DISPLAY
SW16
EXECUTE
SW17
FUNCTION SWITCH
SW18
NO CONNECTION
FUNCTION SHIFT
BLACK
WHITE
SW13
CHANNEL 1
FILTER SELECTOR
SW 14
CHANNEL 2
FILTER SELECTOR
SW 19
CHANNEL 1
ANALOG INPUT
J5
J6
CHANNEL 1
FILTER OUTPUT
J7
TO HEADPHONE AMP
CHANNEL 2
ANALOG INPUT
J8
J9
CHANNEL 2
FILTER OUTPUT
J10
BLOCKS OF DATA
MINUTES
CALIBRATION
STANDBY
CH 1
CH 2
SLM
SINGLE EVENT
THRESHOLD
MANUAL
RECORDER THRESHOLD CONTROLLED
SECONDS
AUTO-CAL
NON-AUTO
RECORDER CLOCK CONTROLLED
AUTO-CAL
NON-AUTO
L1
L2
L3
L4
L5
L6
L7
L8
L9
L10
L11
SAMPLE
J1
START
J2
DIGITAL DATA INPUT
J3
START
L12
START
SW20
SAMPLE
SW21
MASTER
SW22
MASTER SLAVE CONN.
SLAVE
CERL 2200I
HEADPHONE AMP
VOLUME
CH 1 FILTER OUT
CH 1 IN
CH 2 IN
CH 2 FILTER OUT
TO CHANNEL 1 FILTER OUT
ANALOG INPUT SELECTOR
SW27
SHIELD NOT CONNECTED
SHIELDS ARE CONNECTED TOGETHER
SAMPLE TIME
J11
TAPE MOTOR CONTROL
J12
CALIBRATOR ON
SW26
CALIBRATOR START
TEST
SW23
WIND THRESHOLD LEVEL
SW24
PIN 4 OF 14 PIN CONNECTOR
PIN 11 OF 14 PIN CONNECTOR
RESISTOR
WINDY
L13
REVISIONS
LIST OF MATERIAL
DIAGRAM, SCHEMATIC
FRONT PANEL
DRAWN R&W 6/2/77
CHECKED R.M.M. 7/13/77
APPROVED A.T.A. 7/7/77

4 POWER SUPPLY CIRCUIT--PARTS LIST AND SCHEMATIC

Table 2

Power Supply Circuit -- Parts List

Part Description	Part Number
Fuse holders--waterproof 20/A 250 V max	Littlefuse FHN 20G
1-amp fuse 125 V SLO-BLO	
3-amp fuse 125 V	
SW28 - 3 pol 2-5 pos non-shorting rotary switch	CENTRALAB PSA-207
Sonalert Electronic Signal 110-VAC pulsing 2900 Hz	Mallory SC110P
Rechargeable battery 12-V 5.0/AH lead acid	Gates 0800-0016
Uninterruptible power supply system	Semiconductor Circuits UPS12-2T3


DIAGRAM,SCHEMATIC
POWER SUPPLY WIRING
FRONT PANEL
LEFT GROMMET
MIDDLE LEFT GROMMET
MIDDLE RIGHT GROMMET
RIGHT GROMMET
GEL CELL
3 AMP
1 AMP
SONALERT
POWER ON/OFF SWITCH
BOARD #16
50 PIN CONN. 24 STRANDED
14 PIN CONN. 24 STRANDED
MOLEX CONN.
TO 5 PIN I6S CONN
3RD WIRE GRND
120 AC COLD
120 AC HOT
+12 GRND
+12
ALL WIRE IS GAUGE STRANDED UNLESS OTHERWISE NOTED
AC
BLUE
GREEN
ORANGE
BROWN
BLACK
RED
GRAY

5 MONITOR BACK PLANE WIRING LIST

Each PC board in the monitor is divided into two halves, labeled "α" and "ϕ". Each half has 22 output pins on each side. One side's outputs are numbered 1 through 22; the others are labeled with 22 letters. Similarly, the back plane of the monitor chassis is divided into two halves, also labeled "α" and "ϕ". Therefore, the back plane consists of two rows of 44 pin connectors.

The wiring list shows the connections to be made between these 44 pin connectors. Some connections also have to be made to the power supply (PS), to the front panel (FP), and to the various chassis connectors. For more details on the connections to the power supply, front panel, and connectors, see the corresponding diagrams and lists.

To facilitate the wiring of the back plane, several busses were wired from the power supply. When a particular pin is to be wired to a buss, the name of the signal is given and the buss is designated by a dagger. The various busses are listed below in Table 3.

In the wiring list, an asterisk in the origin column means that the pin in question is the origin of that signal. The double dagger indicates that Board 8 has many signal pins which must be connected to ground.

Table 3

Wiring List for Power Supply Busses

Digital Ground

PS pin 2 → 2φA → ••• all boards φA ••• → 21 φA → PS
PS pin 2 → 2αZ → ••• all boards αZ ••• → 21 αZ → PS

+12 V

PS pin 1 → 2φ1 → 4φ1 → 6φ1 → 8Lo1φ1 → 8Hi1φ1 →
PS pin 1 → 2α22→ 4α22→ 6α22→ 8Lo1α22→ 8Hi1α22→

→ 8Lo2φ1 → 8Hi2φ1 → 9φ1 → 11φ1 → 16φ1 → 17φ1 → 18φ1 → PS
→ 8Lo2α22→ 8Hi2α22→ 9α22→ 11α22→ 16α22→ 17α22→ 18α22→ PS

+5 V

PS pin 6 → 2φ19 → 11φB → 12φ1 → 14φ1 → 15φ1 → 16φ2 → 17φ2 →
PS pin 6 → 2φ19 → 11αY → 12α22→ 14α22→ 15α22→ 16α21→ 17α21→

→ 18φ2 → 19φ1 → 20φ1→ 21φ1 →
→ 18α21→ 19α22→ 20α22→21α22 →

Analog ground

PS pin 3 → 1α5 → 1φ5
PS pin 3 → 1α5 → 2φZ

+15 V

PS pin 4 → 1αE → 1φE → 2φX

-15 V

PS pin 5 → 1αV → 1φV → 2φY

Board No. 2, Side ϕ

Pin	Signal Name	Origin	
1	+12	PS	†
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19	+5	PS	†
20			
21			
22			

Board No. 2, Side ϕ

Pin	Signal Name	Origin	†
A	Digital Ground	PS	
B	$\overline{\text{EOC}}$	*	9α20
C	$\overline{\text{MSB}}$	*	4ϕ19, 6ϕR, 17ϕC
D	MSB-1	*	4ϕZ, 6ϕN, 17ϕD
E	MSB-4	*	4ϕP, 6ϕC, 17ϕH
F	MSB-3	*	4ϕN, 6ϕB, 17ϕF
H	MSB-2	*	4ϕM, 6ϕM, 17ϕE
J	LSB+2	*	4ϕ4, 6ϕD, 17ϕL
K	LSB+3	*	4ϕ3, 6ϕK, 17ϕK
L	LSB+4	*	4ϕR, 6ϕL, 17ϕJ
M	LSB+1	*	4ϕ5, 6ϕE, 17ϕM
N	LSB	*	4ϕ6, 6ϕH, 17ϕN
P			
R			
S			
T	GOAD	9αM	
U			
V			
W			
X	+15 V	PS	1αE, 1ϕE
Y	-15 V	PS	1αV, 1ϕV
Z	Analog Ground	PS	1α5, 1ϕ5

Board No. 2, Side α

Pin	Signal Name	Origin	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10	Chan 1 input GND	1φ17	
11			
12			
13			
14			
15			
16	Ch 1 filter bd GND	1φ11	
17	Ch 2 filter bd GND	1α11	
18			
19			
20			
21	Ch 2 input GND	1α17	
22	+12V	PS	†

Board No. 2, Side α

Pin	Signal Name	Origin	
A	A_2	6ϕF	4ϕX, 4αR, 17ϕ5
B	A_1	6ϕJ	4ϕY, 4αY, 17ϕ4
C	A_0	6ϕP	4ϕ2O, 4αX, 17ϕ3
D			
E			
F			
H			
J	HOLD	9αP	
K	ANALOG SWITCH CONTROL	9α9	17ϕR
L	Ch 1 input (analog)	1ϕU	
M			
N			
P			
R			
S			
T			
U			
V			
W			
X			
Y	Ch 2 input (analog)	1αU	
Z	Digital Ground	PS	†

Board No. 4, Side ϕ

Pin	Signal Name	Origin	
1	+12 V	PS	+
2			
3	LSB +3	2ϕK	6ϕK, 17ϕK
4	LSB +2	2ϕJ	6ϕD, 17ϕL
5	LSB +1	2ϕM	6ϕE, 17ϕM
6	LSB	2ϕN	6ϕH, 17ϕN
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19	$\overline{\text{MSB}}$	2ϕC	6ϕR, 17ϕC
20	A_0	6ϕP	4αX, 2αC, 17ϕ3
21	THRESH	*	9αU, 17αJ
22	HIGH BIT TIME	*	

Board No. 4, Side ϕ

Pin	Signal Name	Origin	
A	Digital Ground	PS †	
B	GOOD TIME	9αT	
C	HDX0	11φH	16αL, 18α16
D	HDX1	11φJ	16φ4, 18α17
E	HDX2	11φK	16φ6, 18α18
F	HDX3	11φL	16φ5, 18α19
H	HDX4	11φM	16φC, 18αK
J	HDX5	11φN	16φB, 18αJ
K	HDX6	11φP	16φD
L	HDX7	11φR	16φE
M	MSB-2	2φH	6φM, 17φE
N	MSB-3	2φF	6φB, 17φF
P	MSB-4	2φE	6φC, 17φH
R	LSB+4	2φL	6φL, 17φJ
S	THSET	11α1	
T	HDX8	11φS	16φT
U	HDX9	11φT	16φS
V	HDX10	11φU	16φV
W	HDX11	11φV	16φU
X	A_2	6φF	4αR, 2αA, 17φ5
Y	A_1	6φJ	4αY, 2αB, 17φ4
Z	MSB-1	2φD	6φN, 17φD

Board No. 4, Side α

Pin	Signal Name	Origin	
1	MSBT	*	9φV
2	MSBT-1	*	9φM
3	MSBT-2	*	9φZ
4	LSBT+2	*	9φ14
5			
6	$\overline{\text{TZERO}}$	17αD	
7			
8			
9			
10	T-UNDERFLOW	9φD	
11			
12			
13			
14			
15	$\overline{\text{TSCK}}$	*	9φ6
16			
17	SR LOAD	*	8Lo1φ4, 8Lo2φ4
18	UPDATE	*	9αN, 17αA
19	$\overline{\text{NORM DONE}}$	*	
20	READ SAM	11αL	
21	ZERO	*	8Lo1α20, 8Hi1α20, 8Hi2α20, 8Lo2α20, 17φU
22	+12	PS	†

Board No. 4, Side α

Pin	Signal Name	Origin	
A	LSBT+1	*	9αL
B	LSBT	*	9αC
C	LSBT-1	*	
D	50 kHz	11α11	9α10
E			
F	$\overline{\text{Norm Clock}}$	*	
H	1.8 MHz	*	
J	SR CLK	*	8Lo1φ5, 8Lo2φ5
K	TSR LOAD	*	
L	NORM REQ	*	
M	TSR CLOCK	*	
N	$\overline{\text{TS DONE}}$	*	11α13
P	$\overline{\text{CARRY OUT}}$	*	
R	A_2	6φF	4φX, 2αA, 17φ5
S	NORM DONE	*	
T	PHASE 5	9αR	17φT
U	LOAD ZERO	*	
V	ZERO ENABLE	11α20	
W	LOAD SAM	*	9φB
X	A_0	6φP	4φ20, 2αC, 17φ3
Y	A_1	6φJ	4φY, 2αB, 17φ4
Z	Digital ground	PS	†

Board No. 6, Side ϕ

Pin	Signal Name	Origin
1	+12	PS †
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

Board No. 6, Side ϕ

Pin	Signal Name	Origin	†
A	Digital ground	PS	
B	MSB-3	2ϕF	4ϕN, 17ϕF
C	MSB-4	2ϕE	4ϕP, 17ϕH
D	LSB+2	2ϕJ	4ϕ4, 17ϕL
E	LSB+1	2ϕM	4ϕ5, 17ϕM
F	A_2	*	4ϕX, 4αR, 2αA, 17ϕ5
H	LSB	2ϕN	4ϕ6, 17ϕN
J	A_1	*	4ϕY, 4αY, 2αB, 17ϕ4
K	LSB+3	2ϕK	4ϕ3, 17ϕK
L	LSB+4	2ϕL	4ϕR, 17ϕJ
M	MSB-2	4ϕH	4ϕM, 17ϕE
N	MSB-1	2ϕD	4ϕZ, 17ϕD
P	$\overline{A_0}$	*	4ϕ20, 4αX, 2αC, 17ϕ3
R	$\overline{\text{MSB}}$	2ϕC	4ϕ19, 17ϕC
S			
T	PHASE 1	9ϕ10	17ϕS
U	PHASE 3	9α1	
V			
W			
X			
Y			
Z			

Board No. 6, Side α

Pin	Signal Name	Origin
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22	+12	PS +

Board No. 6, Side α

Pin	Signal Name	Origin	
A			
B	MSBSQ+2	*	8Lo1αD, 8Lo2αD
C	MSBSQ+1	*	8Lo1αC, 8Lo2αC
D	MSBSQ	*	8Lo1αB, 8Lo2αB
E	MSBSQ-1	*	8Lo1φY, 8Lo2φY
F	MSBSQ-2	*	8Lo1φX, 8Lo2φX
H	MSBSQ-3	*	8Lo1φW, 8Lo2φW
J	MSBSQ-4	*	8Lo1φV, 8Lo2φV
K	MSBSQ-5	*	8Lo1φU, 8Lo2φU
L	MSBSQ-6	*	8Lo1φT, 8Lo2φT
M	MSBSQ-7	*	8Lo1φS, 8Lo2φS
N	MSBSQ-8	*	8Lo1φR, 8Lo2φR
P	LSBSQ+8	*	8Lo1φP, 8Lo2φP
R	LSBSQ+7	*	8Lo1φN, 8Lo2φN
S	LSBSQ+6	*	8Lo1φM, 8Lo2φM
T	LSBSQ+5	*	8Lo1φL, 8Lo2φL
U	LSBSQ+4	*	8Lo1φK, 8Lo2φK
V	LSBSQ+3	*	8Lo1φH, 8Lo2φH
W	LSBSQ+2	*	8Lo1φF, 8Lo2φF
X	LSBSQ+1	*	8Lo1φE, 8Lo2φE
Y	LSBSQ	*	8Lo1φD, 8Lo2φD
Z	Digital ground	PS	†

Board No. 8 Lol, Side ϕ

Pin	Signal Name	Origin	
1	+12 V	PS	†
2	OSR CARRY IN	PS	††
3	SR CARRY IN	PS	††
4	SR LOAD	4α17	8Lo2ϕ4
5	SR CLK	4αJ	8Lo2ϕ5
6	OSR-4	*	
7	OSR-3	*	
8	OSR-2	*	
9	OSR-1	*	
10	OSR-8	*	
11	OSR-7	*	
12	OSR-6	*	
13	OSR-5	*	
14	OSR-12	*	
15	OSR-11	*	
16	OSR-10	*	
17	OSR-9	*	
18	OSR-16	*	
19	OSR-15	*	
20	OSR-14	*	
21	OSR-13	*	
22	OSR-20	*	

Board No. 8 Lol, Side ϕ

Pin	Signal Name	Origin	
A	Digital ground	PS	†
B	OSR LOAD	9ϕ11	8Hi2ϕB, 8HilϕB, 8Lo2ϕB, 17ϕ18
C	OSR CLOCK Chl	9ϕ12	8HilϕC
D	LSBSQ	6αY	8Lo2ϕD
E	LSBSQ+1	6αX	8Lo2ϕE
F	LSBSQ+2	6αW	8Lo2ϕF
H	LSBSQ+3	6αV	8Lo2ϕH
J	ADDER CARRY IN	PS	††
K	LSBSQ+4	6αU	8Lo2ϕK
L	LSBSQ+5	6αT	8Lo2ϕL
M	LSBSQ+6	6αS	8Lo2ϕM
N	LSBSQ+7	6αR	8Lo2ϕN
P	LSBSQ+8	6αP	8Lo2ϕP
R	MSBSQ-8	6αN	8Lo2ϕR
S	MSBSQ-7	6αM	8Lo2ϕS
T	MSBSQ-6	6αL	8Lo2ϕT
U	MSBSQ-5	6αK	8Lo2ϕU
V	MSBSQ-4	6αJ	8Lo2ϕV
W	MSBSQ-3	6αH	8Lo2ϕW
X	MSBSQ-2	6αF	8Lo2ϕX
Y	MSBSQ-1	6αE	8Lo2ϕY
Z			

Board No. 8 Lol, Side α

Pin	Signal Name	Origin	
1	OSR-19	*	
2	OSR-18	*	
3	OSR-17	*	
4	OSR-24	*	
5	OSR-23	*	
6	OSR-22	*	
7	OSR-21	*	
8	OSR-28	*	
9	OSR-27	*	
10	OSR-26	*	
11	OSR-25	*	
12	OSR-32	*	
13	OSR-31	*	
14	OSR-30	*	
15	OSR-29	*	
16	OSR-36 (OSR CARRY OUT)	*	8 Hilφ2
17	OSR-35	*	
18	OSR-34	*	
19	OSR-33	*	
20	ZERO	4α21	8 Hilα20, 8 Hi2α20, 8 Lo2α20, 17φU
21	AC1 (UPDATE)	9α12	8 Hilα21
22	+12 V	PS	†

Board No. 8 Lol, Side α

Pin	Signal Name	Origin	
A			
B	MSBSQ	6αD	8 Lo2αß
C	MSBSQ+1	6αC	8 Lo2αC
D	MSBSQ+2	6αß	8 Lo2αD
E	MSBSQ+3	PS	††
F	MSBSQ+4	PS	††
H	MSBSQ+5	PS	††
J	MSBSQ+6	PS	††
K	MSBSQ+7	PS	††
L	MSBSQ+8	PS	††
M	MSBSQ+9	PS	††
N	MSBSQ+10	PS	††
P	MSBSQ+11	PS	††
R	MSBSQ+12	PS	††
S	MSBSQ+13	PS	††
T	MSBSQ+14	PS	††
U	MSBSQ+15	PS	††
V	MSBSQ+16	PS	††
W	MSBSQ+17	PS	††
X	MSBSQ+18	PS	††
Y	ADDER CARRY OUT	*	8 Hilφ J
Z	Digital ground	PS	†

Board No. 8 III, Side ϕ

Pin	Signal Name	Origin
1	+12 V	PS †
2	OSR-36	8Lo1α16
3		
4		
5		
6	OSR-40	*
7	OSR-39	*
8	OSR-38	*
9	OSR-37	*
10	OSR-44	*
11	OSR-43	*
12	OSR-42	*
13	OSR-41	*
14	OSR-48	*
15	OSR-47	*
16	OSR-46	*
17	OSR-45	*
18	OSR-52	*
19	OSR-51	*
20	OSR-50	*
21	OSR-49	*
22	OSR-56	*

Board No. 8 Hil, Side ϕ

Pin	Signal Name	Origin	
A	Digital ground	PS	†
B	OSR LOAD	9ϕ11	8 Hi2ϕB, 8 Lo2ϕB, 8 LolϕB, 17ϕ18
C	OSR CLOCK Ch 1	9ϕ12	8 LolϕC
D			
E			
F			
H			
J	ADDER CARRY OUT	8LolαY	
K			
L			
M			
N			
P			
R			
S			
T			
U			
V			
W			
X			
Y			
Z			

Board No. 8 Hil, Side α

Pin	Signal Name	Origin	
1	OSR-55	*	
2	OSR-54	*	
3	OSR-53	*	
4	OSR-60	*	
5	OSR-59	*	
6	OSR-58	*	
7	OSR-57	*	
8	OSR-64	*	
9	OSR-63	*	
10	OSR-62	*	
11	OSR-61	*	
12	LSBO+2 Ch 1	*	9φ16
13	LSBO+1 Ch 1	*	9αJ
14	LSBO Ch 1	*	9αE
15	OSR-65	*	
16	HIGH BIT Ch 1	*	9αA
17	MSBO Ch 1	*	9φT
18	MSBO-1 Ch 1	*	9φP
19	MSBO-2 Ch 1	*	9φX
20	ZERO	4α21	8 Lo1α20, 8 Hi2α20, 8 Lo2α20, 17φU
21	AC 1 (UPDATE)	9α12	8 Lo1α21
22	+12 V	PS	†

Board No. 8 Hil, Side α

Pin	Signal Name	Origin	
A			
B			
C			
D			
F			
H			
H			
J			
K			
L			
M			
N			
P			
R			
S			
T			
U			
V			
W			
X			
Y	ADDER OVERFLOW	*	
Z	Digital ground	PS	†

Board No. 8 Lo2, Side ϕ

Pin	Signal Name	Origin	
1	+12 V	PS	†
2	CARRY IN	PS	††
3	CARRY IN	PS	††
4	SR LOAD	4α17	8 Lo1ϕ4
5	SR CLK	4αJ	8 Lo1ϕ5
6	OSR-4	*	
7	OSR-3	*	
8	OSR-2	*	
9	OSR-1	*	
10	OSR-8	*	
11	OSR-7	*	
12	OSR-6	*	
13	OSR-5	*	
14	OSR-12	*	
15	OSR-11	*	
16	OSR-10	*	
17	OSR-9	*	
18	OSR-16	*	
19	OSR-15	*	
20	OSR-14	*	
21	OSR-13	*	
22	OSR-20	*	

Board No. 8 Lo2, Side ϕ

Pin	Signal Name	Origin	
A	Digital ground	PS	†
B	OSR LOAD	9ϕ11	8Hi2ϕB, 8Hi1ϕB, 8Lo1ϕB, 17ϕ18
C	OSR CLOCK Ch 2	9ϕ13	8Hi2ϕC
D	LSBSQ	6αY	8Lo1ϕD
E	LSBSQ+1	6αX	8Lo1ϕE
F	LSBSQ+2	6αW	8Lo1ϕF
H	LSBSQ+3	6αV	8Lo1ϕH
J	ADDER CARRY IN	PS	††
K	LSBSQ+4	6αU	8Lo1ϕK
L	LSBSQ+5	6αT	8Lo1ϕL
M	LSBSQ+6	6αS	8Lo1ϕM
N	LSBSQ+7	6αR	8Lo1ϕN
P	LSBSQ+8	6αP	8Lo1ϕP
R	MSBSQ-8	6αN	8Lo1ϕR
S	MSBSQ-7	6αM	8Lo1ϕS
T	MSBSQ-6	6αL	8Lo1ϕT
U	MSBSQ-5	6αK	8Lo1ϕU
V	MSBSQ-4	6αJ	8Lo1ϕV
W	MSBSQ-3	6αH	8Lo1ϕW
X	MSBSQ-2	6αF	8Lo1ϕX
Y	MSBSQ-1	6αE	8Lo1ϕY
Z			

Board No. 8 Lo2, Side α

Pin	Signal Name	Origin	
1	OSR-19	*	
2	OSR-18	*	
3	OSR-17	*	
4	OSR-24	*	
5	OSR-23	*	
6	OSR-22	*	
7	OSR-21	*	
8	OSR-28	*	
9	OSR-27	*	
10	OSR-26	*	
11	OSR-25	*	
12	OSR-32	*	
13	OSR-31	*	
14	OSR-30	*	
15	OSR-29	*	
16	OSR-36(OSR CARRY OUT)	*	8Hi2φ2
17	OSR-35	*	
18	OSR-34	*	
19	OSR-33	*	
20	ZERO	4α21	8Lo1α20, 8Hi1α20, 8Hi2α20, 17φU
21	AC2 (UPDATE)	9αS	8Hi2α21
22	+12 V	PS	†

Board No. 8 Lo2, Side α

Pin	Signal Name	Origin	
A			
B	MSBSQ	6αD	8Lo1αB
C	MSBSQ+1	6αC	8Lo1αC
D	MSBSQ+2	6αB	8Lo1αD
E	MSBSQ+3	PS	††
F	MSBSQ+4	PS	††
H	MSBSQ+5	PS	††
J	MSBSQ+6	PS	††
K	MSBSQ+7	PS	††
L	MSBSQ+8	PS	††
M	MSBSQ+9	PS	††
N	MSBSQ+10	PS	††
P	MSBSQ+11	PS	††
R	MSBSQ+12	PS	††
S	MSBSQ+13	PS	††
T	MSBSQ+14	PS	††
U	MSBSQ+15	PS	††
V	MSBSQ+16	PS	††
W	MSBSQ+17	PS	††
X	MSBSQ+18	PS	††
Y	ADDER CARRY OUT	*	8Hi2φJ
Z	Digital ground	PS	†

Board No. 8 Hi2, Side ϕ

Pin	Signal Name	Origin
1	+12 V	PS †
2	OSR-36	8Lo2α16
3		
4		
5		
6	OSR-40	*
7	OSR-39	*
8	OSR-38	*
9	OSR-37	*
10	OSR-44	*
11	OSR-43	*
12	OSR-42	*
13	OSR-41	*
14	OSR-48	*
15	OSR-47	*
16	OSR-46	*
17	OSR-45	*
18	OSR-52	*
19	OSR-51	*
20	OSR-50	*
21	OSR-49	*
22	OSR-56	*

Board No. 8 Hi2, Side ϕ

Pin	Signal Name	Origin	
A	Digital ground	PS	†
B	OSR LOAD	9ϕ11	8Lo2ϕB, 8Hi1ϕB, 8Lo1ϕB, 17ϕ18
C	OSR LOAD Ch 2	9ϕ13	8Lo2ϕC
D			
E			
F			
H			
J	ADDER CARRY OUT	8Lo2αY	
K			
L			
M			
N			
P			
R			
S			
T			
U			
V			
W			
X			
Y			
Z			

Board No. 8 Hi2, Side α

Pin	Signal Name	Origin	
1	OSR-55	*	
2	OSR-54	*	
3	OSR-53	*	
4	OSR-60	*	
5	OSR-59	*	
6	OSR-58	*	
7	OSR-57	*	
8	OSR-64	*	
9	OSR-63	*	
10	OSR-62	*	
11	OSR-61	*	
12	LSBO+2 Ch 2	*	9φ15
13	LSBO+1 Ch 2	*	9αK
14	LSBO	*	9αD
15	OSR-65	*	
16	HIGH BIT Ch 2	*	9α2
17	MSBO Ch 2	*	9φU
18	MSBO-1 Ch 2	*	9φN
19	MSBO-2 Ch 2	*	9φY
20	ZERO	4α21	8Lo1α20, 8Hi1α20, 8Lo2α20, 17φU
21	AC2 (UPDATE)	9αS	8Lo2α21
22	+12 V	PS	†

Board No. 8 Hi2, Side α

Pin	Signal Name	Origin
A		
B		
C		
D		
E		
F		
H		
J		
K		
L		
M		
N		
P		
R		
S		
T		
U		
V		
W		
X		
Y	ADDER OVERFLOW	*
Z	Digital ground	PS †

Board No. 9, Side ϕ

Pin	Signal Name	Origin	
1	+12 V	PS	†
2	$\overline{\text{UNDERFLOW}}$ Ch 1	*	
3			
4			
5			
6	$\overline{\text{TSCK}}$	4α15	
7	OS DONE Ch 2	*	11α15
8	OS DONE Ch 1	*	11α14
9	MSB-5	*	15α21
10	PHASE 1	*	6φT, 17φS
11	OSR LOAD	*	8Hi2φB, 8Lo2φB, 8Hi1φB, 8Lo1φB, 17φ18
12	OSR CLOCK Ch 1	*	8Hi1φC, 8Lo1φC
13	OSR CLOCK Ch 2	*	8Hi2φC, 8Lo2φC
14	LSBOT+2	4α4	
15	LSBO+2 Ch 2	8Hi2α12	
16	LSBO+2 Ch 1	8Hi1α12	
17	cLSB+2	*	15α18
18	CHAN SEL 0	11φ17	
19	CHAN SEL 1	11φ16	
20			
21			
22			

Board No. 9, Side ϕ

Pin	Signal Name	Origin	
A	Digital ground	PS	†
B	LOAD SAM	4αW	
C	MSB-1	*	15α10
D	T-UNDERFLOW	*	4α10
E	UNDERFLOW Ch 2	*	
F	MSB	*	15α11
H	MSB-3	*	15α19
J	MSB-2	*	15α9
K	MSB-4	*	15α20
L			
M	MSBOT-1	4α2	
N	MSBO-1 Ch 2	8Hi2α18	
P	MSBO-1 Ch 1	8Hi1α18	
R	LSB+4	*	15α14
S	LSB+5	*	15α15
T	MSBO Ch 1	8Hi1α17	
U	MSBO Ch 2	8Hi2α17	
V	MSBOT	4α1	
W	LSB+3	*	15α13
X	MSBO-2 Ch 1	8Hi1α19	
Y	MSBO-2 Ch 2	8Hi2α19	
Z	MSBT-2	4α3	

Board No. 9, Side α

Pin	Signal Name	Origin	
1	PHASE 3	*	6φU
2	HIGH BIT Ch 2	8Hi2α16	
3	OS ENABLE Ch 1	*	
4	OS ENABLE Ch 2	*	
5			
6			
7			
8			
9	ANALOG SW CONTROL	*	2αK, 17φR
10	50 kHz	11α11	4αD
11			
12	ACT	*	8Hi1α21, 8Lo1α21
13			
14			
15			
16			
17			
18	WIND TEST SWITCH	F.P. SW 23	
19	100 Hz	11αK	16α17, 17αL
20	EOC	2φB	
21	WINDY BUS	*	11αU, 9αV, 17αK, CONN.J14 PIN 2, F.P.
22	+12 V	PS	†

Board No. 9, Side α

Pin	Signal Name	Origin
A	HIGH BIT Ch 1	8Hi1α16
B	SINGLE	FP 15α8 SW 27
C	LSBOT	4αB
D	LSBO Ch 2	8Hi2α14
E	LSBO Ch 1	8Hi1α14
F	LSB	* 15α16
H	LSB+1	* 15α17
J	LSBO+1 Ch 1	8Hi1α13
K	LSBO+1 Ch 2	8Hi2α13
L	LSBOT+1	4αA
M	GOAD	* 2φT
N	UPDATE	4α18 17αA
P	HOLD	* 2αJ
R	PHASE 5	* 4αT, 17φT
S	AC2	* 8Hi2α21, 8Lo2α21
T	GOOD TIME	* 4φB
U	THRESH	4φ21 17αJ
V	WINDY BUS	9α21 11αU, 17αK, CONN.J14 PIN 2, F.P.
W	WIND INHIBIT	
X	WIND INPUT	FP SW 23
Y	SHIELD	CONNJ15 PIN 11 F.P. SW24
Z	Digital ground	PS †

Board No. 11, Side ϕ

Pin	Signal Name	Origin	
1	+12 V	PS	†
2	DX0	15ϕ13	14ϕJ, 12ϕ22, 16αH, 17α13, 18ϕN, 19ϕJ, 20ϕJ
3	DX1	15ϕ11	14ϕL, 12ϕ21, 16αA, 17α12, 18ϕM, 19ϕL, 20ϕL
4	DX2	15ϕ9	14ϕM, 12ϕ20, 16αE, 17α11, 18ϕL, 19ϕM, 20ϕM
5	DX3	15ϕ12	14ϕN, 12ϕ19, 16αJ, 17α10, 18ϕK, 19ϕN, 20ϕN
6	DX4	15ϕ10	14ϕV, 12ϕ18, 16αD, 17α9, 18ϕJ, 19ϕV, 20ϕV
7	DX5	15ϕ8	14ϕX, 12ϕ17, 16αF, 17α8, 18ϕH, 19ϕX, 20ϕX
8	DEVSEL	51ϕ21	
9	1MHz	15ϕD	
10	DX11	15ϕ2	14αR, 12ϕU, 17α2, 18αD, 19αR, 20αR, 20ϕR
11	DX10	15ϕ4	14αP, 12ϕV, 17α3, 18αC, 19αP, 20αP, 20ϕS
12	DX8	15ϕ3	14αL, 12ϕX, 17α5, 18αA, 19αL, 20αL, 20ϕV
13	DX7	15ϕ5	14ϕZ, 12ϕY, 17α6, 18ϕE, 19ϕZ, 20ϕZ
14	DX6	15ϕ7	14ϕY, 12ϕZ, 17α7, 18ϕF, 19ϕY, 20ϕY
15	DX9	15ϕ6	14αN, 12ϕW, 17α4, 18αB, 19αN, 20αN, 20ϕT
16	Ch SEL 1	*	9ϕ19
17	Ch SEL 0	*	9ϕ18
18	SEL CHAN	11α7	
19	SPARE	*	
20	TIN	*	18ϕW
21	STATIN	*	18ϕX
22	SAMPLEX	*	17αP

Board No. 11, Side ϕ

Pin	Signal Name	Origin	
A	Digital ground	PS	†
B	+5 V	PS	†
C	MINUTES	*	16α14
D	XTA	15φ20	
E	XTB	15φ18	
F	LXMAR	15φ19	14αM, 12φT, 19αM, 20αM, 20φP
H	HDX0	*	4φC, 16αL, 18α16
J	HDX1	*	4φD, 16φ4, 18α17
K	HDX2	*	4φE, 16φ6, 18α18
L	HDX3	*	4φF, 16φ5, 18α19
M	HDX4	*	4φH, 16φC, 18αK
N	HDX5	*	4φJ, 16φB, 18αJ
P	HDX6	*	4φK, 16φD
R	HDX7	*	4φL, 16φE
S	HDX8	*	4φT, 16φT
T	HDX9	*	4φU, 16φS
U	HDX10	*	4φV, 16φV
V	HDX11	*	4φW, 16φU
W	OUT HI	*	11α18
X	OUT LO	*	11αR
Y	T OUT	*	18φV
Z	SECONDS	*	16α16

Board No. 11, Side α

Pin	Signal Name	Origin	
1	THSET	*	4ϕS
2	SEC	*	
3	MODE	*	16ϕY, 18α15
4	DATA ACCEPT	*	
5	HIDIS	*	16ϕR
6	MIN	*	
7	SEL CHAN	*	11ϕ18
8	OUT MID	*	11αT
9	BEGIN	*	11α21, 16α18
10	FUN HI	*	16αB, 18αM
11	50 kHz	*	9α10, 4αD
12	TIME BASE	16α15	
13	TS DONE	4αN	
14	Ch 1 DONE	9ϕ8	
15	Ch 2 DONE	9ϕ7	
16	WINDY LED	FP LI3	
17	WINDY W	*	CONN. J13 PIN50
18	OUT HI	11ϕW	
19			
20	ZERO ENABLE	*	4αV
21	BEGIN	11α9	16α18
22	+12 V	PS	†

Board No. 11, Side α

Pin	Signal Name	Origin	
A	OPRINT	*	11αM
B	RTC CLEAR	*	16αY
C	LO DIS	*	16φ3
D	SW REG	*	15αH
E	PEAK D	*	17φ19
F	OUTPUT D	*	15α12
H	FUN LO	*	15αX
J	$\overline{CT}$	*	15φX
K	100 Hz	*	9α19, 16α17, 17αL
L	READ SAM	*	4α20
M	OPRINT	11αA	
N	$\overline{PRINT}$	11αN	CONN. J13 PIN36
P	L OUT LO	*	12α1
R	OUT LO	11φX	
S	L OUT MID	*	12α8
T	OUT MID	11α8	
U	$\overline{WINDY\ BUS}$	9α21	9αV, 17αK, CONN. J14 PIN2
V	L OUT HI	*	12α15
W	$\overline{DATA\ READY}$	*	15α2
X	SAMPLE	17αF	
Y	+5 V	PS	†
Z	Digital ground	PS	†

Board No. 12, Side ϕ

Pin	Signal Name	Origin	
1	+5 V	PS	†
2	$\overline{8LO}$	*	15ϕJ
3	$\overline{8HI}$	*	15ϕL
4	A9	*	15ϕ14
5	$\overline{RSEL\ 4}$	*	18αE
6	$\overline{RSEL\ 3}$	*	18αF
7	$\overline{RSEL\ 2}$	*	18αH
8			
9			
10			
11			
12			
13			
14			
15			
16			
17	DX5	15ϕ8	14ϕX, 11ϕ7, 16αF, 17α8, 18ϕH, 19ϕX, 20ϕX
18	DX4	15ϕ10	14ϕV, 11ϕ6, 16αD, 17α9, 18ϕJ, 19ϕV, 20ϕV
19	DX3	15ϕ12	14ϕN, 11ϕ5, 16αJ, 17α10,18ϕK, 19ϕN, 20ϕN
20	DX2	15ϕ9	14ϕM, 11ϕ4, 16αE, 17α11,18ϕL, 19ϕM, 20ϕM
21	DX1	15ϕ11	14ϕL, 11ϕ3, 16αA, 17α12,19ϕM, 19ϕL, 20ϕL
22	DX0	15ϕ13	14ϕJ, 11ϕ2, 16αH, 17α13,18ϕN, 19ϕJ, 20ϕJ

Board No. 12, Side ϕ

Pin	Signal Name	Origin	†
A	Digital ground	PS	
B	XTC	15ϕ17	14ϕK, 19ϕK, 20ϕK
C			
D	FIELD 0	18αY	14ϕW
E	A9	*	15ϕH
F	ROM A8	*	18ϕ21, 20ϕ20
H	ROM A7	*	15ϕV, 18ϕ20, 20ϕ19
J	ROM A6	*	15ϕU, 18ϕ19, 20ϕ18
K	ROM A5	*	15ϕT, 18ϕ18, 20ϕ17
L	ROM A4	*	15ϕS, 18ϕ17, 20ϕ16
M	ROM A3	*	15ϕR, 18ϕ16, 20ϕ15
N	ROM A2	*	15ϕP, 18ϕ15, 20ϕ14
P	ROM A1	*	15ϕN, 18ϕ14, 20ϕ13
R	ROM A0	*	15ϕM, 18ϕ13, 20ϕ12
S			
T	LXMAR	15ϕ19	14αM, 11ϕF, 19αM, 20αM, 20ϕP
U	DX11	15ϕ2	14αR, 11ϕ10,17α2, 18αD, 19αR, 20αR, 20ϕR
V	DX10	15ϕ4	14αP, 11ϕ11,17α3, 18αC, 19αP, 20αP, 20ϕS
W	DX9	15ϕ6	14αN, 11ϕ15,17α4, 18αB, 19αN, 20αN, 20ϕT
X	DX8	15ϕ3	14αL, 11ϕ12,17α5, 18αA, 19αL, 20αL, 20ϕV
Y	DX7	15ϕ5	14ϕZ, 11ϕ13,17α6, 18ϕE, 19ϕZ, 20ϕZ
Z	DX6	15ϕ7	14ϕY, 11ϕ14,17α7, 18ϕF, 19ϕY, 20ϕY

Board No. 12, Side α

Pin	Signal Name	Origin	
1	LOUT LO	11αP	
2	PIO 29	*	CONN J13 PIN 16
3	PIO 26	*	CONN J13 PIN 25
4	PIO 28	*	CONN J13 PIN 35
5	PIO 33	*	CONN J13 PIN 44
6	PIO 35	*	CONN J13 PIN 33
7	PIO 30	*	CONN J13 PIN 30
8	LOUT MID	11αS	
9	PIO 17	*	CONN J13 PIN 7
10	PIO 14	*	CONN J13 PIN 4
11	PIO 16	*	CONN J13 PIN 20
12	PIO 21	*	CONN J13 PIN 46
13	PIO 23	*	CONN J13 PIN 42
14	PIO 18	*	CONN J13 PIN 22
15	LOUT HI	11αV	
16	PIO 5	*	CONN J13 PIN 39
17	PIO 2	*	CONN J13 PIN 13
18	PIO 4	*	CONN J13 PIN 24
19	PIO 9	*	CONN J13 PIN 14
20	PIO 11	*	CONN J13 PIN 23
21	PIO 6	*	CONN J13 PIN 11
22	+5 V	PS	†

Board No. 12, Side α

Pin	Signal Name	Origin	
A			
B			
C			
D	PIO 32	*	CONN J13 PIN 21
E	PIO 36	*	CONN J13 PIN 31
F	PIO 34	*	CONN J13 PIN 6
H	PIO 25	*	CONN J13 PIN 5
J	PIO 27	*	CONN J13 PIN 1
K	PIO 31	*	CONN J13 PIN 10
L	PIO 20	*	CONN J13 PIN 18
M	PIO 24	*	CONN J13 PIN 49
N	PIO 22	*	CONN J13 PIN 40
P	PIO 13	*	CONN J13 PIN 9
R	PIO 15	*	CONN J13 PIN 2
S	PIO 19	*	CONN J13 PIN 27
T	PIO 8	*	CONN J13 PIN 3
U	PIO 12	*	CONN J13 PIN 43
V	PIO 10	*	CONN J13 PIN 12
W	PIO 1	*	CONN J13 PIN 34
X	PIO 3	*	CONN J13 PIN 45
Y	PIO 7	*	CONN J13 PIN 38
Z	Digital	PS	†

Board No. 14, Side ϕ

Pin	Signal Name	Origin
1	+5	PS †

Board No. 14, Side ϕ

Pin	Signal Name	Origin	
A	Digital ground	PS	†
B			
C			
D			
E			
F			
H			
J	DX0	15ϕ13	12ϕ22, 11ϕ2, 16αH, 17α13, 18ϕN, 19ϕJ, 20ϕJ
K	XTC	15ϕ17	12ϕB, 19ϕK, 20ϕK
L	DX1	15ϕ11	12ϕ21, 11ϕ3, 16αA, 17α12, 18ϕM, 19ϕL, 20ϕL
M	DX2	15ϕ9	12ϕ20, 11ϕ4, 16αE, 17α11, 18ϕL, 19ϕM, 20ϕM
N	DX3	15ϕ12	12ϕ19, 11ϕ5, 16αJ, 17α10, 18ϕK, 19ϕN, 20ϕN
P			
R			
S			
T			
U			
V	DX4	15ϕ10	12ϕ18, 11ϕ6, 16αD, 17α9, 18ϕJ, 19ϕV, 20ϕV
W	FIELD 0	18α4	12ϕD
X	DX5	15ϕ8	12ϕ17, 11ϕ7, 16αF, 17α8, 18ϕH, 19ϕX, 20ϕX
Y	DX6	15ϕ7	12ϕZ, 11ϕ14,17α7, 18ϕF, 19ϕY, 20ϕY
Z	DX7	15ϕ5	12ϕY, 11ϕ13,17α6, 18ϕE, 19ϕZ, 20ϕZ

Board No. 14, Side α

Pin	Signal Name	Origin	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22	+5	PS	†

Board No. 14, Side α

Pin	Signal Name	Origin	
A			
B			
C			
D			
E			
F			
H			
J			
K			
L	DX8	15φ3	12φX, 11φ12, 17α5, 18αA, 19αL, 20αL, 20φV
M	LXMAR	15φ19	12φT, 11φF, 19αM, 20αM, 20φP
N	DX9	15φ6	12φW, 11φ15, 17α4, 18αB, 19αN, 20αN, 20φT
P	DX10	15φ4	12φV, 11φ11, 17α3, 18αC, 19αP, 20αP, 20φS
R	DX11	15φ2	12φU, 11φ10, 17α2, 18αD, 19αR, 20αR, 20φR
S			
T			
U			
V			
W			
X			
Y			
Z	Digital ground	PS	†

Board No. 15, Side ϕ

Pin	Signal Name	Origin	
1	+5 V	PS	†
2	DX11	*	14αR, 12ϕU, 11ϕ10, 17α2, 18αD, 19αR, 20αR, 20ϕR
3	DX8	*	14αL, 12ϕX, 11ϕ12, 17α5, 18αA, 19αL, 20αL, 20ϕV
4	DX10	*	14αP, 12ϕV, 11ϕ11, 17α3, 18αC, 19αP, 20αP, 20ϕS
5	DX7	*	14ϕZ, 12ϕY, 11ϕ13, 17α6, 18ϕE, 19ϕZ, 20ϕZ
6	DX9	*	14αN, 12ϕW, 11ϕ15, 17α4, 18αB, 19αN, 20αN, 20ϕT
7	DX6	*	14ϕY, 12ϕZ, 11ϕ14, 17α7, 18ϕF, 19ϕY, 20ϕY
8	DX5	*	14ϕX, 12ϕ17, 11ϕ7, 16αF, 17α8, 18ϕH, 19ϕX, 20ϕX
9	DX2	*	14ϕM, 12ϕ20, 11ϕ4, 16αE, 17α11, 18ϕL, 19ϕM, 20ϕM
10	DX4	*	14ϕV, 12ϕ18, 11ϕ6, 16αD, 17α9, 18ϕJ, 19ϕV, 20ϕV
11	DX1	*	14ϕL, 12ϕ21, 11ϕ3, 16αA, 17α12, 18ϕM, 19ϕL, 20ϕL
12	DX3	*	14ϕN, 12ϕ19, 11ϕ5, 16αJ, 17α10, 18ϕK, 19ϕN, 20ϕN
13	DX0	*	14ϕJ, 12ϕ22, 11ϕ2, 16αH, 17α13, 18ϕN, 19ϕJ, 20ϕJ
14	A9	12ϕ4	
15	FETCH	*	
16	.5MHz Clock Input	15ϕC	
17	XTC	*	14ϕK, 12ϕB, 19ϕK, 20ϕK
18	XTB	*	11ϕE
19	LXMAR	*	14αM, 12ϕT, 11ϕF, 19αM, 20αM, 20ϕP
20	XTA	*	11ϕD
21	DEVSEL	*	11ϕ8
22			

Board No. 15, Side ϕ

Pin	Signal Name	Origin	
A	Digital ground	PS	†
B	4 MHz	*	
C	0.5 MHz	*	15ϕ16
D	1 MHz	*	11ϕ9
E	SKP	*	
F	CP REQUEST	PS(+5V)	to +5 supply
H	A9	12ϕE	
J	8LO	12ϕ2	
K	-9 V	PS	From separate 9v supply. Used only
L	8HI	12ϕ3	if U1 thru U6 installed.
M	ROM A0	12ϕR	18ϕ13, 20ϕ12
N	ROM A1	12ϕP	18ϕ14, 20ϕ13
P	ROM A2	12ϕN	18ϕ15, 20ϕ14
R	ROM A3	12ϕM	18ϕ16, 20ϕ15
S	ROM A4	12ϕL	18ϕ17, 20ϕ16
T	ROM A5	12ϕK	18ϕ18, 20ϕ17
U	ROM A6	12ϕJ	18ϕ19, 20ϕ18
V	ROM A7	12ϕH	18ϕ20, 20ϕ19
W	SWSEL	*	
X	CT	11αJ	
Y	MEMSEL	*	18α20
Z	BIT 0	FP SW 1	

Board No. 15, Side α

Pin	Signal Name	Origin
1	$\overline{\text{CPSEL}}$	*
2	$\overline{\text{DATA READY}}$	11αW
3	RTC	16αU
4	PSEL 2	CONN J13 PIN 47
5	SHIFT F	FP SW 13
6	$\overline{\text{DATA REQUEST}}$	CONN J13 PIN 15
7	$\overline{\text{KEY START}}$	17αU
8	SINGLE	FP SW 27 9αB
9	MSB-2	9φJ
10	MSB-1	9φC
11	MSB	9φF
12	OUTPUT D	11αF
13	LSB+3	9φW
14	LSB+4	9φR
15	LSB+5	9φS
16	LSB	9αF
17	LSB+1	9αH
18	LSB+2	9φ17
19	MSB-3	9φH
20	MSB-4	9φK
21	MSB-5	9φ9
22	+5 V	PS †

Board No. 15, Side α

Pin	Signal Name	Origin
A	DATA F	* 18αL
B	BIT 1	FP SW 2
C	BIT 2	FP SW 3
D	BIT 7	FP SW 8
E	BIT 6	FP SW 7
F	BIT 8	FP SW 9
H	SW REG	11αD
J	BIT 3	FP SW 4
K	BIT 4	FP SW 5
L	BIT 11	FP SW 12
M	BIT 10	FP SW 11
N	BIT 9	FP SW 10
P	BIT 5	FP SW 6
R	THF	17αV
S	SEL/LEQ	FP SW 15
T	PSEL 1	J13 PIN 8
U		
V	KEY PRINT	CONN J13 PIN 19
W	KEY SAMPLE	17αE
X	FUNLO	11αH
Y	+12 V	PS †
Z	Digital	PS †

Board No. 16, Side ϕ

Pin	Signal Name	Origin	
1	+12 V	PS	†
2	+5 V	PS	†
3	LODIS	11αC	
4	HDX1	11ϕJ	4ϕD, 18α17
5	HDX3	11ϕL	4ϕF, 18α19
6	HDX2	11ϕK	4ϕE, 18α18
7	MSBD-2	*	21-11
8	MSBD	*	21-9
9	LSBD+5	*	21-14
10	LSBD+7	*	21-16
11	LSBD+1	*	21-19
12	LSBD+3	*	21-21
13	MSBD-6	*	21-6
14	MSBD-4	*	21-4
15	$\overline{\text{MSBDDP}}$	*	21-8
16	$\overline{\text{LSBDDP}}$	*	21-22
17	POS 13	*	FP SW 18
18	POS 14	*	FP SW 18
19	POS 15	*	FP SW 18
20	POS 16	*	FP SW 18
21	POS 9	*	FP SW 18
22	POS 10	*	FP SW 18

Board No. 16, Side ϕ

Pin	Signal Name	Origin	
A	Digital ground	PS	†
B	HDX5	11ϕN	4ϕJ, 18αJ
C	HDX4	11ϕM	4ϕH, 18αK
D	HDX6	11ϕP	4ϕK
E	HDX7	11ϕR	4ϕL
F	MSBD-7	*	21-7
H	MSBD-5	*	21-5
J	LSBD	*	21-13
K	LSBD+2	*	21-20
L	LSBD+4	*	21-18
M	LSBD+6	*	21-15
N	MSBD-3	*	21-2
P	MSBD-1	*	21-10
R	HI DIS	11α5	
S	HDX9	11ϕT	4ϕU
T	HDX8	11ϕS	4ϕT
U	HDX11	11ϕV	4ϕW
V	4DX10	11ϕU	4ϕV
W	$\overline{\text{LSBDDP+1}}$	*	21-17
X	$\overline{\text{MSBDDP-1}}$	*	21-3
Y	MODE	11α3	18α15
Z	STAND-BY LED	*	FP L1

Board No. 16, Side α

Pin	Signal Name	Origin	
1	POS 11	FP	
		SW 18	
2	POS 12	FP	
		SW 18	
3	POS 5	FP	
		SW 18	
4	POS 6	FP	
		SW 18	
5	POS 7	FP	
		SW 18	
6	POS 8	FP	
		SW 18	
7	POS 1	FP	
		SW 18	
8	POS 2	FP	
		SW 18	
9	POS 3	FP	
		SW 18	
10	POS 4	FP	
		SW 18	
11	START LED	*	FP
			L12
12	PEAK CHANNEL	*	17ϕP
13	V DISPLAY	*	FP
			SW 16, 21-1
14	MINUTES	11ϕC	
15	TIME BASE	*	11α12
16	SECONDS	11ϕZ	
17	100 Hz	11αK	9α19, 17αL
18	BEGIN	11α9	11α21
19			
20			
21	+5	PS	†
22	+12	PS	†

Board No. 16, Side α

Pin	Signal Name	Origin	
A	DX1	15φ11	14φL, 12φ21, 11φ3, 17α12, 18φM, 19φL, 20φL
B	FUNHI	11α10	18αM
C	F4	FP SW 17	
D	DX4	15φ10	14φV, 12φ18, 11φ6, 17α9, 18φJ, 19φV, 20φV
E	DX2	15φ9	14φM, 12φ20, 11φ4, 17α11, 18φL, 19φM, 20φM
F	DX5	15φ8	14φX, 12φ17, 11φ7, 17α8, 18φH, 19φX, 20φX
H	DX0	15φ13	14φJ, 12φ22, 11φ2, 17α13, 18φN, 19φJ, 20φJ
J	DX3	15φ12	14φN, 12φ19, 11φ5, 17α10 18φK, 19φN, 20φN
K	EXECUTE FUNCTION	*	FP SW 16
L	HDX0	11φH	4φC, 18α16
M	TO MIC CAL RELAY	*	CONN J15 PIN 2, FP SW 26
N	+12 V Ext Batt (Red No. 18 gauge)	CONN J16 PIN 1	
P	Minitape Relay Hi	*	FP J12
R	+12 V P.S. (Red No. 18)	PS	
S	Minitape Relay Lo	*	FP J12
T	On/off Switch (Red No. 18)	PS SW 28	
U	$\overline{\text{RTC}}$	*	15α3
V	+12 V Int. (Gray Batt. No. 18)	PS	
W	+15 V (Orange No. 18)	PS	
X	Ground from Ext.Batt. Digital P.S. (Black No. 18)	PS	
Y	RTC Clear	11αB	
Z	Digital ground	PS	†

Board No. 17, Side ϕ

Pin	Signal Name	Origin	
1	12 V	PS	†
2	5 V	PS	†
3	A_0	6ϕP	4ϕ20, 4αX, 2αC
4	A_1	6ϕJ	4ϕY, 4αY, 2αB
5	A_2	6ϕF	4ϕX, 4αR, 2αA
6	PEAK 11	*	
7	PEAK 10	*	
8	PEAK 9	*	
9	PEAK 8	*	
10	PEAK 7	*	
11	PEAK 6	*	
12	PEAK 5	*	
13	PEAK 4	*	
14	PEAK 3	*	
15	PEAK 2	*	
16	PEAK 1	*	
17	PEAK 0	*	
18	OSR LOAD	9ϕ11	8 Hi2ϕB, 8 Lo2ϕB, 8 Hi1ϕB, 8 Lo1ϕB
19	PEAK D	11αE	
20			
21			
22			

Board No. 17, Side ϕ

Pin	Signal Name	Origin	
A	Digital ground	PS	†
B			
C	$\overline{\text{MSB}}$	2ϕC	4ϕ19, 6ϕR
D	MSB-1	2ϕD	4ϕZ, 6ϕN
E	MSB-2	2ϕH	4ϕM, 6ϕM
F	MSB-3	2ϕF	4ϕN, 6ϕB
H	MSB-4	2ϕE	4ϕP, 6ϕC
J	LSB+4	2ϕL	4ϕR, 6ϕL
K	LSB+3	2ϕK	4ϕ3, 6ϕK
L	LSB+2	2ϕJ	4ϕ4, 6ϕD
M	LSB+1	2ϕM	4ϕ5, 6ϕE
N	LSB	2ϕN	4ϕ6, 6ϕH
P	PEAK CHAN	16α12	
R	ANALOG SWITCH	9α9	2αK
S	PHASE 1	9ϕ10	6ϕT
T	PHASE 5	9αR	4αT
U	ZERO	4α21	8 Lo1α20, 8 Hi1α20, 8 Hi2α20, 8 Lo2α20
V			
W			
X			
Y			
Z			

Board No. 17, Side α

Pin	Signal Name	Origin						
1								
2	DX11	15φ2	14αR,	12φU,	11φ10,	18αD,	19αR,	20αR, 20φR
3	DX10	15φ4	14αP,	12φV,	11φ11,	18αC,	19αP,	20αP, 20φS
4	DX9	15φ6	14αN,	12φW,	11φ15,	18αB,	19αN,	20αN, 20φT
5	DX8	15φ3	14αL,	12φX,	11φ12,	18αA,	19αL,	20αL, 20φV
6	DX7	15φ5	14φZ,	12φY,	11φ13,	18φE,	19φZ,	20φZ
7	DX6	15φ7	14φY,	12φZ,	11φ14,	18φF,	19φY,	20φY
8	DX5	15φ8	14φX,	12φ17,	11φ7,	16αF,	18φH,	19φX, 20φX
9	DX4	15φ10	14φV,	12φ18,	11φ6,	16αD,	18φJ,	19φV, 20φV
10	DX3	15φ12	14φN,	12φ19,	11φ5,	10αJ,	18φK,	19φN, 20φN
11	DX2	15φ9	14φM,	12φ20,	11φ4,	16αE,	18φL,	19φM, 20φM
12	DX1	15φ11	14φL,	12φ21,	11φ3,	16αA,	18φM,	19φL, 20φL
13	DX0	15φ13	14φJ,	12φ22,	11φ2,	16αH,	18φN,	19φJ, 20φJ
14								
15								
16								
17								
18								
19								
20								
21	+5	PS	†					
22	+12	PS	†					

Board No. 17, Side α

Pin	Signal Name	Origin	
A	UPDATE	4α18	9αN
B	MODE 3	18α9	
C	MODE 4	18α11	
D	T ZERO	*	4α6
E	KEY SAMPLE	*	15αW
F	SAMPLE	*	11αX
H	SAMPLE TRIG	*	FP SW 22, FP J1
J	THRESH	4φ21	9αU
K	WINDY BUS	9α21	11αU, 9αV
L	100 Hz	11αK	9α19, 16α17
M	K SAMPLE	*	FP SW 21
N	K SAMPLE	*	FP SW 21
P	SAMPLEX	11φ22	
R	K START	*	FP SW 20
S	K START	*	FP SW 20
T	START TRIG	*	FP J2, FP SW 22
U	KEY START	*	15α7
V	THF	*	15αR
W	THRESH UP	*	FP SW 22
X	THRESH DOWN	*	FP SW 22
Y			
Z	Digital ground	PS	†

Board No. 18, Side ϕ

Pin	Signal Name	Origin	
1	+12	PS	†
2	+5	PS	†
3	DX7 (RBR8)	*	
4	DX6 (RBR7)	*	
5	DX5 (RBR6)	*	
6	DX4 (RBR5)	*	
7	DX3 (RBR4)	*	
8	DX2 (RBR3)	*	
9	DX1 (RBR2)	*	
10	DX0 (RBR1)	*	
11	RXC	*	
12	19.2 kHz	*	
13	ROM A0	12ϕR	15ϕM, 20ϕ12
14	ROM A1	12ϕP	15ϕN, 20ϕ13
15	ROM A2	12ϕN	15ϕP, 20ϕ14
16	ROM A3	12ϕM	15ϕR, 20ϕ15
17	ROM A4	12ϕL	15ϕS, 20ϕ16
18	ROM A5	12ϕK	15ϕT, 20ϕ17
19	ROM A6	12ϕJ	15ϕU, 20ϕ18
20	ROM A7	12ϕH	15ϕV, 20ϕ19
21	ROM A8	12ϕF	20ϕ20
22			

Board No. 18, Side ϕ

Pin	Signal Name	Origin	
A	Digital ground	PS	†
B	Relay Coil (ground to activate)	*	
C	Relay Contact Hi	*	
D	Relay Contact Lo	*	
E	DX7 (TBR8)	15ϕ5	14ϕZ, 12ϕY, 11ϕ13, 17α6, 19ϕZ, 20ϕZ
F	DX6 (TBR7)	15ϕ7	14ϕY, 12ϕZ, 11ϕ14, 17α7, 19ϕY, 20ϕY
H	DX5 (TBR6)	15ϕ8	14ϕX, 12ϕ17, 11ϕ7, 16αF, 17α8, 19ϕX, 20ϕX
J	DX4 (TBR5)	15ϕ10	14ϕV, 12ϕ18, 11ϕ6, 16αD, 17α9, 19ϕV, 20ϕV
K	DX3 (TBR4)	15ϕ12	14ϕN, 12ϕ19, 11ϕ5, 16αJ, 17α10, 19ϕN, 20ϕN
L	DX2 (TBR3)	15ϕ9	14ϕM, 12ϕ20, 11ϕ4, 16αE, 17α11, 19ϕM, 20ϕM
M	DX1 (TBR2)	15ϕ11	14ϕL, 12ϕ21, 11ϕ3, 16αA, 17α12, 19ϕL, 20ϕL
N	DX0 (TBR1)	15ϕ13	14ϕJ, 12ϕ22, 11ϕ2, 16αH, 17α13, 19ϕJ, 20ϕJ
P	DR	*	
R	TBRE	*	
S	PE	*	
T	FE	*	
U	OE	*	
V	TOUT	11ϕY	
W	TIN	11ϕ20	
X	STATIN	11ϕ21	
Y	CASSETTE IN	FP J3	
Z	CASSETTE OUT	*	FP J11

Board No. 18, Side α

Pin	Signal Name	Origin	
1	M11	*	
2	M10	*	
3	M9	*	FP L11
4	M8	*	FP L10
5	M7	*	FP L9
6	M6	*	FP L8
7	M5	*	FP L7
8	M4	*	FP L6
9	MODE 3	*	17αB
10	M3	*	FP L5
11	MODE 4	*	17αC
12	M2	*	FP L4
13	M1	*	FP L3
14	M0	*	FP L2
15	MODE	11α3	16φY
16	HDX0	11φH	4φC, 16αL
17	HDX1	11φJ	4φD, 16φ4
18	HDX2	11φK	4φE, 16φ6
19	HDX3	11φL	4φF, 16φ5
20	MEMSEL	15φY	
21	+5 V	PS	†
22	+12 V	PS	†

Board No. 18, Side α

Pin	Signal Name	Origin	
A	DX8	15φ3	14αL, 12φX, 11φ12, 17α5, 19αL, 20αL, 20φV
B	DX9	15φ6	14αN, 12φW, 11φ15, 17α4, 19αN, 20αN, 20φT
C	DX10	15φ4	14αP, 12φV, 11φ11, 17α3, 19αP, 20αP, 20φS
D	DX11	15φ2	14αR, 12φU, 11φ10, 17α2, 19αR, 20αR, 20φR
E	$\overline{\text{RSEL 4}}$	12φ5	
F	$\overline{\text{RSEL 3}}$	12φ6	
H	$\overline{\text{RSEL 2}}$	12φ7	
J	HDX5	11φN	4φJ, 16φB
K	HDX4	11φM	4φH, 16φC
L	DATA F	15αA	
M	$\overline{\text{FUNHI}}$	11α10	16αB
N	$\overline{\text{LSBSN}}$	*	
P	$\overline{\text{LSBSN +1}}$	*	
R	$\overline{\text{LSBSN +2}}$	*	
S	$\overline{\text{MSBSN -2}}$	*	Serial number for each unit in one's complement binary (Same as stamped on front panel)
T	$\overline{\text{MSBSN -1}}$	*	
U	$\overline{\text{MSBSN}}$	*	
V	FIELD 3	*	
W	FIELD 2	*	20φW
X	FIELD 1	*	19φW
Y	FIELD 0	*	14φW, 12φD
Z	Digital ground	PS	†

Board No. 19, Side ϕ

Pin	Signal Name	Origin
1	+5	PS †
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

Board No. 19, Side ϕ

Pin	Signal Name	Origin	
A	Digital ground	PS	†
B			
C			
D			
E			
F			
H			
J	DX0	15ϕ13	12ϕ22, 11ϕ2, 16αH, 17α13, 18ϕN, 20ϕJ
K	XTC	15ϕ17	12ϕB, 20ϕK
L	DX1	15ϕ11	12ϕ21, 11ϕ3, 16αA, 17α12, 18ϕM, 20ϕL
M	DX2	15ϕ9	12ϕ20, 11ϕ4, 16αE, 17α11, 18ϕL, 20ϕM
N	DX3	15ϕ12	12ϕ19, 11ϕ5, 16αJ, 17α10, 18ϕK, 20ϕN
P			
R			
S			
T			
U			
V	DX4	15ϕ10	12ϕ18, 11ϕ6, 16αD, 17α9, 18ϕJ, 20ϕV
W	FIELD 1	18αX	
X	DX5	15ϕ8	12ϕ17, 11ϕ7, 16αF, 17α8, 18ϕH, 20ϕX
Y	DX6	15ϕ7	12ϕZ, 11ϕ14, 17α7, 18ϕF, 20ϕY
Z	DX7	15ϕ5	12ϕY, 11ϕ13, 17α6, 18ϕE, 20ϕZ

Board No. 19, Side α

Pin	Signal Name	Origin	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22	+5	PS	†

Board No. 19, Side α

Pin	Signal Name	Origin	
A			
B			
C			
D			
E			
F			
H			
J			
K			
L	DX8	15φ3	12φX, 11φ12, 17α5, 18αA, 20αL, 20φV
M	LXMAR	15φ19	12φT, 11φF, 20αM, 20φP
N	DX9	15φ6	12φW, 11φ15, 17α4, 18αB, 20αN, 20φT
P	DX10	15φ4	12φV, 11φ11, 17α3, 18αC, 20αP, 20φS
R	DX11	15φ2	12φU, 11φ10, 17α2, 18αD, 20αR, 20φR
S			
T			
U			
V			
W			
X			
Y			
Z	Digital ground	PS	†

Board No. 20, Side ϕ

Pin	Signal Name	Origin	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12	ROM A0	12ϕR	15ϕM, 18ϕ13
13	ROM A1	12ϕP	15ϕN, 18ϕ14
14	ROM A2	12ϕN	15ϕP, 18ϕ15
15	ROM A3	12ϕM	15ϕR, 18ϕ16
16	ROM A4	12ϕL	15ϕS, 18ϕ17
17	ROM A5	12ϕK	15ϕT, 18ϕ18
18	ROM A6	12ϕJ	15ϕU, 18ϕ19
19	ROM A7	12ϕH	15ϕV, 18ϕ20
20	ROM A8	12ϕF	18ϕ21
21			
22			

Board No. 20, Side ϕ

Pin	Signal Name	Origin						
A	Digital ground	PS						
B								
C								
D								
E								
F								
H								
J	DX0	15ϕ13	14ϕJ,	12ϕ22,	11ϕ2,	16αH,	17α13,	19ϕJ, 18ϕN
K	XTC	15ϕ17	14ϕK,	19ϕK,	12ϕB			
L	DX1	15ϕ11	14ϕL,	12ϕ21,	11ϕ3,	16αA,	17α12,	19ϕL, 18ϕM
M	DX2	15ϕ9	14ϕM,	12ϕ20,	11ϕ4,	16αE,	17α11,	19ϕM, 18ϕL
N	DX3	15ϕ12	14ϕN,	12ϕ19,	11ϕ5,	16αJ,	17α10,	19ϕN, 18ϕK
P	LXMAR	15ϕ19	14αM,	11ϕF,	19αM,	12ϕT,	20αM	
R	DX11	15ϕ2	14αR,	12ϕU,	11ϕ10,	17α2,	19αR,	20αR, 18αD
S	DX10	15ϕ4	14αP,	12ϕV,	11ϕ11,	17α3,	19αP,	20αP, 18αC
T	DX9	15ϕ6	14αN,	12ϕW,	11ϕ15,	17α4,	19αN,	20αN, 18αB
U	DX8	15ϕ3	14αL,	12ϕX,	11ϕ12,	17α5,	19αL,	20αL, 18αA
V	DX4	15ϕ10	14ϕV,	12ϕ18,	11ϕ6,	16αD,	17α9,	19ϕV, 18ϕJ
W	FIELD 2	18ϕW						
X	DX5	15ϕ8	14ϕX,	12ϕ17,	11ϕ7,	16αF,	17α8,	19ϕX, 18ϕH
Y	DX6	15ϕ7	14ϕY,	12ϕZ,	11ϕ14,	17α7,	19ϕY,	18ϕF
Z	DX7	15ϕ5	14ϕZ,	12ϕY,	11ϕ13,	17α6,	19ϕZ,	18ϕE

Board No. 20, Side α

Pin	Signal Name	Origin	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22	+5	PS	†

Board No. 20, Side α

Pin	Signal Name	Origin	
A			
B			
C			
D			
E			
F			
H			
J			
K			
L	DX8	15φ3	12φX, 11φ12, 17α5, 18αA, 19αL, 14αL, 20φU
M	LXMAR	15φ19	12φT, 11φF, 19αM, 14αM, 20φP
N	DX9	15φ6	12φW, 11φ15, 17α4, 18αB, 19αN, 14αN, 20φT
P	DX10	15φ4	12φV, 11φ11, 17α3, 18αC, 19αP, 14αP, 20φS
R	DX11	15φ2	12φU, 11φ10, 17α2, 18αD, 19αR, 14αR, 20φR
S			
T			
U			
V			
W			
X			
Y			
Z	Digital ground	PS	⏚

Board No. 21

Pin	Signal Name	Origin
1	VOISPLAY	16α13
2	MSBD-3	16ϕN
3	$\overline{\text{MSBDDP-1}}$	16ϕX
4	MSBD-4	16ϕ14
5	MSBD-5	16ϕH
6	MSBD-6	16ϕ13
7	MSBD-7	16ϕF
8	$\overline{\text{MSBDDP}}$	16ϕ15
9	MSBD	16ϕ8
10	MSBD-1	16ϕP
11	MSBD-2	16ϕ7
12		
13	LSBD	16ϕJ
14	LSBD+5	16ϕ9
15	LSBD+6	16ϕM
16	LSBD+7	16ϕ10
17	$\overline{\text{LSBDDP+1}}$	16ϕW
18	LSBD+4	16ϕL
19	LSBD+1	16ϕ11
20	LSBD+2	16ϕK
21	LSBD+3	16ϕ12
22	$\overline{\text{LSBDDP}}$	16ϕ16

Board No. 22

Pin	Signal Name	Origin	
	CHANNEL 1 FILTER OUT	1ϕU	F.P. CH1 FILTEROUT BNC
	CHANNEL 1 FILTER IN	1ϕD	F.P. CH1 INPUT BNC
	CHANNEL 2 FILTER IN	1αD	F.P. CH2 INPUT BNC
	CHANNEL 2 FILTER OUT	1αU	F.P. CH2 FILTER OUT BNC
	Headphone Amp OUT +	*	F.P. HEADPHONE BNC
	Headphone Amp OUT -	*	F.P. HEADPHONE BNC
	12 V	P.S.	F.P.
	Ground	P.S.	F.P.

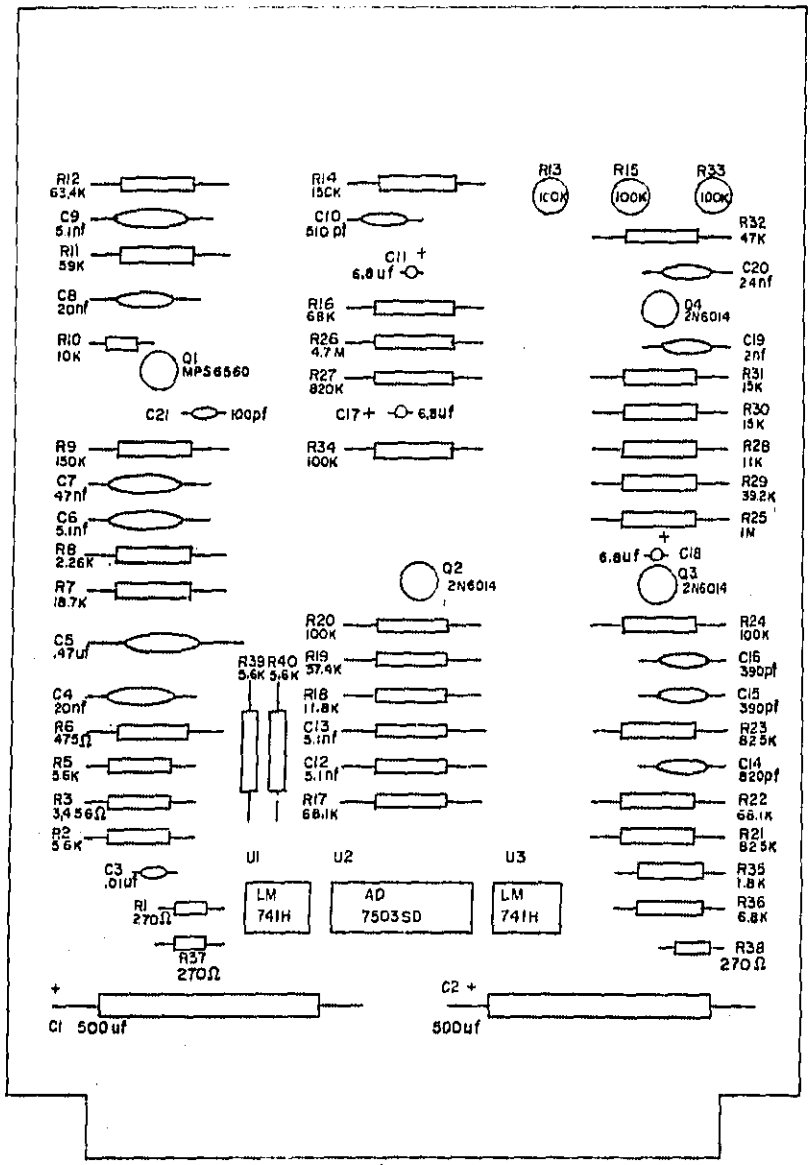
Table 4

Board Number 1002 -- Parts List

Circuit Diagram Reference	Component Type			
R1, R37, R38	Carbon	1/4W	5%	270 Ω
R6	Carbon film		1%	475 Ω
R35	Carbon film		1%	1.8 K Ω
R8	Carbon film		1%	2.26K Ω
R3	Carbon film		1%	3456 Ω
R5	Carbon		5%	5.6 K Ω
R2, R39, R40	Carbon film		1%	5.6 K Ω
R36	Carbon film		1%	6.8 K Ω
R10	Carbon		5%	10 K Ω
R28	Carbon film		1%	11 K Ω
R18	Carbon film		1%	11.8 K Ω
R30, R31	Carbon film		1%	15 K Ω
R7	Carbon film		1%	18.7 K Ω
R19	Carbon film		1%	37.4 K Ω
R29	Carbon film		1%	39.2 K Ω
R32	Carbon film		1%	47 K Ω
R11	Carbon film		1%	59 K Ω
R12	Carbon film		1%	63.4 K Ω
R16	Carbon film		1%	68 K Ω
R17, R22	Carbon film		1%	68.1 K Ω
R21, R23	Carbon film		1%	82.5 K Ω
R20, R24, R34	Carbon film		1%	100 K Ω
R9, R14	Carbon film		1%	150 K Ω
R27	Carbon film		1%	820 K Ω
R25	Carbon film		1%	1 M Ω
R26	Carbon film	1/2W	1%	4.7 M Ω
R13, R15, R33	Trimmer	Cermet		100 K Ω
C21	Ceramic	100 pF		1 K V
C15, C16	Polystyrene	390 pF		63 V
C10	Polystyrene	510 pF		125 V
C14	Polystyrene	820 pF		63 V
C19	Polystyrene	2 nF		63 V
C20	Polystyrene	2.4 nF		63 V
C6, C9, C12, C13	Polystyrene	5.1 nF		63 V
C3	Ceramic	.01 nF		100 V

Table 4 (Cont'd)

Circuit Diagram Reference	Component Type			
C4, C8	Polystyrene	20 nF	63	V
C7	Polystyrene	.047 uF	160	V
C5	Polystyrene	.47 uF	63	V
C11, C17, C18	Tantalum	6.8 uF	6	V
C1, C2	Aluminum Electrolytic	500 uF	25	V
Q1	Si Trans	NPN	MPS 6560	
Q2, Q3, Q4	Si Trans	NPN	2N6014	
U1, U3	LM741H			
U2	AD7503SD			


R12 63.4K
C9 5.1nf
R11 59K
C8 20nf
R10 10K
Q1 MPS6560
C21 100pf
R9 150K
C7 47nf
C6 5.1nf
R8 2.26K
R7 18.7K
C5 .47uf
C4 20nf
R6 475Ω
R5 5.6K
R3 3,456Ω
R2 5.6K
C3 .01uf
R1 270Ω
R37 270Ω
C1 500uf
R14 15CK
C10 510 pf
C11 6.8uf
R16 68K
R26 4.7M
R27 820K
C17 6.8uf
R34 100K
R39 5.6K
R40 5.6K
Q2 2N6014
R20 100K
R19 37.4K
R18 11.8K
C13 5.1nf
C12 5.1nf
R17 68.1K
U1 LM 741H
U2 AD 7503SD
U3 LM 741H
R13 100K
R15 100K
R33 100K
R32 47K
C20 24nf
Q4 2N6014
C19 2nf
R31 15K
R30 15K
R28 11K
R29 39.2K
R25 1M
6.8uf C18
Q3 2N6014
R24 100K
C16 390pf
C15 390pf
R23 82.5K
C14 820pf
R22 66.1K
R21 82.5K
R35 1.8K
R36 6.8K
R38 270Ω
C2 500uf

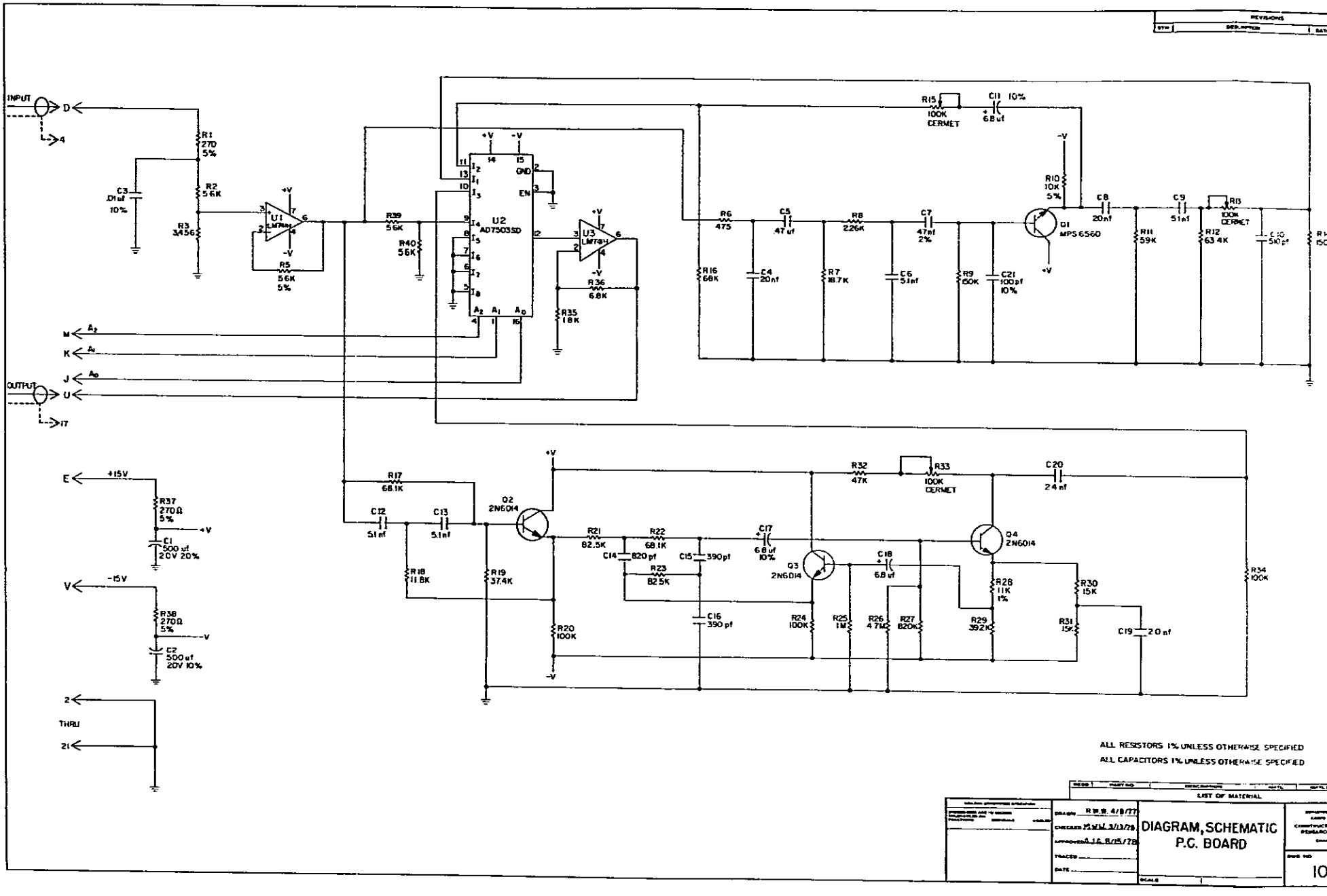
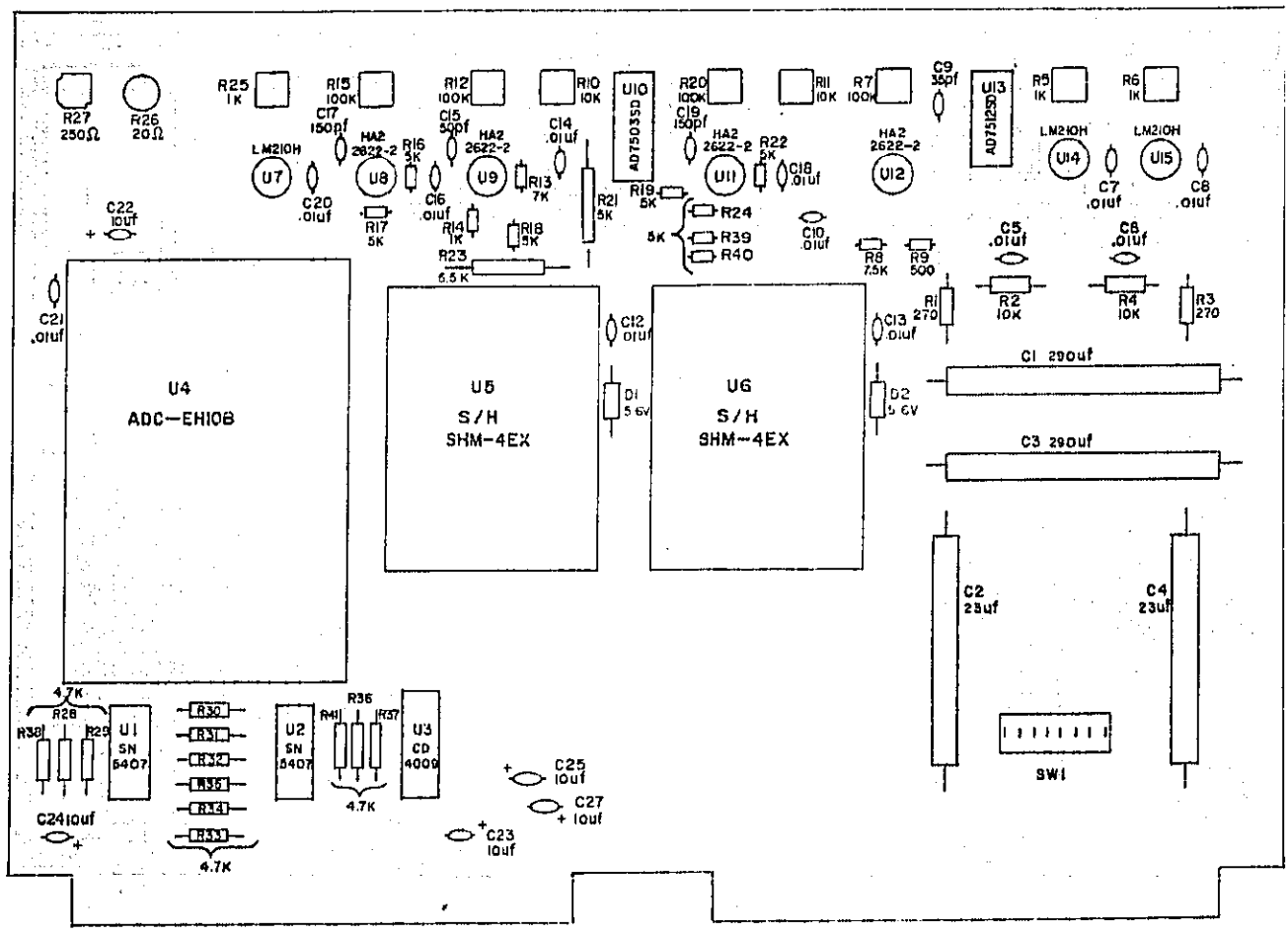

INPUT
OUTPUT
U1
U2
AD7503SD
U3
LM78H
Q1
MPS6560
Q2
2N6014
Q3
2N6014
Q4
2N6014
+15V
-15V
THRU
ALL RESISTORS 1% UNLESS OTHERWISE SPECIFIED
ALL CAPACITORS 1% UNLESS OTHERWISE SPECIFIED
LIST OF MATERIAL
DIAGRAM, SCHEMATIC
P.C. BOARD

Table 5

Board Number 2004 -- Parts List

Circuit Diagram Reference	Component Type				
R1, R3	Carbon	1/4W	5%	270	Ω
R9	Bulk metal film	0.3W	0.1%	500	Ω
R14	Bulk metal film	0.3W	0.1%	1	K Ω
R28-R38, R41	Carbon	1/4W	5%	4.7	K Ω
R21	Carbon film		1%	5	K Ω
R16-R19, R22, R24, R39, R40	Bulk metal	0.3W	0.1%	5	K Ω
R23	Carbon film	1/4W	1%	5.5	K Ω
R13	Bulk metal	0.3W	0.1%	7	K Ω
R8				7.5	K Ω
R2, R4	Carbon	1/4W	5%	10	K Ω
R26	Trimmer	Cermet		20	Ω
R27	Trimmer	Cermet		250	Ω
R5, R6, R25	Trimmer	Cermet		1	K Ω
R10, R11	Trimmer	Cermet		10	K Ω
R7, R12, R15, R20	Trimmer	Cermet		100	K Ω
C9	Ceramic	35 pF		1	K V
C15	Ceramic	50 pF			
C17, C19	Ceramic	150 pF			
C5-C8, C10, C12-C14, C16, C18 C20, C21, C26	Ceramic	.01 uF		100	V
C22-C25, C27	Tantalum	10 uF		35	V
C2, C4	Tantalum	20 uF	NP	25	V
C1, C3	Tantalum	290 uF	NP	25	V
D1, D2	Zener	1W		5.6	V
U1, U2	SN5407				
U3	CD4009				
U4	ADC-EH10B1-EX	A/D Converter			
U5, U6	SHM-4-EX	Sample and hold			
U7, U14, U15	LM210H				
U8, U9, U11, U12	HA2 2622-2				
U10	AD7503SD				
U13	AD7512SD				
SW1	Dip switch	8 station	SPST		


R27 250Ω
R26 20Ω
R25 1K
R15 100K
R12 100K
R10 10K
U10 AD7503SD
R20 100K
R11 10K
R7 100K
C9 35pf
U13 AD7512SD
R5 1K
R6 1K
C17 150pf
C15 50pf
C14 .01uf
C19 150pf
R22 5K
C18 .01uf
HA2 2622-2
LM210H
U7
U8
U9
U11
U12
U14
U15
C7 .01uf
C8 .01uf
C20 .01uf
R16 5K
C16 .01uf
R13 7K
R17 5K
R14 1K
R18 5K
R21 5K
R19 5K
R24
R39
R40
5K
C10 .01uf
C22 10uf
R23 6.5K
R8 7.5K
R9 500
C5 .01uf
C6 .01uf
R1 270
R2 10K
R4 10K
R3 270
C21 .01uf
U4 ADC-EH10B
U5 S/H SHM-4EX
U6 S/H SHM-4EX
C12 .01uf
D1 5.6V
C13 .01uf
D2 5.6V
C1 290uf
C3 290uf
C2 23uf
C4 23uf
SW1
4.7K
R28
R38
R29
U1 SN 5407
R30
R31
R32
R33
R34
R35
4.7K
U2 SN 5407
R36
R41
R37
4.7K
U3 CD 4009
C24 10uf
C25 10uf
C27 10uf
C23 10uf

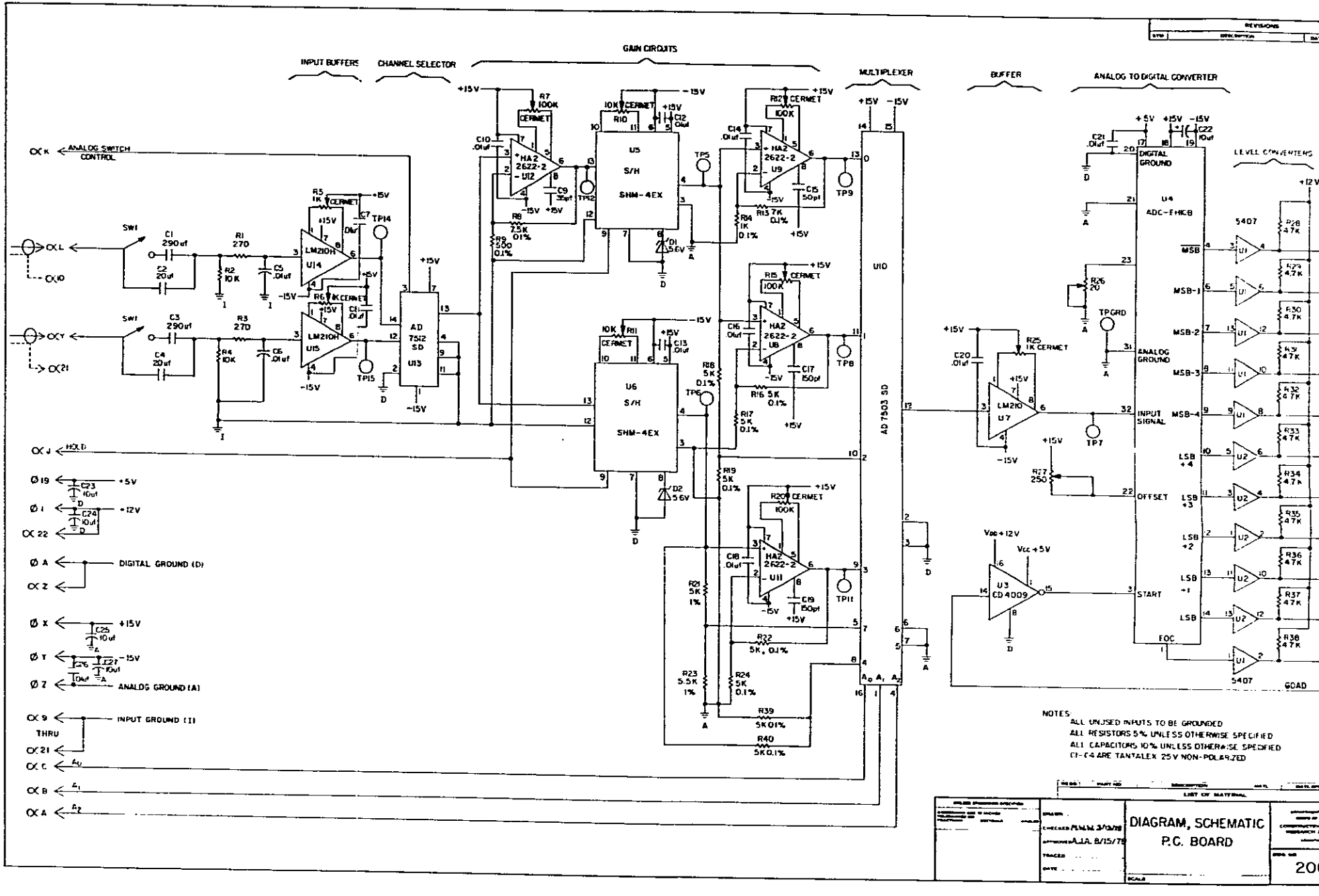
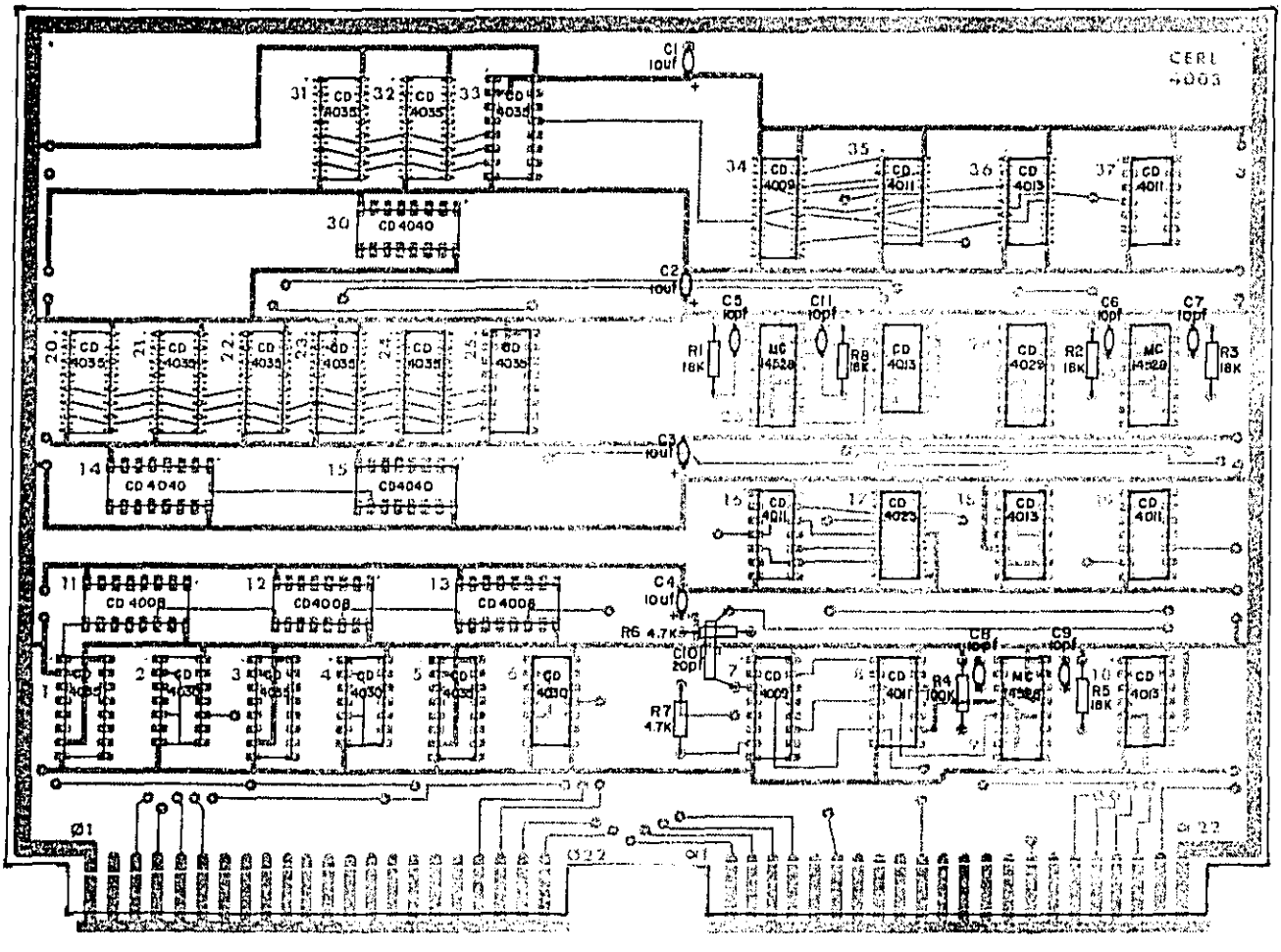
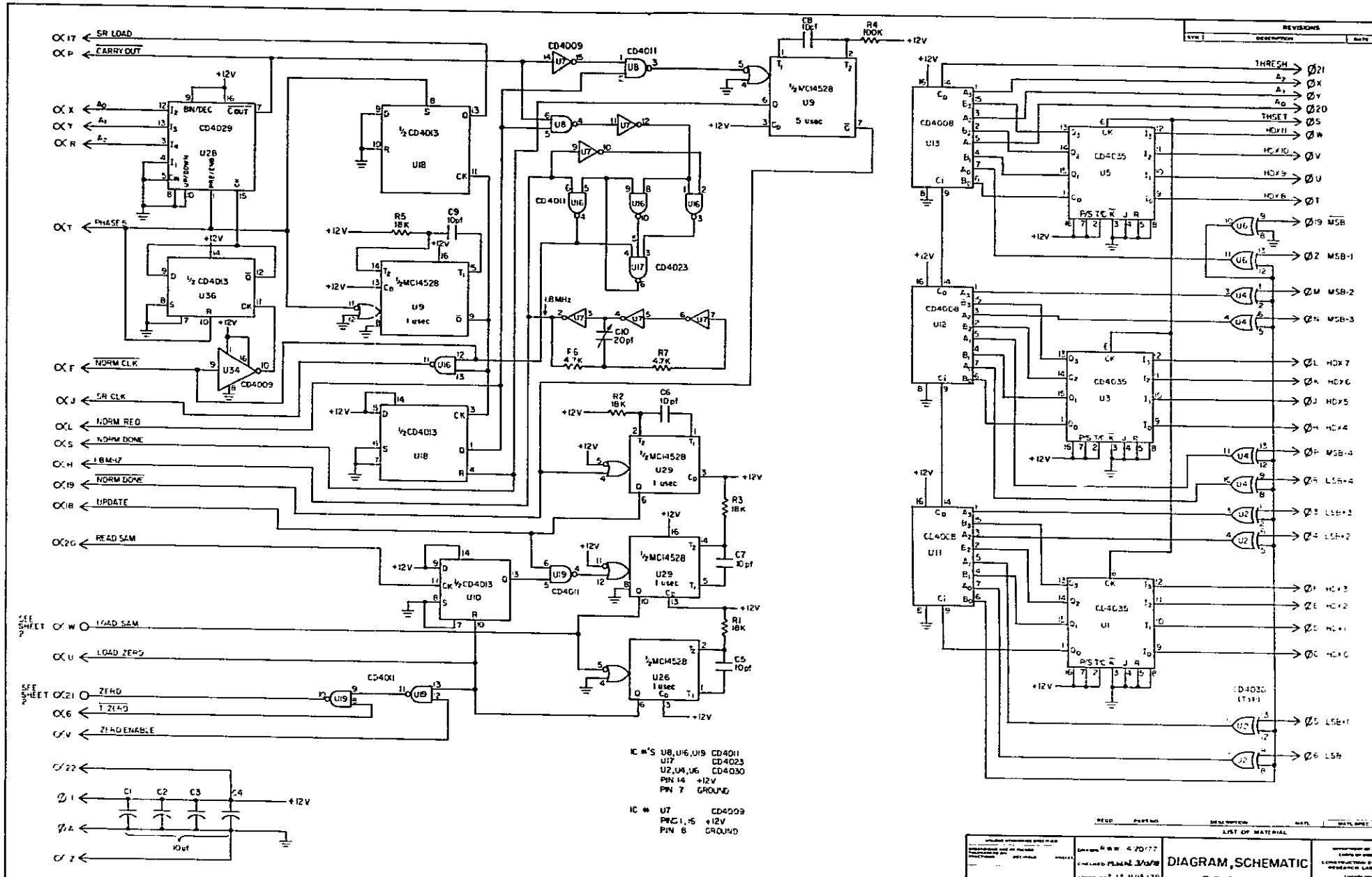

INPUT BUFFERS
CHANNEL SELECTOR
GAIN CIRCUITS
MULTIPLEXER
BUFFER
ANALOG TO DIGITAL CONVERTER
LEVEL CONVERTERS
ANALOG SWITCH CONTROL
HOLD
DIGITAL GROUND (D)
ANALOG GROUND (A)
INPUT GROUND (I)
THRU
AD 7503 SD
ADC-EHC8
DIGITAL GROUND
ANALOG GROUND
INPUT SIGNAL
OFFSET
START
EOC
MSB
MSB-1
MSB-2
MSB-3
MSB-4
LSB +4
LSB +3
LSB +2
LSB +1
LSB
5407
GOAD
NOTES:
ALL UNUSED INPUTS TO BE GROUNDED
ALL RESISTORS 5% UNLESS OTHERWISE SPECIFIED
ALL CAPACITORS 10% UNLESS OTHERWISE SPECIFIED
C1-C4 ARE TANTALEX 25V NON-POLARIZED
LIST OF MATERIAL
DIAGRAM, SCHEMATIC
P.C. BOARD

Table 6

Board Number 4003 -- Parts List

Circuit Diagram Reference	Component Type				
R6, R7	Carbon	1/4W	5%	4.7	K Ω
R1, R2, R3, R5, R8	Carbon	1/4W	5%	18	K Ω
R4	Carbon	1/4W	5%	100	K Ω
C5-C9, C11	Mica	10 pF		500	V
C10	Trimmer	4-47 pF			
C1-C4	Tantalum	10 uF		35	V
U1, U3, U5, U20-U25, U31-U33	CD4035				
U2, U4, U6	CD4030				
U7, U34	CD4009				
U8, U16, U19, U35, U37	CD4011				
U9, U26, U29	MC14528				
U10, U18, U27, U36	CD4013				
U11, U12, U13	CD4008				
U14, U15, U30	CD4040				
U17	CD4023				
U28	CD4029				


C1 10uf
C2 10uf
C3 10uf
C4 10uf
C5 10pf
C6 10pf
C7 10pf
C8 10pf
C9 10pf
C10 20pf
C11 10pf
R1 18K
R2 18K
R3 18K
R4 100K
R5 18K
R6 4.7K
R7 4.7K
R8 18K
CD 4035
CD 4040
CD 4008
CD 4009
CD 4011
CD 4013
CD 4023
CD 4029
MC 14528
Ø1
Ø22


SR LOAD
CARRY OUT
PHASE S
NORM CLK
SR CLK
NORM REQ
NORM DONE
1.8MHz
NORM DONE
UPDATE
READ SAM
LOAD SAM
LOAD ZERO
ZERO
T ZERO
ZERO ENABLE
CD4029
CD4013
CD4009
CD4011
CD4023
CD4030
CD4008
CD4035
½MC14528
5 usec
1 usec
IC #'S U8,U16,U19 CD4011
U17 CD4023
U2,U4,U6 CD4030
PIN 14 +12V
PIN 7 GROUND
IC # U7 CD4009
PINS 1,15 +12V
PIN 8 GROUND
THRESH
THSET
MSB
MSB-1
MSB-2
MSB-3
MSB-4
LSB+4
LSB+3
LSB+2
LSB+1
LSB
DIAGRAM, SCHEMATIC
P.C. BOARD
4003

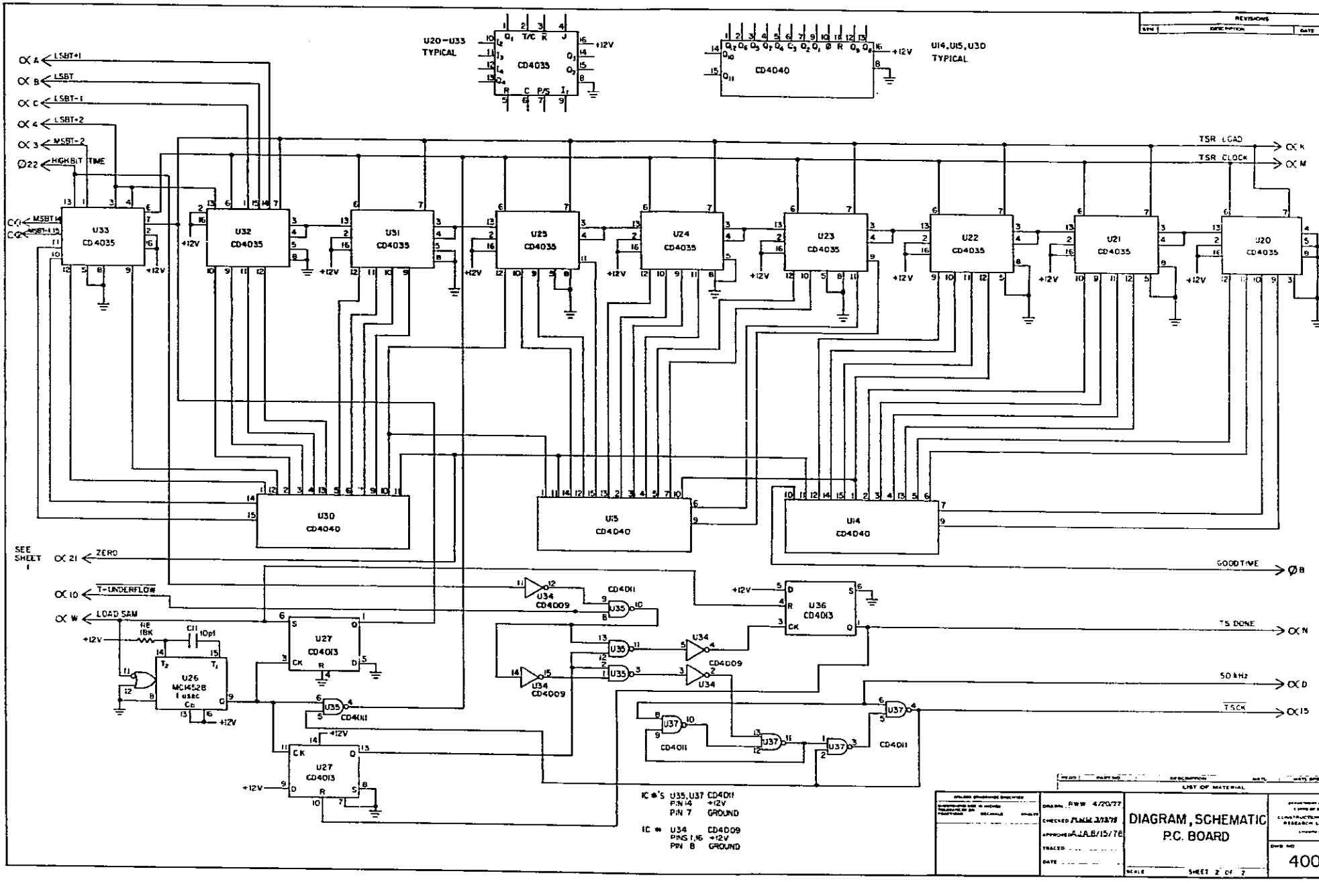

U20–U33 TYPICAL
CD4035
U14, U15, U30 TYPICAL
CD4040
LSBT+1
LSBT
LSBT-1
LSBT+2
MSBT-2
HIGH BIT TIME
MSBT
MSBT-1.5
U33 CD4035
U32 CD4035
U31 CD4035
U25 CD4035
U24 CD4035
U23 CD4035
U22 CD4035
U21 CD4035
U20 CD4035
+12V
TSR LOAD
TSR CLOCK
U30 CD4040
U15 CD4040
U14 CD4040
SEE SHEET 1
ZERO
T-UNDERFLOW
LOAD SAM
GOODTIME
TS DONE
50 kHz
TSCK
U34 CD4009
CD4011
U35
U36 CD4013
U37
U27 CD4013
U26 MC14528
1 usec
RE 18K
C11 10pf
IC #'s U35, U37 CD4011
PIN 14 +12V
PIN 7 GROUND
IC # U34 CD4009
PINS 1, 16 +12V
PIN 8 GROUND
REVISIONS
LIST OF MATERIAL
DRAWN RWW 4/20/77
CHECKED
APPROVED
TRACED
DATE
DIAGRAM, SCHEMATIC
P.C. BOARD
SCALE
SHEET 2 OF 2
400

Table 7

Board Number 6003 -- Parts List

Circuit Diagram Reference	Component Type			
C1-C5	Tantalum	10 uF	35	V
U1, U2	CD 4013			
U3-U7, U10-U14, U17-U21	MC14554			
U24-U28, U31-U35	MC14554			
U8, U15, U22	CD4030			
U9, U16, U23	CD4008			
U29	CD4532			
U30	CD4019			

CERL
6003
C1 IOUT
C2 IOUT
C3 IOUT
C4 IOUT
C5 IOUT
CD 4532
CD 4030
CD 4006
CD 4013
MC 14554
29
30
31
32
33
34
35
22
23
24
25
26
27
28
15
16
17
18
19
20
21
8
9
10
11
12
13
14
1
2
3
4
5
6
7

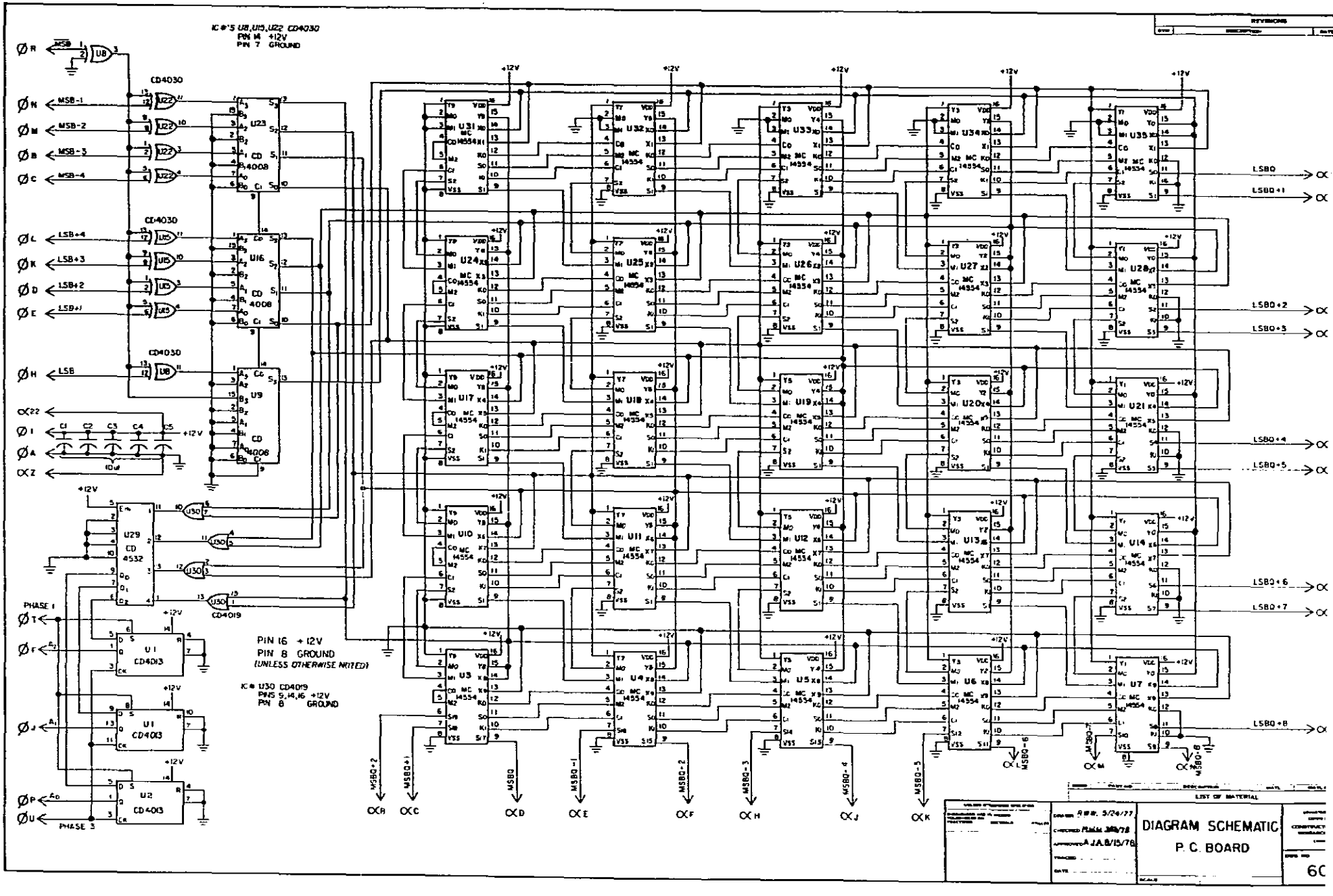
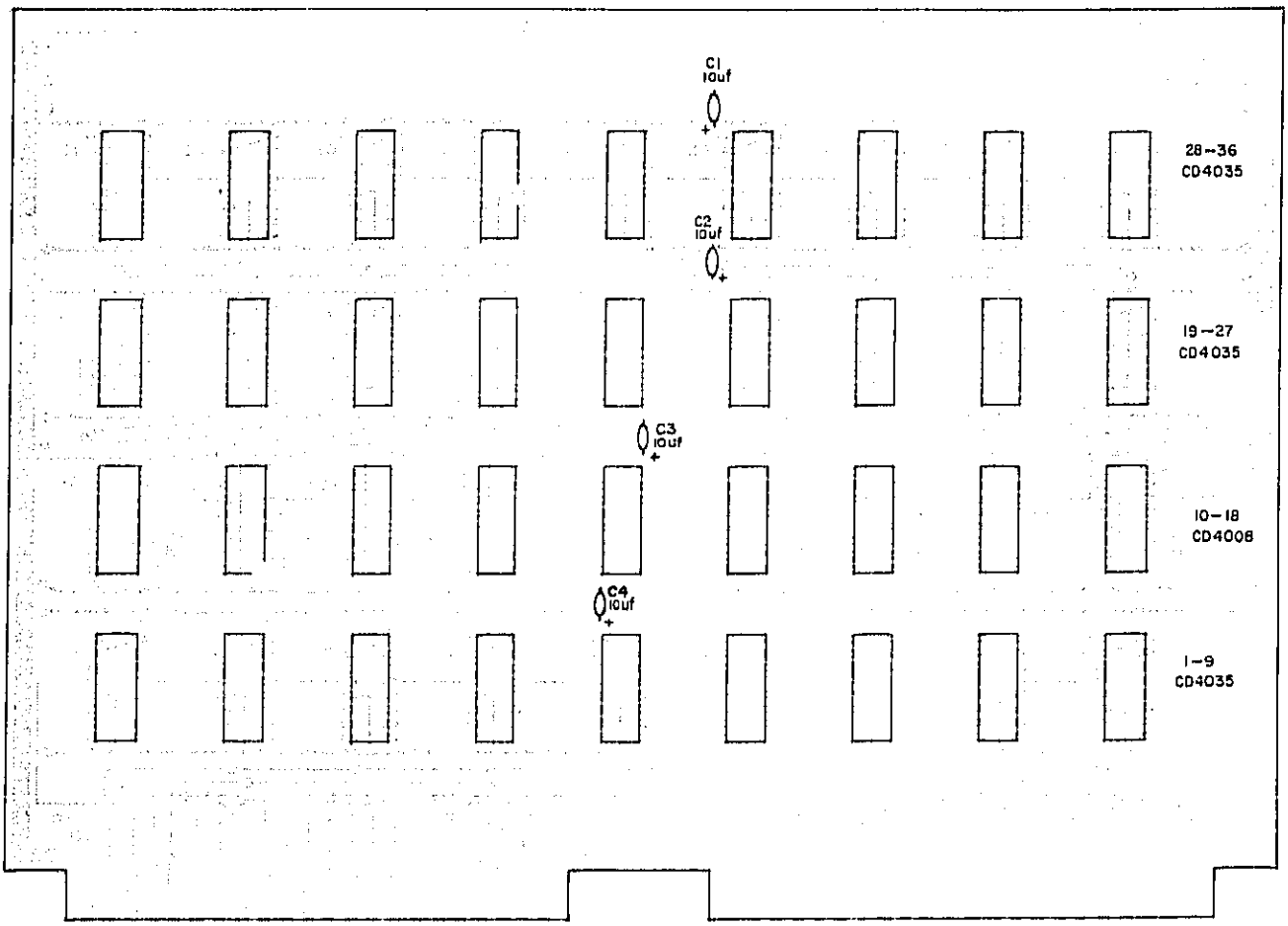

IC #'S U8,U15,U22 CD4030
PIN 14 +12V
PIN 7 GROUND
CD4030
MSB-1
MSB-2
MSB-3
MSB-4
LSB+4
LSB+3
LSB+2
LSB+1
LSB
CD4008
CD4019
CD4532
CD4013
PHASE 1
PHASE 3
PIN 16 +12V
PIN 8 GROUND
(UNLESS OTHERWISE NOTED)
IC # U30 CD4019
PINS 5,14,16 +12V
PIN 8 GROUND
MSBO-1
MSBO
MSBO+1
MSBO+2
MSBO+3
MSBO+4
MSBO+5
MSBO-6
LSBO
LSBO+1
LSBO+2
LSBO+3
LSBO+4
LSBO+5
LSBO+6
LSBO+7
LSBO+8
LIST OF MATERIAL
DIAGRAM SCHEMATIC
P.C. BOARD

Table 8

Board Number 8002 -- Parts List

Circuit Diagram Reference	Component Type			
C1-C4	Tantalum	10 uF	35	V
U1-U9, U19-U36	CD4035			
U10-U18	CD4008			


C1
10uf
C2
10uf
C3
10uf
C4
10uf
28-36
CD4035
19-27
CD4035
10-18
CD4008
1-9
CD4035

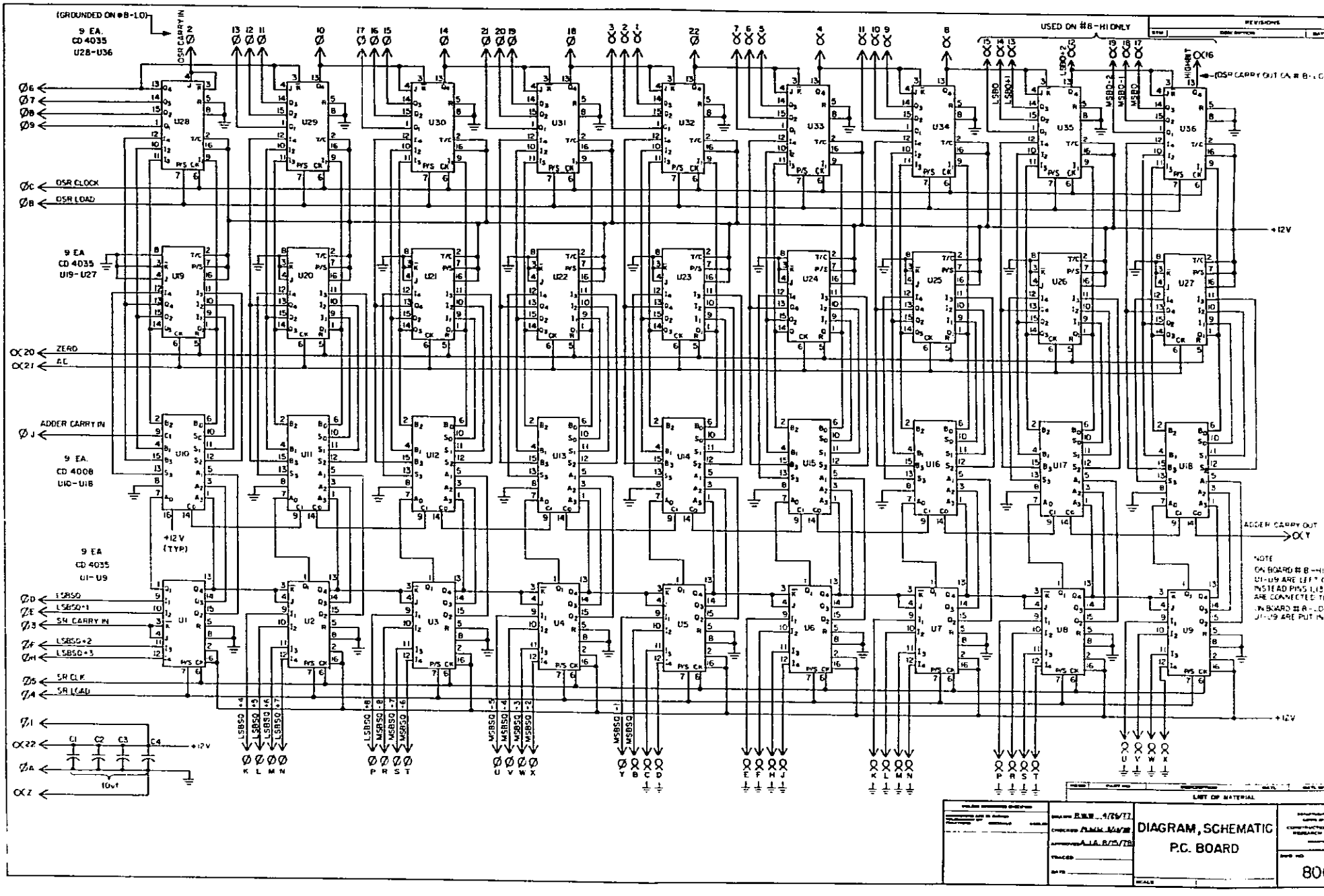
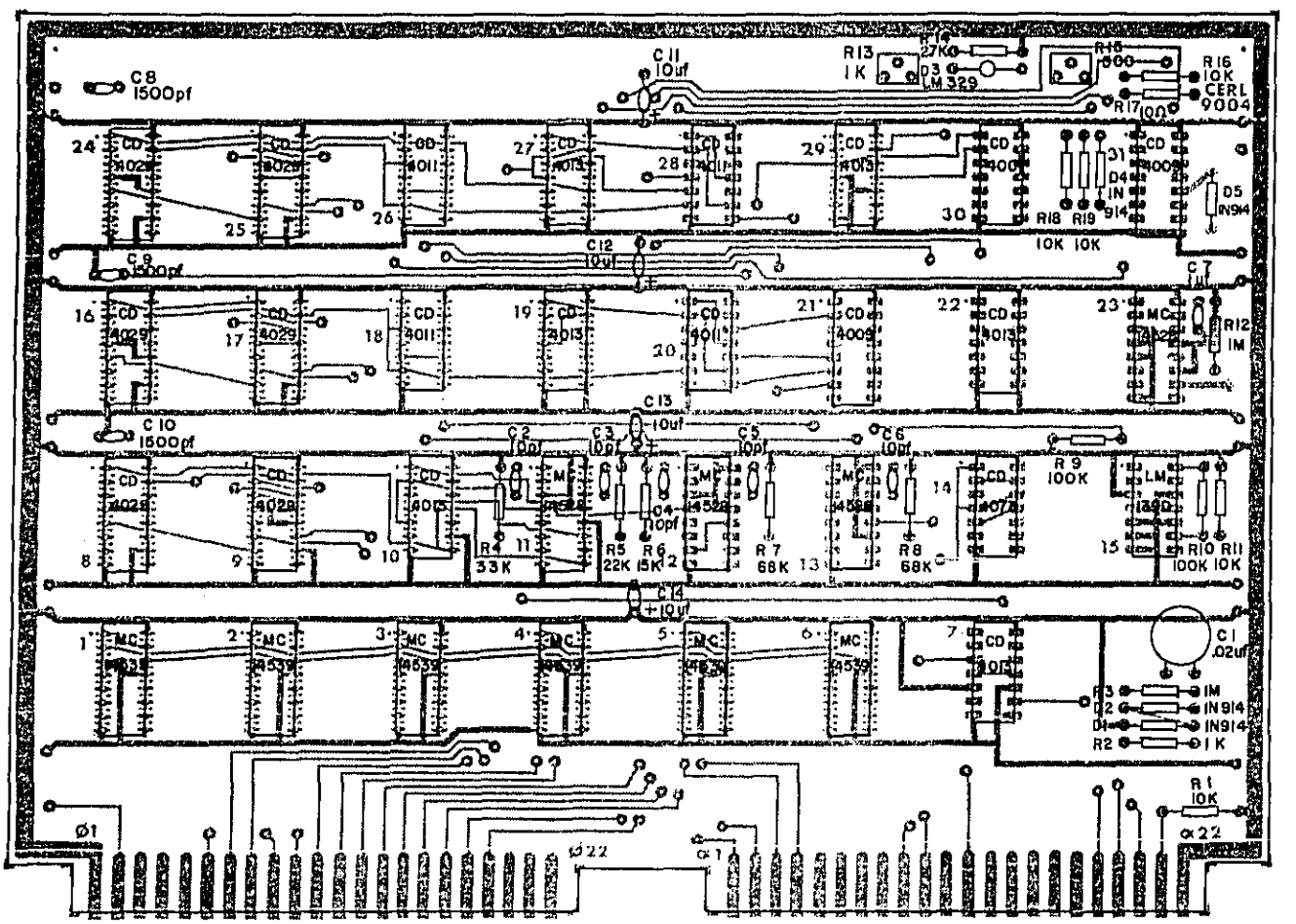

(GROUNDED ON #8-LO)
9 EA. CD 4035 U28-U36
OSR CARRY IN
USED ON #8-HI ONLY
REVISIONS
(OSR CARRY OUT CA. # 8-LO)
ØC OSR CLOCK
ØB OSR LOAD
+12V
9 EA CD 4035 U19-U27
ØC20 ZERO
ØC21 AC
ADDER CARRY IN
ØJ
9 EA. CD 4008 U10-U18
+12V (TYP)
ADDER CARRY OUT
ØCY
9 EA CD 4035 U1-U9
ØD LSBSO
ØE LSBSO+1
ØG SR CARRY IN
ØF LSBSO+2
ØH LSBSO+3
ØS SR CLK
ØA SR LOAD
ØI
ØC22
C1 C2 C3 C4
10uf
ØA
ØCZ
LSBSO
LSBSO+1
LSBSO+2
LSBSO+3
MSBSO
MSBSO-1
MSBSO-2
MSBSO-3
MSBSO-4
MSBSO-5
K L M N
P R S T
U V W X
Y B C D
E F H J
K L M N
P R S T
U V W X
LIST OF MATERIAL
DIAGRAM, SCHEMATIC
P.C. BOARD

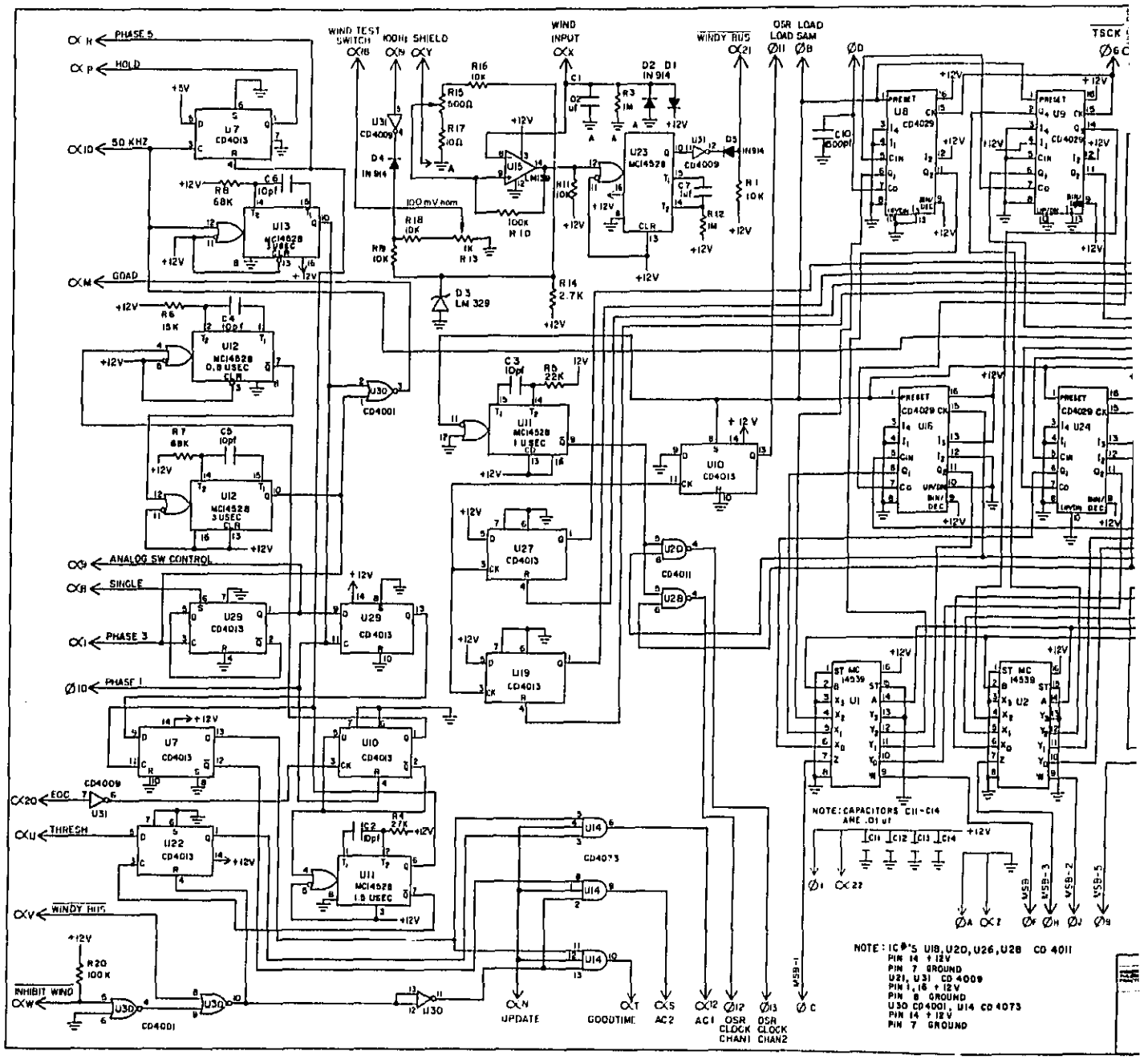
Table 9

Board Number 9004 -- Parts List

Circuit Diagram Reference	Component Type				
R17	Carbon	1/4W	5%	10	Ω
R2	Carbon	1/4W	5%	1	K Ω
R14	Carbon	1/4W	5%	2.7	K Ω
R1, R11, R16, R18, R19	Carbon	1/4W	5%		
R6	Carbon	1/4W	5%	15	K Ω
R5	Carbon	1/4W	5%	22	K Ω
R4	Carbon	1/4W	5%	33	K Ω
R7, R8	Carbon	1/4W	5%	68	K Ω
R9, R10, R20	Carbon	1/4W	5%	100	K Ω
R3, R12	Carbon	1/4W	5%	1	M Ω
R15	Trimmer	Cermet		500	Ω
R13	Trimmer	Cermet		1	K Ω
C2-C6	Ceramic	10 pF		500	V
C8-C10	Ceramic	1500 pF		1	K V
C1	Ceramic	.02 uF		1	K V
C7	Tantalum	1 uF		35	V
C11-C14	Tantalum	10 uF		35	V
D1, D2, D4, D5	IN914B	Silicon Diode			
D3	LM329H	Zener 6.95V			
U1-U6	MC14539				
U7, U10, U19, U22, U27, U29	CD4013				
U8, U9, U16, U17, U24, U25	CD4029				
U11-U13, U23	MC14528				
U14	CD4073				
U15	LM139D				
U18, U20, U26, U28	CD4011				
U21, U31	CD4009				
U30	CD4001				



NOTE: C11–C14 ARE BYPASS CAPACITORS. R20 IS LOCATED ON REVERSE SIDE OF BOARD, 100 KΩ R9 IS USED TO TIE UNUSED INPUT INPUT OF U13 HIGH.



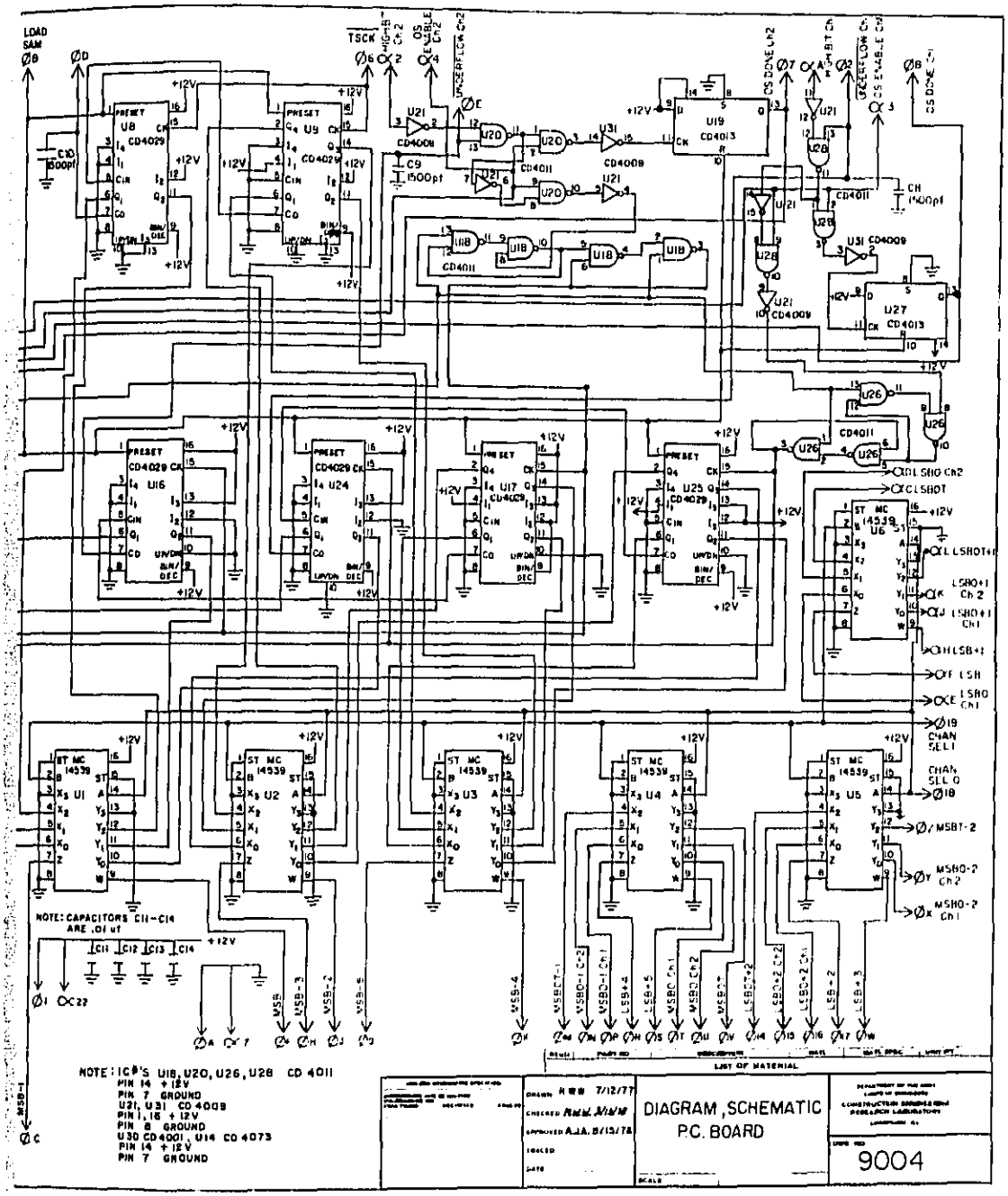
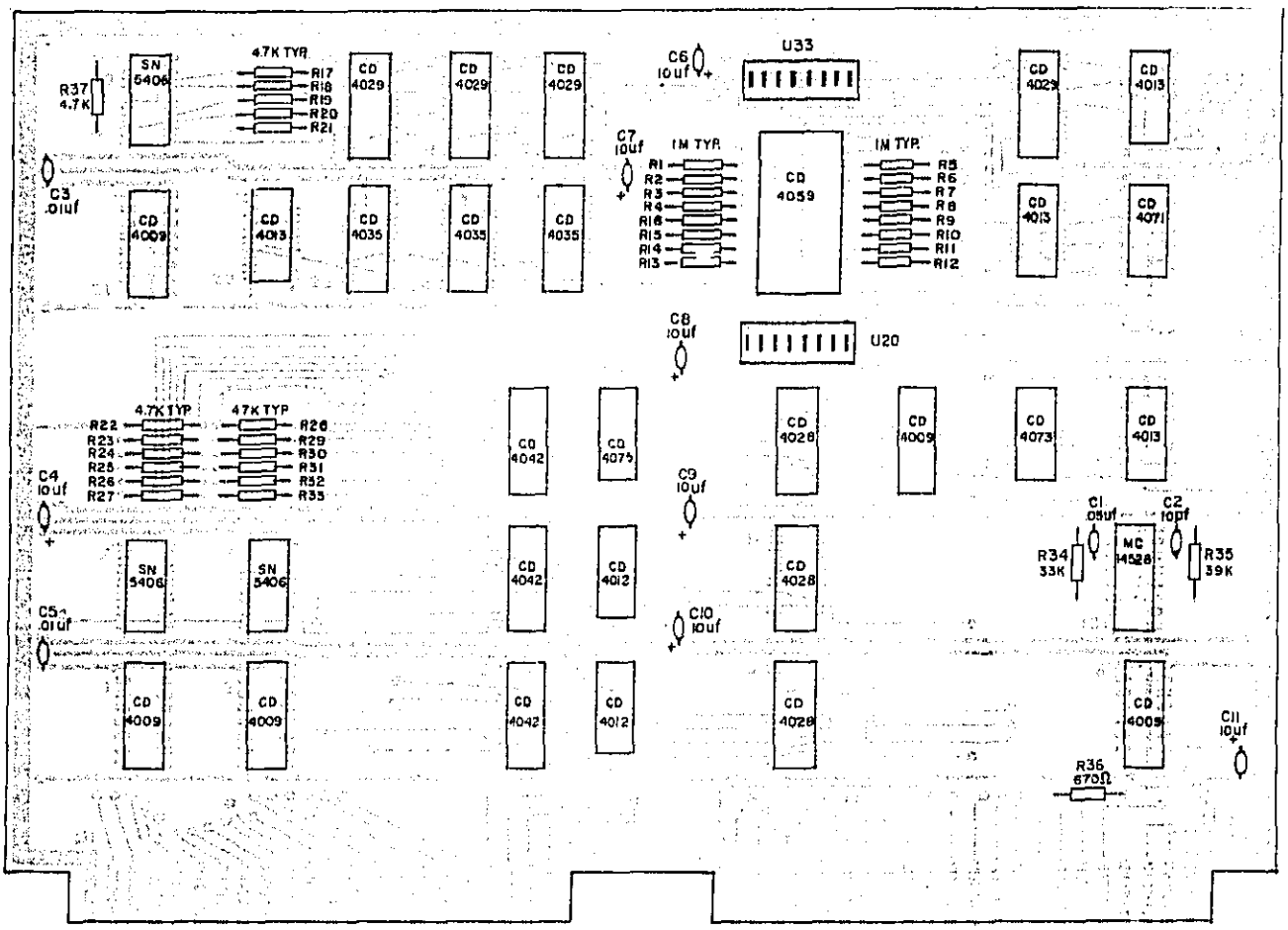


Table 10

Board Number 11003 -- Parts List

Circuit Diagram Reference	Component Type				
R36	Carbon	1/4W	5%	670	Ω
R17-R33, R37	Carbon	1/4W	5%	4.7	K Ω
R34	Carbon	1/4W	5%	33	K Ω
R35	Carbon	1/4W	5%	39	K Ω
R1-R16	Carbon	1/4W	5%	1	M Ω
C2	Mica	10 pF		500	V
C3, C5	Ceramic	.01 uF		100	V
C1	Ceramic	.05 uF		50	V
C4, C6-C11	Tantalum	10 uF		35	V
U1, U2, U6, U17, U21	CD4009				
U3, U9, U14	CD4042				
U4, U10	CD4012				
U5, U11, U16	CD4028				
U7, U8, U29	SN5406				
U13	MC14528				
U15	CD4075				
U18	CD4073				
U19, U22, U27, U35	CD4013				
U23-U25	CD4035				
U26	CD4059				
U28	CD4071				
U30-U32, U34	CD4029				
U20, U33	Dipswitch	8 Station	SPST		



NOTE: C3–C11 ARE BYPASS CAPACITORS. R37 IS USED TO THE UNUSED INPUT OF U20 HIGH.

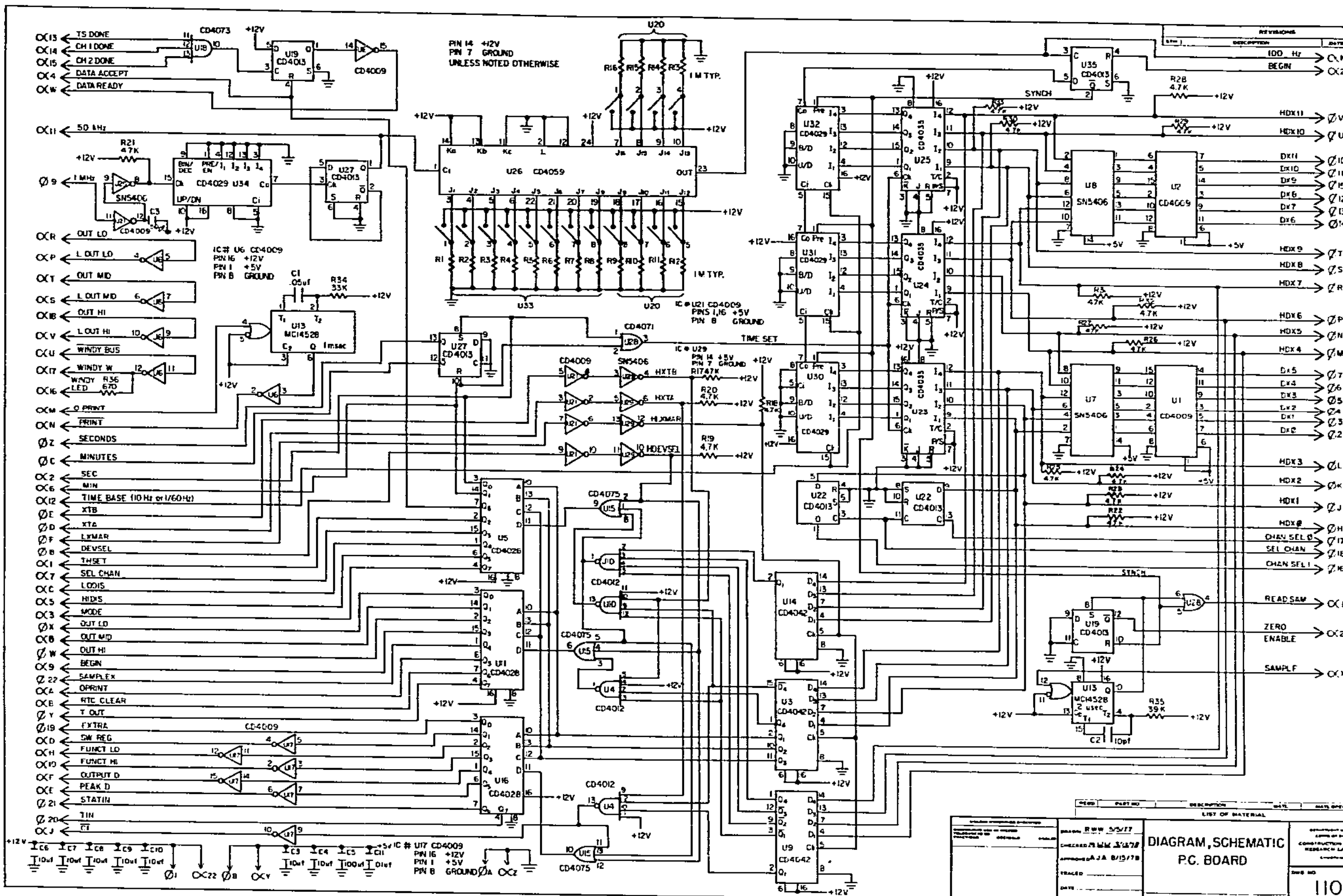
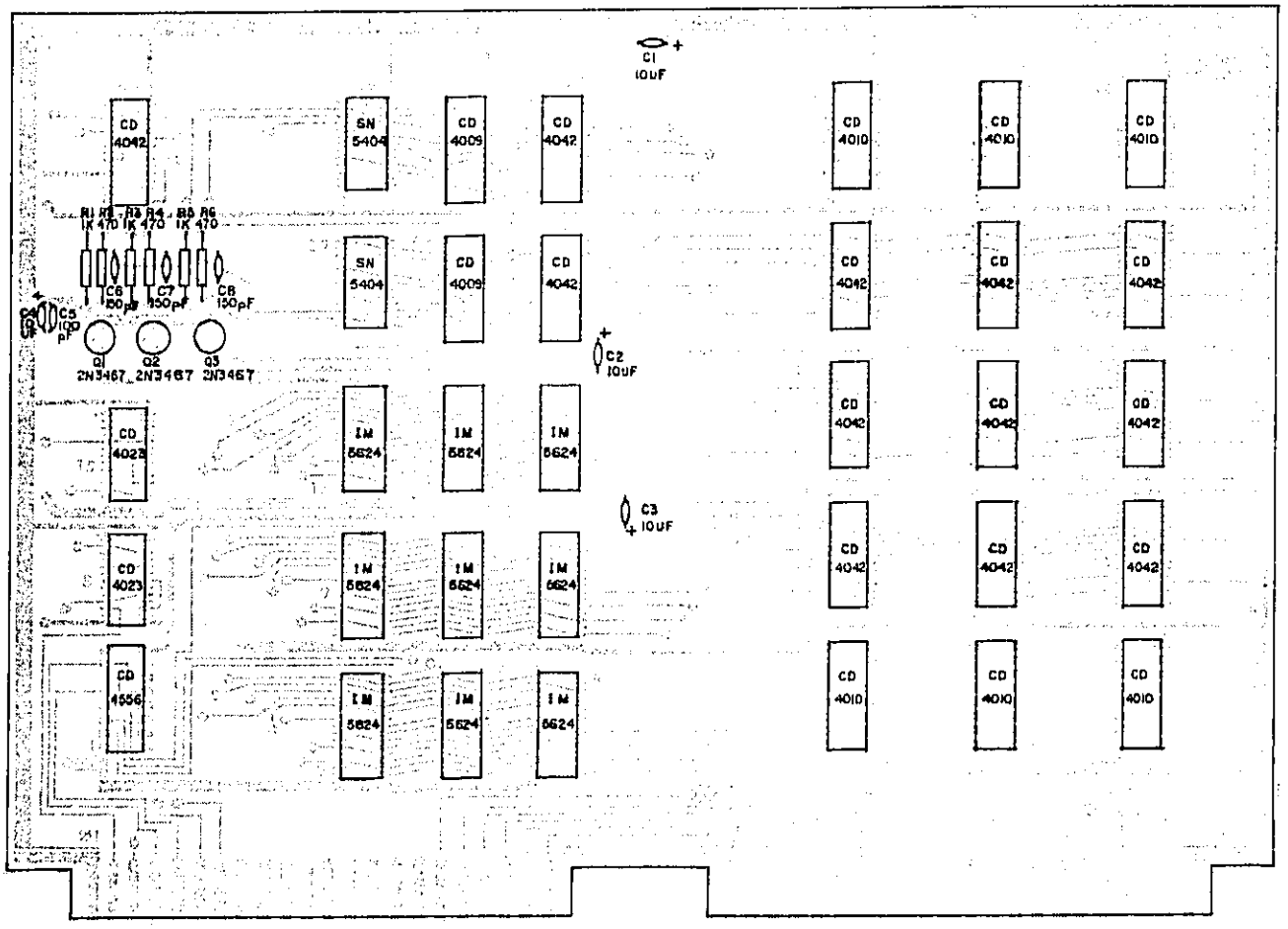

TS DONE
CH 1 DONE
CH 2 DONE
DATA ACCEPT
DATA READY
50 kHz
1 MHz
OUT LO
L OUT LO
OUT MID
L OUT MID
OUT HI
L OUT HI
WINDY BUS
WINDY W
WINDY LED
O PRINT
PRINT
SECONDS
MINUTES
SEC
MIN
TIME BASE (10 Hz or 1/60 Hz)
XTB
XTA
LXMAR
DEVSEL
THSET
SEL CHAN
LODIS
HIDIS
MODE
OUT LO
OUT MID
OUT HI
BEGIN
SAMPLEX
OPRINT
RTC CLEAR
T OUT
EXTRA
SW REG
FUNCT LO
FUNCT HI
OUTPUT D
PEAK D
STATIN
TIN
CI
PIN 14 +12V
PIN 7 GROUND
UNLESS NOTED OTHERWISE
IC# U6 CD4009
PIN 16 +12V
PIN 1 +5V
PIN 8 GROUND
IC # U21 CD4009
PINS 1,16 +5V
PIN 8 GROUND
IC # U29
PIN 14 +5V
PIN 7 GROUND
IC # U17 CD4009
PIN 16 +12V
PIN 1 +5V
PIN 8 GROUND
U26 CD4059
U33
U20
1 M TYP.
CD4029 U34
U27 CD4013
U13 MC14528
1 msec
U19 CD4013
CD4073
U18
CD4009
SN5406
U5 CD4026
U11 CD4028
U16 CD4028
CD4075
CD4012
CD4071
U28
TIME SET
HXTB
HXTA
HXMAR
HDEVSEL
U14 CD4042
U3 CD4042
U9 CD4042
U30 CD4029
U31 CD4029
U32 CD4029
U23 CD4035
U24 CD4035
U25 CD4035
U22 CD4013
U35 CD4013
U8 SN5406
U2 CD4009
U7 SN5406
U1 CD4009
U13 MC14528 2 usec
SYNCH
100 Hz
BEGIN
HDX11
HDX10
DX11
DX10
DX9
DX8
DX7
DX6
HDX9
HDX8
HDX7
HDX6
HDX5
HDX4
DX5
DX4
DX3
DX2
DX1
DX0
HDX3
HDX2
HDX1
HDX0
CHAN SEL 0
SEL CHAN
CHAN SEL 1
READ SAM
ZERO
ENABLE
SAMPLF
R21 4.7K
R34 33K
C1 .05uf
R36 670
R19 4.7K
R20 4.7K
R17 47K
R28 4.7K
R35 39K
C2 10pf
+12V
+5V
LIST OF MATERIAL
DRAWN RWW 5/5/77
CHECKED
APPROVED AJA 8/15/78
TRACED
DATE
SCALE
DIAGRAM, SCHEMATIC
P.C. BOARD
DWG NO
110
REVISIONS

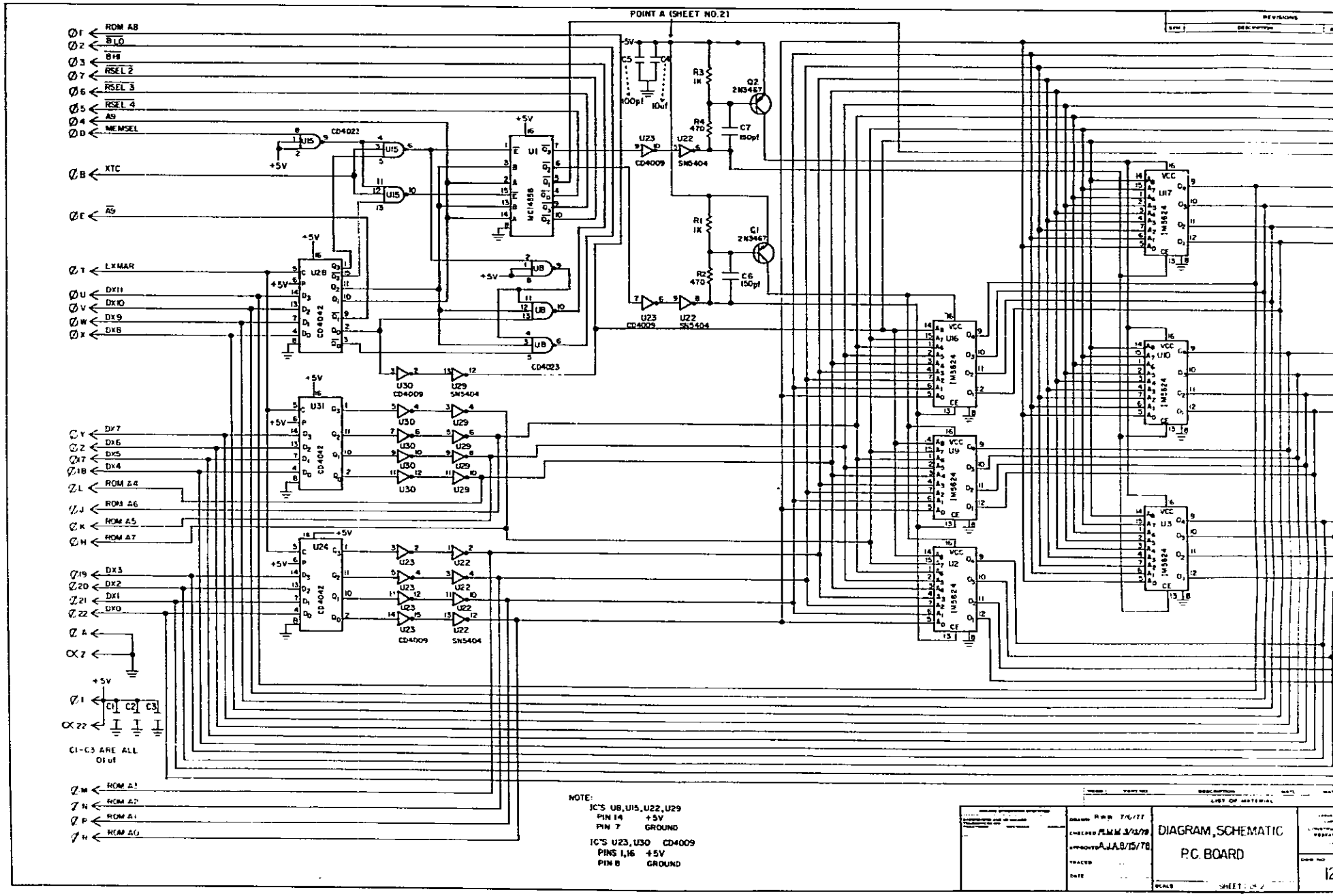
Table 11

Board Number 12004 -- Parts List

Circuit Diagram Reference	Component Type			
R2, R4, R6	CARBON	1/4W	5%	470 Ω
R1, R3, R5	CARBON	1/4W	5%	1 KΩ
C1-C4	TANTALUM	10 uF		35 V
C5	CERAMIC	100 pF		1 KV
C6-C8	CERAMIC	150 pF		1 KV
Q1-Q3	SILICON TRANS.	PNP		2N3467
U1	CD 4556			
U2-U4, U9-U11, U16-U13	IM 5624			
U5-U7, U32-U34	CD 4010			
U8, U15	CD 4023			
U12-U14, U19-U21, U24-U28, U31	CD 4042			
U22, U29	SN 5404			
U23, U30	CD 4009			



NOTE: C1–C5 ARE BYPASS CAPACITORS.


POINT A (SHEET NO.2)
REVISIONS
ROM A8
BLO
BHI
RSEL 2
RSEL 3
RSEL 4
A9
MEMSEL
XTC
A9
LXMAR
DX11
DX10
DX9
DX8
DX7
DX6
DX5
DX4
ROM A4
ROM A6
ROM A5
ROM A7
DX3
DX2
DX1
DX0
ROM A1
ROM A2
ROM A3
ROM A0
+5V
C1 C2 C3
C1-C3 ARE ALL .01uf
CD4022
CD4042
MC14556
CD4023
CD4009
SN5404
2N3467
1M5624
R3 1K
R4 470
R1 1K
R2 470
C5 100pf
C6 150pf
C7 150pf
10uf
NOTE:
IC'S U8,U15,U22,U29
PIN 14 +5V
PIN 7 GROUND
IC'S U23,U30 CD4009
PINS 1,16 +5V
PIN 8 GROUND
DIAGRAM, SCHEMATIC
P.C. BOARD

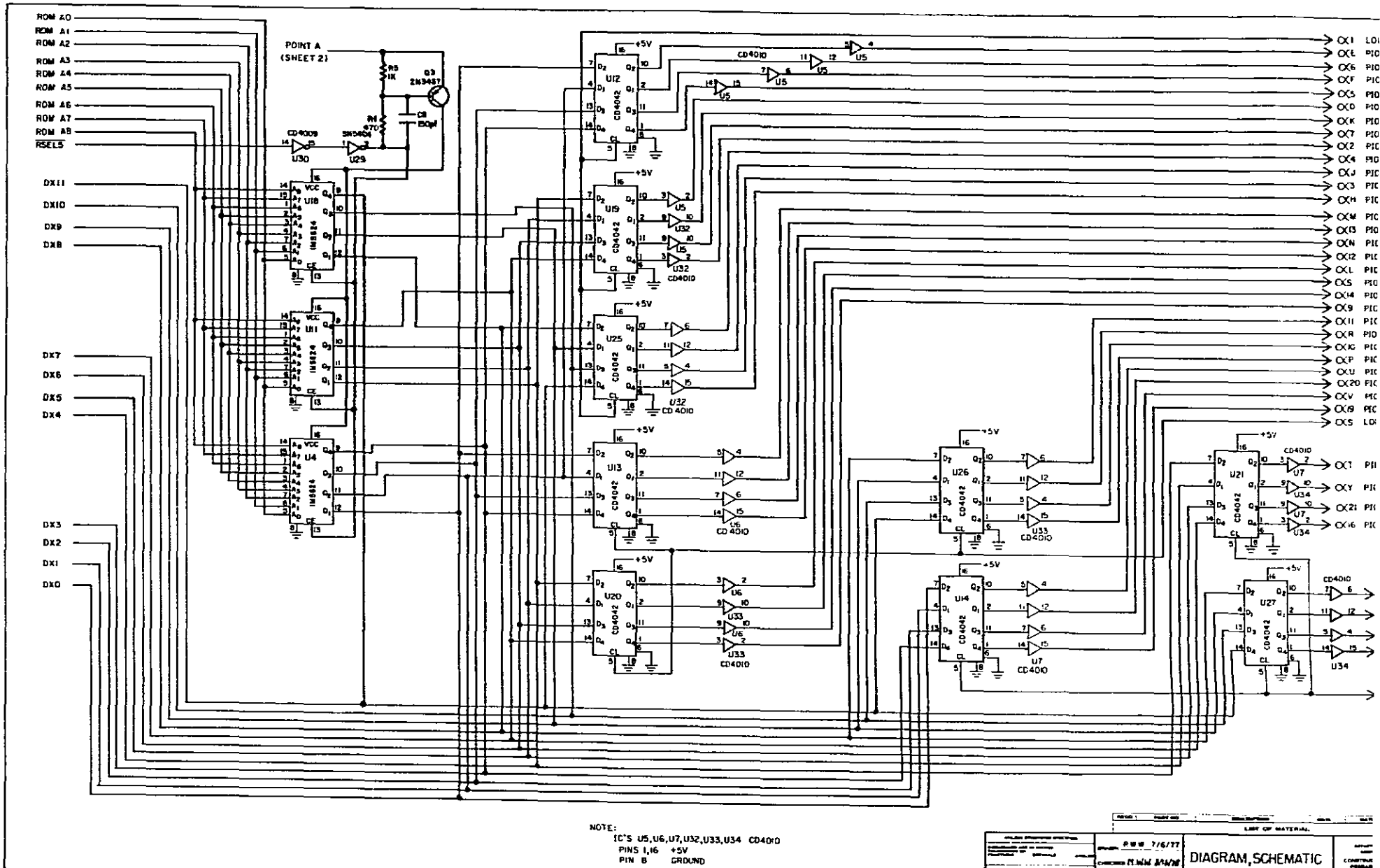

ROM A0
ROM A1
ROM A2
ROM A3
ROM A4
ROM A5
ROM A6
ROM A7
ROM A8
RSEL5
DX11
DX10
DX9
DX8
DX7
DX6
DX5
DX4
DX3
DX2
DX1
DX0
POINT A
(SHEET 2)
R5
1K
Q3
2N3487
R4
470
C8
150pf
CD4009
U30
SN5404
U29
U18
U11
U4
IN5824
+5V
U12
U19
U25
U13
U20
CD4042
CD4010
U5
U32
U37
U6
U33
U26
U14
U7
U21
U27
U34
NOTE:
IC'S U5,U6,U7,U32,U33,U34 CD4010
PINS 1,16 +5V
PIN 8 GROUND
DIAGRAM, SCHEMATIC
P.C. BOARD
SHEET 2 OF 2

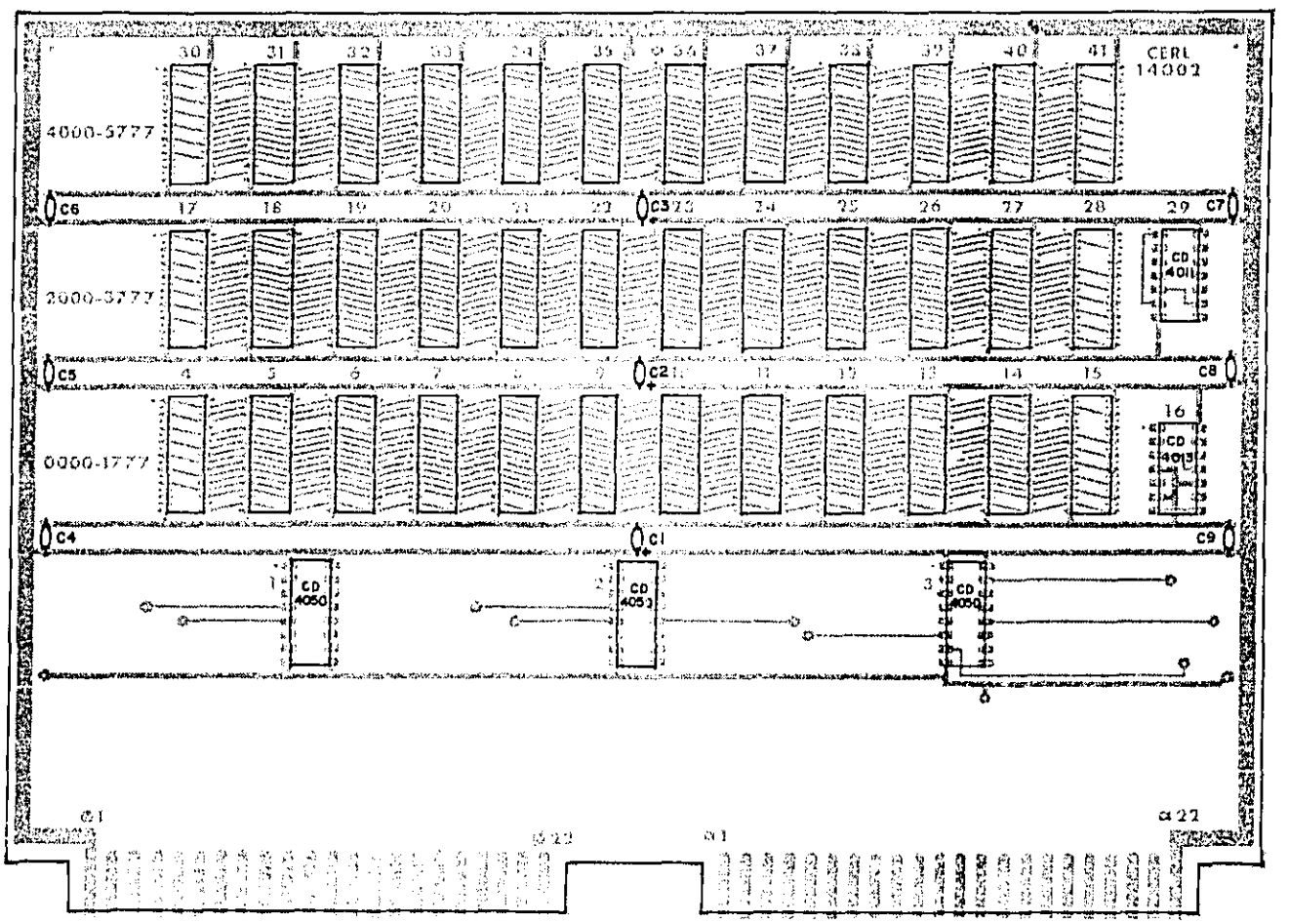
Table 12

Board Number 14002 -- Parts List

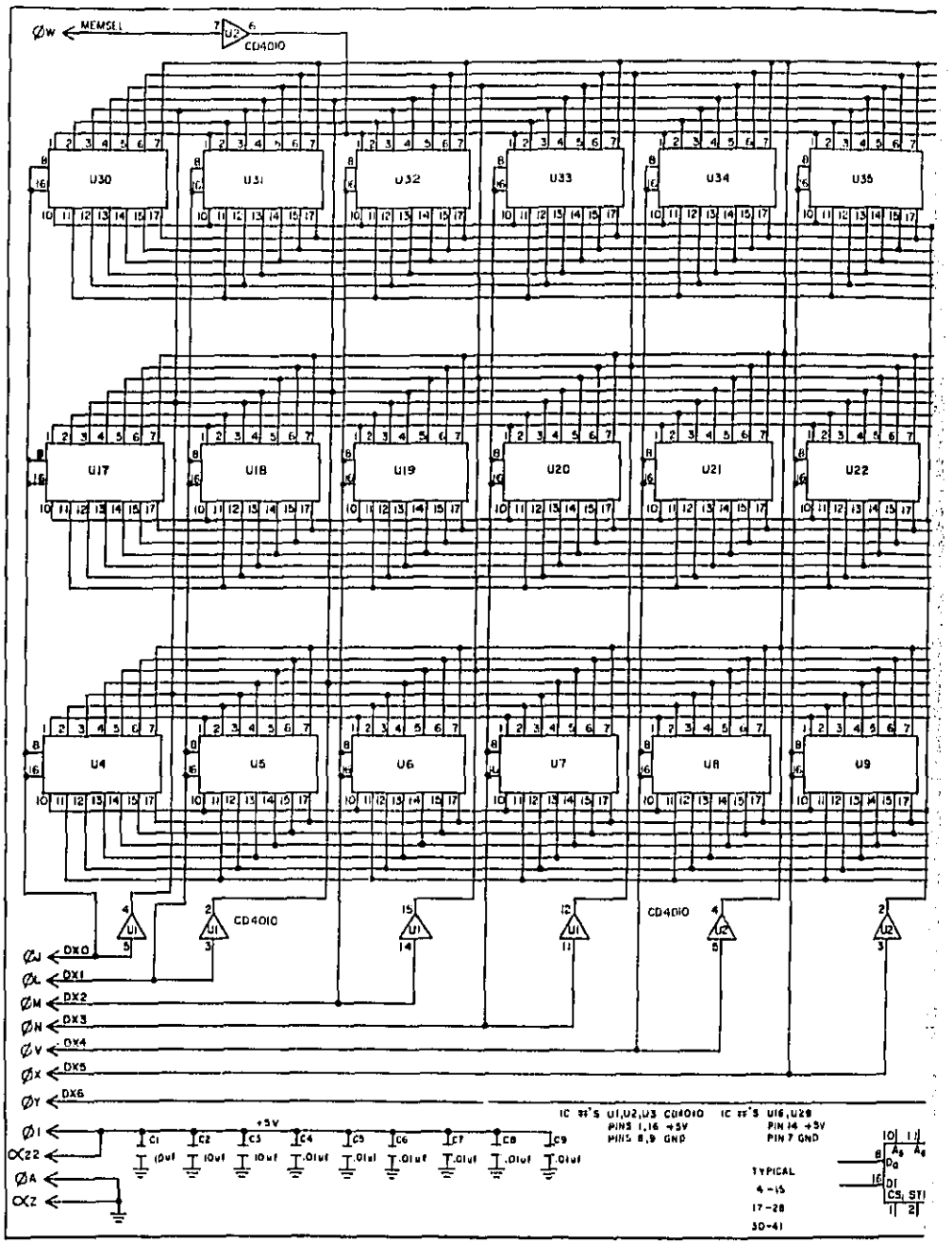
Circuit Diagram Reference	Component Type				
C1, C2, C3	Tantalum	10 uF		35	V
C4, C5, C6, C7, C8, C9	Ceramic	.01 uF	disc	100	V
U1-U3	CD4010				
U4-U15, U17-U28, U30-U41	IM6518IDN				
U16	CD4013				
U29	CD4011				

Note: Board 14002 has only 1U words of memory and has only U4-U15 installed. U17-28 and U30-41 must not be used unless less read only memory is used.

Board Slot 19 has a Board 14002 installed there. It can have 1, 2, or 3 kilo words installed. If less than 3 kilo-words is used, the sockets with the lower U designations should be used first.



NOTE: C1 AND C2 ARE BYPASS CAPACITORS. EACH IS 10uf. U4–U15, U17–U28, U30–U41 ARE ALL IM6518.



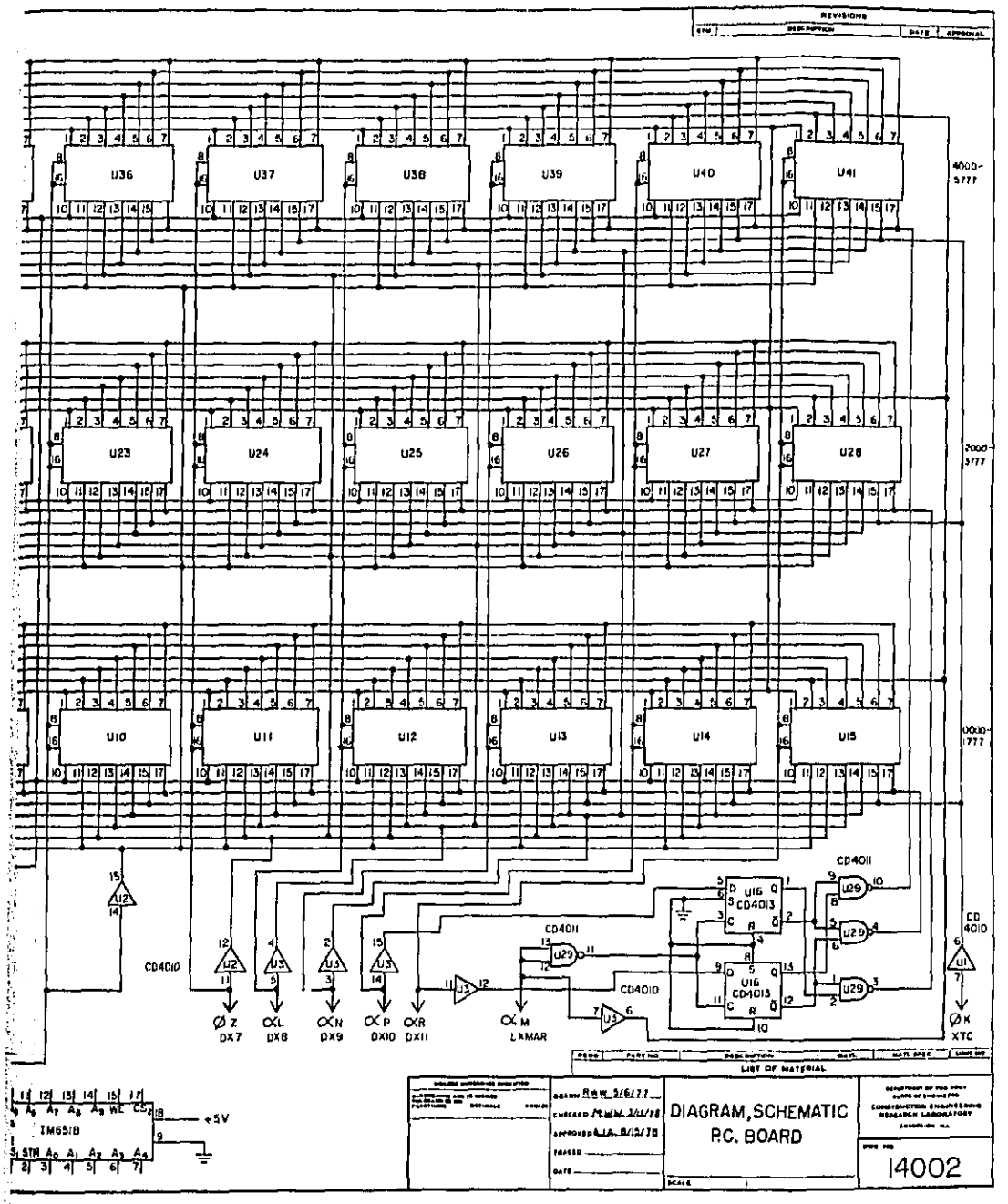
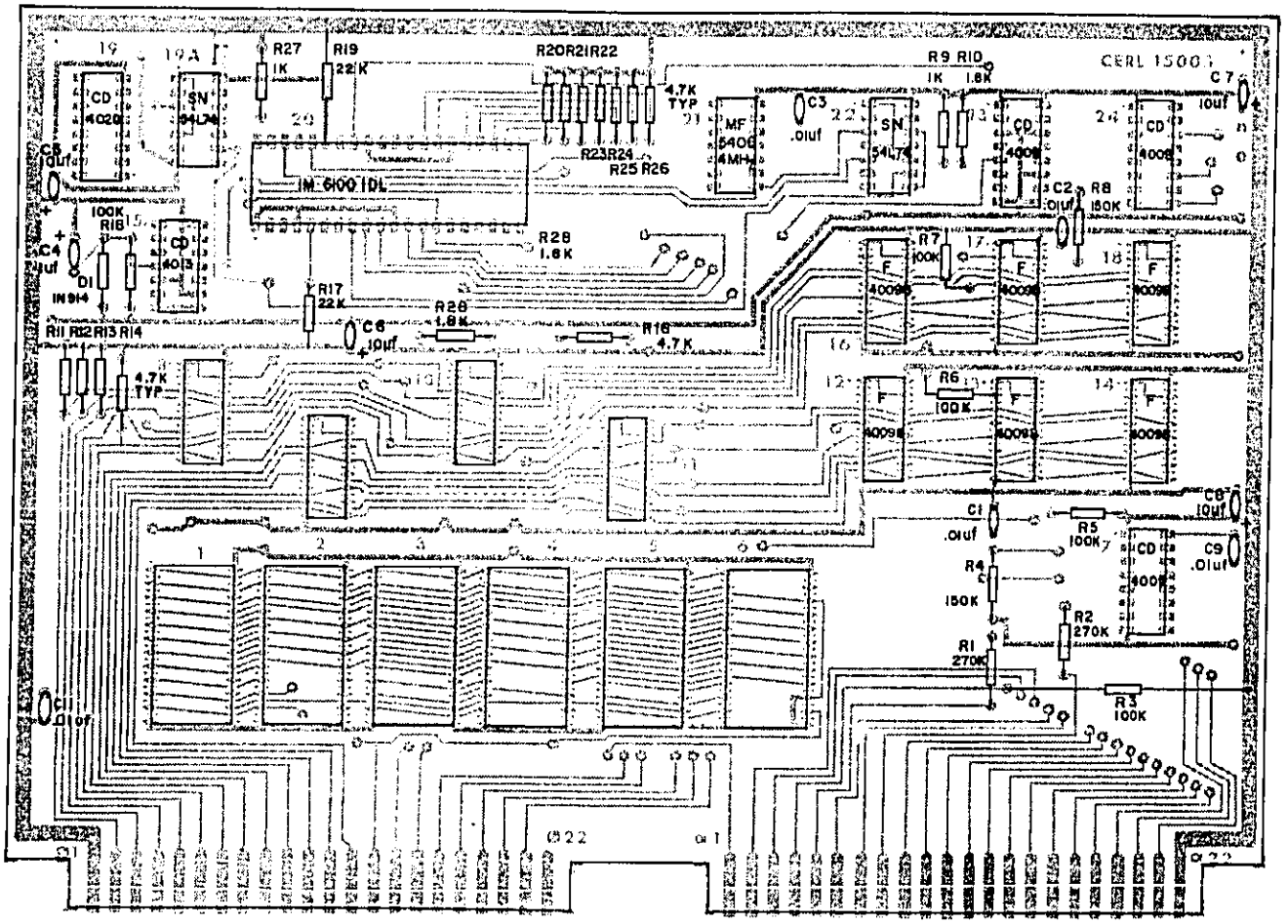


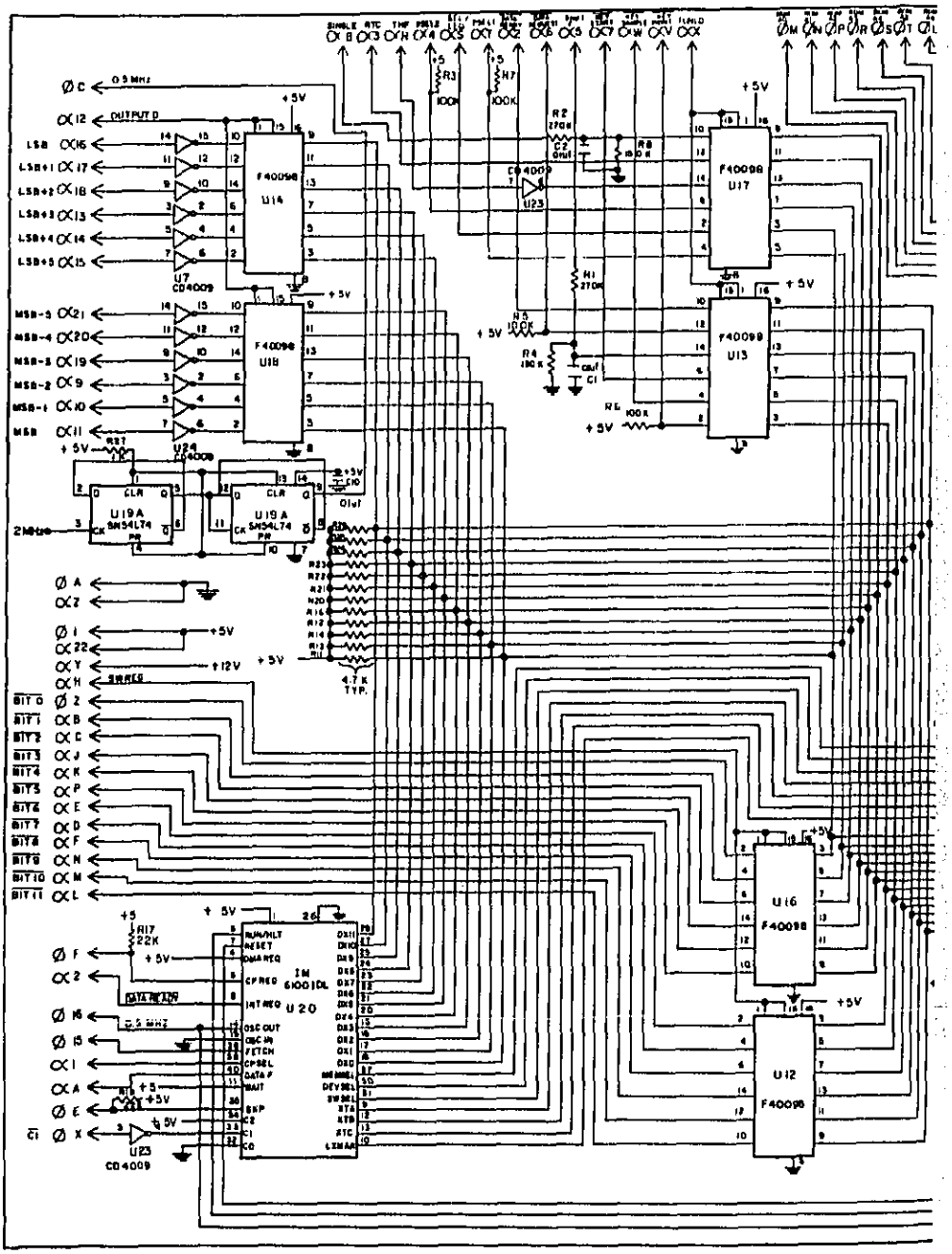
Table 13

Board Number 15003 -- Parts List

Circuit Diagram Reference	Component Type				
R9, R27	Carbon	1/4W	5%	1	K Ω
R10, R15, R28	Carbon	1/4W	5%	1.8	K Ω
R11-R14, R20-R26, R16	Carbon	1/4W	5%	4.7	K Ω
R17, R19	Carbon	1/4W	5%	22	K Ω
R3, R5-R7, R18	Carbon	1/4W	5%	100	K Ω
R4, R8	Carbon	1/4W	5%	150	K Ω
R1, R2	Carbon	1/4W	5%	270	K Ω
C1-C3, C10	Ceramic	.01 uF		100	V
C4	Tantalum	1 uF		35	V
C5-C9	Tantalum	10 uF		35	V
D1-D25	Silicon Diode	1N914B			
U7, U23, U24	CD4009				
U12-U14, U16-U18	F40098				
U15	CD4013				
U19	CD4020				
U19A, U22	SN54L74				
U20	IM6100IDL				
U21	Crystal Oscillator MF5406 4MHZ				



NOTE: C5–C8 ARE BYPASS CAPACITORS. SPACES ARE PROVIDED ON BOARD FOR U1–U6 (11702) AND U8–U11 (40098) BUT ARE NOT NORMALLY USED. DIODES D2–D25 ARE NEEDED ON INPUTS OF 40098 WHEN THEY ARE USED AND ADDED ON BOTTOM SIDE OF BOARD.



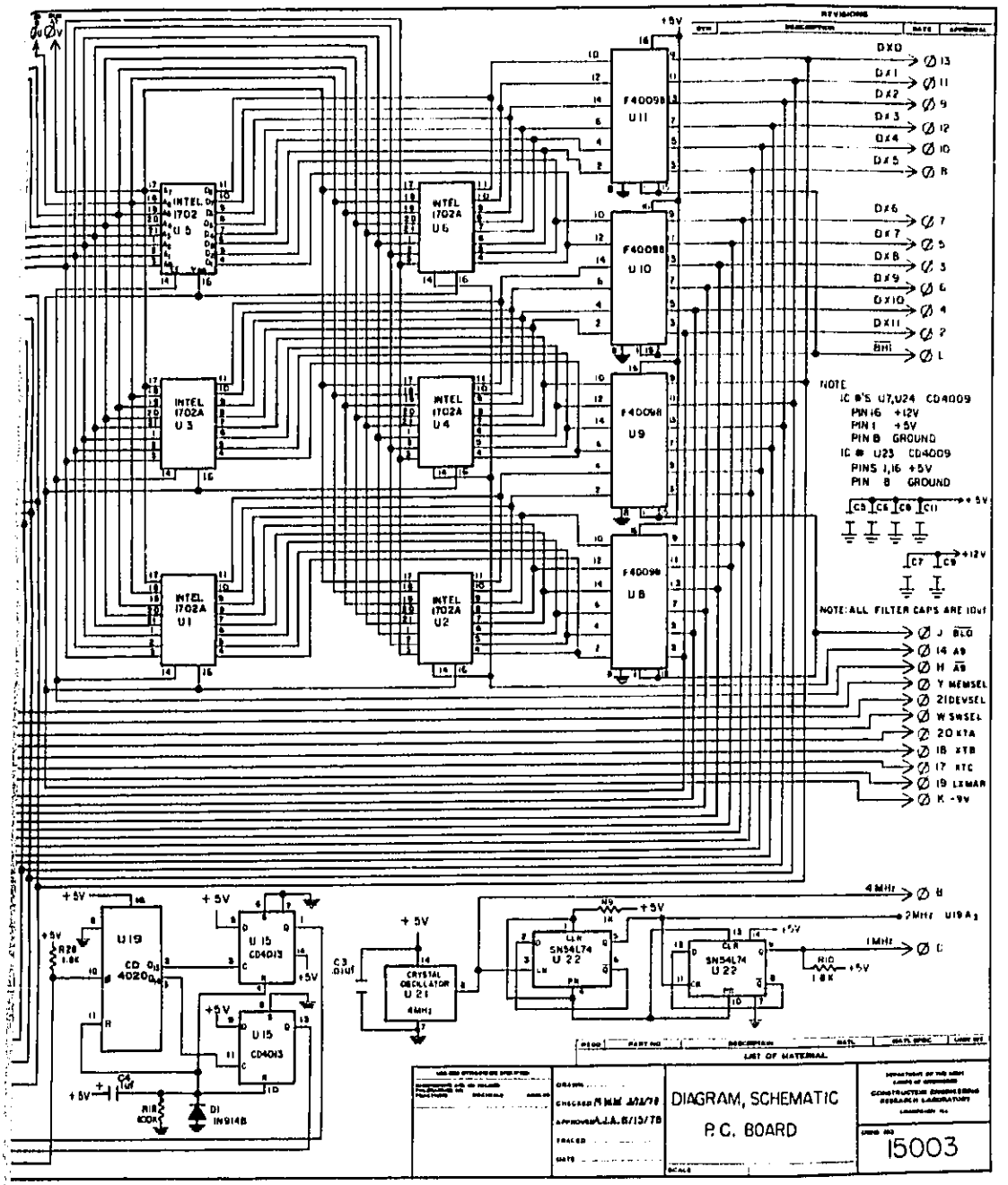
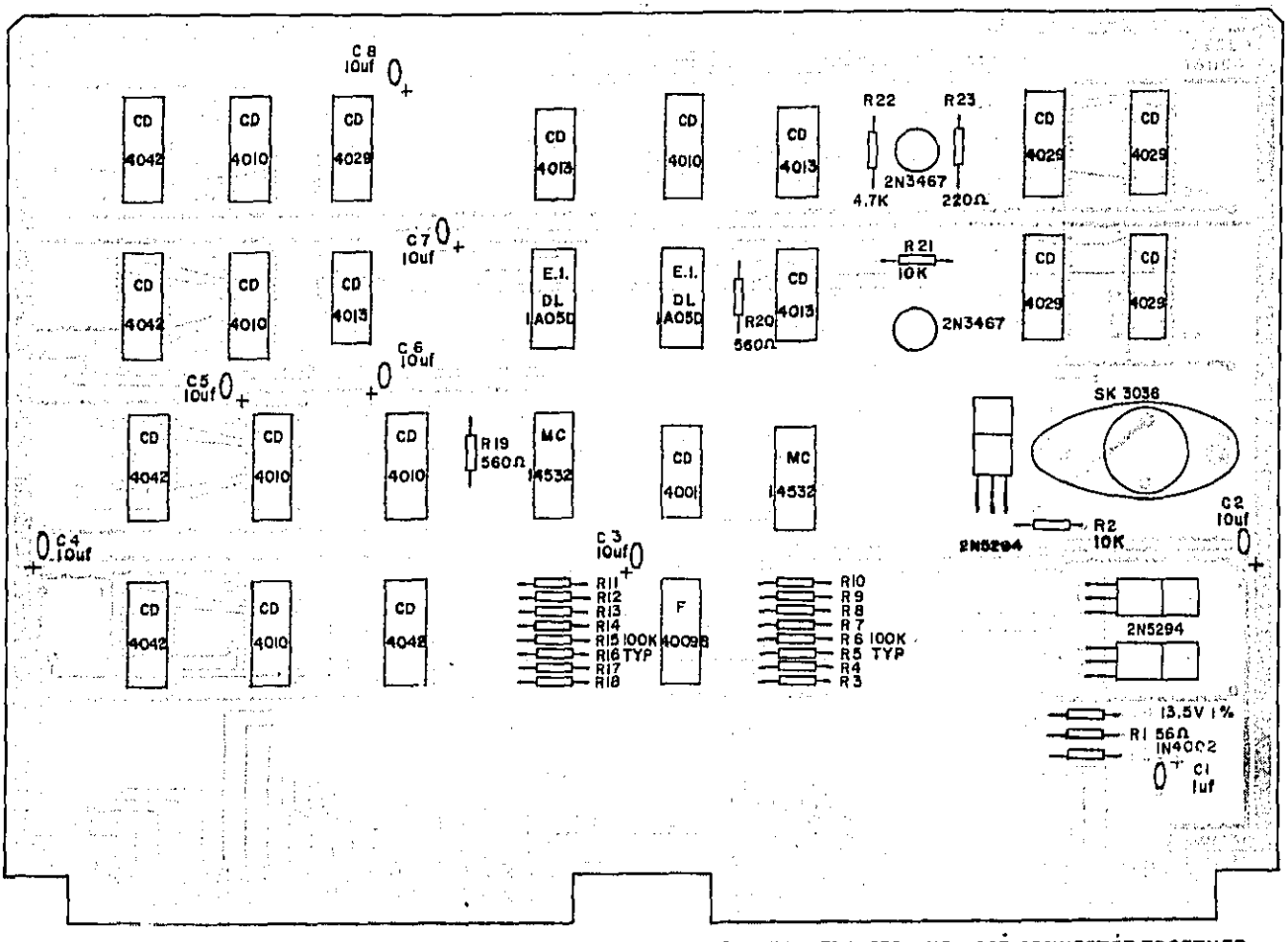


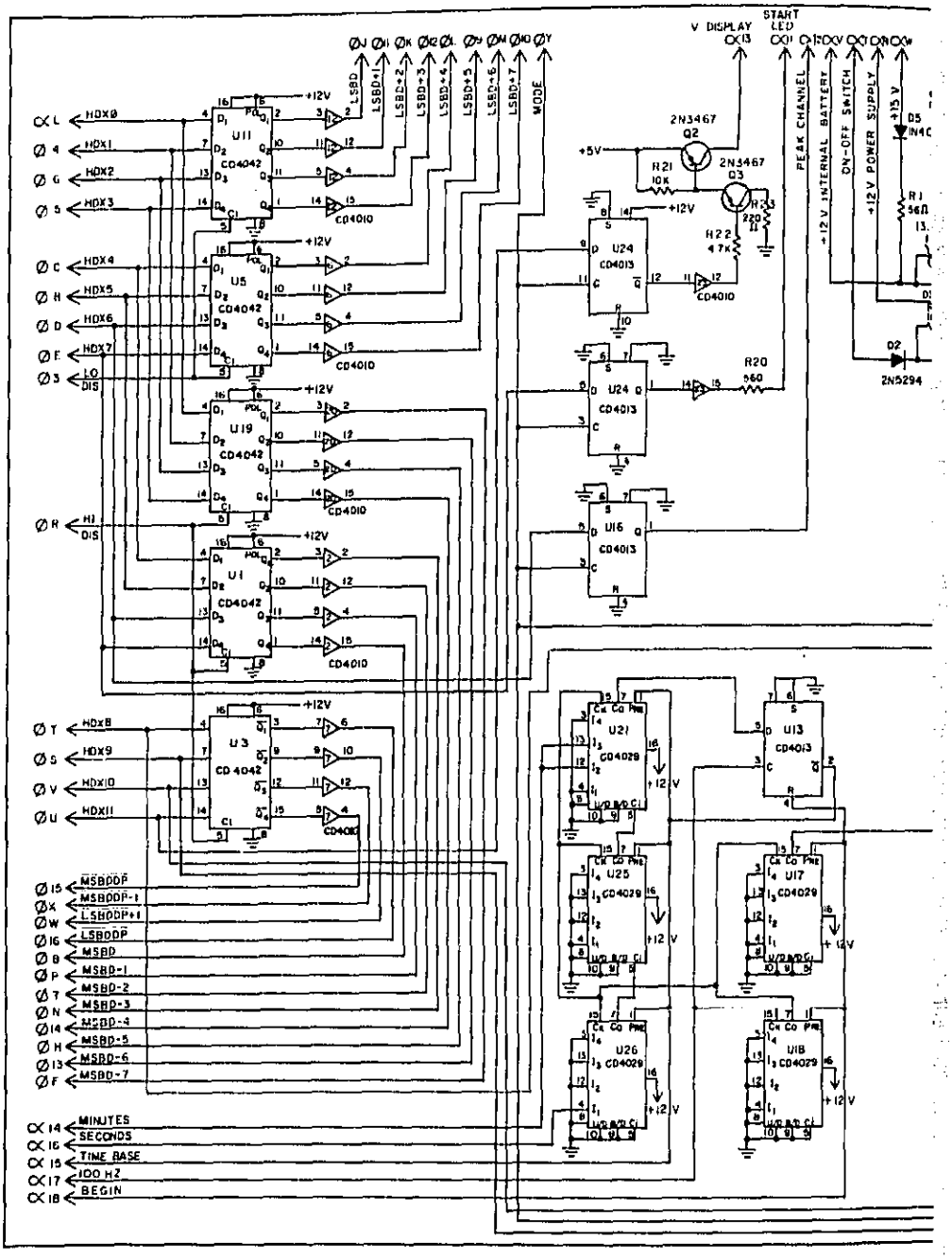
Table 14

Board Number 16004 -- Parts List

Circuit Diagram Reference	Component Type				
R1	Carbon	1/4W	5%	56	Ω
R23	Carbon	1/4W	5%	220	Ω
R19, R20	Carbon	1/4W	5%	560	Ω
R22	Carbon	1/4W	5%	4.7	K Ω
R2, R21	Carbon	1/4W	5%	10	K Ω
R3-R18	Carbon	1/4W	5%	100	K Ω
C1	Tantalum	1 uF		35	V
C2-C8	Tantalum	10 uF		35	V
D1-D3	Silicon Power Trans	NPN	2N5294		
D4	Zener	1/2W	1%	13.5	V
D5	Silicon Diode	IN4002			
Q1	Silicon High Power	NPN	SK3036		
Q2, Q3	Silicon Trans	PNP	2N3467		
U1, U3, U5, U11, U19	CD4042				
U2, U6, U7, U12, U20, U23	CD4010				
U4	F40098				
U8, U10	MC14532				
U9	CD4001				
U13, U16, U22, U24	CD4013				
U14, U15	EI DL 1A05D				
U17, U18, U21, U25, U26	CD4029				



NOTE: C2–C8 ARE BYPASS CAPACITORS. D1–D3 ARE POWER TRANSISTORS WITH EMITTER AND BASE CONNECTED TOGETHER FOR HIGH POWER DIODE.



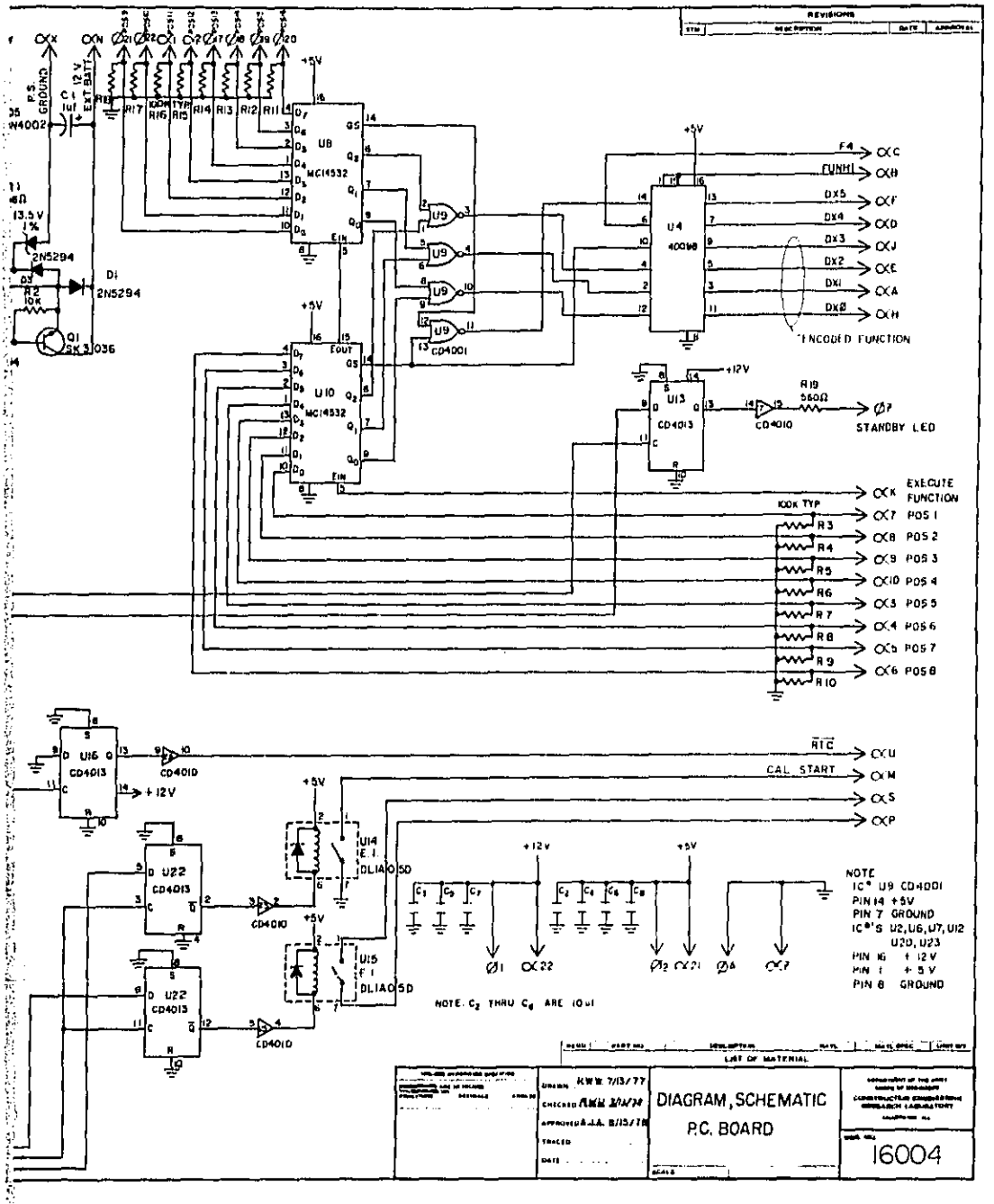
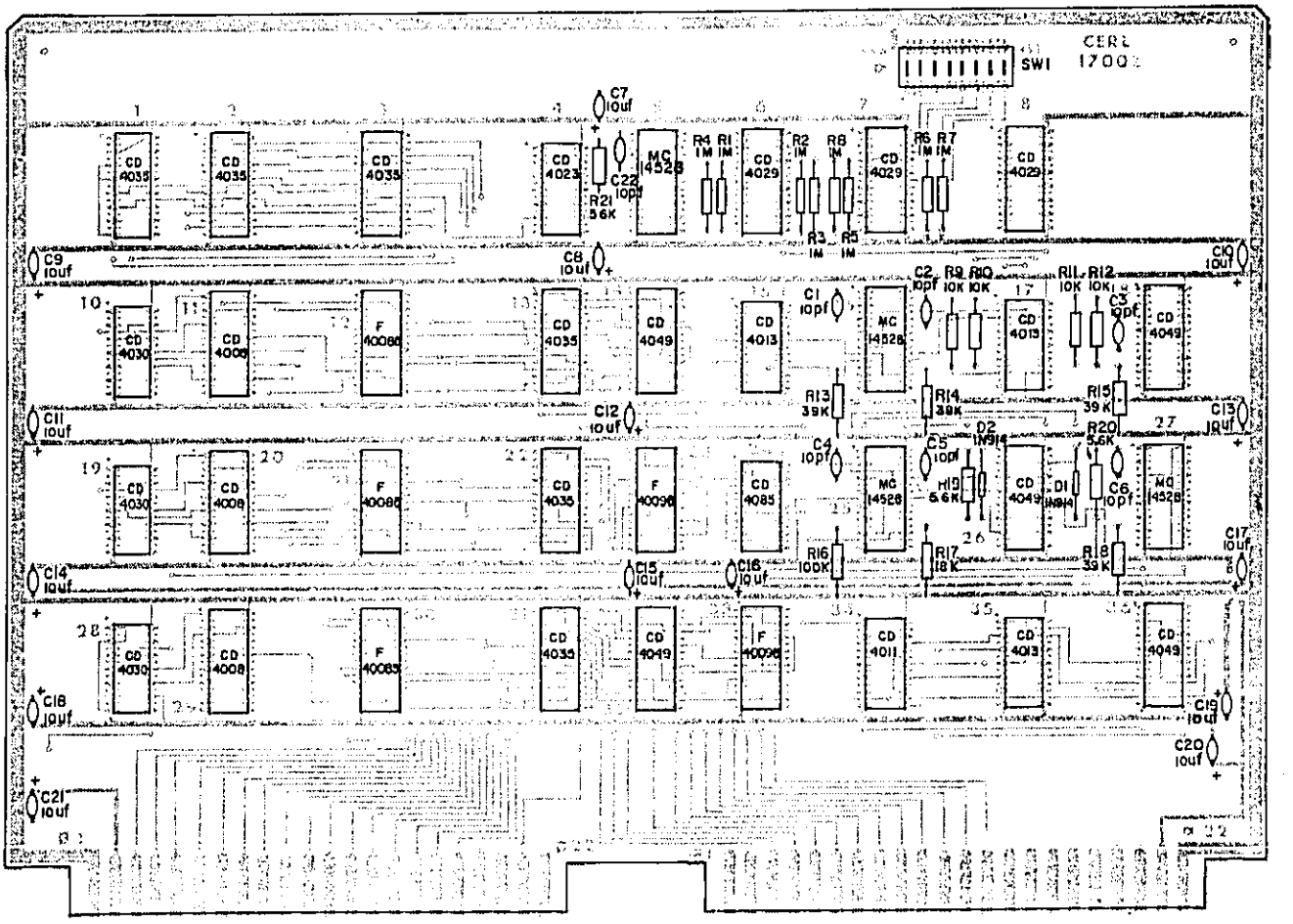


Table 15

Board Number 17002 -- Parts List

Circuit Diagram Reference	Component Type			
R19, R20	Carbon	1/4W	5%	5.6 K Ω
R9-R12	Carbon	1/4W	5%	10 K Ω
R17	Carbon	1/4W	5%	18 K Ω
R13-R15, R18	Carbon	1/4W	5%	39 K Ω
R16	Carbon	1/4W	5%	100 K Ω
R1-R8	Carbon	1/4W	5%	1 M Ω
C1-C6	Mica	10 pF		500 V
C7-C21	Tantalum	10 uF		35 V
D1, D2	Silicon	IN914B		
U1-U3, U13, U22, U31	CD4035			
U4	CD4023			
U6-U8	CD4029			
U10, U19, U28	CD4030			
U11, U20, U29	CD4008			
U12, U21, U30	F40085			
U14, U18, U26, U32, U36	CD4049			
U15, U17, U35	CD4013			
U16, U25, U27	MC14528			
U23, U33	F40098			
U24	CD4085			
U34	CD4011			
U9 (SW1)	Dipswitch 8 Station SPST			



NOTE: C7–C21 ARE BYPASS CAPACITORS, EACH CAPACITOR IS 10uf.

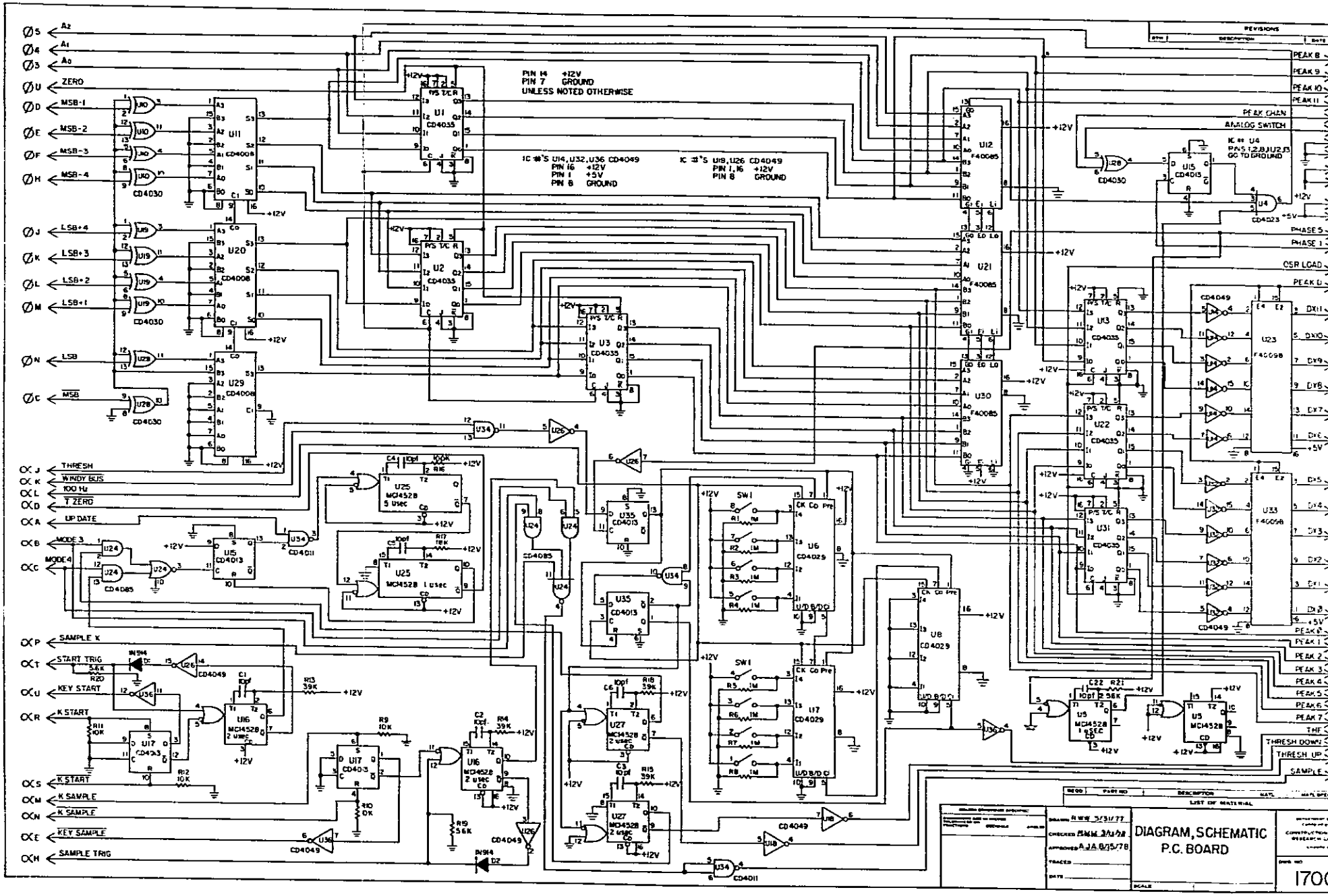

DIAGRAM, SCHEMATIC
P.C. BOARD
1700
PEAK 8
PEAK 9
PEAK 10
PEAK 11
PEAK CHAN
ANALOG SWITCH
PHASE 5
PHASE 1
OSR LOAD
PEAK 0
THRESH DOWN
THRESH UP
SAMPLE
PIN 14 +12V
PIN 7 GROUND
UNLESS NOTED OTHERWISE
IC #'S U14,U32,U36 CD4049
PIN 16 +12V
PIN 1 +5V
PIN 8 GROUND
IC #'S U18,U26 CD4049
PIN 1,16 +12V
PIN 8 GROUND
IC # U4
PINS 1,2,8,U12,13
GO TO GROUND
ØS
Ø4
Ø3
ØU
ØD
ØE
ØF
ØH
ØJ
ØK
ØL
ØM
ØN
ØC
ØA
ØB
ØP
ØT
ØU
ØR
ØS
ØM
ØN
ØE
ØH
A2
A1
A0
ZERO
MSB-1
MSB-2
MSB-3
MSB-4
LSB+4
LSB+3
LSB+2
LSB+1
LSB
MSB
THRESH
WINDY BUS
100 Hz
T ZERO
UP DATE
MODE 3
MODE 4
SAMPLE K
START TRIG
KEY START
K START
K SAMPLE
K SAMPLE
KEY SAMPLE
SAMPLE TRIG
+12V
+5V
CD4030
CD4008
CD4035
CD4049
CD4011
CD4085
CD4013
CD4029
CD4023
F40085
F40098
MC14528
U1
U2
U3
U4
U5
U6
U8
U11
U12
U20
U21
U22
U23
U29
U30
U31
U33
U35
U36
SW1
DIAGRAM, SCHEMATIC
P.C. BOARD
1700

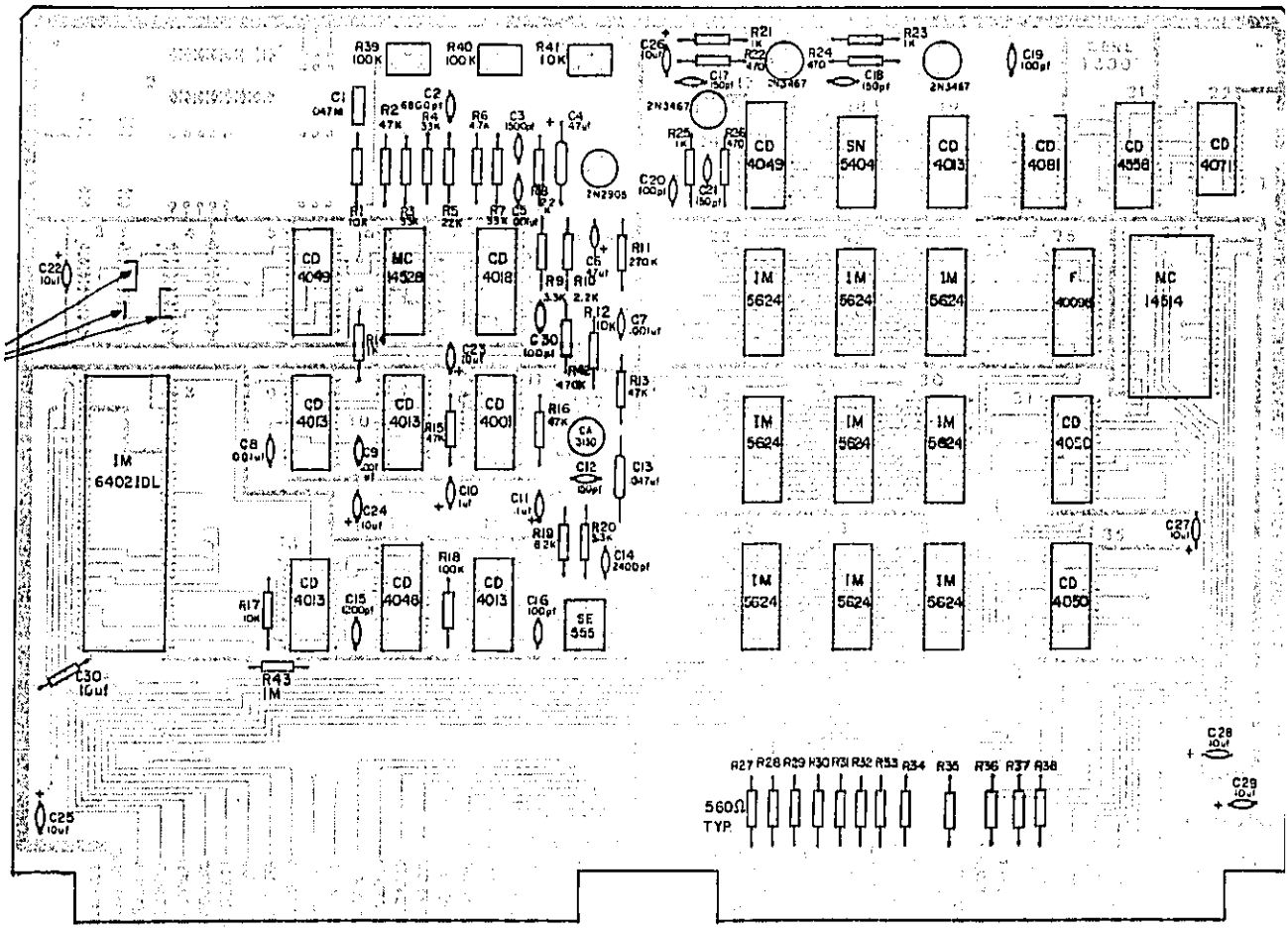
Table 16

Board Number 18002 -- Parts List

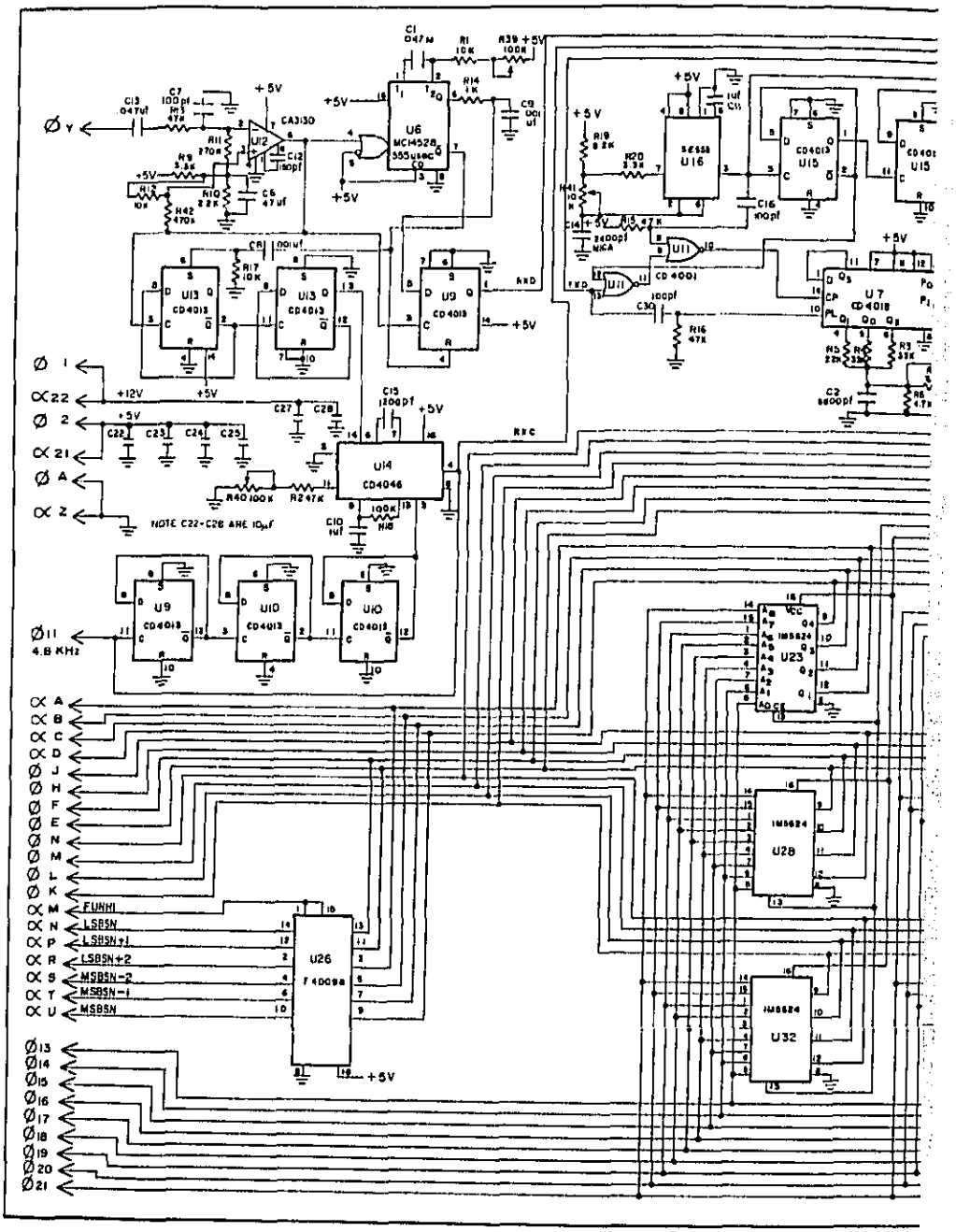
Circuit Diagram Reference	Component Type				
R22, R24, R26	Carbon	1/4W	5%	470	Ω
R27-R38	Carbon	1/4W	5%	560	Ω
R14, R21, R23, R25	Carbon	1/4W	5%	1	K Ω
R8, R10	Carbon	1/4W	5%	2.2	K Ω
R9, R20	Carbon	1/4W	5%	3.3	K Ω
R6	Carbon	1/4W	5%	4.7	K Ω
R19	Carbon	1/4W	5%	8.2	K Ω
R1, R12, R17	Carbon	1/4W	5%	10	K Ω
R5	Carbon	1/4W	5%	22	K Ω
R3, R4, R7	Carbon	1/4W	5%	33	K Ω
R2, R13, R15, R16	Carbon	1/4W	5%	47	K Ω
R18	Carbon	1/4W	5%	100	K Ω
R11	Carbon	1/4W	5%	270	K Ω
R42	Carbon	1/4W	5%	470	K Ω
R43	Carbon	1/4W	5%	1	M Ω
R41	Trimmer	Cermet		10	K Ω
R39, R40	Carbon	1/4W	5%	100	K Ω
C16, C19, C20, C30	Ceramic	100 pF		1	K V
C12, C17, C18, C21	Ceramic	150 pF		1	K V
C1	Mylar	.047 uF		100	V
C5, C7, C8, C9	Mylar	.001 uF		100	V
C15	Ceramic	1200 pF		1	K V
C3	Ceramic	1500 pF		1	K V
C14	Mica	2400 pF		500	V
C2	Ceramic	6800 pF		1	K V
C13	Ceramic	.047 uF		50	V
C11	Tantalum	.1 uF		35	V
C4	Tantalum	.47 uF		35	V
C10, C30	Tantalum	1 uF		35	V
C22-C29	Tantalum	10 uF		35	V
C6	Tantalum	47 uF		35	V
Q1	Silicon	PNP	2N2905		
Q2-Q4	Silicon	PNP	2N3467		
U5, U17	CD4009				
U6	MC14528				
U7	CD4018				
U8	IM6402IDL				
U9, U10, U13, U15, U19	CD4013				

Table 16 (Cont'd)

Circuit Diagram Reference	Component Type	
U11	CD4001	
U12	CA3130AT	
U14	CD4046	
U16	SE555C	Timer
U18	SN5404	
U20	CD4081	
U21	CD4556	
U22	CD4071	
U23-U25, U28-U30, U32-U34	IM5624	
U26, U31, U35	F40098	
U27	MC14514	



NOTE: C22–C29 ARE BYPASS CAPACITORS.



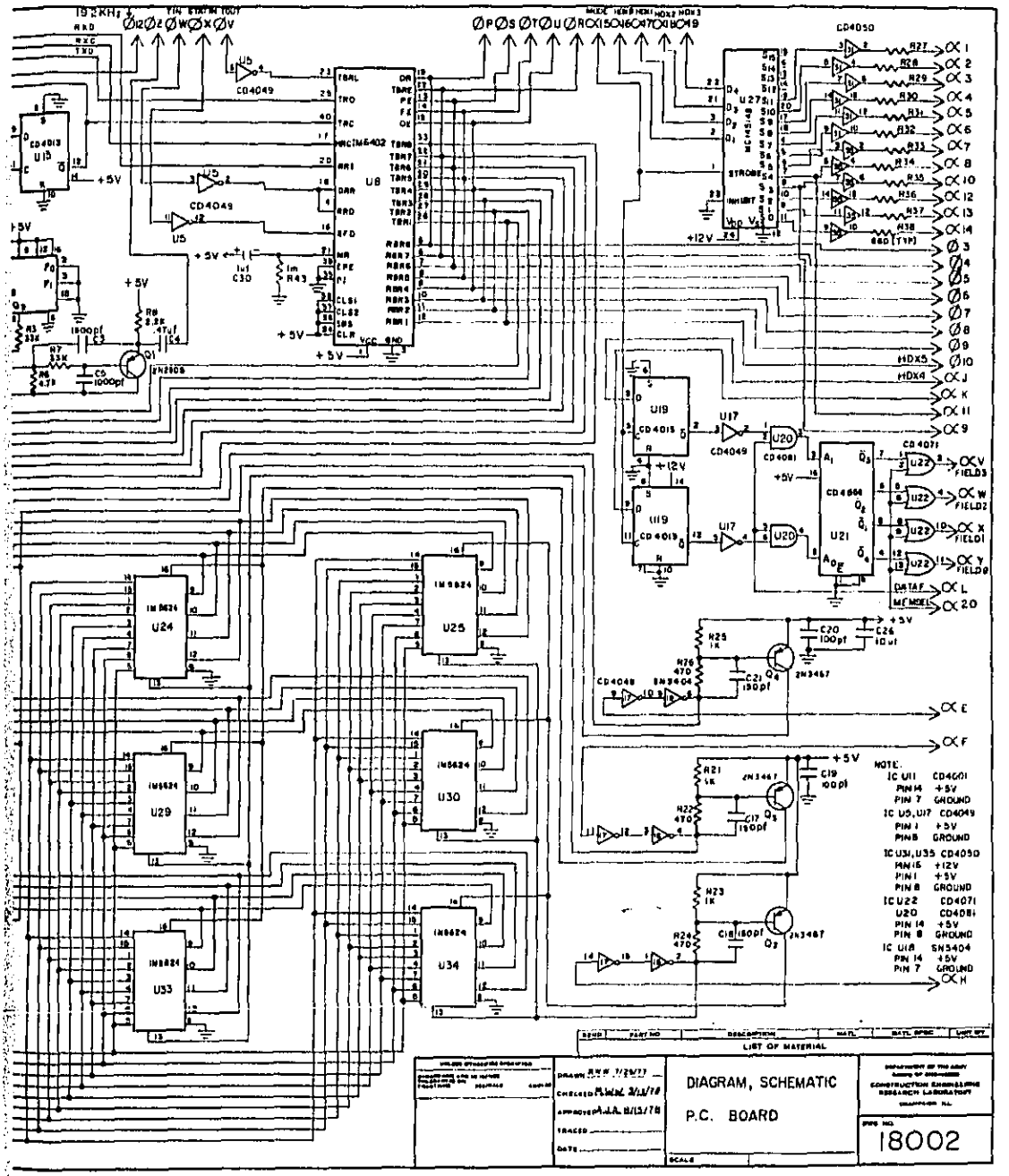
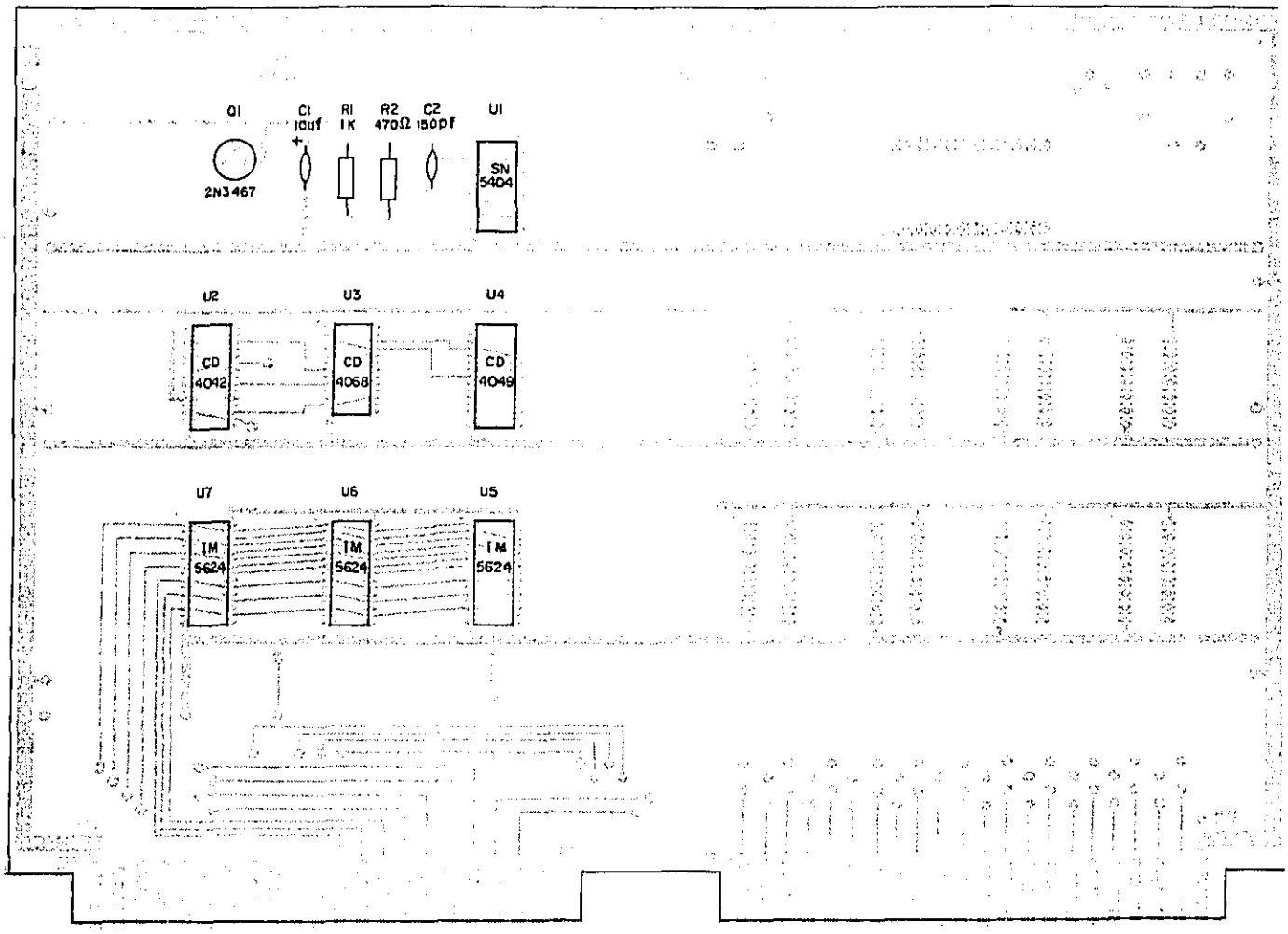
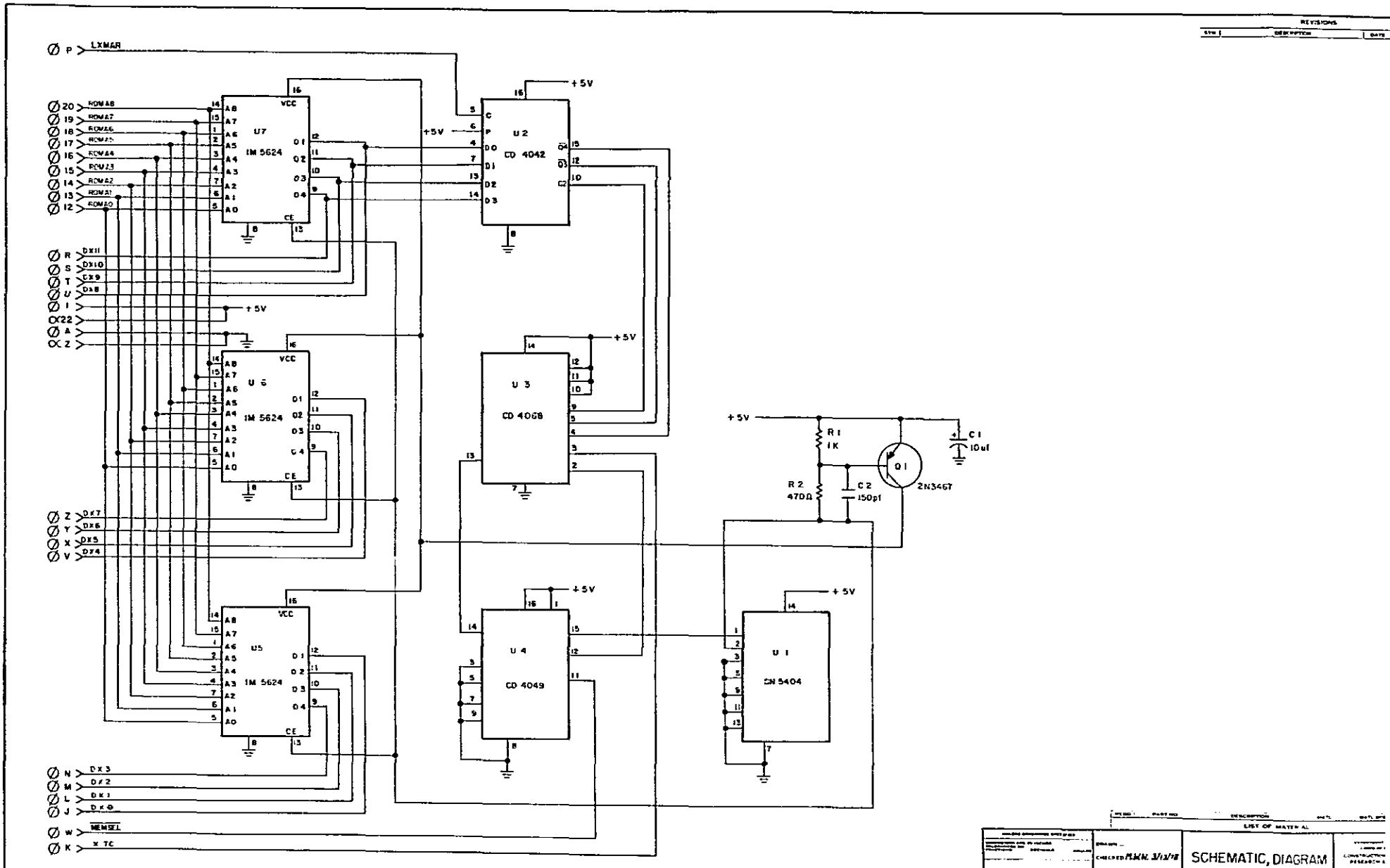


Table 17

Board Number 20001 -- Parts List

Circuit Diagram Reference	Component Type				
R2	Carbon	1/4W	5%	470	Ω
R1	Carbon	1/4W	5%	1	K Ω
C2	Ceramic	150 pF		1	K V
C1, C3-C5	Tantalum	10 uF		35	V
Q1	Silicon	PNP	2N3467		
U1	SN5404				
U2	CD4042				
U3	CD4068				
U4	CD4049				
U5-U7	IM5624				


Q1
2N3467
C1
10uf
R1
1K
R2
470Ω
C2
150pf
U1
SN
5404
U2
CD
4042
U3
CD
4068
U4
CD
4049
U7
TM
5624
U6
TM
5624
U5
TM
5624



REVISIONS

LIST OF MATERIAL

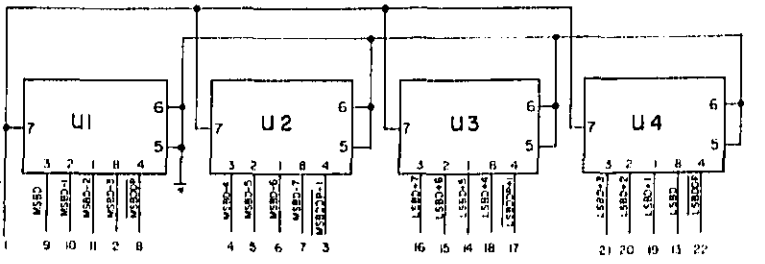
SCHEMATIC, DIAGRAM
P.C. BOARD

200

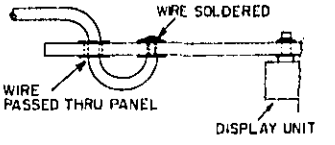
Table 18

Board Number 21001 -- Parts List

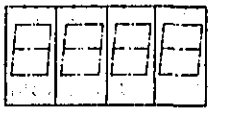
Circuit Diagram Reference	Component Type
U1-U4	HP5082-7300



SCHEMATIC DIAGRAM



DETAIL A



HP5082-7300
NUMERIC INDICATOR (4)

PARTS LAYOUT

LIST OF MATERIAL

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TRACED
DATE

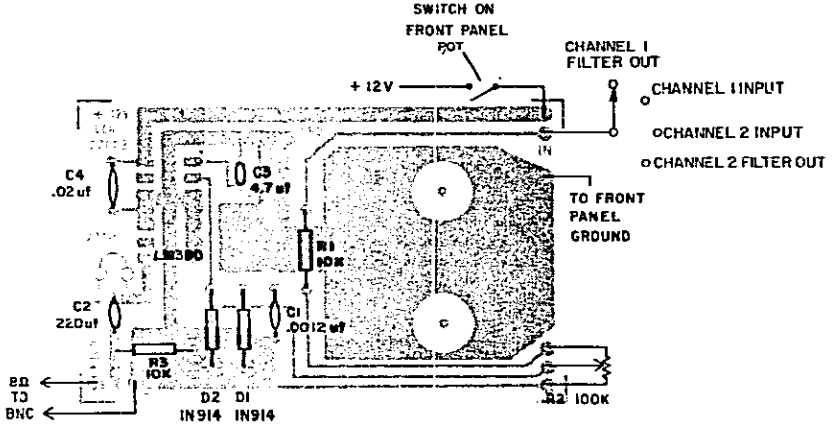
DISPLAY BOARD

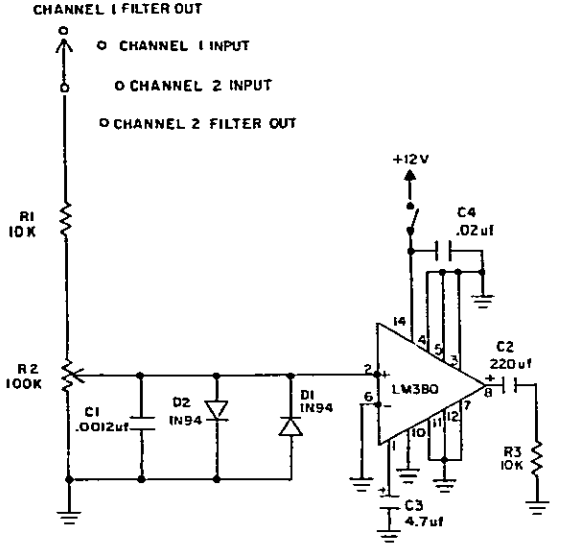
2100

Table 19

Board Number 22002 -- Parts List

Circuit Diagram Reference	Component Type			
R1, R3	Carbon	1/4W	5%	10 K Ω
R2	Carbon Potentiometer with Switch		1W	100 K Ω
C1	Ceramic	1.2nf		100 V
C4	Ceramic	20 nf		100 V
C3	Tantalum	4.7μf		35 V
C2	Aluminum	220 μf		25 V
D1, D2	Silicon Diode		IN914B	
U1	LM380N			





REQD	PART NO.	DESCRIPTION	MATL	MATL SPEC	UNIT WT

LIST OF MATERIAL

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TOLERANCES ON FRACTIONS DECIMALS ANGLES

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HEADPHONE AMPLIFIER

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CHAMPAIGN, ILL.

DWG. NO.
22002

7 CABLES AND CONNECTORS WIRING LISTS

The following are lists of wiring between the chassis and all connectors on the chassis and the wiring from connectors on the chassis to the side connectors. If a specific device is to be connected to one of the side connectors (for example, the monitor is designed so that a data printer can be connected to the output side connector), then the wiring is also given from the side connector to the device.

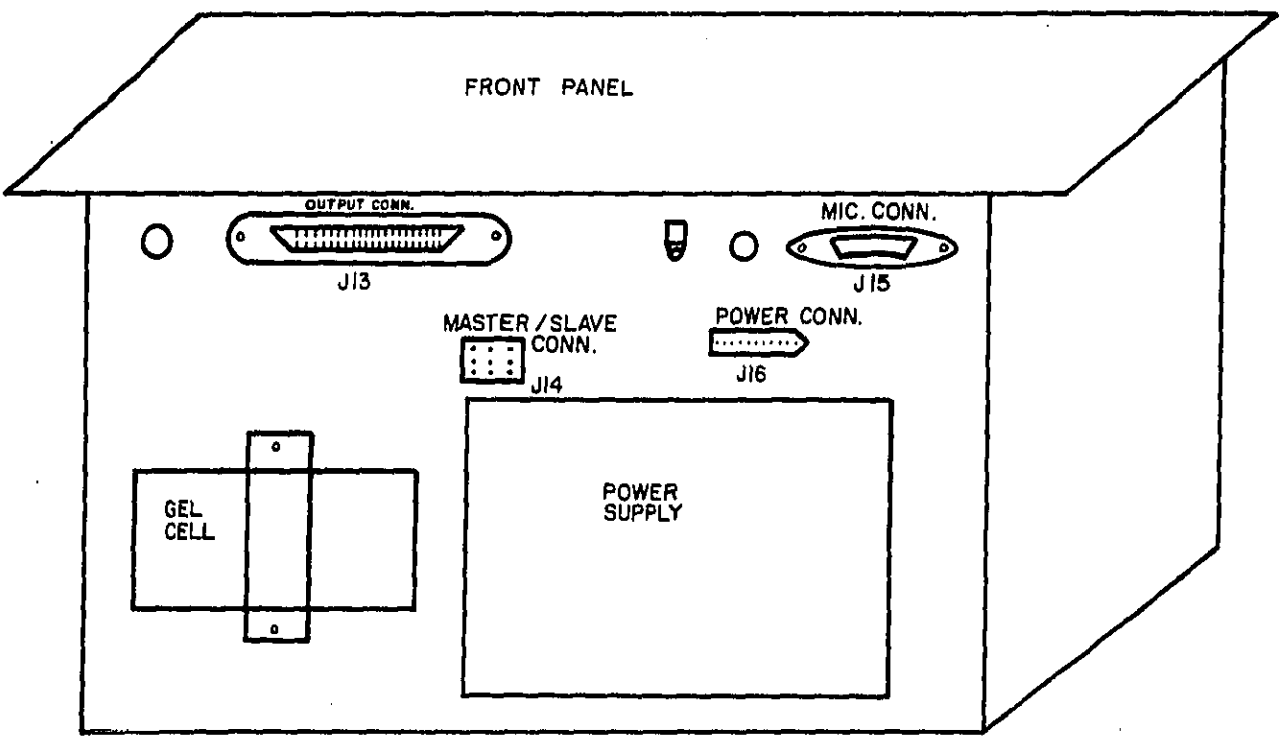

Figure 2. Layout of chassis connectors.

Table 20

Chassis to Side Connector Output

Monitor Signal Name	Chassis Connection	50 Pin Output Connector J13	Cable Color Code 52 Wire	48 Pin Side Conn. J17
PIO 36	12αE	31	WH/RED & ORG	A
PIO 35	12α6	33	ORG/WH & BLUE	B
PIO 34	12αF	6	BLUE/WH & ORG	C
PIO 33	12α5	44	GRN/WH & BLK	D
PIO 32	12αD	21	ORG/BLK & WH	E
PIO 31	12αK	10	WH/RED & BLUE	F
PIO 30	12α7	30	BLK/WH & GRN	G
PIO 29	12α2	16	BLUE/BLK	H
PIO 28	12α4	35	BLK/RED	J
PIO 27	12αJ	1	GRN	K
PIO 26	12α3	25	BLUE/WH & BLK	L
PIO 25	12αH	5	WH/BLK & GRN	M
PIO 24	12αM	49	RED/WH & BLUE	N
PIO 23	12α13	42	RED/BLK & GRN	P
PIO 22	12αN	40	GRN/BLK & ORG	Q
PIO 21	12α12	46	ORG/BLK	R
PIO 20	12αL	18	BLK	S
PIO 19	12αS	27	BLK/GRN & RED	T
PIO 18	12α14	22	RED/WH	U
PIO 17	12α9	7	GRN/WH & BLUE	V
PIO 16	12α11	20	WH/GRN & RED	W
PIO 15	12αR	2	WH/BLK & RED	X
PIO 14	12α10	4	RED/WH & BLK	Y
PIO 13	12αP	9	GRN/BLK	Z
PIO 12	12αU	43	RED	a
PIO 11	12α20	23	WH	b
PIO 10	12αV	12	ORG	c
PIO 9	12α19	14	GRN/WH	d
PIO 8	12αT	3	BLUE/RED & ORG	e
PIO 7	12αY	38	BLK/ORG & RED	f
PIO 6	12α21	11	ORG/GRN	g
PIO 5	12α16	39	BLK/WH & RED	h
PIO 4	12α18	24	RED/BLK	j
PIO 3	12αX	45	BLUE	k
PIO 2	12α17	13	BLUE/WH	l
PIO 1	12αW	34	RED/GRN	m
$\overline{\text{PRINT}}$	11αN	36	SHIELDED WIRE	z
$\overline{\text{DATA REQUEST}}$	15α6	15	ORG/BLUE & RED	t
LOGIC GND	P.S. DIG GND	41	GRN/RED & ORG	u

Table 20 (Cont'd)

Monitor Signal Name	Chassis Connection	50 Pin Output Connector J13	Cable Color Code 52 Wire	48 Pin Side Conn. J17
LOGIC GND	P.S. DIG GND	37	ORG/RED	v
LOGIC GND	P.S. DIG GND	17	BLK/WH & BLUE	w
+5 V	P.S. +5V	26	WH/BLK & BLUE	x
KEY PRINT	15αV	19	BLUE/RED	n
WINDY W	11α17	50	BLUE/RED & GRN	p
SHIELD	P.S. DIG GND	28	SHIELD	y
CHASSIS DIG GND	P.S. DIG GND	32	WH/RED	q
PSEL 2	15α 4	47	WH/BLK	r
PSEL 1	15α T	8	ORG/BLK & GRN	s
		48	ORG/GRN & RED	
		29	BLK/WH & ORG	

Table 21

Monitor Chassis to B&K 4921

Microphone 1

Monitor Signal Name	Monitor Connection	14 Pin Mic Conn. J15	Wire Type	Mic. 1 Monitor Side Conn. J19	Cable Color Code (Shielded)	B&K 4921 Connector	B&K 4921 Signal Name
CHASSIS	CHASSIS DIGITAL GROUND	10	BLK 24 GAUGE	J	WH/YEL	3	CASE GROUND
GROUND P.S.	P.S. DIGITAL GND	9	BLK 24 Gauge	A	WH/BLK	7	GROUND
ANALOG INPUT SEL. GND	1φ4	8	SHIELD	B	(SHIELD OF WH/BLK, SHIELD OF WH/RED)	7	GROUND
ANALOG INPUT SEL.	1φD	1	SHIELDED WIRE	C	WH/RED	8	SIGNAL OUTPUT
+12 V	P.S. +12 V	3	RED 24 GAUGE	N	RED	(9, 16)	+EXT. BATT. HEATER
GROUND P.S.	P.S. DIGITAL GND	9	BLK 24 GAUGE	M	BLK	10	-EXT. BATT.
MIC CAL RELAY	16 = M	2	STRANDED GRN 24 GAUGE	D	WH/GRN	11	CAL. START
					FROM PIN 10 THRU 47 Ω	15	HEATER
WIND METER SW TO 18 K Ω	F.P. SW24	4	STRANDED YELLOW 24 GAUGE	H	WH	17	WIND DETECTOR
WIND METER SW TO 587 Ω	F.P. SW24	11	STRANDED	L	GRN	18	WIND DETECTOR

Table 21 (Cont'd)

MICROPHONE 2

Monitor Signal Name	Monitor Connection	14 Pin Mic Conn. J15	Wire Type	Mic. 2 Monitor Side Conn. J20	Cable Color Code (Shielded)	B&K 4921 Connector	B&K 4921 Signal Name
CHASSIS	CHASSIS DIGITAL GND	12	BLK 24 GAUGE	J	WH/YEL	3	CASE GROUND
GROUND P.S.	P.S. DIGITAL GROUND	13	BLK 24 GAUGE	A	WH/BLK	7	GROUND
ANALOG INPUT SEL. SND	1 α 4	14	SHIELD	B	{SHIELD OF WH/BLK, SHIELD OF WH/RED}	7	GROUND
ANALOG INPUT SEL.	1 α D	7	SHIELDED WIRE	C	WH/RED	8	SIGNAL OUTPUT
+12 V	P.S. +12 V	5	RED 24 GAUGE	N	RED	{9, 16}	+EXT. BATT. HEATER
GROUND P.S.	P.S. DIGITAL GROUND	13	BLK 24 GAUGE	M	BLK	10	-EXT. BATT.
MIC CAL RELAY	16 α M	6	STRANDED GRN 24 GAUGE	D	WH/GRN	11	CAL. START
WIND METER SW TO 18 K Ω	F.P. SW 24	J19 PIN H		H	WH	17	WIND DETECTOR
WIND METER SW TO 587 Ω	F.P. SW 24	J19 PIN L		L	GRN	18	WIND DETECTOR
					FROM PIN 10 THRU 47 Ω	15	HEATER

Table 22

Monitor to Master/Slave Connector

Monitor Connection	9 Pin Molex Connector J14	Cable Color Code	Monitor Side Connector J21	Monitor Signal Name Slave/Master
F.P. SW22 LEFT SIDE	7	WH	A	START/THRESH-UP
F.P. SW22 RIGHT SIDE	8	YEL	B	SAMPLE/THRESH-DOWN
	3	RED	C	
17 α K	2	ORG	D	$\overline{\text{WINDY BUS}}$
	1	BLUE	E	
	5	BROWN	F	
GROUND	4	BLK	H	GROUND
	6	GRN	J	

Table 23

Power Connectors: Chassis to Side Connector

Power Supply Connection (See Diagram)	5 Pin Chassis Power Connector J16	5 Pin Side Connector J18
+12 V	1	D
+12 V Ground	2	C
120 V AC Hot	3	E
120 V AC Cold	4	A
3RD Wire Ground	5	B

Table 24

Mini Sample Tape Control Connector

Pin	Signal	Wire to
1	Windy Bus	9 α 21
2	Ground	Digital Ground
3		
4	Tape Motor Hi	180C
5	Tape Motor Lo	180D
6		
7	+5	+5 volts

Schomer, Paul D
True-integrating environmental noise monitor and sound exposure level meter / by P. D. Schomer, A. J. Averbuch, M. W. Weisberg. -- Champaign, Ill. : Construction Engineering Research Laboratory ; Springfield, Va : available from National Technical Information Service , 1978 - 79.
2v. : ill. ; 27 cm. (Technical report - Construction Engineering Research Laboratory ; N-41)

1. Noise-measurement. I. Averbuch, Aaron J. II. Weisberg, M. W. III. Title. IV. Series: U.S. Construction Engineering Research Laboratory. Technical report ; N-41.

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