AD-4324

WEIGHING INDICATOR

MAINTENANCE MANUAL

Maintenance-AD-4324-v.1.b 91.10.23 OGA

CHECK WEIGHING INDICATOR

A&D Company, Limited

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Outline

The AD-4324(AD-4942) is an exclusive indicator for the check weighing. High-speed A/D conversion is enabled by the same hardware and software as those for the AD-4323 with 70 sampling times per second and resolution of 1/10,000. It has been provided with six types of comparators as standard, to fit various applications.

Calibration and function data are stored in an EEPROM, and various set values such as upper and lower limit values, etc. are stored in CMOS RAM backed up by batteries.

The A/D board, OP-01 board, and OP-04 board are the same as those for the AD-4323. A watchdog timer is provided to prevent the CPU from crashing.

Theory of Operation

1.Operating Principles

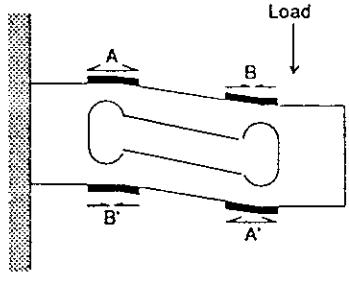
Load Cell and Indicator

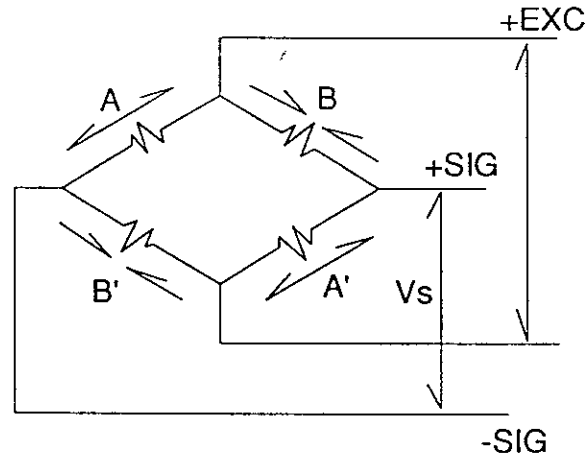
A strain gauge style load cell has strain gauges affixed to an elastic body designed to be strained in proportion to a load and has those gauges wired to form a Wheatstone bridge.

A voltage of about 12V DC is applied to this Wheatstone bridge from the indicator. The output from the bridge is connected to the input of the indicator.

If a load is applied to the load cell, the elastic body is deformed as shown in the below figure and the gauges A and A' change in the elongating direction, and those B and B' in the contracting direction. Since a strain gauge increases its resistance in direct proportion to its elongation and decreases it in direct proportion to compression, a voltage proportional to the load is generated at the output of the Wheatstone bridge.

The indicator converts this signal from analog into digital and displays it as a weight value.





Since the resistance between the input terminals(+EXC and -EXC) of the load cell is as low as about 350Ω, if it is installed in a place away from the indicator, the actual voltage applied to the load cell may vary with changes in temperature due to changes in the resistance of the cable supplying excitation to the load cell. A change of this applied voltage affects the output and results in an weighing error. In order to avoid such a phenomenon, sensing cables are connected in parallel with +EXC and -EXC to monitor a voltage change between them on the part of the indicator. If the voltage between them falls, the A/D unit compensates for error due to a resistance change between the cables internally.

- **A/D Converter**

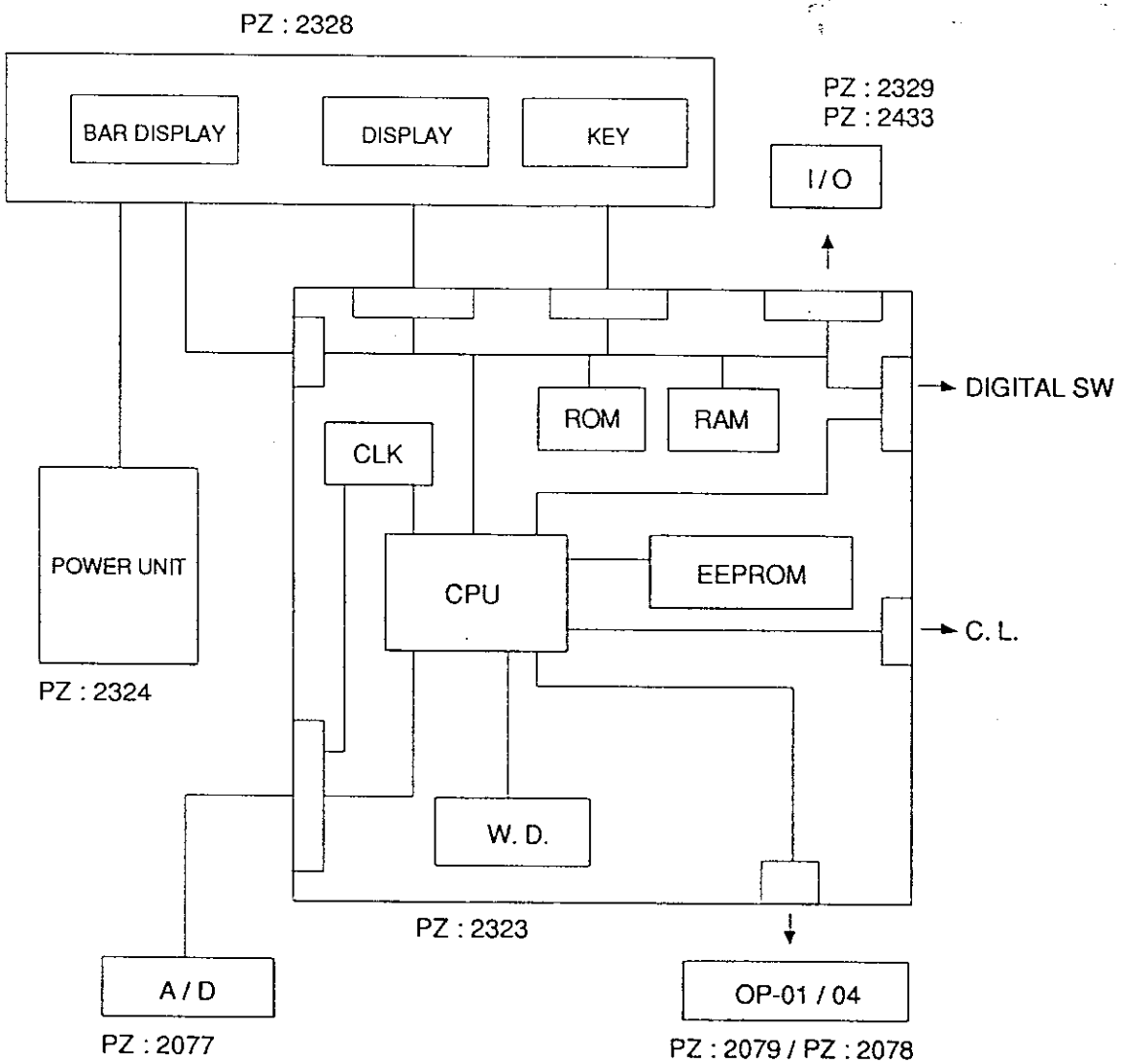
The weight indicator converts an analog signal from the load cell into digital data and displays it as a weight value. The A/D converter uses the same high-accuracy double integrating system as the AD-4323.

- **Data Processing after A/D Conversion**

A/D conversion is of a double integrating type of system. For both hardware and software, the A/D conversion block uses that of the AD4-323 as it is. It applies zero span obtained by calibration to an A/D-converted count to be a weight value and uses it as display and output data.

However, output timing depends on the operation mode. For example, the stop mode rewrites the data at any time(8times/second), but the operation mode rewrites it at judgement completion time and holds it until next judgment.

2.Block Diagram



[PZ : 2323] Main Board

The W. D.(watchdog) circuit monitors power-on reset and the CPU. The clock rate is 12 MHz and used as CLK by the CPU and A/D counter. The RAM 5564 is backed up by a lithium battery. The life of a lithium batteriy is about 6 years. Upper and lower limit values are stored in RAM, and calibration and function data is stored in an EEPROM. Display data is parallel/serial converted by a 66300 and sent to the display board(same for bar display). Although I/O, keys, etc. are exchanged on the data bus by the latch and buffer, there were some cases where different type transistors had been used to determine addresses. When key input is abnormal, check the type number of these transistors.

[PZ : 2324] Power Board

It contains a fuse. This fuse is to protect against short-circuits. Power is applied to I/O from JP1 on the main board. 12 volts for the relay drive also comes from JP 1.

[PZ : 2328] Display Board

For the display, serial data sent from the main board is converted into parallel data. Display is of dynamic drive; data is sent from the main board every 0.832 ms. There are 3 groups of keys and switches. The 5 keys on the right read the data in serial mode.The 6 keys on the left and the switches on the lower right are read in the parallel mode.

[PZ : 2077] A/D Board

The A/D board converts the analog input from the load cell to digital output for main board.

[PZ : 2329/PZ : 2433] Relay Board

This board is located outside the main body and connected with an 1 : 1 cable. Its input is pressed directly through to the main board. Its output is converted into a relay contact output. Power is derived from the main board to drive these relays. This power is obtained by shifting JP1 on the main board to the 1C side.

[PZ :2079/PZ : 2078] OP-01/OP-04 Board

Op-01 is a standard BCD board with open collector outpputs. If TTL output is required with op-01, pull up resitor packs may be added to this board. Op-04 is a atandard Current loop/RS-232C board. These board are the same as for the AD-4323, but the cable length is different.

2.1Voltage Check Point

Main Board

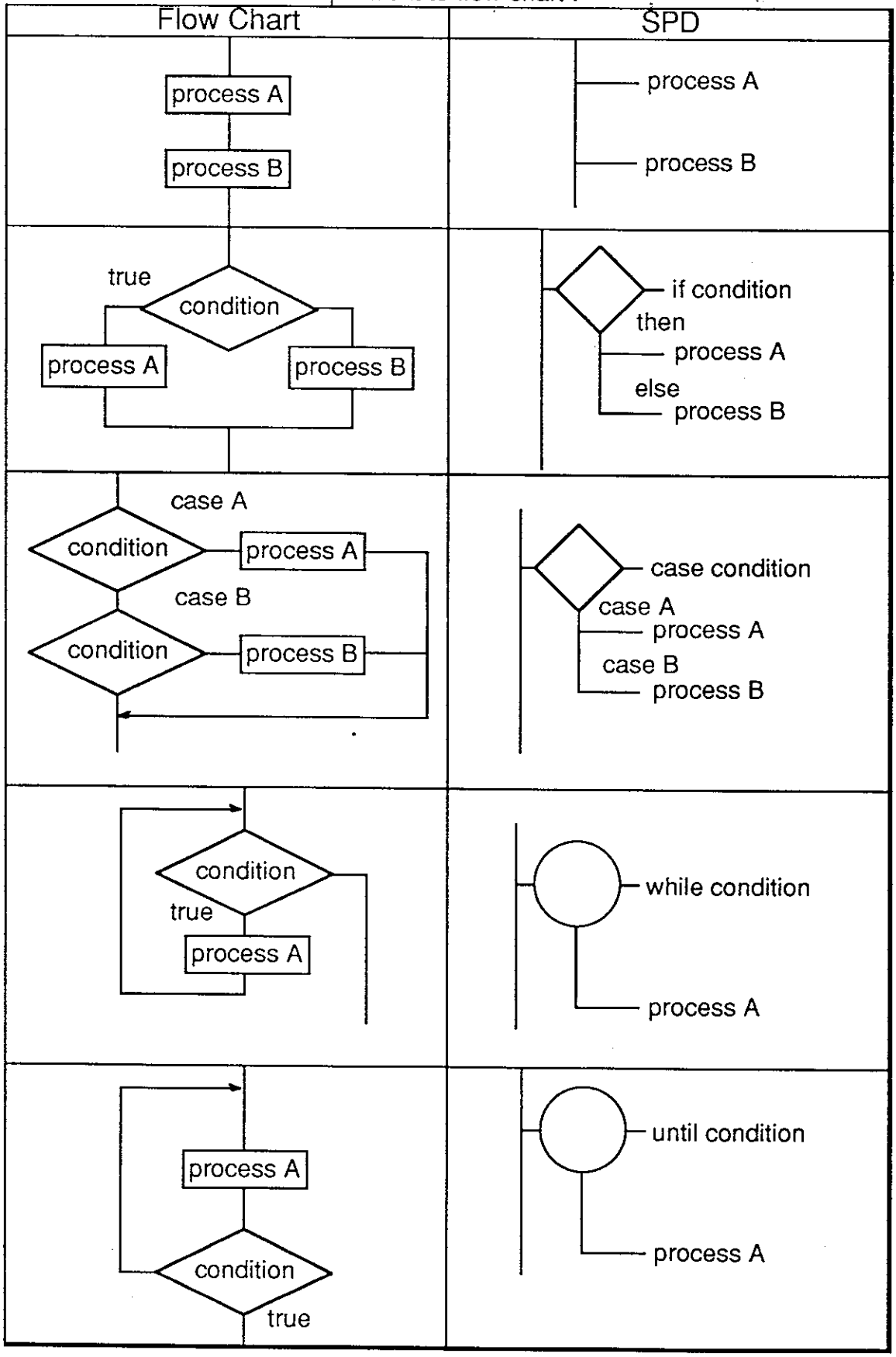
Item	Symbol	terminals	Specification
Lithium battery	BAT	BAT+ to GND	3.2V±0.2V
Voltage drop of R1	R1	R1 terminals	under 2mV

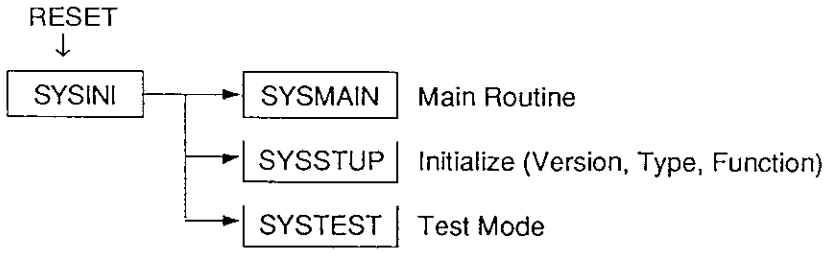
Power Supply Board

+ terminal	- terminal	Specification
J3-2	J3-3	AC 3.0V to 3.6V
J3-1	DZ1 anode	DC 27.1V to 40.7V
J2-1	J2-4	DC 10.2V to 12.4V
J2-2	J2-4	DC 4.75V to 5.25V
J2-5	J2-6	DC 11.4V to 12.6V
J2-7	J2-8	DC 4.75V to 5.25V
J2-9	J2-10	DC 17.8V to 21.8V
J2-11	J2-12	AC 21.6V to 26.4V(p-p)

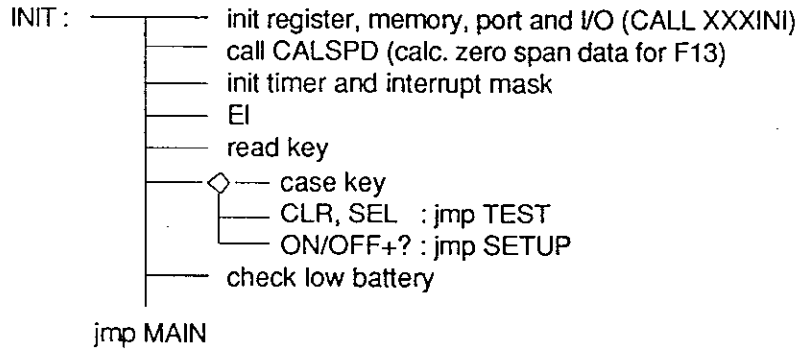
3. Flow Chart

Software is illustrated by SPD, as following ;
This table shows SPD is equivalent to flow chart .

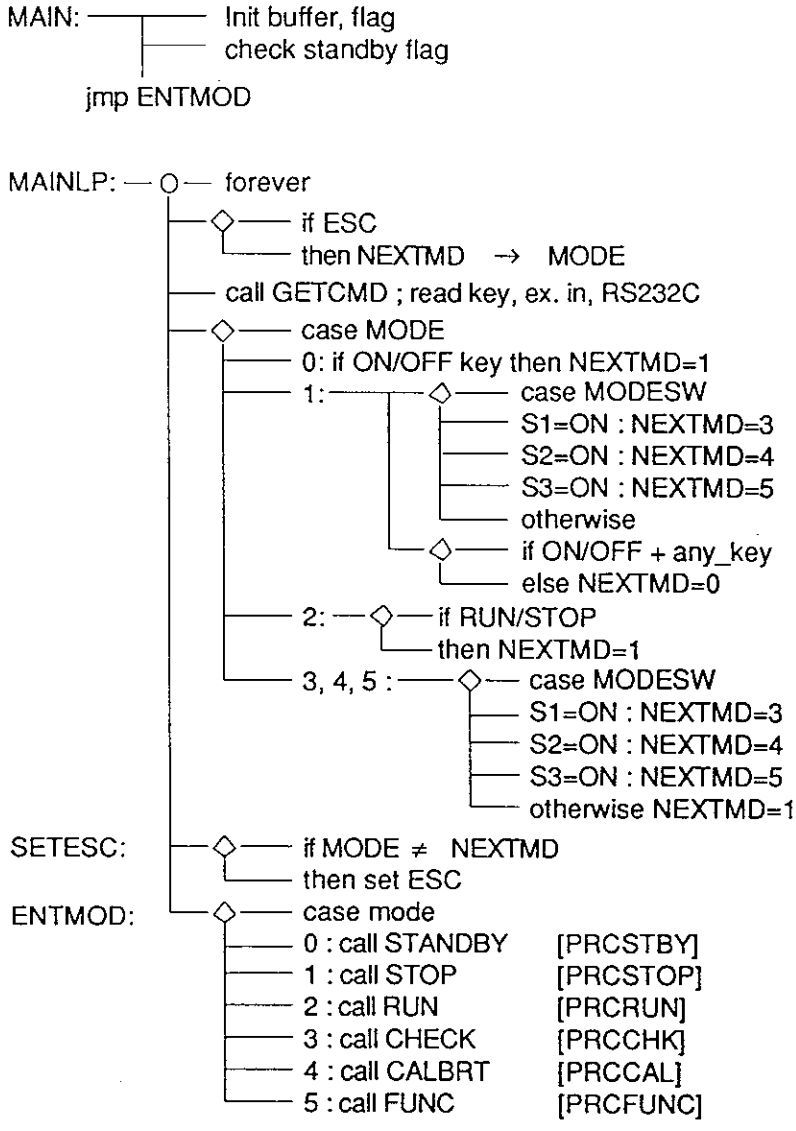



RESET
SYSINI
SYSMAIN
Main Routine
SYSSTUP
Initialize (Version, Type, Function)
SYSTEST
Test Mode

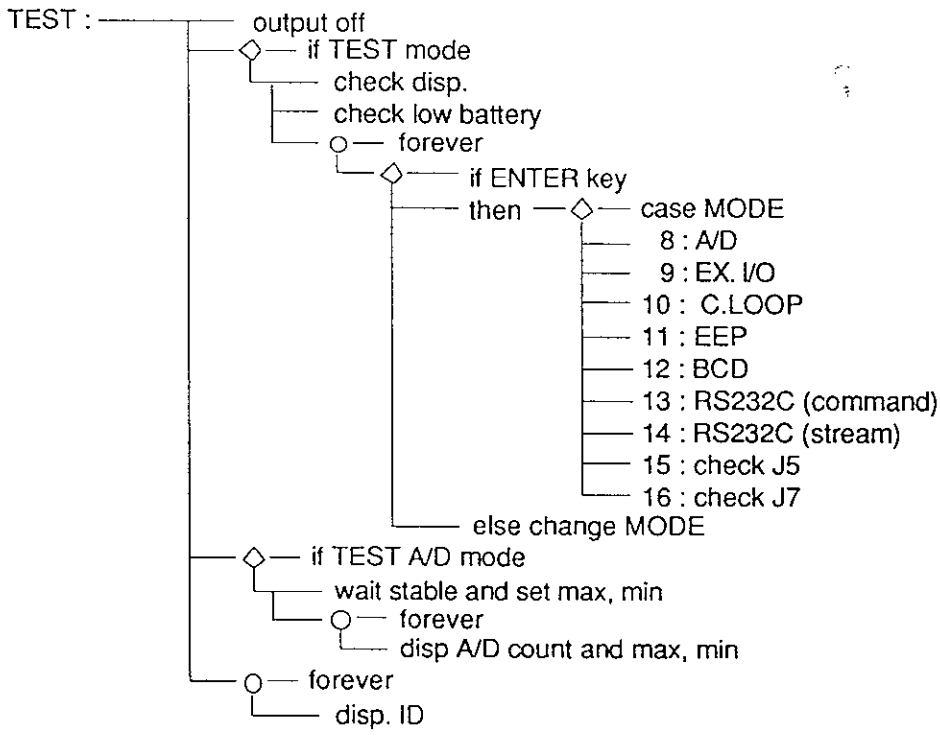
[SYSINI]


INIT :
init register, memory, port and I/O (CALL XXXINI)
call CALSPD (calc. zero span data for F13)
init timer and interrupt mask
EI
read key
case key
CLR, SEL : jmp TEST
ON/OFF+? : jmp SETUP
check low battery
jmp MAIN

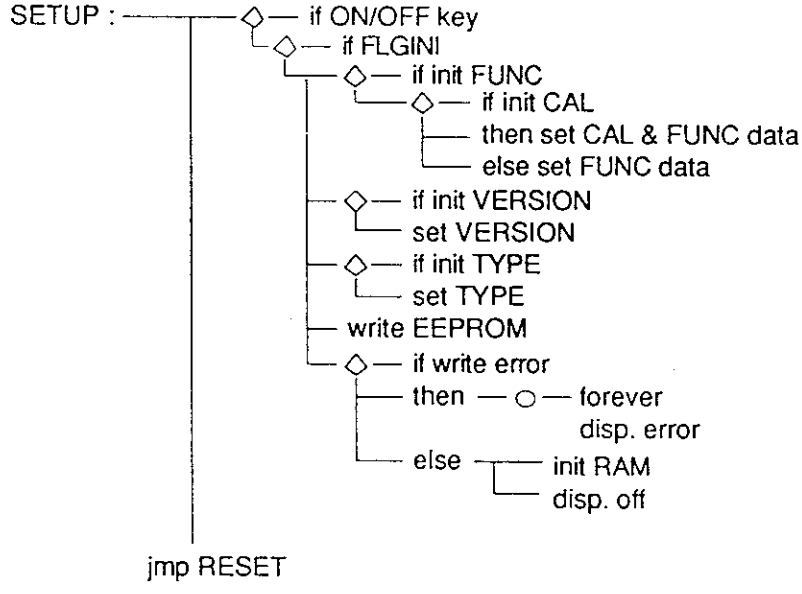
[SYSMAIN]


MAIN:
Init buffer, flag
check standby flag
jmp ENTMOD
MAINLP:
forever
if ESC
then NEXTMD → MODE
call GETCMD ; read key, ex. in, RS232C
case MODE
0: if ON/OFF key then NEXTMD=1
1:
case MODESW
S1=ON : NEXTMD=3
S2=ON : NEXTMD=4
S3=ON : NEXTMD=5
otherwise
if ON/OFF + any_key
else NEXTMD=0
2:
if RUN/STOP
then NEXTMD=1
3, 4, 5 :
case MODESW
S1=ON : NEXTMD=3
S2=ON : NEXTMD=4
S3=ON : NEXTMD=5
otherwise NEXTMD=1
SETESC:
if MODE ≠ NEXTMD
then set ESC
ENTMOD:
case mode
0 : call STANDBY [PRCSTBY]
1 : call STOP [PRCSTOP]
2 : call RUN [PRCRUN]
3 : call CHECK [PRCCHK]
4 : call CALBRT [PRCCAL]
5 : call FUNC [PRCFUNC]

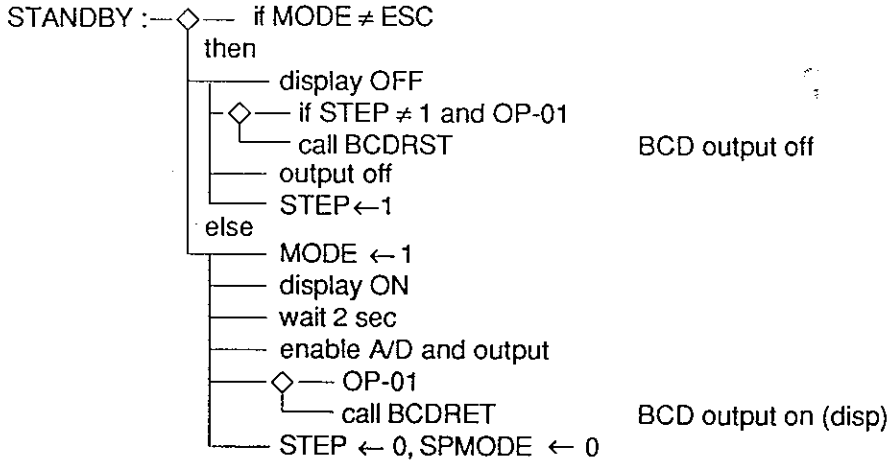
[SYSTEST]



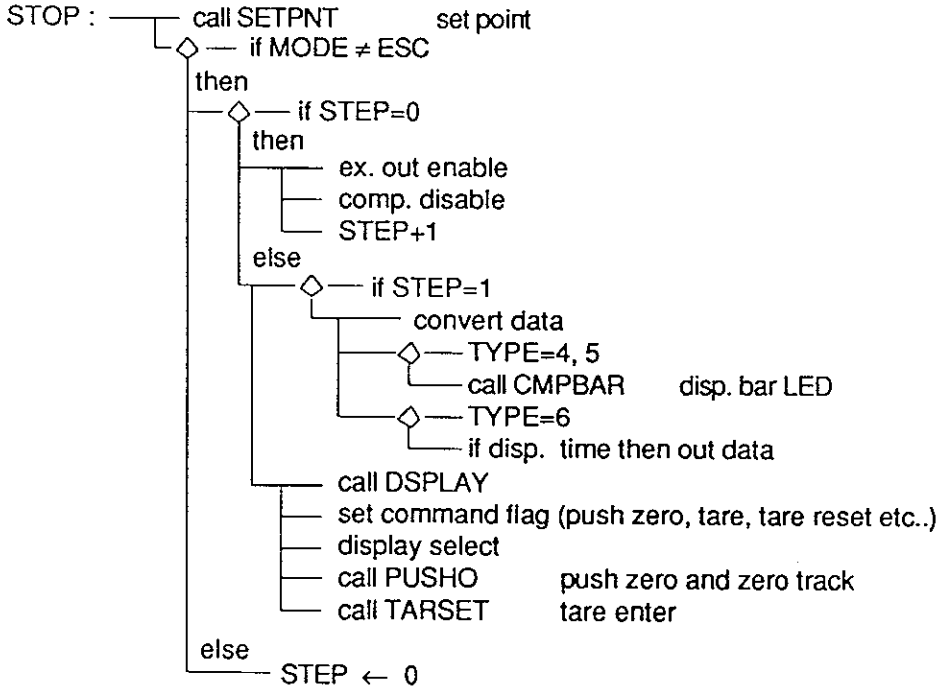
[SYSSTUP]



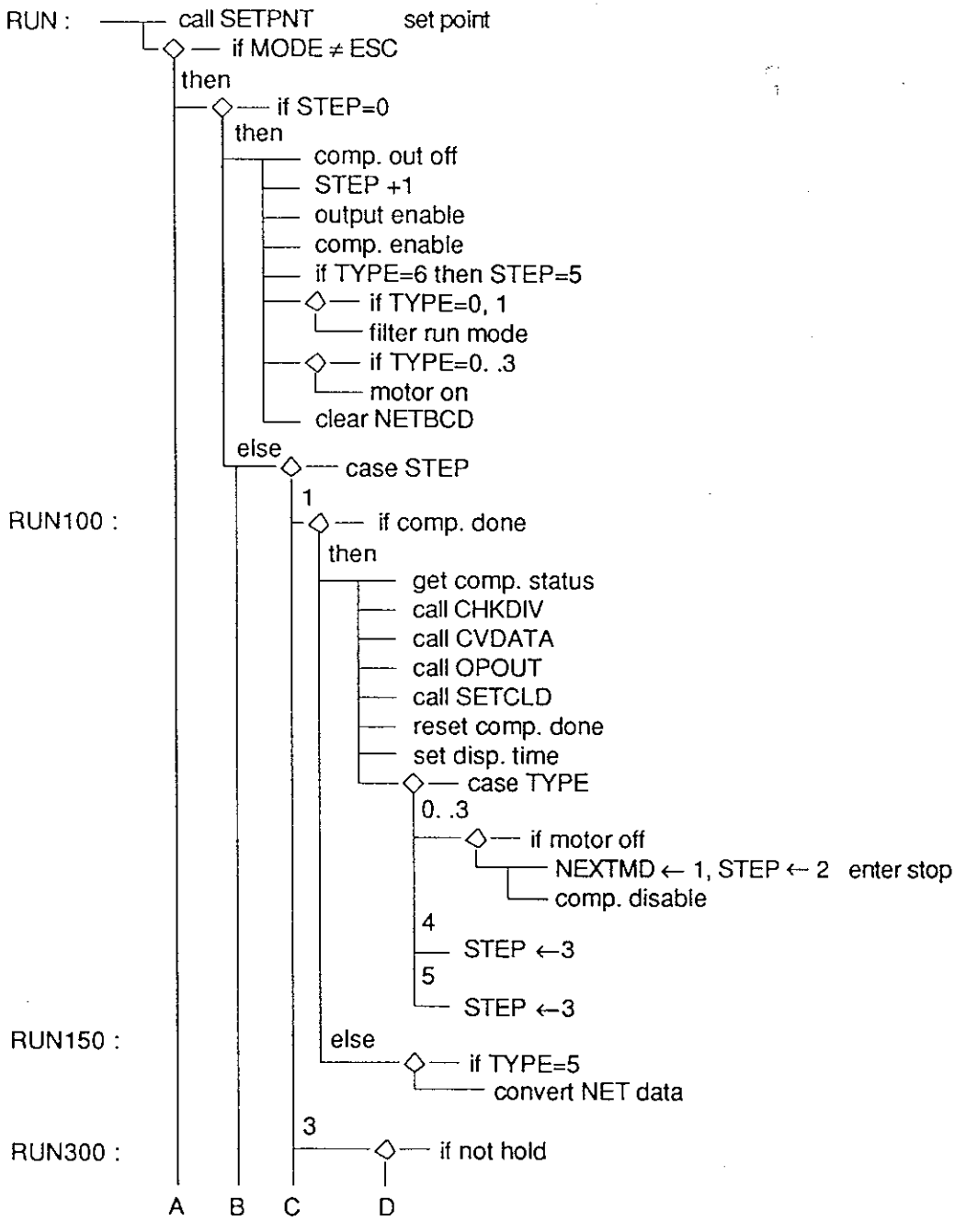
[PRCSTBY]

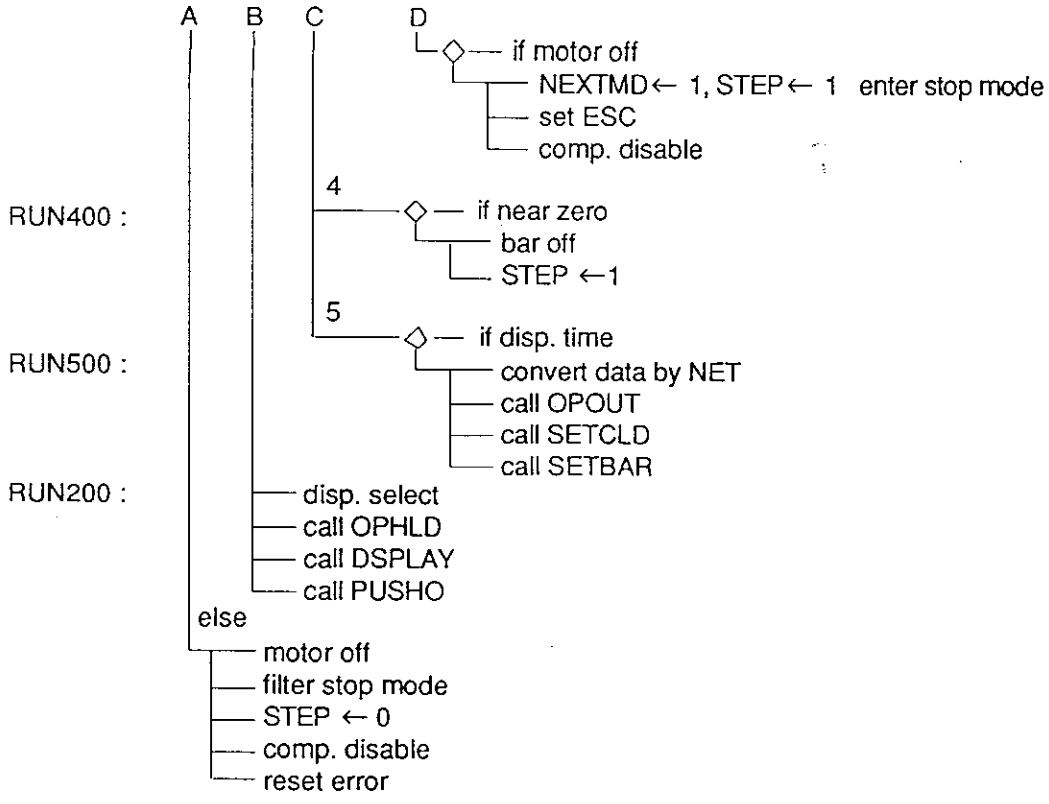


[PECSTOP]

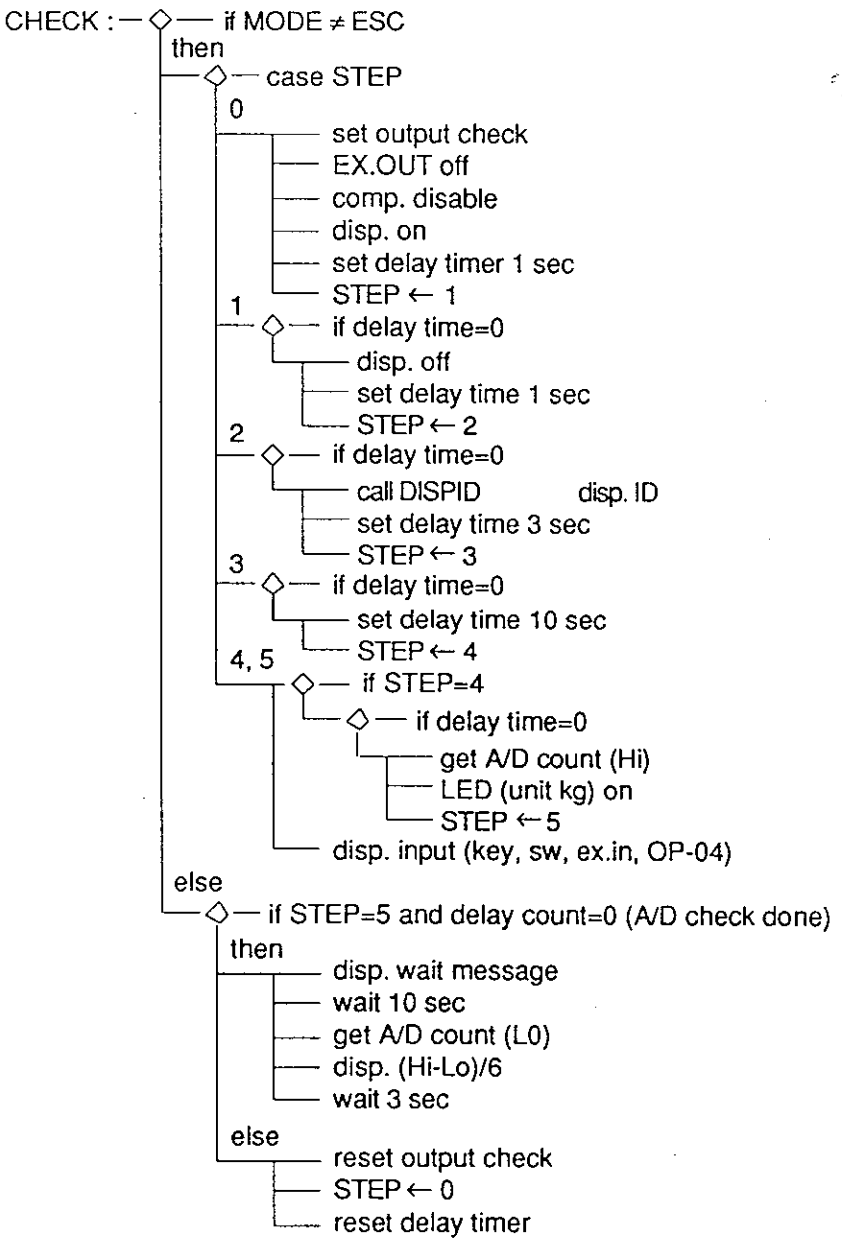


[PRCRUN]

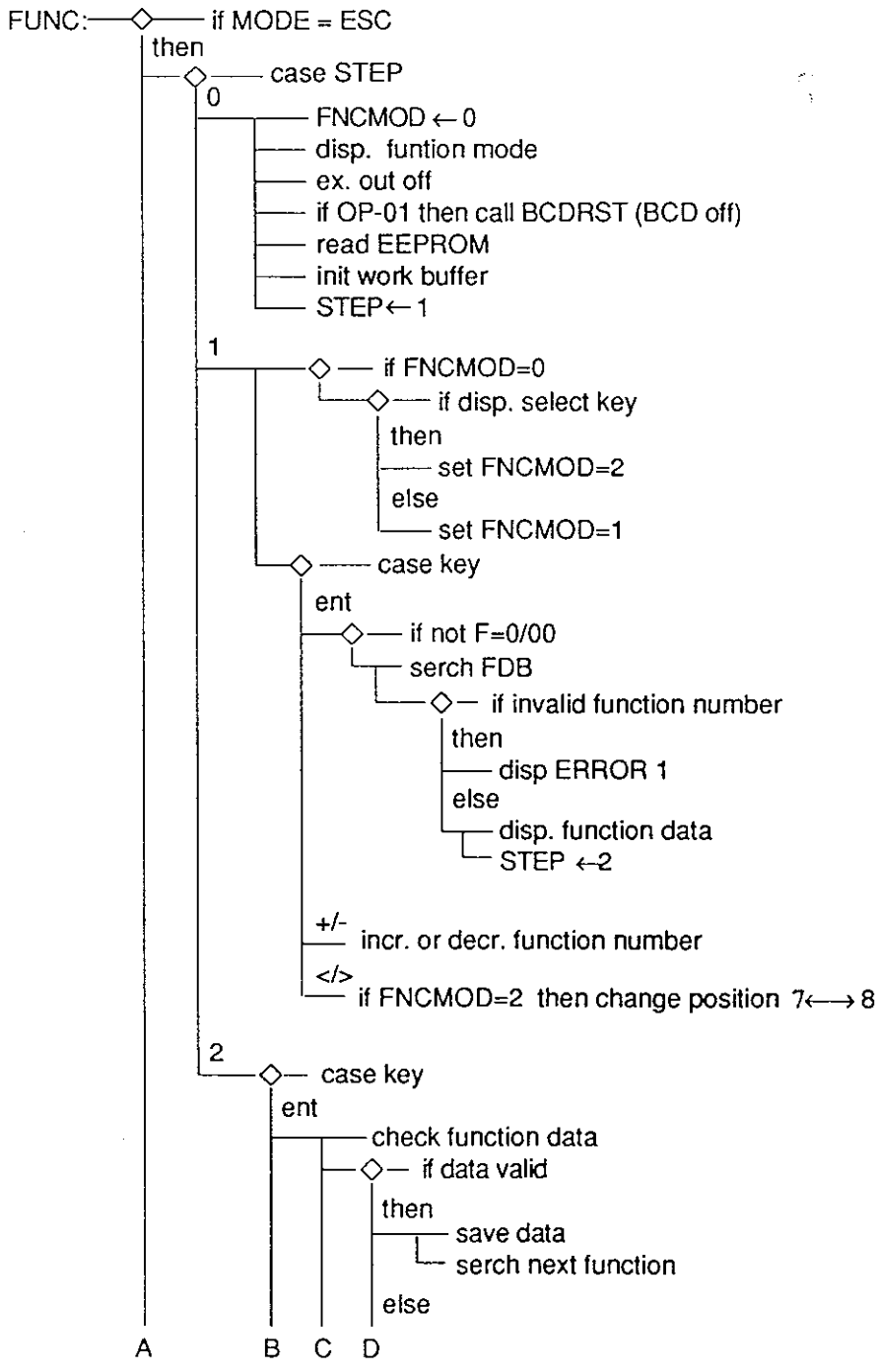

RUN :
call SETPNT
set point
if MODE ≠ ESC
then
if STEP=0
then
comp. out off
STEP +1
output enable
comp. enable
if TYPE=6 then STEP=5
if TYPE=0, 1
filter run mode
if TYPE=0. .3
motor on
clear NETBCD
else
case STEP
1
RUN100 :
if comp. done
then
get comp. status
call CHKDIV
call CVDATA
call OPOUT
call SETCLD
reset comp. done
set disp. time
case TYPE
0. .3
if motor off
NEXTMD ← 1, STEP ← 2 enter stop
comp. disable
4
STEP ←3
5
STEP ←3
RUN150 :
else
if TYPE=5
convert NET data
3
RUN300 :
if not hold
A
B
C
D

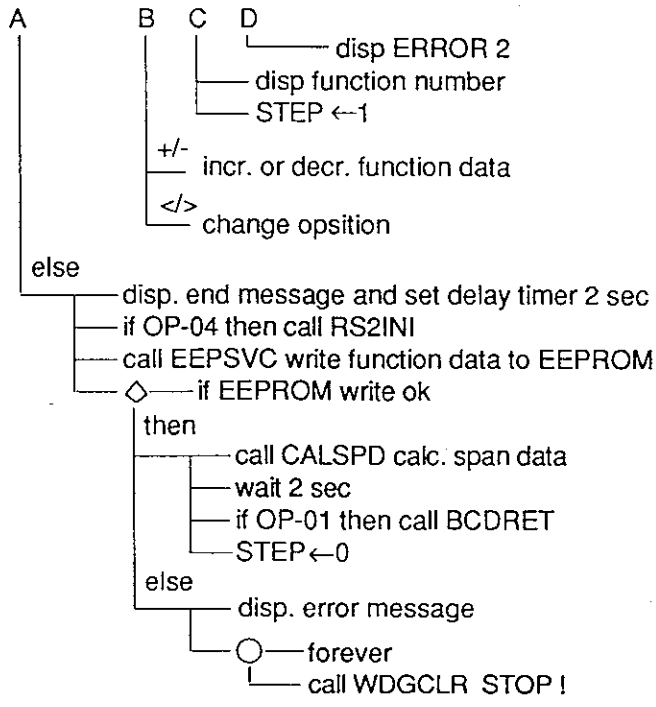

A
B
C
D
if motor off
NEXTMD← 1, STEP← 1 enter stop mode
set ESC
comp. disable
4
RUN400 :
if near zero
bar off
STEP ←1
5
if disp. time
RUN500 :
convert data by NET
call OPOUT
call SETCLD
call SETBAR
RUN200 :
disp. select
call OPHLD
call DSPLAY
call PUSHO
else
motor off
filter stop mode
STEP ← 0
comp. disable
reset error

[PRCCHK]


CHECK :
if MODE ≠ ESC
then
case STEP
0
set output check
EX.OUT off
comp. disable
disp. on
set delay timer 1 sec
STEP ← 1
1
if delay time=0
disp. off
set delay time 1 sec
STEP ← 2
2
if delay time=0
call DISPID
disp. ID
set delay time 3 sec
STEP ← 3
3
if delay time=0
set delay time 10 sec
STEP ← 4
4, 5
if STEP=4
if delay time=0
get A/D count (Hi)
LED (unit kg) on
STEP ← 5
disp. input (key, sw, ex.in, OP-04)
else
if STEP=5 and delay count=0 (A/D check done)
then
disp. wait message
wait 10 sec
get A/D count (L0)
disp. (Hi-Lo)/6
wait 3 sec
else
reset output check
STEP ← 0
reset delay timer

[PRCFUNC]


FUNC:
if MODE = ESC
then
case STEP
0
FNCMOD ← 0
disp. funtion mode
ex. out off
if OP-01 then call BCDRST (BCD off)
read EEPROM
init work buffer
STEP ← 1
1
if FNCMOD=0
if disp. select key
then
set FNCMOD=2
else
set FNCMOD=1
case key
ent
if not F=0/00
serch FDB
if invalid function number
then
disp ERROR 1
else
disp. function data
STEP ←2
+/-
incr. or decr. function number
</>
if FNCMOD=2 then change position 7←→8
2
case key
ent
check function data
if data valid
then
save data
serch next function
else
A
B
C
D


A
B
C
D
disp ERROR 2
disp function number
STEP ←1
+/-
incr. or decr. function data
</>
change opsition
else
disp. end message and set delay timer 2 sec
if OP-04 then call RS2INI
call EEPSVC write function data to EEPROM
◇
if EEPROM write ok
then
call CALSPD calc. span data
wait 2 sec
if OP-01 then call BCDRET
STEP←0
else
disp. error message
○
forever
call WDGCLR STOP !

4 Troubleshooting using Check Software

There are 2 kinds of check software. They are incorporated in the standard ROM.

(1) The check mode is put into effect by turning on the slide switch S1 in the stop mode(when "RUN" is unilluminated) with the power turned on. This mode checks the entries of the keys and switches. It can be used for checking the functioning of photoelectric switches.

(2) With the [COUNT CLEAR] and [DISPLAY SELECT] keys pressed, turning on the power enters the test mode and makes a check by items, following a display segment check. This check can be made individually on A/D, external I/O, current loop, EEPROM, OP-01, OP-04, and connectors J5 and J7.

1. Check Mode

In the check mode, only inputs are checked and all outputs are turned off. Therefore, it can be executed even when connected to a system.

[Entering the Check Mode]

Turn on the power switch on the rear panel. If the display is turned off, Press the [ON/OFF] key to turn on the display.

Remove the switch cover located at the lower right part of the front panel and turn on the slide switch S1. This enters you into the check mode. Check that the entire display is turned on. Since the check mode checks inputs by displaying the status, no check can be made unless the display is normal. When the display is doubtful, check the segments first in the test mode. After the entire display is turned on, the version is displayed for about 3 seconds. Next, the input status is displayed; the slide switch is displayed on the upper left LED(light weight, normal weight, overweight), external input on the fluorescent display tube, and key switch on the right LED> It is "1" when an input is ON, and "0" when OFF.

<<Slide Switches>>

S1 is checked by entering this check mode. When S2, S3, and S4 are turned on, the light weight, normal weight, and overweight LEDs are illuminated, respectively.

<<External Input>>

The external input is displayed on the fluorescent display tube. The left digit of the display indicates whether an option is attached. It is "1" when the OP-04 is connected, and otherwise, "0". The remaining 6 digits correspond and the display shows "1" when the input is turned on. Options are checked only when the power is turned on.

<<Key Switches>>

The key switches on the front panel are displayed on the upper right LED. The upper 5 digits are [<] [>] [+] [-] and [ENTER] and the lower 6 digits correspond to [ON/OFF] through [DISPLAY SELECT]. Pressing the key causes the LED to show "1". The 5 right keys ([<] [>] [+] [-] [ENTER]) are read dynamically by using display digit select signals. A data line has a problem when no reaction occurs by pressing all keys or all 5 digits show "1" by pressing only one of those keys.

When the check mode is put into effect, if S1 is turned off, the cable connected to J3 of the display board or J2 of the main board may have a contact failure. This may cause S1 to appear defective. The slide switches are open when turned on.

2. Test Mode

The test mode should only be used by maintenance personnel. It mainly checks outputs.

[Entering the Test Mode]

With the slide switches S1 through S4 turned off, turn on the power with the [COUNT CLEAR] and [DISPLAY SELECT] keys held down. A display segment check starts immediately. If the entire display is illuminated, not entering the test mode, it is likely that the keys or slide switches are defective, or that the key has not been pressed properly.

<<Segment Check>>

From the display off state, the segment and digit select signals are turned on one by one. The segments of the leftmost digit are illuminated one by one and proceed to the next right digit after all the segments are illuminated. Finally, the entire display is illuminated and a buzzer sounds, thus completing a segment check. When 2 digits are illuminated at the same time or when there are any unilluminated segments, check from the display tube or LED toward the display driver. A possible cause is an open or short-circuit.

<<Low Battery Check>>

Following the segment check, a test of whether certain data has been written in a specified addresses. If not, the message "Lo bAtt" appears. If this message appears, it is likely that either the lithium batteries or RAM itself is defective. If not defective, the check proceeds to the next without displaying anything. If you turn on the power again after this message appeared because the lithium batteries were defective, the message may not appear. This is because electric charge remaining in the capacitor on the board backs up the RAM. Leave the power turned off for about 1 hour. When the ROM is replaced with another version, however, the message "Lo bAtt" may appear even if hardware is working properly.

Following the segment check and low battery check, the message "tESt" appears on the upper right. Select an item with the [+] or [-] key and press the [ENTER] key. The check starts.

* When omitting the segment check, press the [ON/OFF] key when illumination of the display tube shifts from the 1st digit to the 2nd digit. When you want to leave the entire display illuminated, press the [ON/OFF] key when the last buzzer of the segment check sounds. The check stops once when the entire display has been illuminated. Pressing the [ON/OFF] key proceeds to the next.

• Check by Items

Select the item you want to check with the [+] [-] key and press the ENTER [ENTER] key. Pressing the [ON/OFF] key ends that item.

<<A/D>>

The internal count of the A/D converter is averaged and displayed.

Since deep averaging is being applied, a display response to an input change may be delayed.

<<External Output>>

External outputs are turned on one by one, and at the same time, the input state is displayed. The outputs A7 and B8 are not checked. Although A7 is used as an output(under judgment), it is not described in the instruction manual. B8 is used as the power for the relays, but it depends on JP1 on the main board. When shifted to the 1C side, an unstabilized voltage of about 18 V DC is output; no voltage is output when shifted to the 2C side.

<<Current Loop>>

Select a baud rage with the [+] and [-] keys. Pressing the [ENTER] key outputs "1234567890<CR><LF>" at intervals of about 1.8 seconds. Pressing the [ENTER] key again returns you to the baud rate selection waiting condition.

<<EEPROM>>

Data is written into all areas of the EEPROM and read to make a check. What is displayed is the data. It is all right if the message "Good" appears.

Press the [ON/OFF] key to return to item selection. If the message "no Good" appears, you can do nothing Redo from turning on the power. Since the CPU and EEPROM are connected directly, its cause lies in the pattern or port. The EEPROM contains the calibration and function data. When it is replaced, you must re-set them.

* Never turn off the power while checking the EEPROM. Its contents will be destroyed.

<<OP-01>>

Outputs are turned on(output transistors off) one by one. If Hold is input, the outputs are held, displaying "Hold".

This item cannot be selected when the OP-04 is connected.

<<OP-04>>

The OP-04 has an output check and an input check made separately. Make the output check first because the input check is made by checking the input data after outputting it. The output check is "OP-04S". Similar to the current loop, set a baud rate and press the ENTER key. This outputs "1234567890<CR><LF>". The input check is "OP-04C"; if <LF> is received, the preceding data is transmitted as it is. Connect a personal computer, etc. and send any desired data(with <LF> at the end)> The same data should be returned.

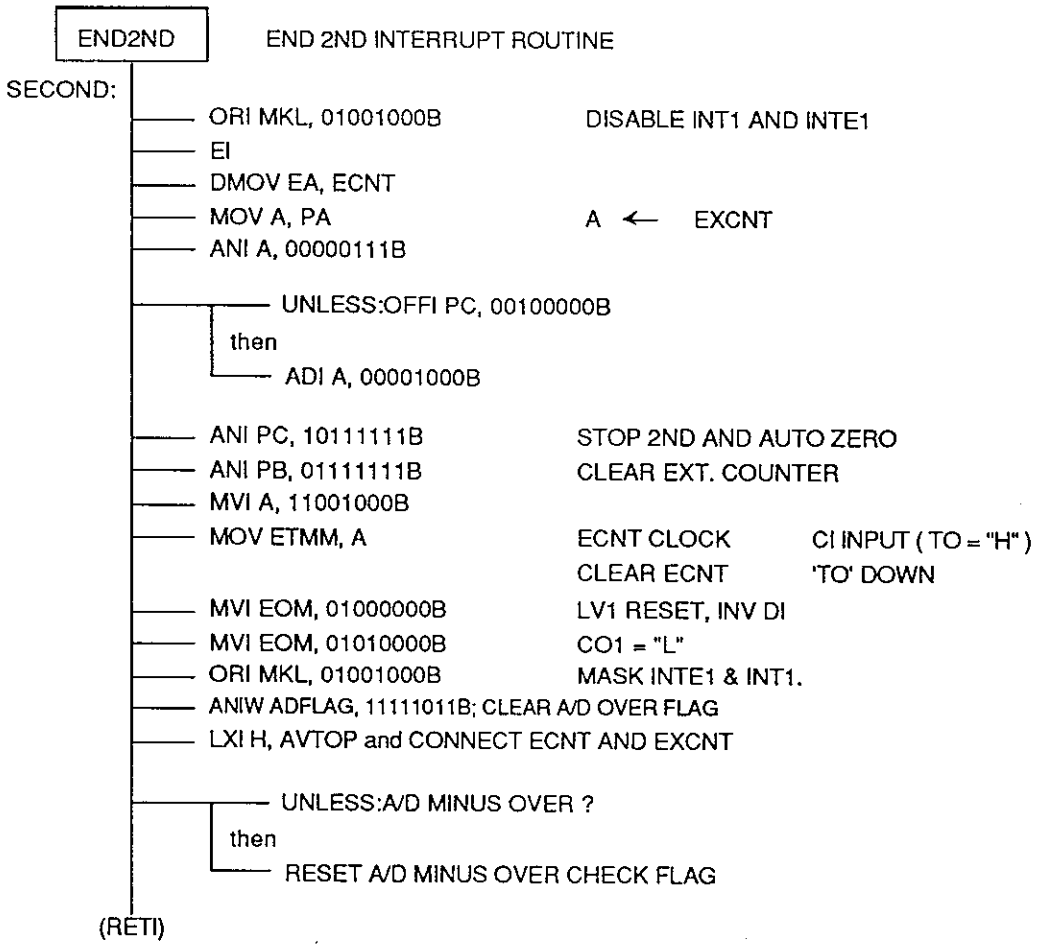
This item can be selected only when the OP-04 is connected.

<<Connector J5>>

Connector for the OP-01/OP-04. It is used to check only the connectors when no option board is connected. Solder bridges cannot be checked.

<<Connector J7>>

Connector for the digital switch. It displays the input state. When SW1 beside this connector is shifted to the IN side, the display changes from 00 to 99. When shifted to the GND side, only 00 through 39 can be read because 2 bits are connected to ground.


END2ND
END 2ND INTERRUPT ROUTINE
SECOND:
ORI MKL, 01001000B
DISABLE INT1 AND INTE1
EI
DMOV EA, ECNT
MOV A, PA
A ← EXCNT
ANI A, 00000111B
UNLESS:OFFI PC, 00100000B
then
ADI A, 00001000B
ANI PC, 10111111B
STOP 2ND AND AUTO ZERO
ANI PB, 01111111B
CLEAR EXT. COUNTER
MVI A, 11001000B
MOV ETMM, A
ECNT CLOCK
CI INPUT (TO = "H")
CLEAR ECNT
'TO' DOWN
MVI EOM, 01000000B
LV1 RESET, INV DI
MVI EOM, 01010000B
CO1 = "L"
ORI MKL, 01001000B
MASK INTE1 & INT1.
ANIW ADFLAG, 11111011B; CLEAR A/D OVER FLAG
LXI H, AVTOP and CONNECT ECNT AND EXCNT
UNLESS:A/D MINUS OVER ?
then
RESET A/D MINUS OVER CHECK FLAG
(RETI)

PARTS LIST
AD4324 MAIN BOARD -1/2

CIRCUIT SYMBOL or DRWG.NO.	PARTS NAME	DESCRIPTION	Q'TY
	7PZ:2323	MAIN BOARD AD4324	1
C4,11～26	CC:0.022U	CERAMIC CAPACITOR 0.022μF 80V	17
C6	CC:100P	CERAMIC CAPACITOR 100pF 50V	1
C5	CM:V1H474JZ	FILM CAPACITOR 0.47μF	1
C1,7	CT:1A4R7	TANTALUM CAPACITOR 4.7μF 10V	2
C2,3	CT:1D2R2	TANTALUM CAPACITOR 2.2μF 20V	2
PC5,8	DF:PS-2403-2	PHOTO COUPLER	2
PC1～4,6,7	DF:PS-2403-4	PHOTO COUPLER	6
D3	DI:A54H	DIODE ARRAY	1
DB1	DI:1B4B42	BRIDGE DIODE	1
D1,2	DI:1SS97	DIODE	2
BAT	EB:CR2032-WT12	LITHIUM BATTERY	1
J9	JA:4470-01-1111	CONNECTOR	1
J7	JI:364P024-AG	CONNECTOR	1
J8	JI:365P016-AG	CONNECTOR	1
(U7)	JS:10328-01-445	IC SOCKET	1
JP1	JS:14120-01	IC SOCKET	1
J1	JT:1-171825-0	CONNECTOR	1
J3,4	JT:1-171825-2	CONNECTOR	2
J2,5	JT:1-172429-2	CONNECTOR	2
J10,11	JT:171825-7	CONNECTOR	2
J6	JT:172429-8	CONNECTOR	1
	PC:2323	PC BOARD	1
Q2,3,4	QT:BA1A4P	TRANSISTOR	3
Q1,5	QT:C1815Y	TRANSISTOR	2
R5～9,11,16～21 23	RC:NAT1K	CARBON RESISTOR 1KΩ 1/4W	13
R25	RC:NAT1M	CARBON RESISTOR 1MΩ 1/4W	1
R1,4	RC:NAT10K	CARBON RESISTOR 10KΩ 1/4W	2
R3,12	RC:NAT22K	CARBON RESISTOR 22KΩ 1/4W	2
R14	RC:NAT27R	CARBON RESISTOR 27Ω 1/4W	1
R22	RC:NAT3.9K	CARBON RESISTOR 3.9KΩ 1/4W	1
R24	RC:NAT330R	CARBON RESISTOR 330Ω 1/4W	1
R2,15	RC:NAT4.7K	CARBON RESISTOR 4.7KΩ 1/4W	1
R13	RC:NAT470R	CARBON RESISTOR 470Ω 1/4W	1
R10	RC:NAT680R	CARBON RESISTOR 680Ω 1/4W	1
RA1,3,4	RN:IHR-4-182KA	RESISTOR NETWORK 1.8KΩ×4	3

PARTS LIST
AD4324 MAIN BOARD -2/2

CIRCUIT SYMBOL or DRWG.NO.	PARTS NAME	DESCRIPTION	Q'TY
	7PZ:2323	MAIN BOARD AD4324	1
RA8	RN:IHR-4-223MA	RESISTOR NETWORK 22KΩ×4	1
RA2,6,7	RN:IHR-4-472MA	RESISTOR NETWORK 4.7KΩ×4	3
RA5,9	RN:IHR-8-223MA	RESISTOR NETWORK 22KΩ×8	2
RA10	RN:IHR-8-392JA	RESISTOR NETWORK 3.9KΩ×8	1
SW1	SS:SSS022	SWITCH	1
TP1,2,3	TM:CP-10	TEST PIN	3
U11	UA:MB3773PS-G	VOLTAGE COMPARATOR	1
	UA:TD62503BP	TRANSISTOR ARRAY	2
U12	UC:D78C10G-1B	CMOS CPU	1
U19	UC:HCU04	CMOS IC	1
U10,18	UC:HC00	CMOS IC	2
U2	UC:HC02	CMOS IC	1
U4	UC:HC08	CMOS IC	1
U5,22	UC:HC32	CMOS IC	1
U17	UC:HC4520	CMOS IC	1
U15	UC:HC540	CMOS IC	1
U14,16	UC:HC573	CMOS IC	2
U9	UC:RP93C46	EEPROM	1
U8	UC:5564AFL-15	CMOS SRAM	1
U1,6	UN:M66300FP	PISO DATA BUFFER IC	2
U3	UT:LS06	TTL	1
U13	UT:159	TTL	1
X1	XT:C4SB-12M-K02	CRYSTAL 12MHz	1
	04:B42944A		2
	05:A40702	SPACER 16mm	1

PARTS LIST
AD4324 POWER BOARD -1/1

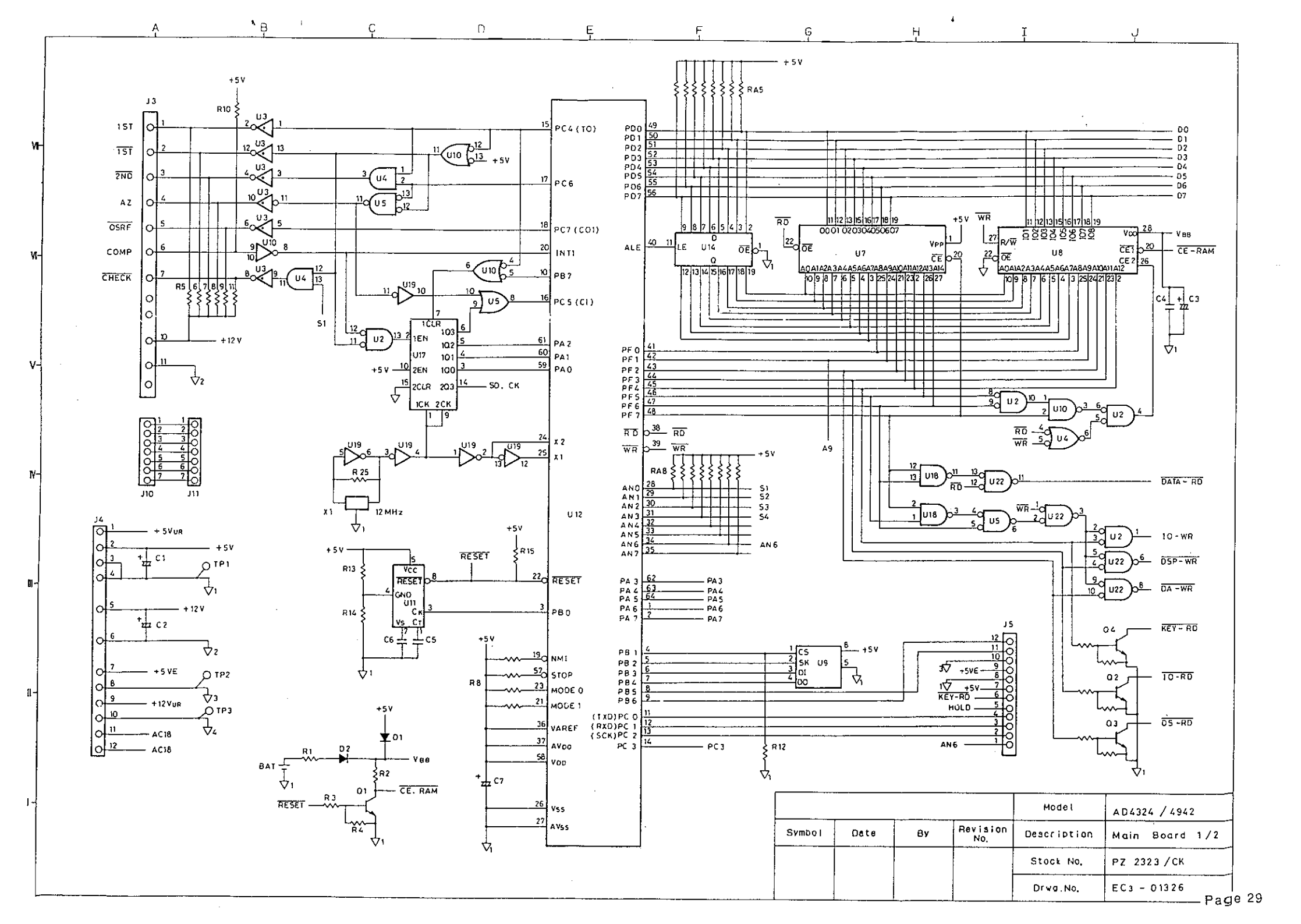
CIRCUIT SYMBOL or DRWG.NO.	PARTS NAME	DESCRIPTION	Q'TY
	7PZ:2324	POWER BOARD AD4324	1
C1,2	CC:0.01U500V	CERAMIC CAPACITOR 0.01μF 500V	2
C11～16	CC:0.1U25V	CERAMIC CAPACITOR 0.1μF 25V	6
C4,8	CK:SME25VB2200	ELECTROLYTIC CAPACITOR 2200μF 25V	2
C5,7,9	CK:SM25VB22	ELECTROLYTIC CAPACITOR 22μF 25V	3
C17	CK:SM50VB10	ELECTROLYTIC CAPACITOR 10μF 50V	1
C10	CK:SXE35VB1000	ELECTROLYTIC CAPACITOR 1000μF 35V	1
	CK:9117	ELECTROLYTIC CAPACITOR 4700μF 35V	1
C3	CM:E6104KZ	FILM CAPACITOR 0.1μF	1
D1,2,3	DI:W02	BRIDGE DIODE	3
D4,5	DI:1B4B42	BRIDGE DIODE	2
DZ1	DZ:05Z5.6	ZENNER DIODE 5.6V	1
	FH:85PN0819	FUSE HOLDER	2
J2	JT:1-171825-2	CONNECTOR	1
J3	JT:171825-3	CONNECTOR	1
J1	JT:172369-3	CONNECTOR	1
	JT:61134-1	CONNECTOR	2
	KO:280A-08BR	CONNECTOR CABLE	2
L1,2	LL:SF-T8-40S	COIL	2
	PC:2324A	PC BOARD	1
R1	RC:NAT22K	CARBON RESISTOR 22KΩ 1/4W	1
R2,3	RC:NAT82R	CARBON RESISTOR 82Ω 1/4W	2
	TF:378	TRANSFORMER	1
U2	UR:78M12HF	REGURATOR	1
U1,3	UR:7805HF	REGURATOR	2
	04:B42955	HEAT SINK	1

PARTS LIST
AD4324 DISPLAY BOARD -1/2

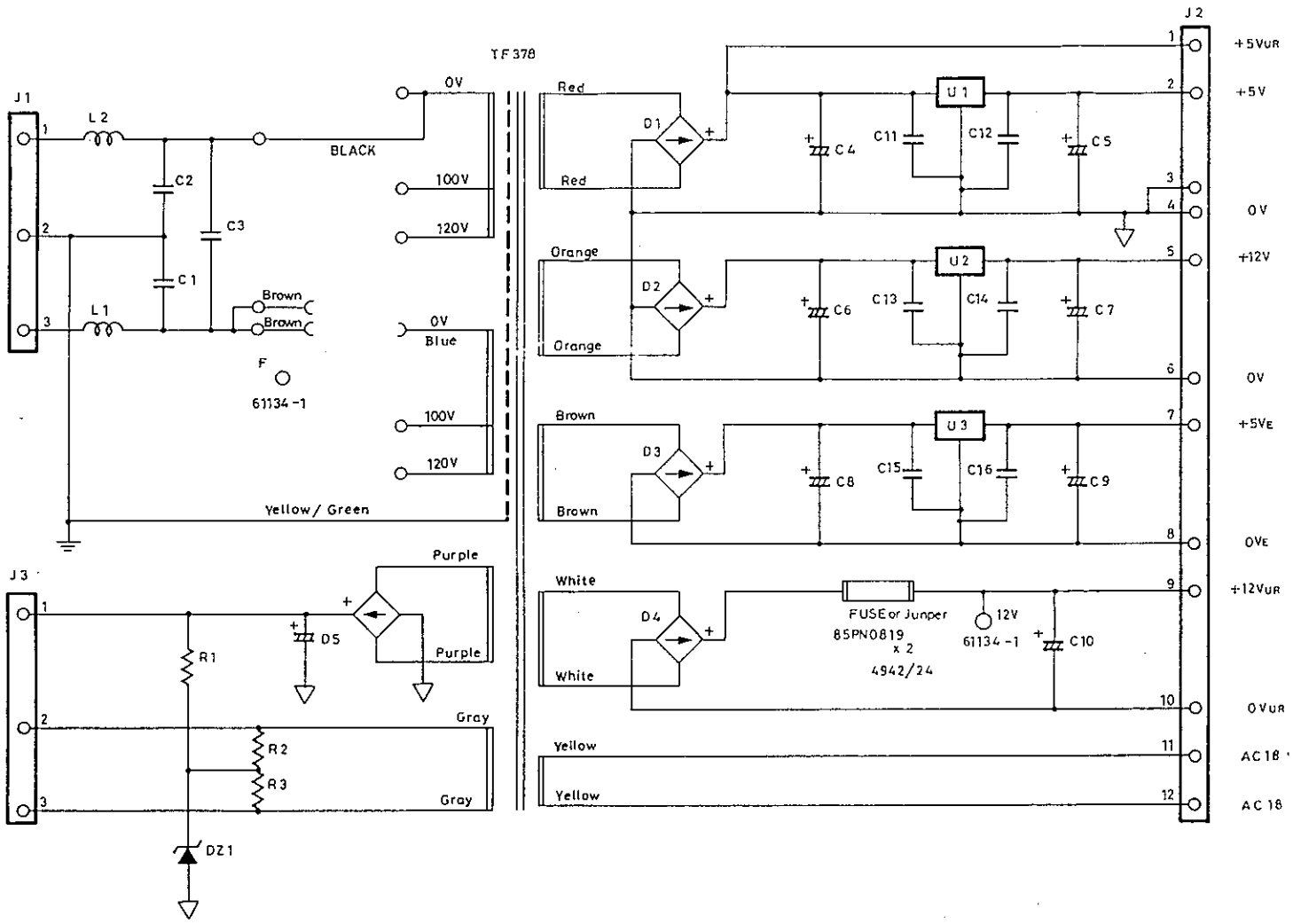
CIRCUIT SYMBOL or DRWG.NO.	PARTS NAME	DESCRIPTION	Q'TY
	7PZ:2328	DISPLAY BOARD AD4324	1
C2,7	CC:FK16Y5V1H104	CERAMIC CAPACITOR 0.1μF 16V	2
C3,8～12	CC:0.1U25V	CERAMIC CAPACITOR 0.1μF 25V	6
C4,5	CK:SXE25VB10	ELECTROLYTIC CAPACITOR 10μF 25V	2
C1	CK:SXE35VB100	ELECTROLYTIC CAPACITOR 100μF 35V	1
C6	CT:1A4R7	TANTALUM CAPACITOR 4.7μF 10V	1
	DA:LL-2BK	LED SPACER	6
	DA:LL-4BK	LED SPACER	2
D12	DI:1B4B42	BRIDGE DIODE	1
D13	DI:1SS97	DIODE	1
D1～11	DI:1SS1588	DIODE	11
LED6,7	DL:LD-006BMG	LED	2
LED3,5	DL:LT9230D	LED	2
LED4	DL:LT9230N	LED	1
LED8～18	DL:TLS347T	LED	11
LED1,2	DL:TLUG144	LED	2
	ED:FIP7B13	DISPLAY TUBE	1
	ET:CA25A53-CON	BUZZER	1
J1	JT:1-171825-0	CONNECTOR	1
J3	JT:1-172429-2	CONNECTOR	1
J2,5	JT:171825-3	CONNECTOR	2
J4	JT:172429-8	CONNECTOR	1
	PC:2328A	PC BOARD	1
Q1,2,3	QT:BA1L4Z	TRANSISTOR	3
Q4	QT:BN1L3Z	TRANSISTOR	1
R5,6	RC:NAT1.2K	CARBON RESISTOR 1.2KΩ 1/4W	2
R1,7	RC:NAT22K	CARBON RESISTOR 22KΩ 1/4W	2
R2,3,4	RC:NAT470R	CARBON RESISTOR 470Ω 1/4W	3
K1～11	SK:TM1-01/0010	SWITCH	11
S1～4	SS:2NB2X2AG	SWITCH	4
TP1～4	TM:LC-2-G-0	TEST PIN	4
U5	UA:TD62783AP	TRANSISTOR ARRAY	1
U4	UC:HC595	CMOS IC	1
U1	UC:MSC1164GS	CMOS IC	1
U2,3	UC:TD62C850N	CMOS IC	2
U6	UR:TA78012AP	REGURATOR	1

PARTS LIST
AD4324 DISPLAY BOARD -2/2

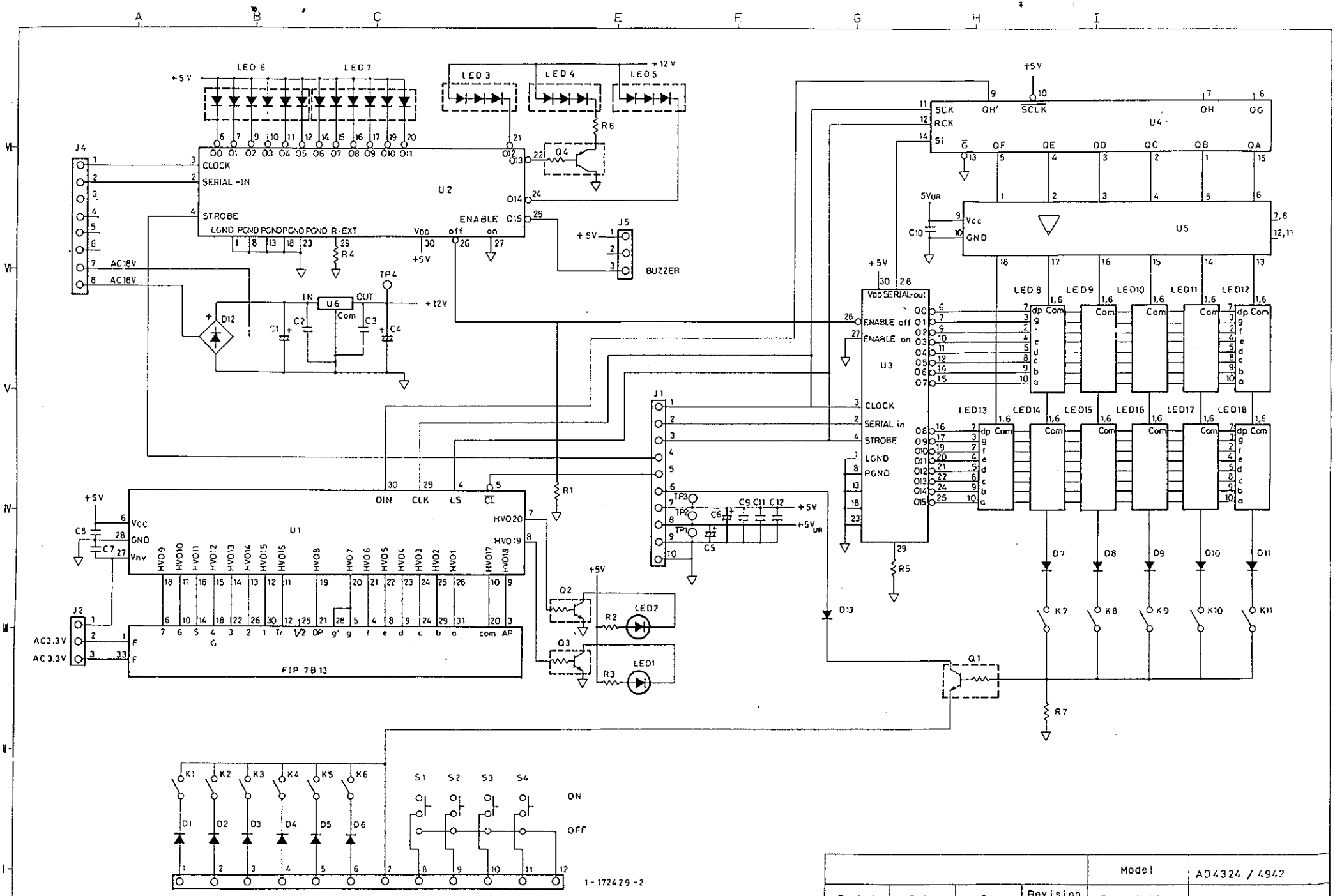
CIRCUIT SYMBOL or DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
	7PZ:2328	DISPLAY BOARD AD4324	1
	05:A40331	SPACER 13mm	2
	07:B43041	SWITCH TOP	11



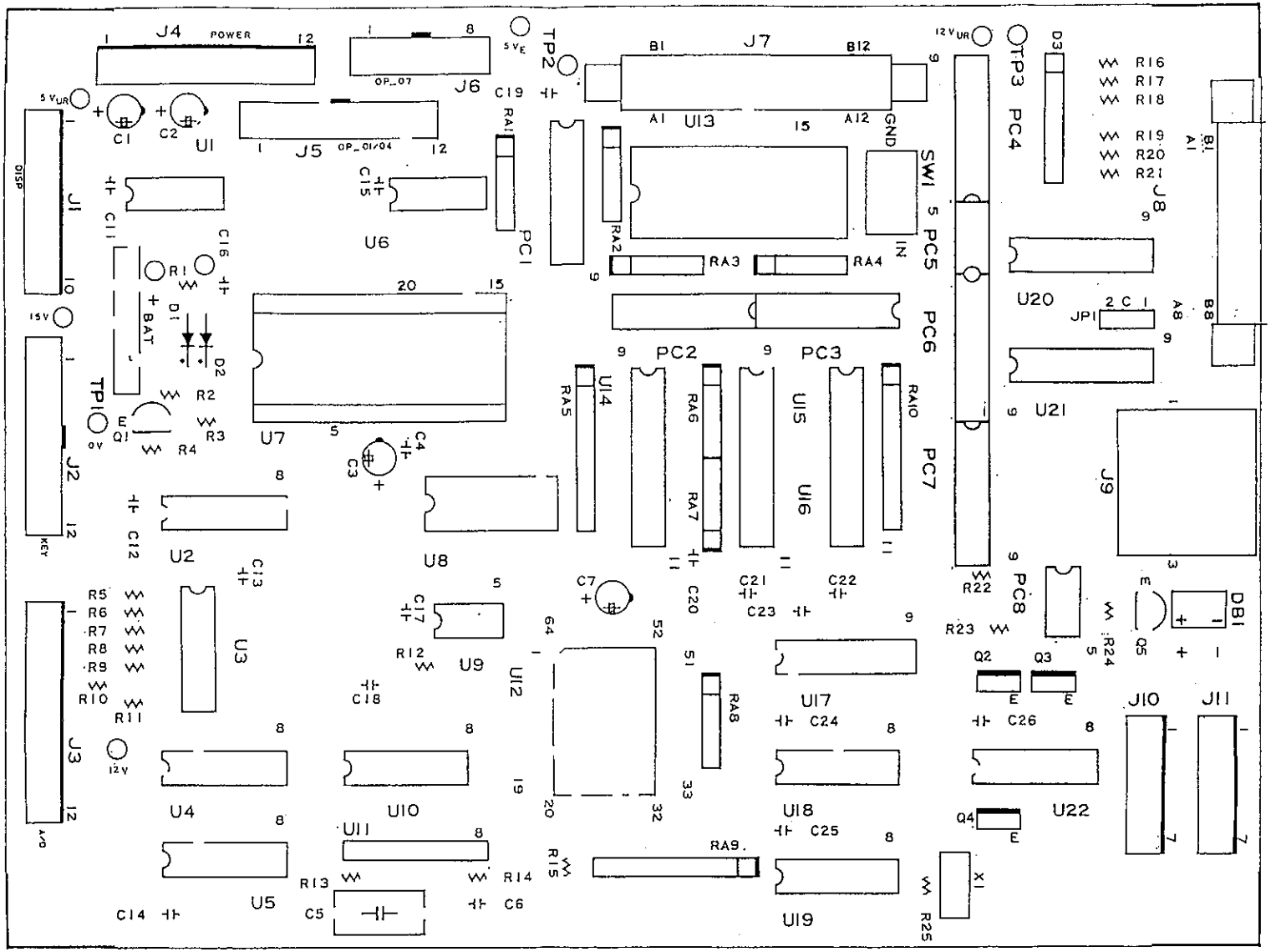
Symbol	Date	By	Revision No.	Model	AD4324 / 4942
				Description	Main Board 1/2
				Stock No.	PZ 2323 /CK
				Drwg.No.	EC3 - 01326



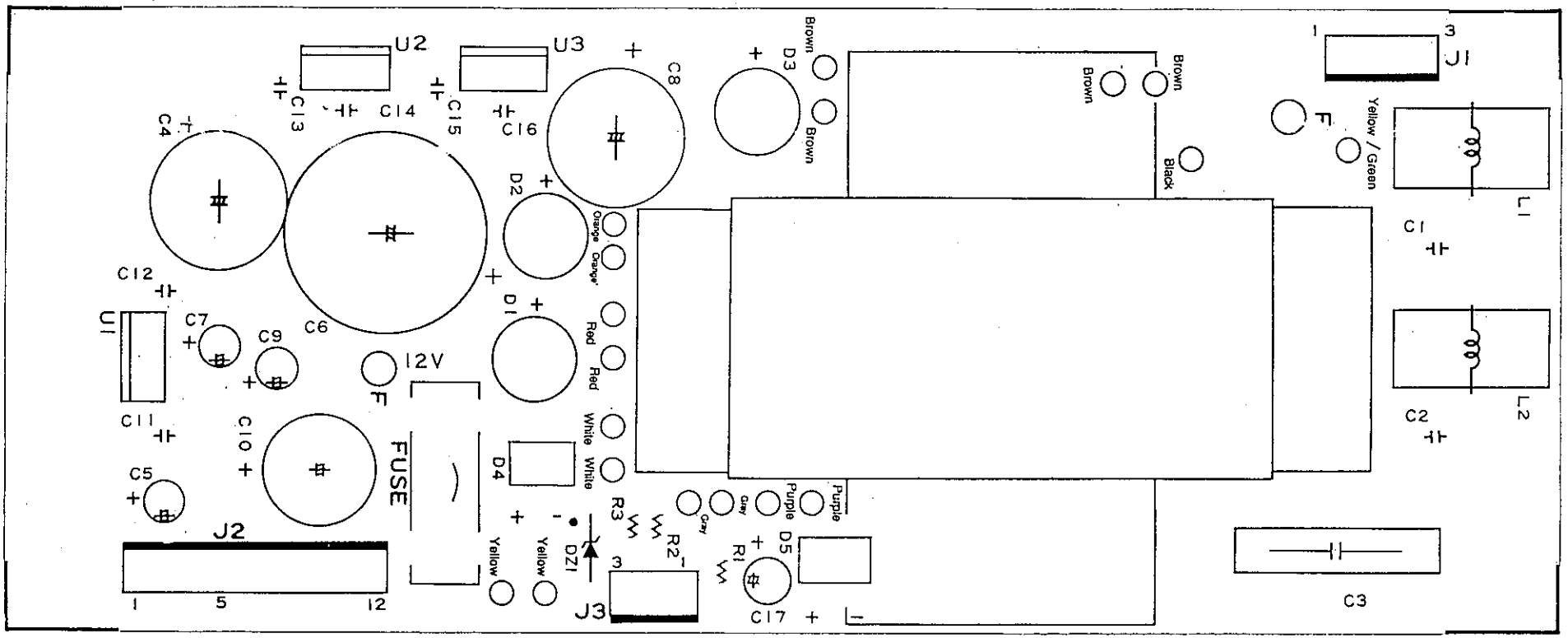
				Model	AD4324/4942
Symbol	Date	By	Revision No.	Description	Power Supply Board
				Stock No.	PZ : 2324/CK
				Drwg.No.	EC3-01325



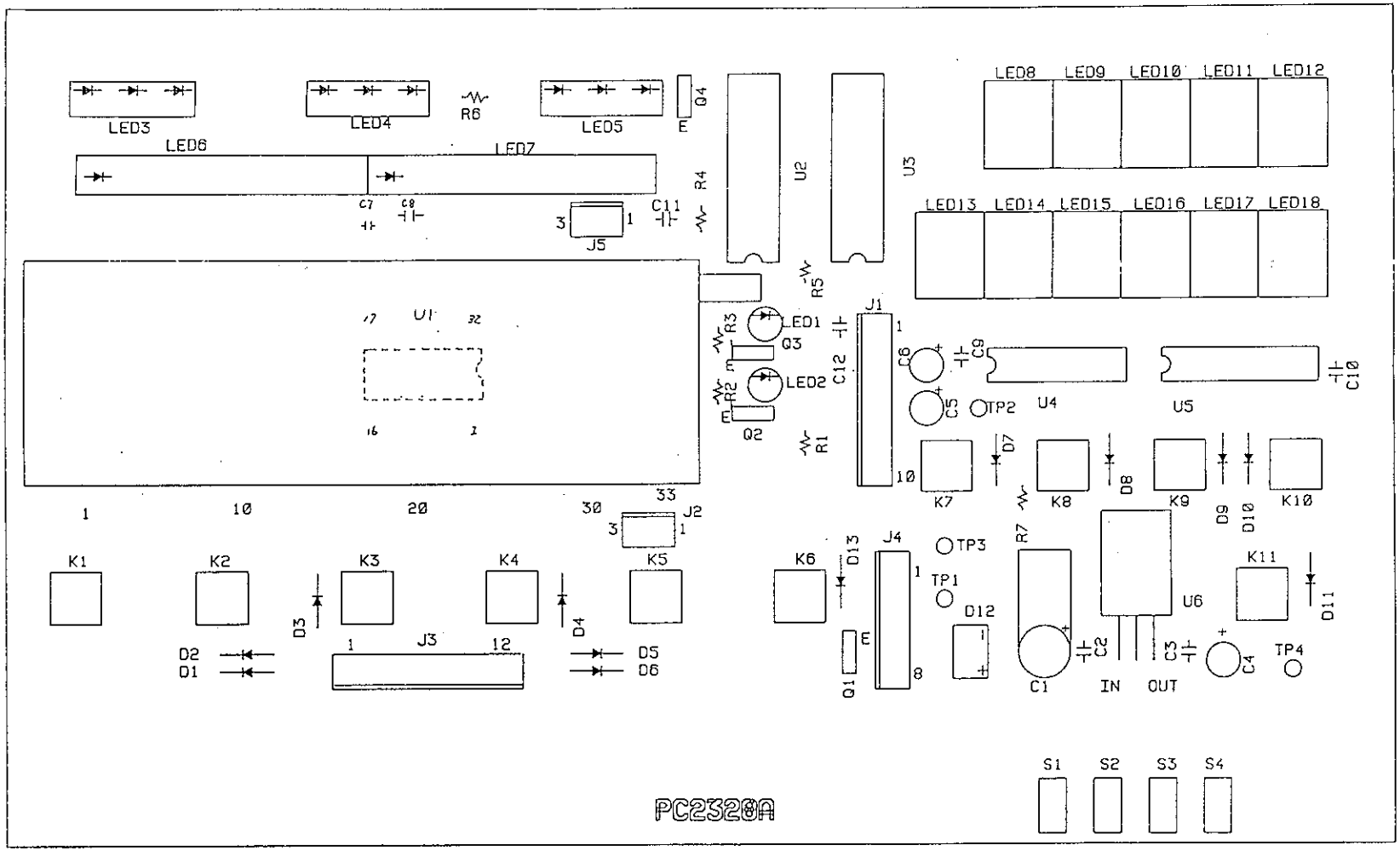
				Model	AD4324 / 4942
Symbol	Date	By	Revision No.	Description	Display Board
				Stock No.	PZ : 2328
				Drwg.No.	EC₃ - 01407



				Model	AD4324
Symbol	Date	By	Revision No.	Description	MAIN BOARD
				Stock No.	PZ:2323
				Drwg.No.	KZ3-00874



				Model	AD4324
Symbol	Date	By	Revision No.	Description	POWER BOARD
				Stock No.	PZ:2324
				Drwg.No.	KZ3-00875



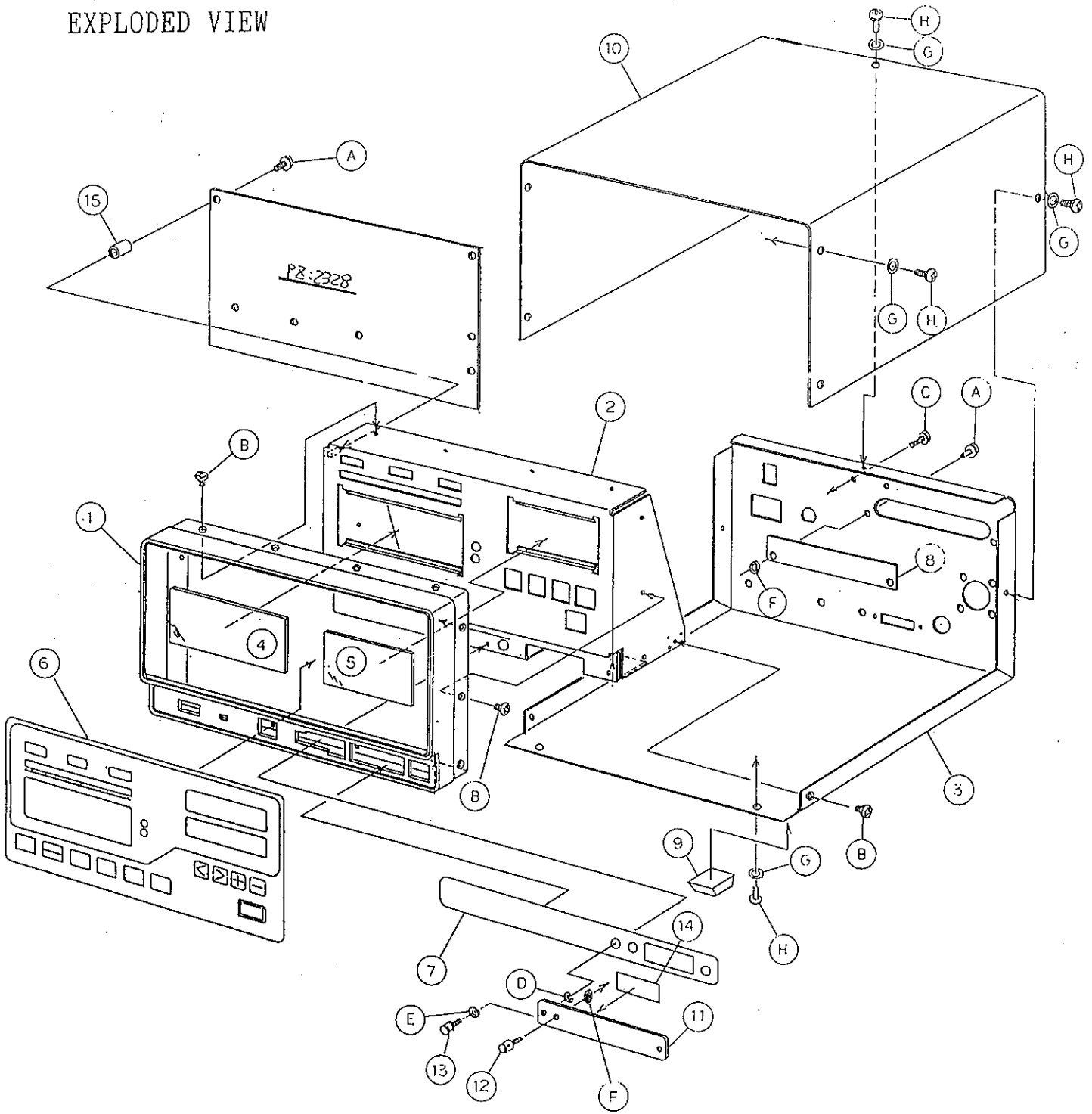
				Model	AD4324/4942
Symbol	Date	By	Revision No.	Description	Display Board
				Stock No.	PZ:2328
				Drwg.No.	KZ3-00884

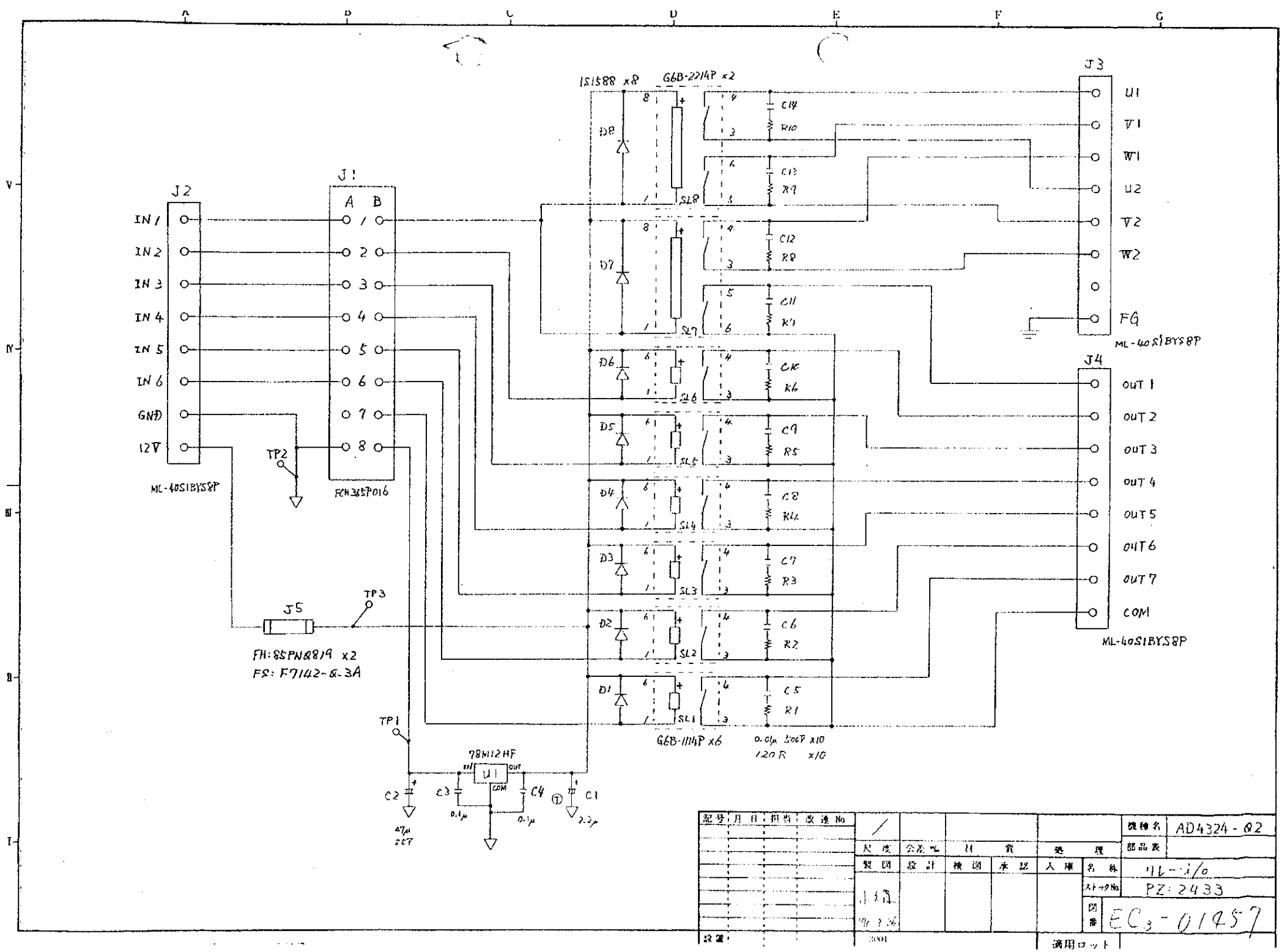
PARTS LIST
AD4324 EXPLODED VIEW

MAY.30th.1990

DRG.NO.	PARTS NAME	DESCRIPTION	Q'TY
1	07:A36842	FRONT COVER	1
2	04:A21084A	FRONT FRAME	1
3	01:A36843A	CASE	1
4	07:B42936	FILTER	1
5	07:B43135A	FILTER B	1
6	01:A36846B	KEY SHEET UPPER (JPN)	1
(6)	01:A37417A	KEY SHEET UPPER (INT'L)	1
7	01:B43246	KEY SHEET LOWER	1
8	04:A49236	BCD OUT BLANK PANEL	1
9	10:SJ-5023	RUBBER FOOT	4
10	02:A36845	COVER	1
11	02:B43136	BLANK COVER	1
12	05:A42206	SEALING BOLT WITH HOLE M3	1
13	05:A42208	SEALING SCREW WITH HOLE	2
14	08:B42940A	STICKER	1
15	05:B42938	SPACER (Φ7X10)	7
A		W SEMUSU (S) M3X6	
B		FLAT SCREW M3X4	
C		W SEMUSU (S) M3X8	
D		E RING M2.6	
E		WASHER (L) M2.6	
F		NUT M3	
G		WASHER	
H		BIND SCREW M3X6	

EXPLODED VIEW





記号	月 日	担当	改造 No			機種名	AD4324-02
				尺度	公差	材質	処理	部品表	
				製図	設計	検図	承認	入庫	名称	外形図
									ストック No.	PZ-2433
									図番	EC3-01957
									適用ロット	