MAINTENANCE MANUAL

AD4335

A&D MERCURY PTY. LTD.
32 Dew St, Thebarton, S.A., 5031
Telephone (08) 352 3033 Facsimile (08) 352 7409

CHAPTER 1. OUTLINE

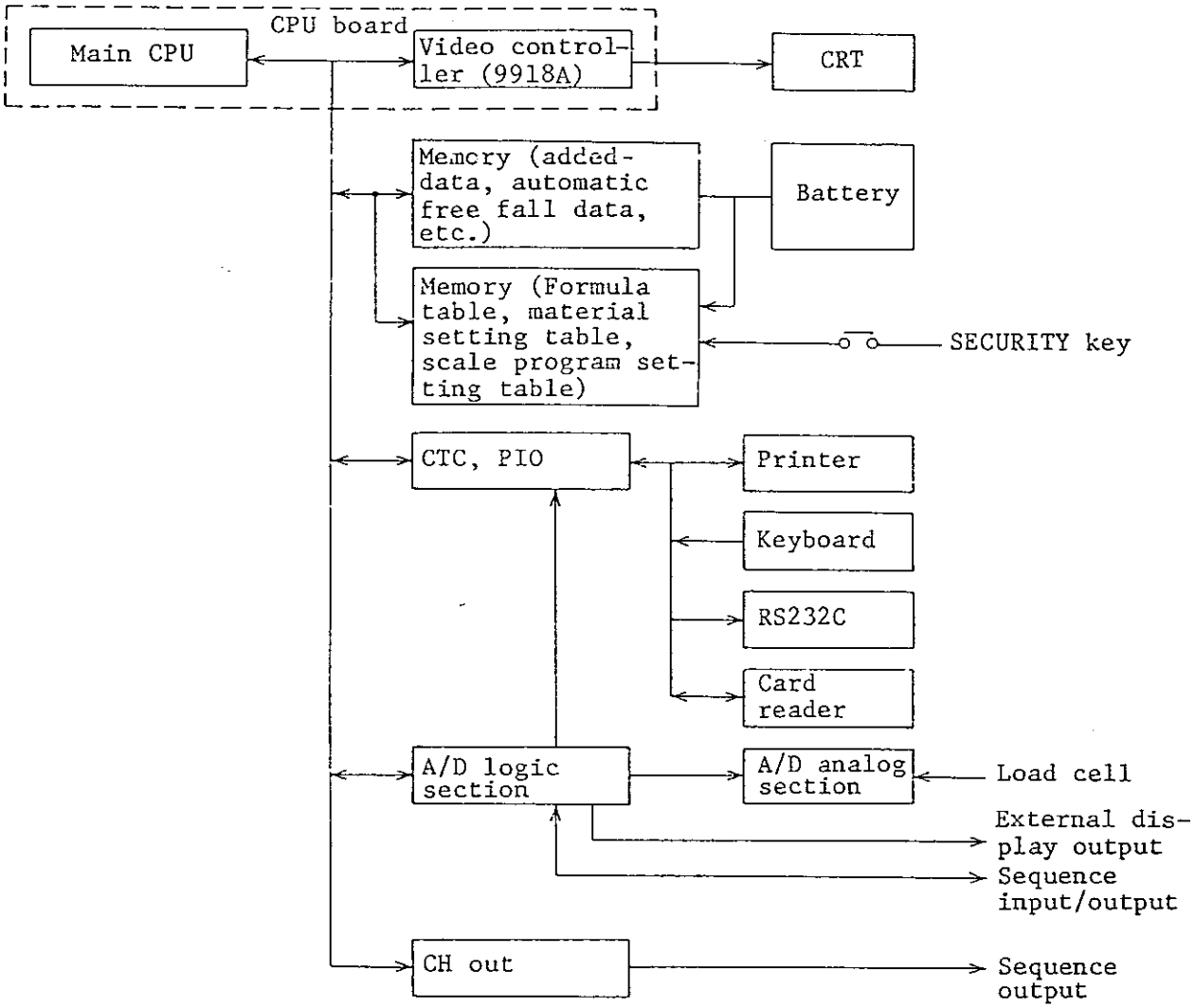
The standard configuration of this blending controller consists of a CRT of 40 digits × 24 lines, a 40-digit dot-impact printer, and A/D converter, 32K RAMs with battery backup, and a keyboard.
Data entered through the keyboard is displayed on the CRT.
Issuing an Enter command enters the displayed data into memory (RAMs with battery backup).
Stored data may be called up, as needed, by issuing a Refer command. The memory consists of a protected and an unprotected portion. The protected portion stores high-priority data such as for the blending table. The unprotected portion stores less important data such as added-up data. Memory protection may be canceled by operating the SECURITY switch.
On receiving a Print command, the printer copies the contents of the various tables displayed on the CRT. It also prints measured data batch by batch, or lot by lot.

CHAPTER 2. OPERATING PRINCIPLES

2.1 Operating Principles

With power applied, the main CPU (Z80) executes programs in the boot ROM and sets the video control IC (9918A), data communication IC (8251A), keyboard LEDs, and PiO. The operating system is then read from a ROM on the memory board into the work D-RAM. After initializing various setpoints and setting the interruption table, the OS runs a user program.
Besides the main CPU, a CPU (80C49) is provided on the A/D board and another in the printer. The CPU on the A/D board performs comparative controls such as A/D conversion, Full Flow, Dribble Flow, and Zero Band; permits Serial Out for an external display device; and exchanges data with the main CPU. The CPU in the printer receives data from the main CPU to control printer mechanisms. The PiO, CTC, and ICs on the PiO board are used to control data exchange between CPUs, data entry from the keyboard, the RS-232C interface, and a card reader, all by interruption.

2.2 Block Diagram

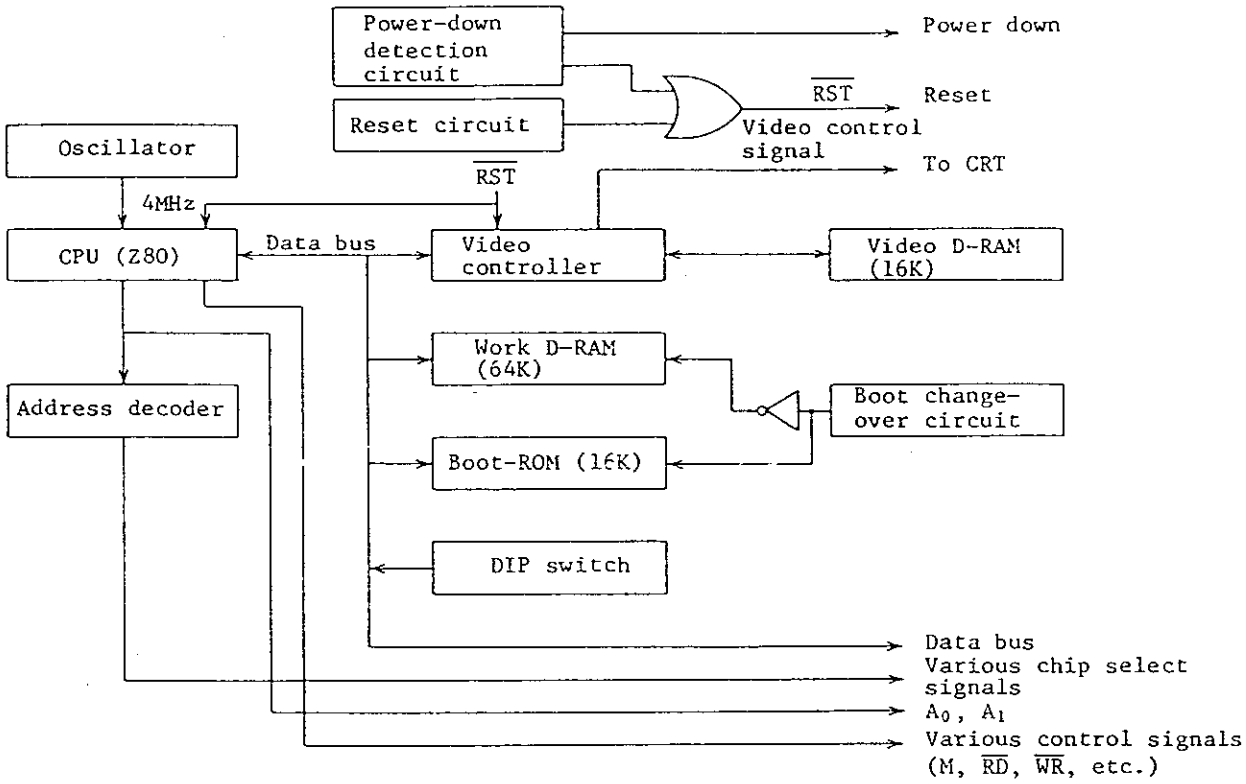


2.3 Explanation of Operations Performed by Various Boards

(1) CPU board (PZ:617)

The CPU board controls and supervises the functions of the AD4335. The board comprises the following blocks:

1) Block diagram



2) Configuration

The CPU board is configured with the following components:

- CPU (Z80)
- Power-down detection circuit (MB3761)
- CRT control (video controller TR9918 + TMM416D-3)
- Oscillator (4 MHz)
- Work D-RAM
- Boot ROM
- Address decoder

i) CPU

The AD4335 has an 8 MHz crystal oscillator output divided by 2 and 4 into 4 MHz and 2 MHz clock pulses. The 2 MHz clock is used with the 8251A on the PiO board, and the 4 MHz clock with the CPU, CTC, and PiO. When power is applied, the CPU is provided with a +5 V power supply and 4 MHz clock pulses. When tne power supply and the clock are stabilized, the $\overline{RST}$ signal from the reset circuit goes High. This activates the CPU, which starts its operation by admitting the content at address 0.

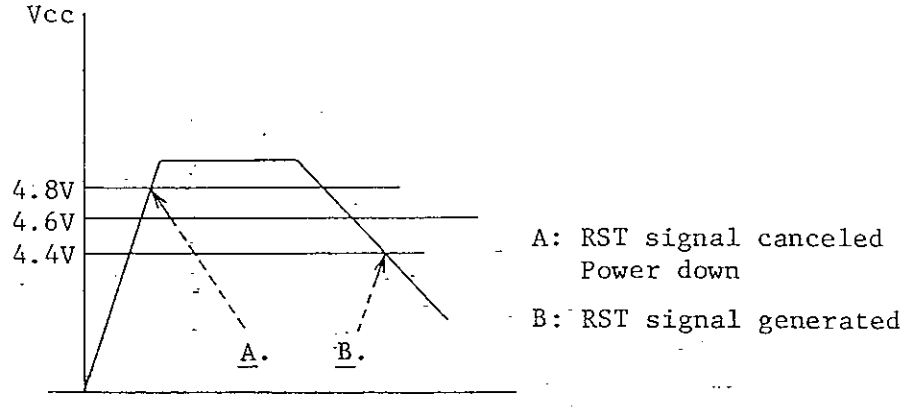
On power-up, the boot changeover switch is activated and the boot ROM is selected. Thus the CPU admits the content at address 0 of the boot ROM for execution. Under the control of programs in the boot ROM, the CPU is initialized in its storage elements and writes characters into the video D-RAM via the video controller.

The CPU then reads a system program called "M.INTERP" from the ROM (27128) on the memory board into the work D-RAM for execution. The boot ROM is detached at this stage. The CPU runs under M.INTERP thereafter.

ii) Power-down detection circuit

A Reset signal and a Power Down signal are generated using voltage comparator MB3761. This is intended to prevent the CPU from malfunctioning upon voltage drop.

VR1 is used to adjust the reset voltage level, and VR2 the power-down voltage level. The Reset signal has a degree of hysteresis.

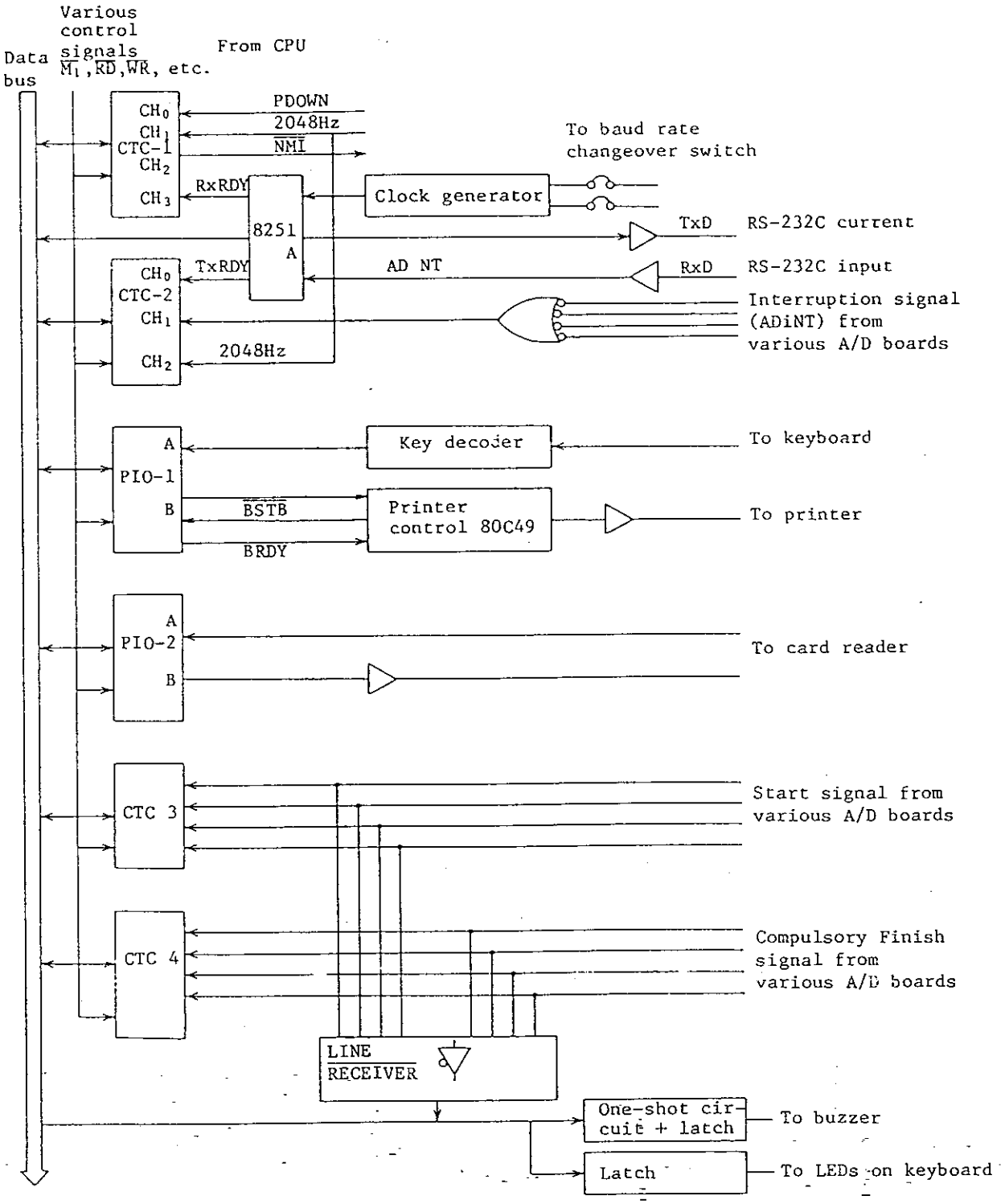


With power on, the Power Down signal is canceled when the supply voltage exceeds 4.6 V, and the Reset signal is canceled when the supply voltage exceeds 4.8 V.
With the power switch turned off, the Power Down signal is sent to CTC-1 of PIO board PZ:618 when the supply voltage drops below 4.6 V. CTC-1 in turn transmits an interruption vector to the CPU. Upon receipt of the Power Down interruption, the CPU turns on the "ERROR IN MEASUREMENT" LED on the keyboard, executes a HALT instruction and comes to a stop. When the supply voltage drops below 4.4 V, the Reset signal is output to reset various elements. The moment a Power Down or a Reset signal is output, the RAM on the PZ:619 is disabled against read or write operations.

(2) PiO board (PZ:617)

The PiO board controls interruptions from the printer, A/D board, keyboard, and RS-232C. The board comprises the following blocks.

1) Block diagram



2) Configuration

The PiO board is configured with the following components:

- CTC
- PiO
- Printer control
- Key decoder

3) Operations

(i) CTC and 8251A

After bootstrapping by the CPU, the CTC is initialized under the control of the M.INTERP program. CH0 and CH3 of CTC-1, as well as CH0 and CH1 of CTC-2, are set to count 1 in the counter mode; their signal level is set for a leading edge, and the interruption is enabled. CH0 through CH3 of CTC-3 and CTC-4 are set for a trailing edge in signal level.

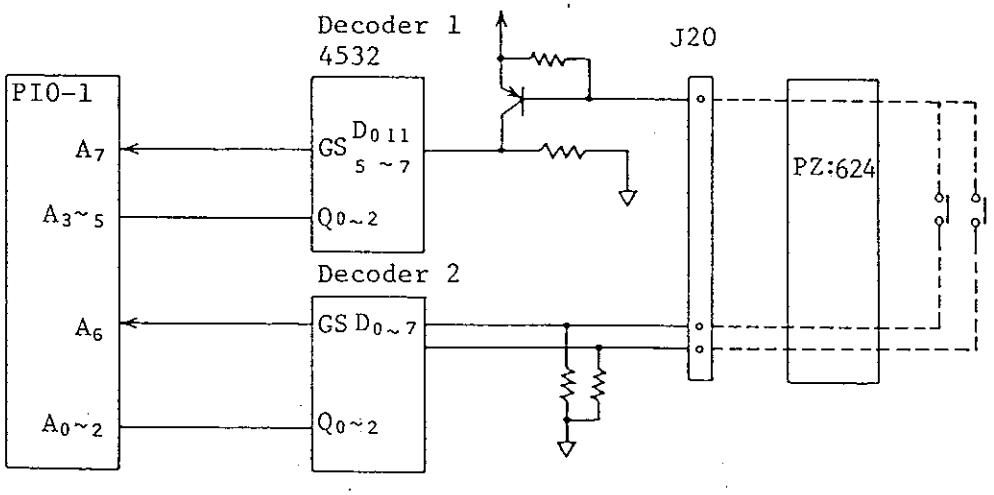
When a Power Down signal is generated, the CTC starts the count. At a count of 1, an interruption vector is sent to the CPU. The CPU analyzes the vector and performs power-down processing. Likewise, when a Start or a Compulsory Finish signal (trailing edge signal) comes from an A/D board, the CTC sends an interruption vector to the CPU. After analyzing the vector, the CPU admits the Start of Compulsory Finish signal from the line receiver.

When an RS-232C signal enters the 8251A, the 8251A brings an RXRDY signal High as soon as it admits one character of the signal. The CTC detects the High level and sends an interruption vector to the CPU. The CPU in turn admits the data that entered the 8251A.

When outputting an RS-232C signal, the CPU writes the characters to be output in the 8251A. The 8251A outputs the characters according to predetermined patterns then brings the TXRDY signal High. The reset is the same as with the input process.

During bootstrapping, the 8251A is initialized to data bit 8, even parity, and stop bit 2. In the counter mode, CH1 of CTC-1 is initialized to a count of 102, with its signal level set for a trailing edge and its interruption enabled; in the same mode, CH2 of CTC-1 is initialized to a count of 20, with its interruption disabled.
CH1 admits 2048 Hz clock pulses from watch IC μPD1990C on the memory board. When the count reaches 102 (1000 ms/ 2048 × 102 ≒ 50 ms), an interruption vector is sent to the CPU, with pulses output to TO1 simultaneously. The CPU uses interruptions at intervals of 50 ms for a timer. Because TO1 is connected to CH2, an $\overline{\text{NMi}}$ signal is sent from TO2 to the CPU at a count of 20 (1 sec.). This signal is used as a watch dog timer. The CPU clears this timer whenever it detects an interval during program execution. If the timer is left uncleared due to runaway or other causes, the timer reaches full count, sending an $\overline{\text{NMi}}$ signal to the CPU, which is reset by this signal.

(ii) PiO (Key data read circuit)

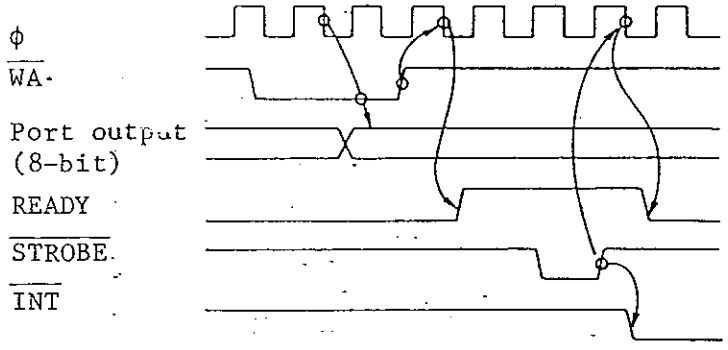


The PiO is initialized during bootstrapping. Port A of PiO-1 is set so that it causes an interruption when the input of A0 through A7 changes from 00 in the input mode.

Usually, with no key pressed, input terminals D0 to D7 of decoders 1 and 2 are at the Low level; output terminals Q0 to Q2 and GS are also at the Low level.
When one of the keys is pressed, the transistor base is brought Low, and Input terminals D0 to D7 of decoders 1 and 2 are brought High. The input is converted to a code. The PiO senses changes in input at A0 to A7 and admits them as data, sending an interruption vector to the CPU simultaneously. After analyzing the interruption vector, the CPU sets a count constant to CH2 of CTC-2. When the counter reaches full count 20 msec. later, CH2 sends an interruption vector to the CPU. The CPU admits the vector and recognizes a lapse of 20 msec. The CPU then reads the code latched at port A of PiO-1.
If two keys are pressed simultaneously, the value closer to D7 becomes valid. That is, normal values cannot be read in.

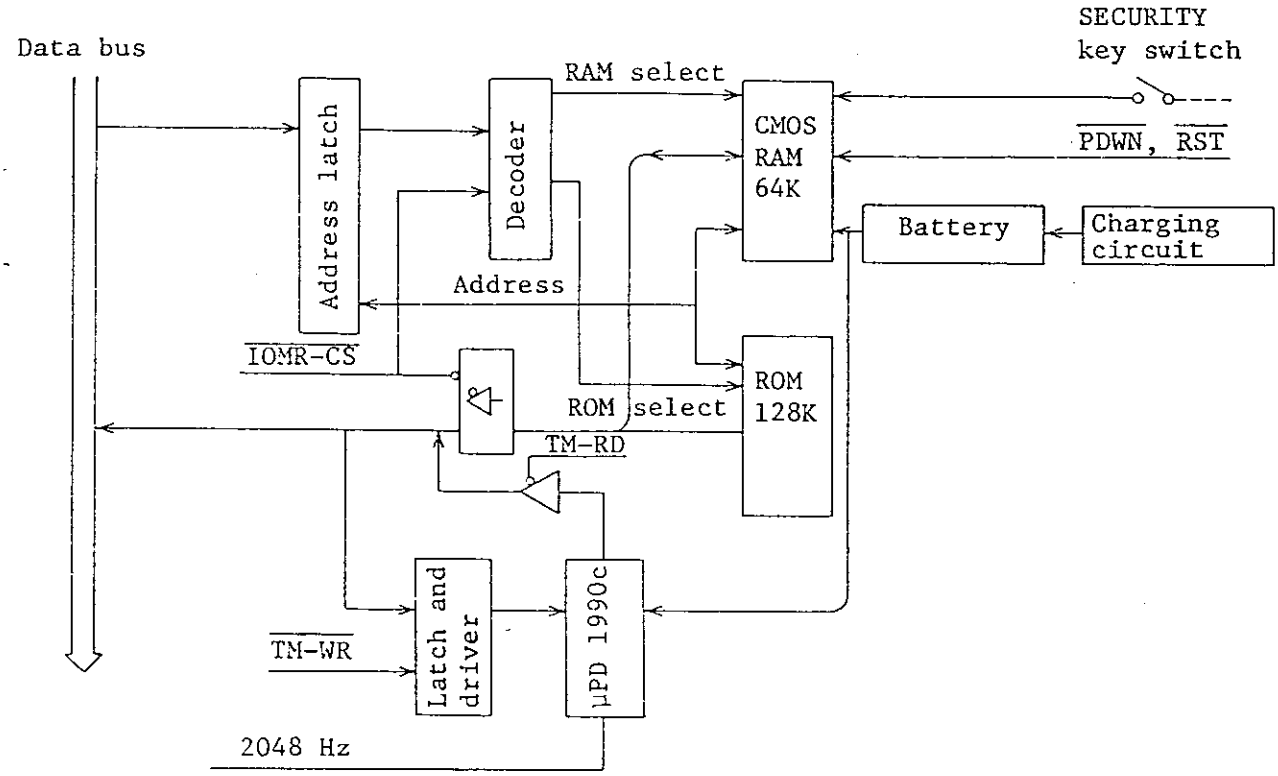
(iii) PiO (Printer output circuit)

Port B of PiO-1 is set to the output mode, with its interruption enabled. When receiving 8-bit data from the CPU, the PiO gets the data routed to printer controller 80C49 via port B, bringing the BRDY signal High simultaneously. The 80C49 keeps polling the BRDY signal and, when it detects a High level, admits the 8-bit data and brings the $\overline{\text{BSTB}}$ signal Low. When the signal is input, the PiO sends an interruption vector to the CPU, which in turns outputs another 8-bit of data.



(3) Memory board (PZ:619)

1) Block diagram



2) Memory operations

When the CPU writes 3-byte address data (Low, Middle, High) in the address latch, the signal is decoded. If bit 17 is Low, the ROM is selected, and the signal is placed on the data bus synchronized with an external memory read signal from the CPU. If bit 17 is High, the CMOS RAM is selected. The $\overline{\text{PDWN}}$ and $\overline{\text{RST}}$ signals from the CPU board disable the CMOS RAM for read and write operations. If the SECURITY switch is in the ENTER position, RAMs of IC9 through IC15 are disabled for write operations.

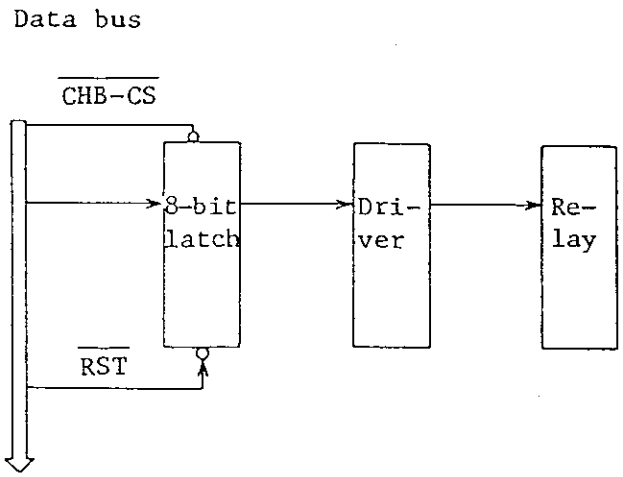
3) Watch IC

IC µPD1990C is driven by 32,768 Hz clock pulses. This watch IC remains active on battery during power failures. The time of day is entered by numeric keys, and is set

in the μPD1990C via the latch and driver under CPU control. The watch IC output is transferred serially by the $\overline{\text{TM-WR}}$ signal from the CPU. The 2048 Hz clock pulses are sent to the PiO board to serve as a basic clock for the timer.

(4) CH output board (PZ:620)

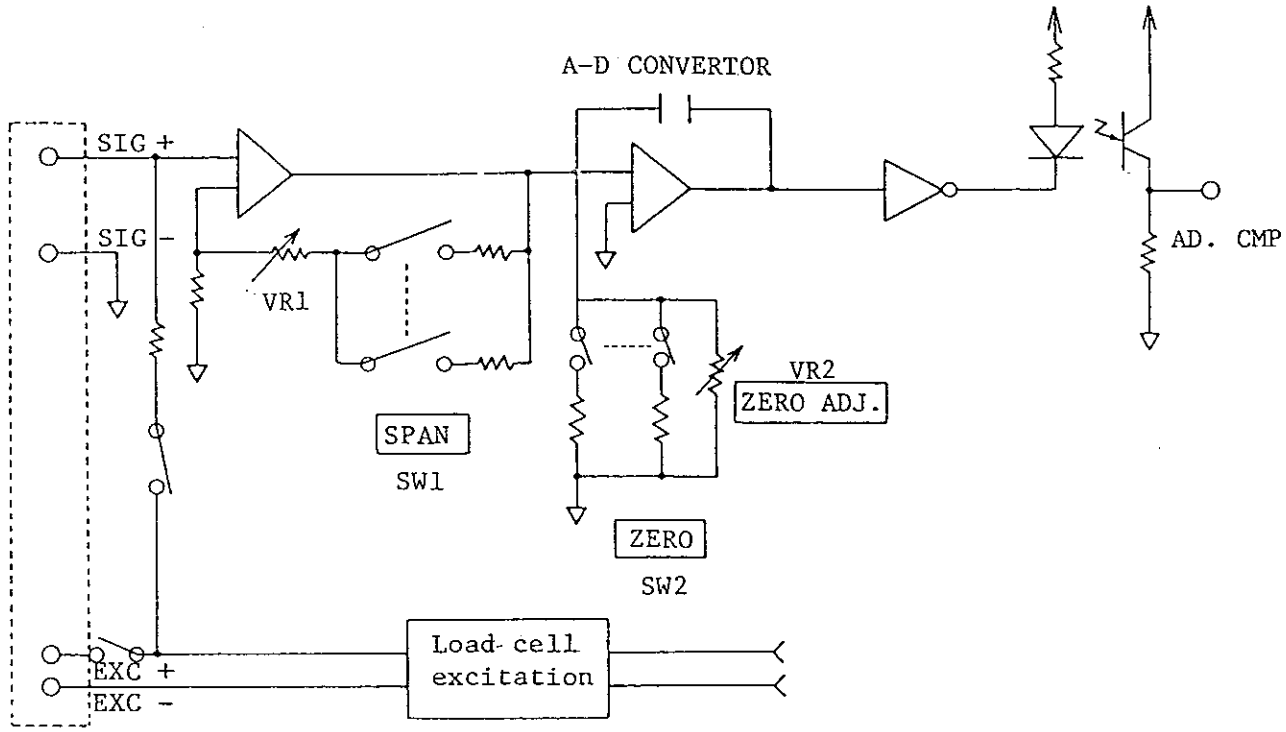
1) Block diagram



The $\overline{\text{CHB-CS}}$ signal from the CPU writes 8-bit data from the data bus into the latch, drives the relay, and outputs the data.

(5) A/D analog section (PZ:622)

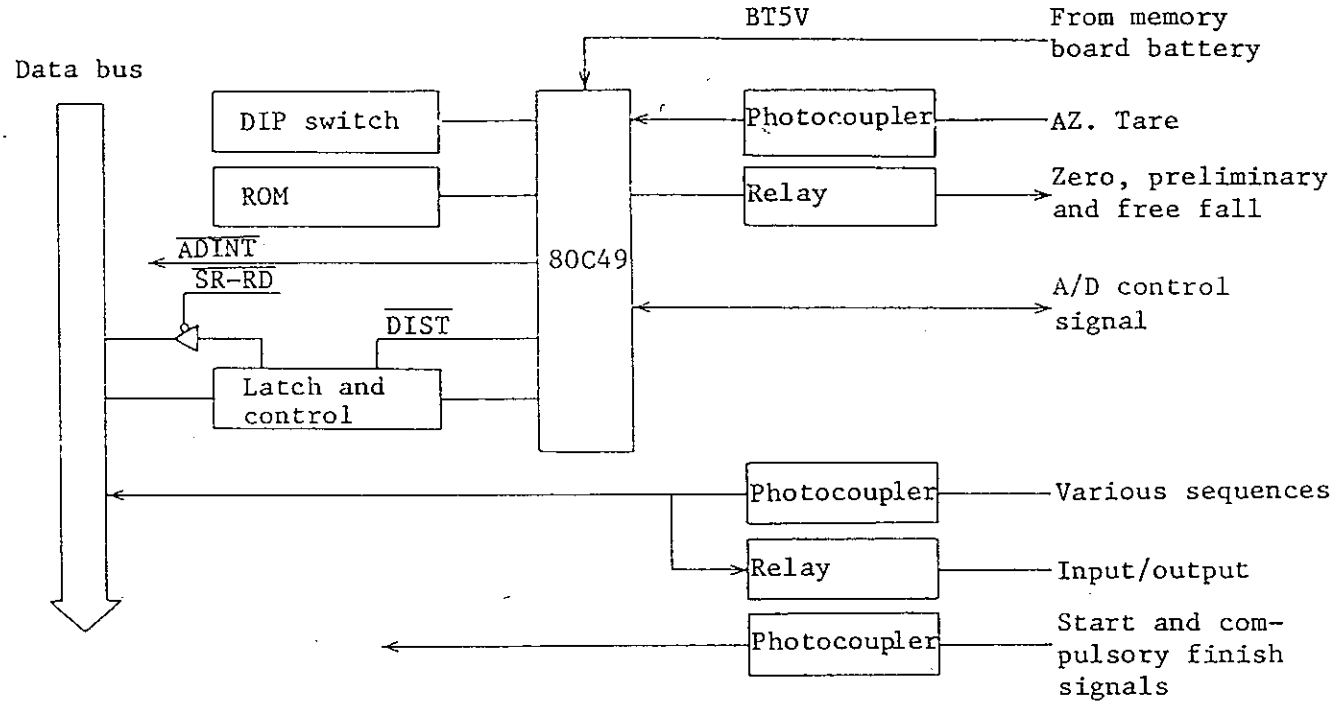
1) Block diagram



A very low voltage from the load cell is amplified by a preamplifier to be charged in an integrating capacitor for a first period of time. When the first period of time is up, the capacitor is discharged. At the same time, the CPU (80C49 on PZ:621) starts counting.
Upon receipt of an AD COMP signal, the CPU stops counting, and the final count is taken as the measurement.

(6) A/D logic section (PZ:621)

1) Block diagram



2) Logic operations

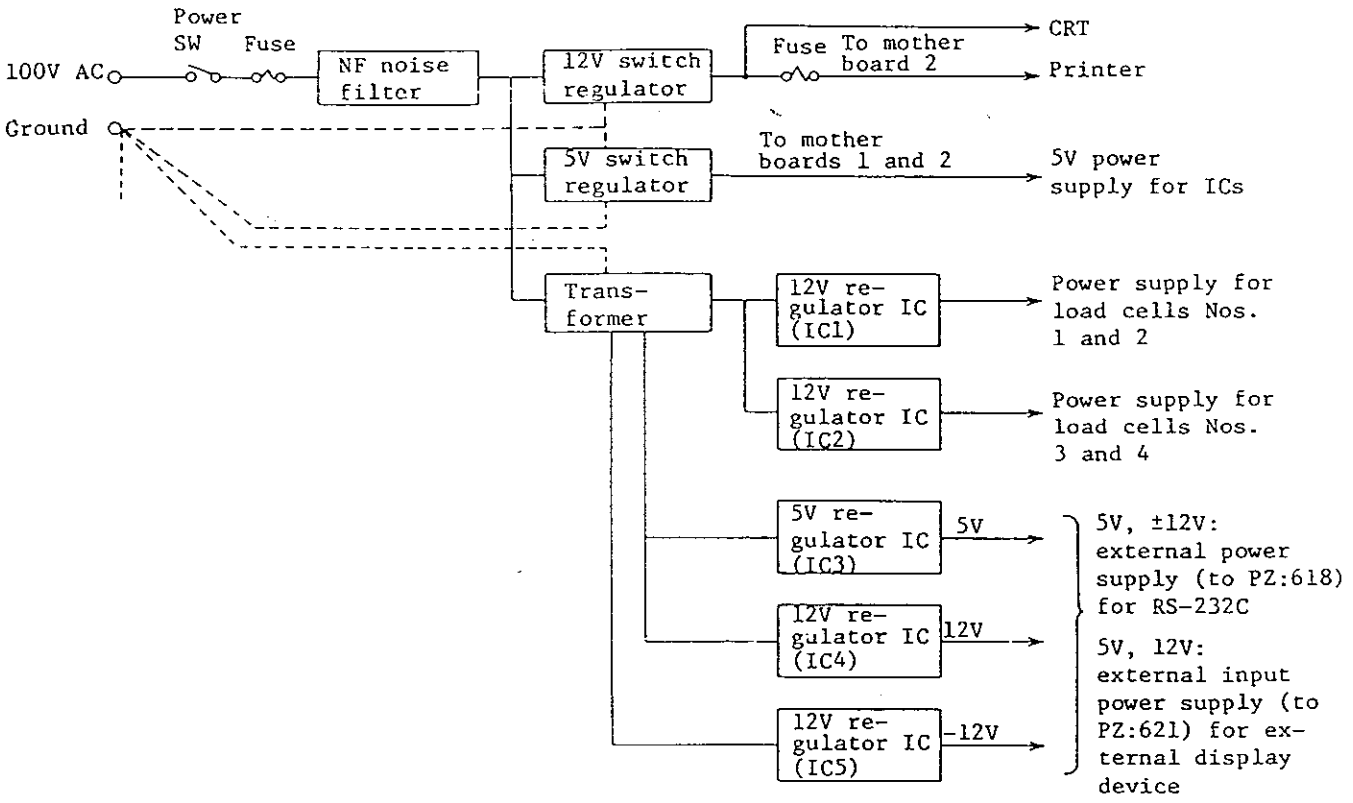
The input and output of each sequence are directly driven by the CPU via photocouplers and relays. The Start and the Compulsory Finish signals are input to the PiO board (PZ:618) to cause an interruption, which is read by the CPU. IC 80C49 sets and resets AZ and Tare, and controls the Zero, preliminary and free fall signals.

The main CPU admits measured data as follows: The CPU periodically outputs a Data Request command to the A/D section. The command is written in the latch and control circuit, bringing the $\overline{\text{DTST}}$ signal Low. IC 80C49 checks the $\overline{\text{DTST}}$ signal after each sampling. If the signal is found Low, the 80C49 admits the command, writes the measured data in the latch, and brings the $\overline{\text{ADiNT}}$ signal Low. The $\overline{\text{ADiNT}}$ signal drives the CTC on the PiO board and generates an interruption to the CPU. IC 80C49 is driven by the battery on the memory board.

When power is turned off, voltage detection IC MB3761 places the 80C49 in the standby mode (to retain internal memory at low power consumption). Thereafter, the internal memory is retained by battery. When power is turned on, the standby mode is left and the ordinary mode is entered. If the battery power is turned off, as when the ooard is detacned with power off, inserting the board again starts the operation in the ordinary mode; the battery has been dissipated and all contents in the CMOS RAM have been erased.

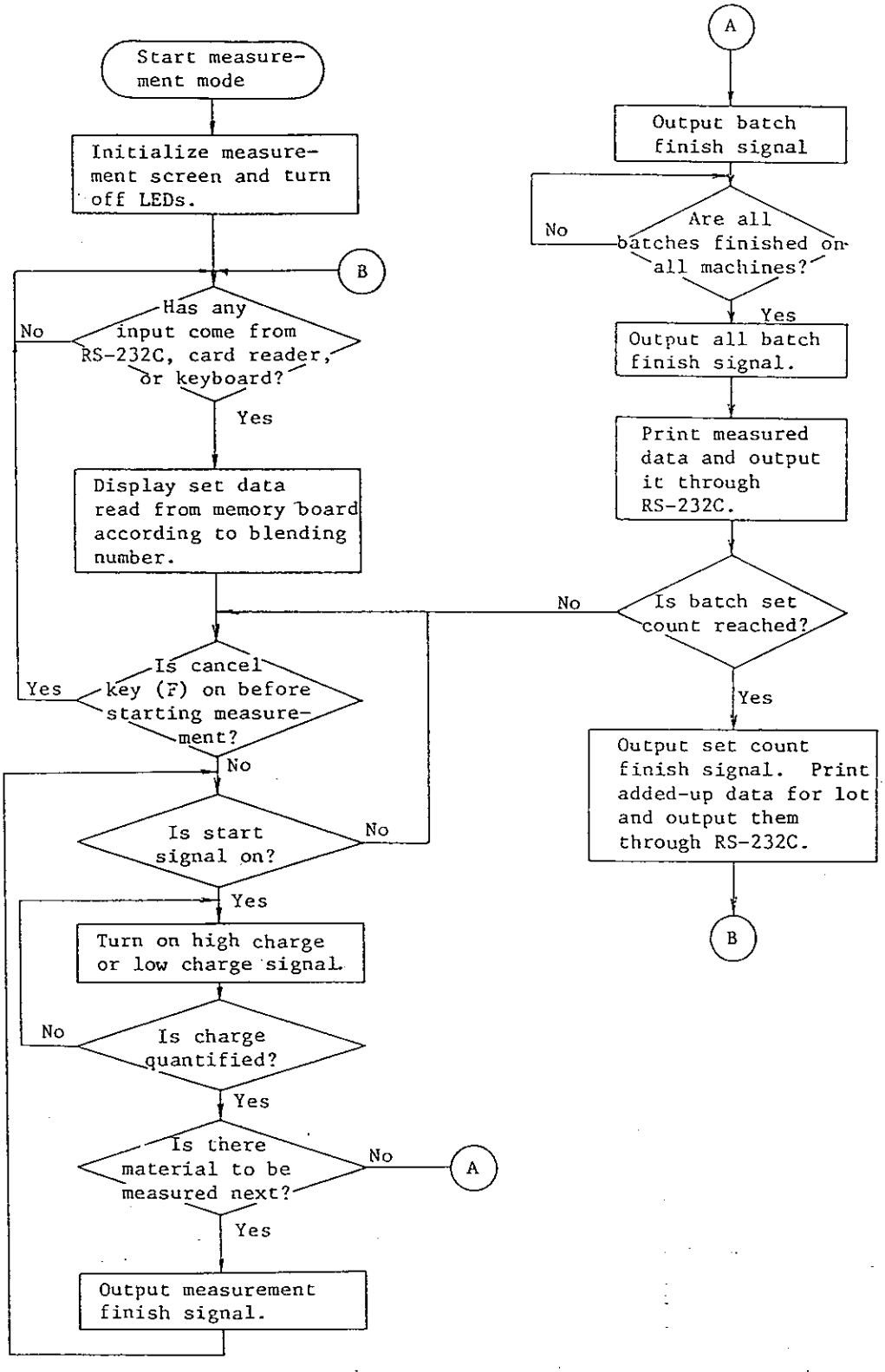
(7) Power supply circuit

1) Wiring diagram

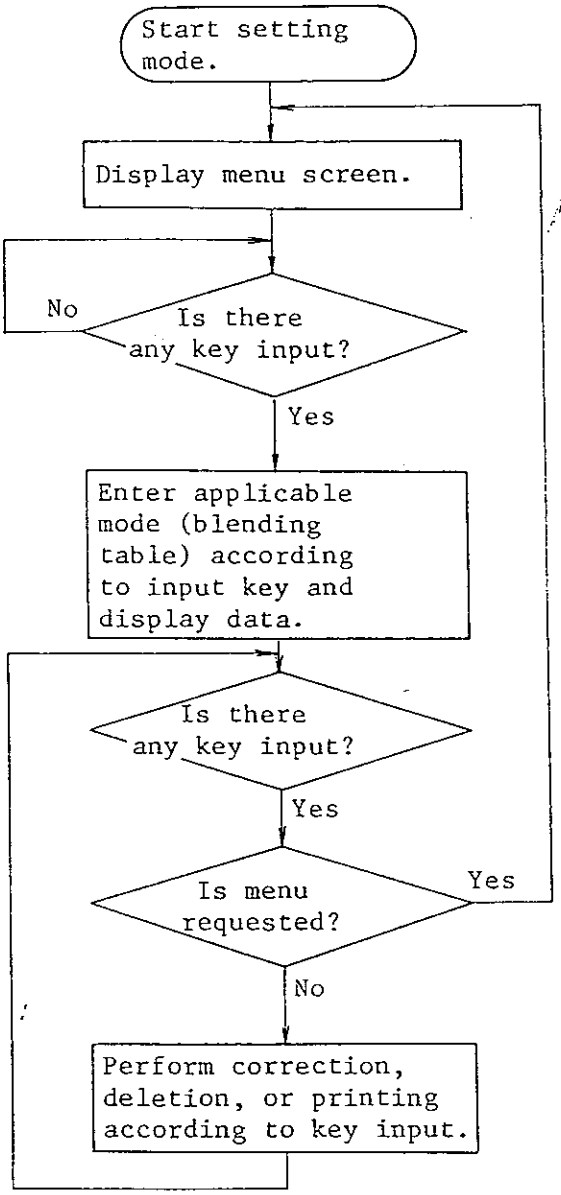


2.4 Software Performance Flowchart

(1) Measurement mode



Setting mode



4. PARTS LIST

AD-4335
CPU BOARD-1/2

CIRCUIT SYMBOL OR DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
	PZ:617	CPU BOARD FULLY ASSEMBLED	
	PC:617A	PRINTED CIRCUIT BOARD	
C8,12,14~21,47~52 56~62,64~71	CC:0.022U	CAPACITOR 0.022μF 50V	31
C 1	CC:100P	CAPACITOR 100pF 50V	1
C 5,13	CC:150P	CAPACITOR 150pF 50V	2
C 9,10	CC:33P	CAPACITOR 33pF 50V	2
C 38,63	CC:330P	CAPACITOR 330pF 50V	2
C 4,6	CK:SM25VB100	CAPACITOR 100μF 25V	2
C 2,3	CT:1C100	CAPACITOR 10μF 16V	2
C 90	CT:1C220	CAPACITOR 22μF 16V	1
C 7,11,22~37 39~46, 72~89	CT:1D2R2	CAPACITOR 2.2μF 20V	44
D 1,2	DI:1SS53	DIODE	2
①	JC:31-010	BNC CONNECTOR	1
J 2	JI:365P064-AG	CONNECTOR	1
U 17	JS:10328-01-445	SOCKET (28pin)	1
U 16	JS:10340-01-445	SOCKET (40pin)	1
L 2	LL:SF-T8-50D	COIL	1
LL 1	LR:H5AT7-14-3.5	COIL	1
Tr 1,2	QT:C1815Y	TRANSISTOR	2
R 12,13,20	RC:1.2K	RESISTOR 1.2K	3
R 18	RC:1R	RESISTOR 1Ω	1
R 9	RC:12K	RESISTOR 12K	1
R 5,6	RC:120R	RESISTOR 120Ω	2
R 23,34	RC:15R	RESISTOR 15Ω	2
R 8	RC:150R	RESISTOR 150Ω	1
R 7,10	RC:2.7K	RESISTOR 2.7K	2
R 21	RC:22K	RESISTOR 22K	1
R 3,4	RC:220R	RESISTOR 220Ω	2
R 19	RC:3.9K	RESISTOR 3.9K	1
R 11	RC:330R	RESISTOR 330Ω	1
R 14,15,22,37	RC:4.7K	RESISTOR 4.7K	4
R 17	RC:47K	RESISTOR 47K	1

PARTS LIST

AD－4335
CPU BOARD－2／2

CIRCUIT SYMBOL OR DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
R 16	RC:470R	RESISTOR 470Ω	1
R 1,2,25,36	RC:560R	RESISTOR 560Ω	4
R 24,35	RC:75R	RESISTOR 75Ω	2
R 30～33	RN:IHR-4-223MA	RESISTOR NETWORK 22K×4, 1/8W	4
R 26～29	RN:IHR-4-472MA	RESISTOR NETWORK 4.7K×4, 1/8W	4
VR 1,2	RV:H102	POTENTIOMETER 1KΩ	2
DISW 1,2	SD:KTD08	DIP SWITCH	2
U 1	UA:MB3761	VOLTAGE COMPARATOR	1
U 40～47	UN:4116	D RAM	8
U 32～39	UN:8264-15	D RAM	8
U 18	UN:9918ANL	CRTC	1
U 48	UR:TL497ACN	VOLTAGE REGULATOR 5V	1
U 7	UT:LS00	TTL	1
U 8	UT:LS02	TTL	1
U 9,24	UT:LS08	TTL	2
U 27,28,30,31	UT:LS138	TTL	4
U 13,20,21	UT:LS139	TTL	3
U 3	UT:LS14	TTL	1
U 5,11	UT:LS161	TTL	2
U 19,22	UT:LS244	TTL	2
U 25	UT:LS245	TTL	1
U 14,15	UT:LS257	TTL	2
U 12,23,26	UT:LS32	TTL	3
U 29	UT:LS367	TTL	1
U 6,10	UT:LS74	TTL	2
U 4	UT:S04	TTL	1
U 1	UT:75452B	TTL	1
XT 1	XT:18/U8MHZ	CRYSTAL 8MHZ	1
XT 2	XT:9105	CRYSTAL 10.738635MHZ	1
③	01:A43070A		1
②	10:NO-3881		1

PARTS LIST

AD－4335
PIO BOARD－1／2

CIRCUIT SYMBOL OR DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
	PZ:618	PIO BOARD FULLY ASSEMBLED	
	PC:618B	PRINTED CIRCUIT BOARD	
C 21～32	CC:0.001U	CAPACITOR 0.001μF 50V	12
C 2,3～6,10～13 17,19,20	CC:0.022U	CAPACITOR 0.022μF 50V	12
C 14	CC:0.1U25V	CAPACITOR 0.1μF 25V	1
C 7	CC:10P	CAPACITOR 10pF 50V	1
C 8	CC:100P	CAPACITOR 100pF 50V	1
C 15,16	CC:22P	CAPACITOR 22pF 50V	2
C 1	CT:1C220	CAPACITOR 22μF 16V	1
C 18	CT:1D2R2	CAPACITOR 2.2μF 20V	1
C 9	CT:1V010	CAPACITOR 1μF 35V	1
PF 1,2	DF:TLP521-1	PHOTO COUPLER	2
D 1,2	DI:1SS53	DIODE	2
②	JA:RDBB-25S-LN	CONNECTOR	1
J 1	JI:365P064-AG	CONNECTOR	1
④	JI:700A2	CONNECTOR	1
J 20	JI:705P050-AU/M	CONNECTOR	1
U 17	JS:10324-01-445	SOCKET (24pin)	1
U 24	JS:10340-01-445	SOCKET (40pin)	1
Tr 3～7	QT:A1015Y	TRANSISTOR	5
Tr 1,2,8	QT:C1815Y	TRANSISTOR	3
R 1	RC:1/21M	RESISTOR 1MΩ 1/2W	1
R 2,11,39	RC:1K	RESISTOR 1KΩ	3
R 37,38	RC:10K	RESISTOR 10KΩ	2
R 14	RC:100K	RESISTOR 100KΩ	1
R 8,12	RC:100R	RESISTOR 100Ω	2
R 7	RC:2.2K	RESISTOR 2.2KΩ	1
R 15～17,40,41,46	RC:22K	RESISTOR 22KΩ	6
R 35	RC:220R	RESISTOR 220Ω	1
R 9,13	RC:270R	RESISTOR 270Ω	2
R 3,10	RC:330R	RESISTOR 330Ω	2
R 4～6,29,36,48,49	RC:4.7K	RESISTOR 4.7KΩ	8
R 19～26	RC:8.2K	RESISTOR 8.2KΩ	8

PARTS LIST

AD－4335
PIO BOARD－2／2

CIRCUIT SYMBOL OR DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
R 34	RN:IHR-4-102MA	RESISTOR NETWORK 1K×4, 1/8W	1
R 31,32	RN:IHR-4-223MA	RESISTOR NETWORK 22K×4, 1/8W	2
R 27,28,47	RN:IHR-4-472MA	RESISTOR NETWORK 4.7K×4, 1/8W	3
R 18	RN:IHR-6-104JA	RESISTOR NETWORK 100K×6, 1/8W	1
U 10	UC:4049	CMOS	1
U 12	UC:4093	CMOS	1
U 2,4	UC:4532	CMOS	2
U 14,18,22,25	UN:Z80A-CTC	CTC	4
U 8,13	UN:Z80A-PIO	PIO	2
U 11	UN:8251	AM8251PC	1
U 1,3	UT:LS04	TTL	2
U 15	UT:LS08	TTL	1
U 19	UT:LS123	TTL	1
U 28,31	UT:LS14	TTL	2
U 26	UT:LS174	TTL	1
U 16,27	UT:LS244	TTL	2
U 30	UT:LS245	TTL	1
U 29	UT:LS30	TTL	1
U 23	UT:LS32	TTL	1
U 32	UT:LS367	TTL	1
U 21	UT:LS374	TTL	1
U 9	UT:LS393	TTL	1
U 20	UT:LS74	TTL	1
U 5	UT:LS86	TTL	1
U 7	UT:75188	TTL	1
U 6	UT:75189	TTL	1
XT-2	XT:HC18/U6MHZ	CRYSTAL 6MHZ	1
XT-1	XT:9104	CRYSTAL 4.9152MHZ	1
③	01:A43068A		1
①	10:NO-3881		1

PARTS LIST

AD－4335
MEMORY BOARD

CIRCUIT SYMBOL OR DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
	PZ:619	MEMORY BOARD FULLY ASSEMBLED	
	PC:619	PRINTED CIRCUIT BOARD	
C 6～24,33～40,46	CC:0.022U	CAPACITOR 0.022μF 50V	28
C 3,4	CC:33P	CAPACITOR 33pF 50V	2
C 5	CT:1C220	CAPACITOR 22μF 16V	1
C 1,2, 25～32 41～51,47～51	CT:1D2R2	CAPACITOR 2.2μF 20V	22
D 1～4	DI:1SS53	DIODE	4
BAT	EB:N-SB3	NiCd BATTERY	1
J 3	JI:365P032-AG	CONNECTOR	1
U 1～12	JS:10328-01-445	CONNECTOR	12
R 2	RC:1K	RESISTOR 1KΩ	1
R 1	RC:2.7K	RESISTOR 2.7KΩ	1
R 4,10,11	RC:22K	RESISTOR 22KΩ	3
R 9	RC:47K	RESISTOR 47KΩ	1
	RC:68K	RESISTOR 68KΩ	1
R 5～8	RN:IHR-4-223MA	RESISTOR NETWORK 22K×4, 1/8W	4
U 22	UC:D1990C	CMOS LSI	1
U 23	UC:40H032	CMOS	1
U 21	UC:4050	CMOS	1
U 13～16	UN:6264LP-15	CMOS STATIC RAM	4
U 30	UR:TA78005AP	VOLTAGE REGULATOR +5V, 1A	1
U 28	UT:LS08	TTL	1
U 25,26	UT:LS138	TTL	2
U 17,20	UT:LS174	TTL	2
U 27	UT:LS245	TTL	1
U 29	UT:LS32	TTL	1
U 24	UT:LS368	TTL	1
U 18,19	UT:LS374	TTL	2
XT	XT:9102	CRYSTAL 32.768 KMZ	1
①	01:A44183		1
②	05:A44176		2

PARTS LIST

AD−4335
CH OUT BOARD

CIRCUIT SYMBOL OR DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
	PZ:620	CH OUT BOARD FULLY ASSEMBLED	
	PC:620A	PRINTED CIRCUIT BOARD	
C 6～29,56～59	CC:0.001U	CAPACITOR 0.001μF 50V	29
C 30～53,60	CC:0.01U500V	CAPACITOR 0.01μF 500V	25
C 2～5,54,55	CC:0.022U	CAPACITOR 0.022μF 50V	6
C 1	CT:1D2R2	CAPACITOR 2.2μF 20V	1
K 1,2	JI:360A2		2
J(4,5,6),CHOUT	JI:365P032-AG	CONNECTOR	2
R 1～24	RC:100R	RESISTOR 100Ω	24
R 25～27	RC:560R	RESISTOR 560Ω	3
RX 1～24	SL:LDI-1M-05D	READ RELAY	24
U 4～7	UT:LS04	TTL	4
U 1～3	UT:LS273	TTL	3
U 8	UT:LS367	TTL	1
①	01:A43071		1
②	05:A44176		2

PARTS LIST

AD-4335
A/D LOGIC BOARD-1/2

CIRCUIT SYMBOL OR DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
	PZ:621	A/D LOGIC BOARD FULLY ASSEMBLED	
	PC:621A	PRINTED CIRCUIT BOARD	
C 14～23,33,66	CC:0.001U	CAPACITOR 0.001μF 50V	13
C 24～26,52～55	CC:0.01U	CAPACITOR 0.01μF 50V	7
C 3～13	CC:0.01U500V	CAPACITOR 0.01μF 500V	11
C 27,28,34～42 56～59	CC:0.022U	CAPACITOR 0.022μF 50V	24
C 1,2	CC:22P	CAPACITOR 22pF 50V	2
C 31,32	CT:1C220	CAPACITOR 22μF 16V	2
C 29	CT:1D2R2	CAPACITOR 2.2μF 20V	1
C 30	CT:1VR33	CAPACITOR 33μF 35V	1
PHC 3,4	DF:TLP521-1	PHOTO COUPLER	2
PHC 1,5,6	DF:TLP521-2	PHOTO COUPLER	3
PHC 2	DF:TLP521-3	PHOTO COUPLER	1
D 1～6	DI:1SS53	DIODE	6
②	JC:31-010	BNC CONNECTOR	1
①	JI:360A2		2
I/O	JI:365P024-AG	CONNECTOR	1
J(7～10)	JI:365P032-AG	CONNECTOR	1
U 6	JS:10324-01-445	SOCKET (24pin)	1
U 4	JS:10340-01-445	SOCKET (40pin)	1
L 1	LR:H5AT7-14-3.5	COIL	1
Q 1,2	QT:C1815Y	TRANSISTOR	2
R 15～18,30,31 33～36,42	RC:1K	RESISTOR 1KΩ	11
R 20	RC:10K	RESISTOR 10KΩ	1
R 22,23	RC:100K	RESISTOR 100KΩ	2
R 1～12	RC:100R	RESISTOR 100Ω	12
R 21	RC:270R	RESISTOR 270Ω	1
R 19	RC:330R	RESISTOR 330Ω	1
R 25,26,32	RC:4.7K	RESISTOR 4.7KΩ	3
R 24	RC:5.6K	RESISTOR 5.6KΩ	1
R 13,14,37～40	RC:680R	RESISTOR 680Ω	6
R 27,28	RN:IHR-4-223MA	RESISTOR NETWORK 22K×4, 1/8W	2

PARTS LIST

AD−4335
A/D LOGIC BOARD−2/2

CIRCUIT SYMBOL OR DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
R 29,41	RN:IHR-4-472MA	RESISTOR NETWORK 4.7K×4, 1/8W	2
SW	SD:KTD08	DIP SWITCH	1
K 1～11	SL:LDI-1M-05D	READ RELAY	11
TP 1～6	TM:CP-10	TEST PIN	6
U 7	UA:MB3761	COMPARATER	1
U 17	UC:MC14503	CMOS	1
U 8	UC:14520B	CMOS	1
U 10	UC:40174	CMOS	1
U 13	UT:LS00	TTL	1
U 1,2,11	UT:LS04	TTL	3
U 3,9	UT:LS273	TTL	2
U 14,19	UT:LS32	TTL	2
U 5,18	UT:LS367	TTL	2
U 12,16	UT:LS374	TTL	2
U 15	UT:LS74	TTL	1
X 1	XT:HC18/U6MHZ	CRYSTAL 6MHZ	1
③	01:A43065		1
②	05:A44176		2

PARTS LIST

AD－4335
A/D ANALOG BOARD－1/2

CIRCUIT SYMBOL OR DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
	PZ:622	A/D ANALOG BOARD FULLY ASSEMBLED	
	PC:622A	PRINTED CIRCUIT BOARD	
C 22,25	CC:0.001U	CAPACITOR 0.001μF 50V	2
C 11	CC:0.0022U	CAPACITOR 0.0022μF 50V	1
C 12～21	CC:0.022U	CAPACITOR 0.022μF 50V	22
C 10	CC:470P	CAPACITOR 470pF 50V	1
C 6	CM:E1105KN	CAPACITOR 1μF 100V	1
C 1,2	CM:E1225KN	CAPACITOR 2.2μF 100V	2
C 3	CM:E1474KN	CAPACITOR 0.47μF 100V	1
C 4	CS:08S0.1U50V	CAPACITOR 0.1μF 50V	1
C 24	CT:1C220	CAPACITOR 22μF 16V	1
C 7～9	CT:1D2R2	CAPACITOR 2.2μF 20V	3
PHC 3	DF:TLP521-1	PHOTO COUPLER	1
PHC 1,2	DF:TLP550	PHOTO COUPLER	2
D 1～8	DI:1SS53	DIODE	8
D 9,11	DI:1S1588	DIODE	2
D 10	DZ:05Z5.6	ZENER DIODE	1
J(11～14),J(28～31)	JT:171826-7	CONNECTOR	2
L 1	LL:LF5-222K	COIL	1
Q 1,2	QF:A71A-SI	DUAL FETS	2
Q 3～6	QF:K30ATM-Y	FETS	4
R 18	RC:1/21M	RESISTOR 1MΩ 1/2W	1
R 16,19,38	RC:1K	RESISTOR 1KΩ	3
R 39,44	RC:10K	RESISTOR 10KΩ	2
R 42	RC:12K	RESISTOR 12KΩ	1
R 2,3	RC:15K	RESISTOR 15KΩ	2
R 6	RC:2.7K	RESISTOR 2.7KΩ	1
R 4,5,7～9,11	RC:27K	RESISTOR 27K	6
R 43	RC:270R	RESISTOR 270Ω	1
R 21	RC:3.3K	RESISTOR 3.3KΩ	1
R 1	RC:33K	RESISTOR 33KΩ	1
R 45	RC:330R	RESISTOR 330Ω	1
R 17,20	RC:470K	RESISTOR 470KΩ	2
R 10	RC:560R	RESISTOR 560Ω	1

PARTS LIST

AD-4335
A/D ANALOG BOARD-2/2

CIRCUIT SYMBOL OR DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
R 15	RC:6.8K	RESISTOR 6.8KΩ	1
R 40	RC:680R	RESISTOR 680Ω	1
R 41	RC:8.2K	RESISTOR 8.2KΩ	1
R 13	RF:RR110	ASSEMBLY RESISTOR	1
R 28	RF:1/4120KRF	RESISTOR 120KΩ 1/4W ±50ppm/℃	1
R 27	RF:1/464KRF	RESISTOR 64KΩ 1/4W ±50ppm/℃	1
R 25	RF:16KRF	RESISTOR 16KΩ 1/8W ±50ppm/℃	1
R 26,37	RF:32KRF	RESISTOR 32KΩ 1/8W ±50ppm/℃	2
R 12	RF:62RRF	RESISTOR 62Ω 1/8W ±50ppm/℃	1
R 22	RF:9124	ASSEMBLY RESISTOR	1
R 14	RF:9126	ASSEMBLY RESISTOR	1
R 36	RM:S150KF	RESISTOR 150KΩ 1/4W ±100ppm/℃	1
R 34	RM:147KF	RESISTOR 147K 1/4W ±100ppm/℃	1
R 35	RM:215KF	RESISTOR 215K 1/4W ±100ppm/℃	1
R 29	RM:237KF	RESISTOR 237K 1/4W ±100ppm/℃	1
R 23,24	RM:261KF	RESISTOR 261K 1/4W ±100ppm/℃	2
R 32	RM:31.6KF	RESISTOR 31.6K 1/4W ±100ppm/℃	1
R 30,33	RM:464KF	RESISTOR 464K 1/4W ±100ppm/℃	2
R 31	RM:825KF	RESISTOR 825K 1/4W ±100ppm/℃	1
VR 4	RV:H501	POTENTIOMETER 500Ω	1
VR 3	RV:9W5K	POTENTIOMETER 5KΩ	1
VR 1	RV:9X100R	POTENTIOMETER 100Ω	1
VR 2	RV:9X50K	POTENTIOMETER 50K	1
SW 1,2	SD:BT-8	DIP SWITCH	2
TP 1~5	TM:CP-10	TEST TERMINAL	5
U 5	UA:TL072CN	DUAL OP AMPS	1
U 1,6,9	UA:TL082CP	DUAL OP AMPS	3
U 7	UA:4558C	DUAL OP AMPS	1
U 3	UC:4001	CMOS	1
U 4	UC:4011	CMOS	1
U 8	UC:4016	CMOS	1
U 2	UC:4069	CMOS	1

PARTS LIST

AD－4335
OP－05 MAIN BOARD

CIRCUIT SYMBOL OR DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
	PZ:695	OP-05 MAIN BOARD FULLY ASSEMBLED	
	PC:695	PRINTED CIRCUIT BOARD	
C 5	CC:0.001U	CAPACITOR 0.001μF 50V	1
C 8,10	CC:0.0022U	CAPACITOR 0.0022μF 50V	2
C 7	CC:0.01U	CAPACITOR 0.01μF 50V	1
C 2,3,11～17	CC:0.022U	CAPACITOR 0.022μF 50V	9
C 6	CC:220P	CAPACITOR 220pF 50V	1
C 1	CK:SM25VB470	CAPACITOR 470μF 25V	1
C 4	CT:1C220	CAPACITOR 22μF 16V	1
C 9	CT:1VR33	CAPACITOR 0.33μF 35V	1
D 1	DI:W02	DIODE BRIDGE	1
D 2,3	DI:1S1588	DIODE	2
①	FH:85PN0819	FUSE HOLDER	2
②	HT:6073PB	HEAT SINK	1
J 2	JT:171825-3	CONNECTOR	1
Q 1	QT:C1815Y	TRANSISTOR	1
R 2	RC:1K	RESISTOR 1KΩ 1/4W	1
R 3	RC:18K	RESISTOR 18KΩ 1/4W	1
R 4,6	RC:47K	RESISTOR 47KΩ 1/4W	2
R 5	RC:5.6K	RESISTOR 5.6KΩ 1/4W	1
R 1	RC:560R	RESISTOR 560Ω 1/4W	1
R 7～41	RC:680R	RESISTOR 680Ω 1/4W	35
T 1	TF:291	TRANSFORMER	1
U 6～8	UC:MSM541RS	CMOS	3
U 9	UC:4013	CMOS	1
U 1～5	UC:4511	CMOS	5
U 10,11	UC:4528	CMOS	2
U 13	UR:TA78005AP	VOLTAGE REGULATOR 5V 1A	1
U 12	UT:LS14	TTL	1

PARTS LIST

AD-4335
OP-05 DISPLAY BOARD

CIRCUIT SYMBOL OR DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
	PZ:696	OP-05 DISPLAY BOARD FULLY ASSEMBLED	
	PC:696	PRINTED CIRCUIT BOARD	
D 1~6	DL:GL8P04	LED LAMP	6
J 3	JI:1-163740-9	CONNECTOR	2
J 2	KO:102-3S20	CONNECTOR CABLE	1
R 1	RC:390R	RESISTOR 390Ω 1/4W	1
R 2	RC:560R	RESISTOR 560Ω 1/4W	1

PARTS LIST

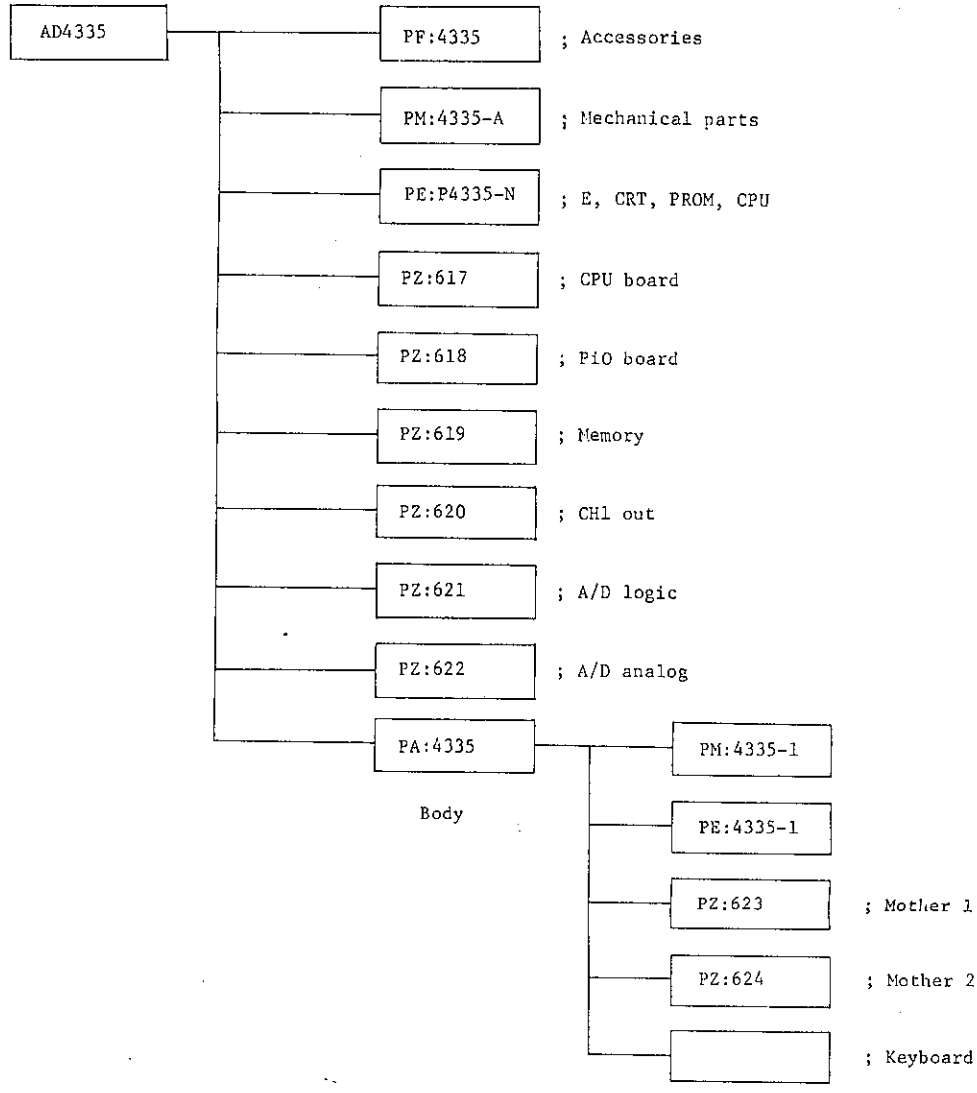
AD-4335
MOTHER BOARD 2

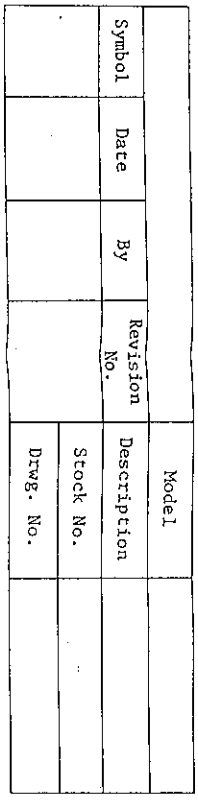
CIRCUIT SYMBOL OR DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
	PZ:624	MOTHER BOARD 2 FULLY ASSEMBLED	
	PC:624A	PRINTED CIRCUIT BOARD	
C 1,3,5	CC:0.022U	CAPACITOR 0.022μF 50V	3
C 6	CK:SM10VB220	CAPACITOR 220μF 10V	1
C 2,4	CT:1C220	CAPACITOR 22μF 16V	2
D 2,3	DI:SM-1-08	DIODE	2
D 1	DZ:05Z9.1	ZENER DIODE	1
▽	JI:700A2		3
J 24,27	JI:704P026-AU/M	CONNECTOR	2
J 20	JI:704P050-AU/M	CONNECTOR	1
J 19,21～23,26	JT:171825-3	CONNECTOR	5
J 25	JU:HLB-18S-1J	CONNECTOR (18P)	1
Tr 2,4,6	QT:C1815Y	TRANSISTOR	3
Tr 1,3,5	QT:D525	TRANSISTOR	3
R 1	RC:1K	RESISTOR 1KΩ 1/4W	1
R 2,6	RC:100R	RESISTOR 100Ω 1/4W	2
R 4,5,8,9	RC:22K	RESISTOR 22KΩ 1/4W	4
R 10,11	RC:4.7K	RESISTOR 4.7KΩ 1/4W	2
R 3,7	RC:6.8K	RESISTOR 6.8KΩ 1/4W	2
R 12	RN:1HR-4-472MA	RESISTOR NETWORK 4.7KΩ×4 1/8W	1
U 1,2	UA:TD62064P	TRANSISTOR NETWORK	2

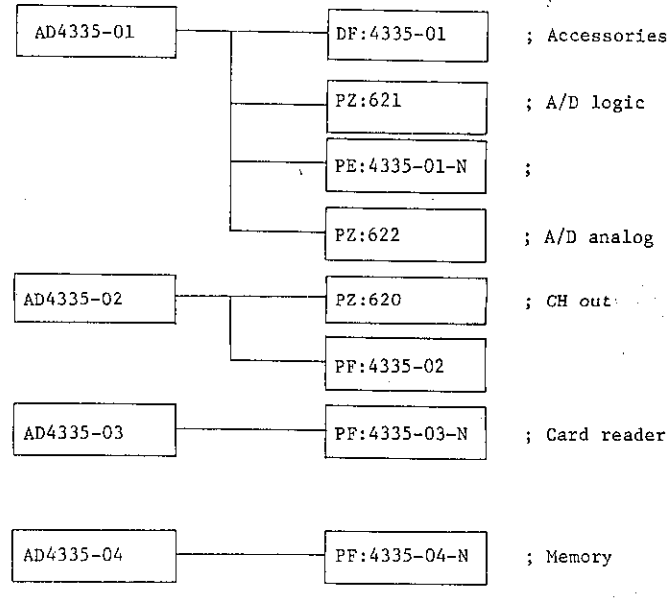
PARTS LIST

AD-4335
MOTHER BOARD 1

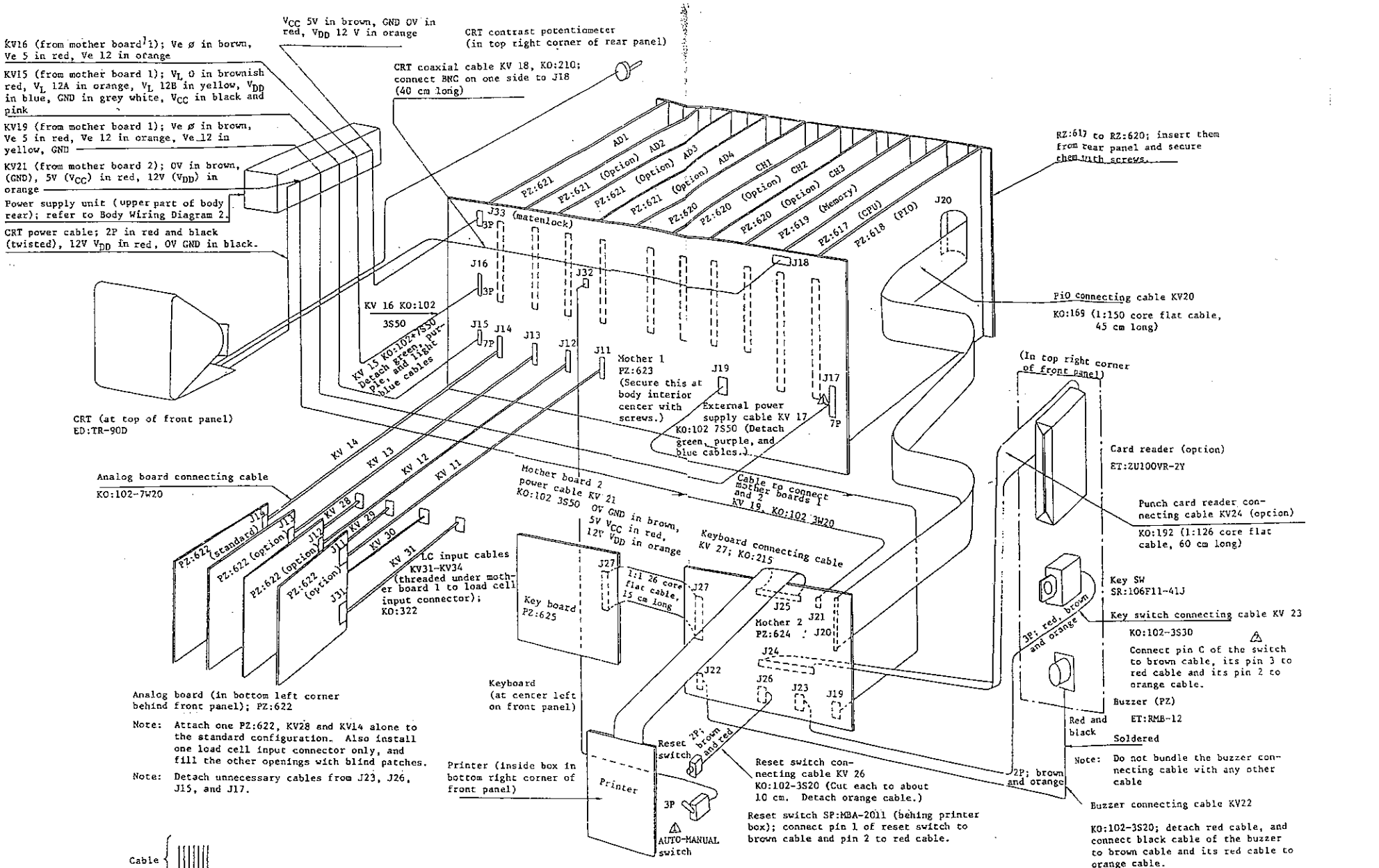
CIRCUIT SYMBOL OR DRWG. NO.	PARTS NAME	DESCRIPTION	Q'TY
	PZ:623	MOTHER BOARD 1 FULLY ASSEMBLED	
	PC:623A	PRINTED CIRCUIT BOARD	
C 2	CC:0.1U25V	CAPACITOR 0.1μF 25V	1
C 1	CK:SM16VB1000	CAPACITOR 1000μF 16V	1
C 3～5,8～10	CK:SM25VB100	CAPACITOR 100μF 25V	6
J 18	JC:31-010	BNC	1
J 3～10	JI:364J032-AG	CONNECTOR	8
J 1,2	JI:364J064-AG	CONNECTOR	2
J 16,19,32	JT:171825-3	CONNECTOR	3
J 11～15,17	JT:171825-7	CONNECTOR	6
J 33	JU:350429-1	PIN CONNECTOR	1
①	04:A43072	BNC HOLDER	1
	05:A42208	SEALING BOLT WITH HOLE	2



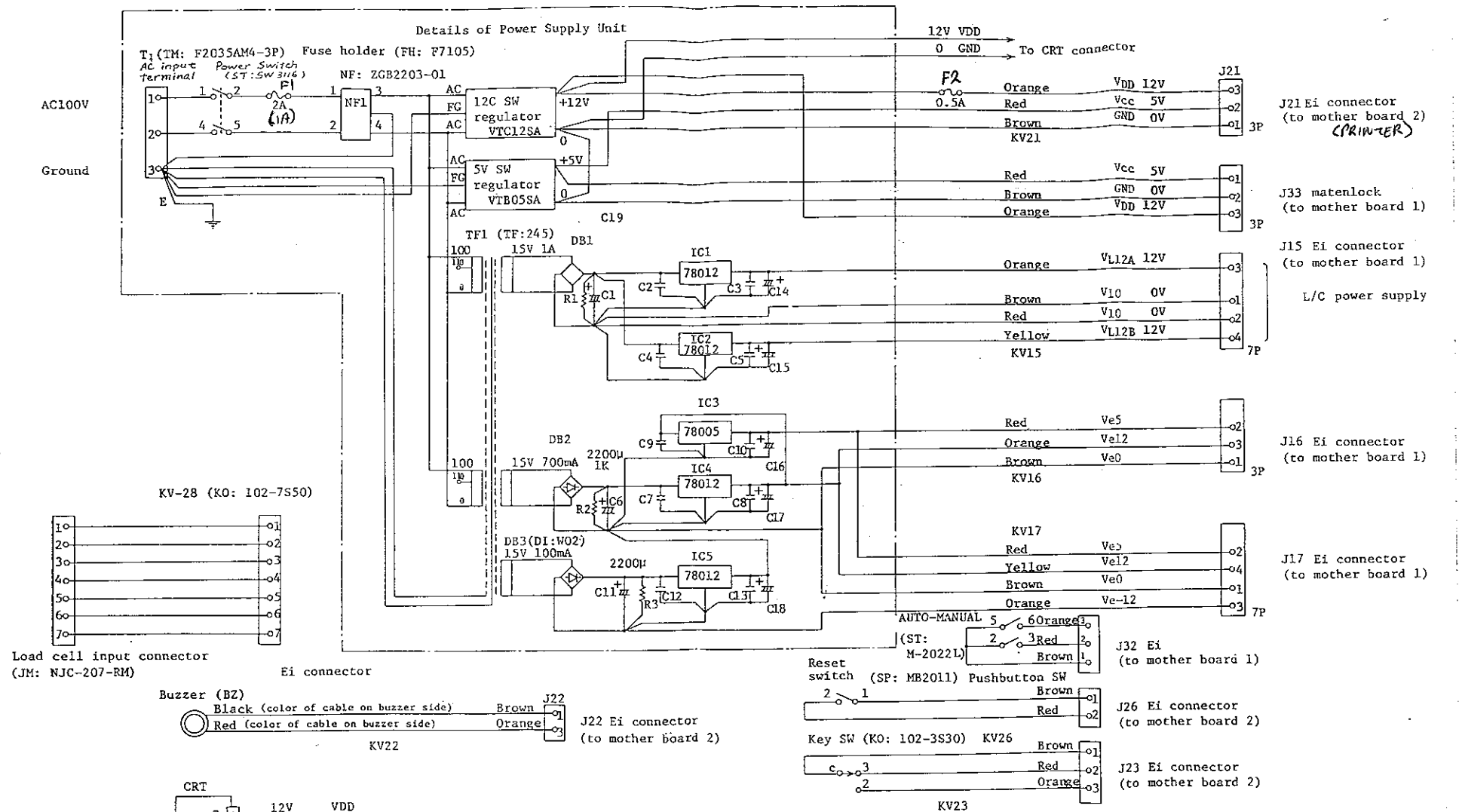




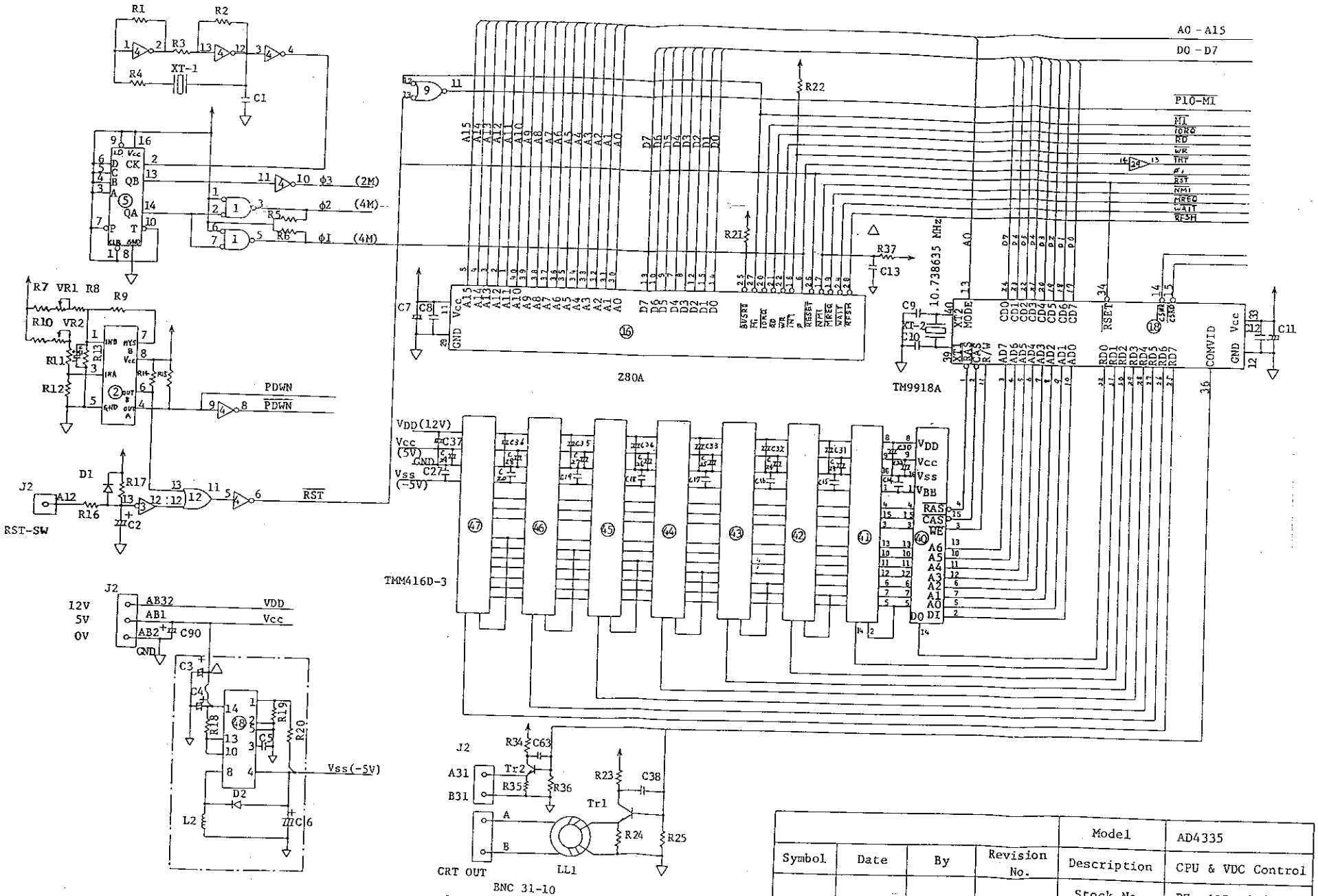
See drawings for the AD4335-05.



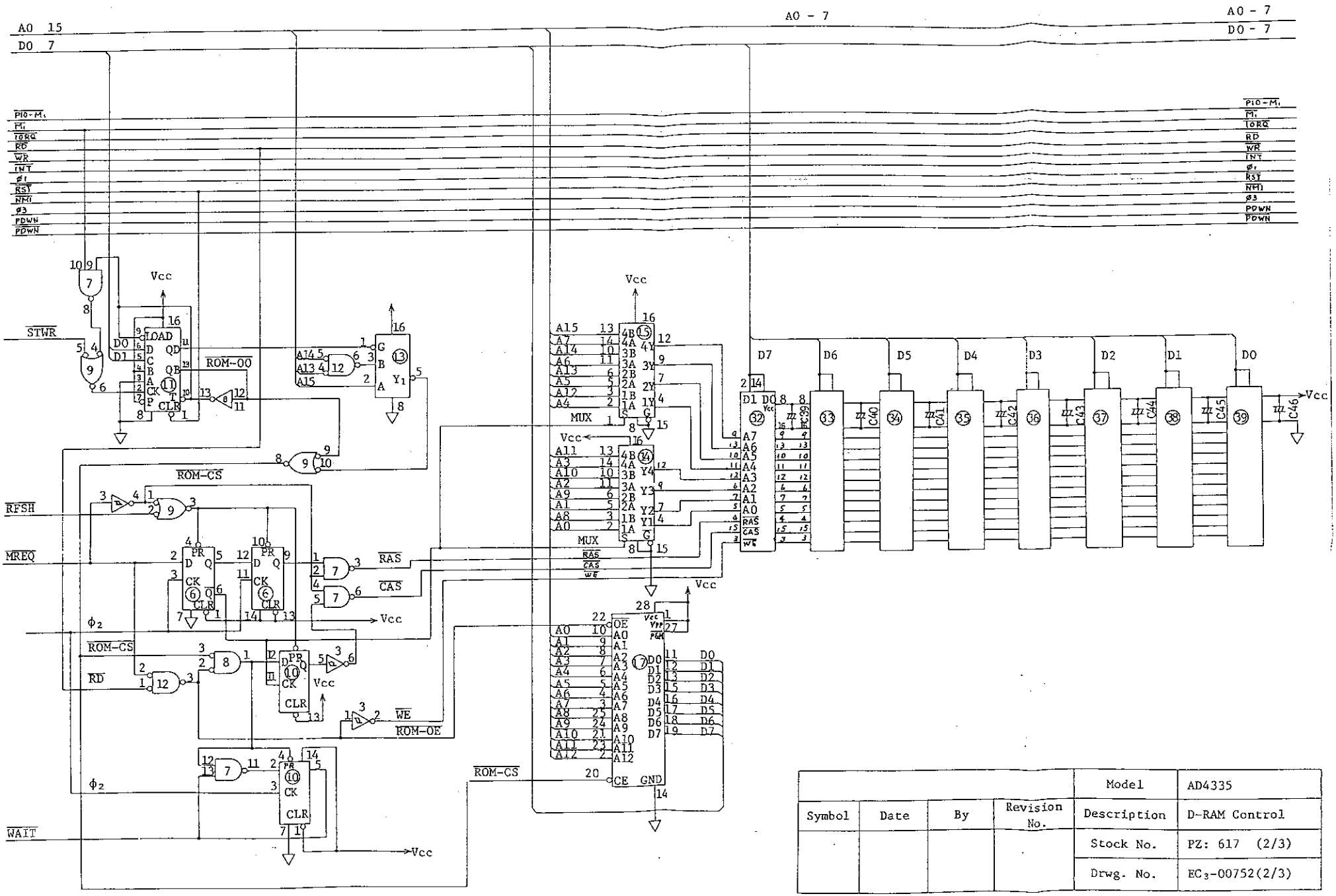
				Model	AD4335
Symbol	Date	By	Revision No.	Description	Body Wiring Diagram 1
				Stock No.	PA: 4335
				Drwg. No.	EC$_3$-00751



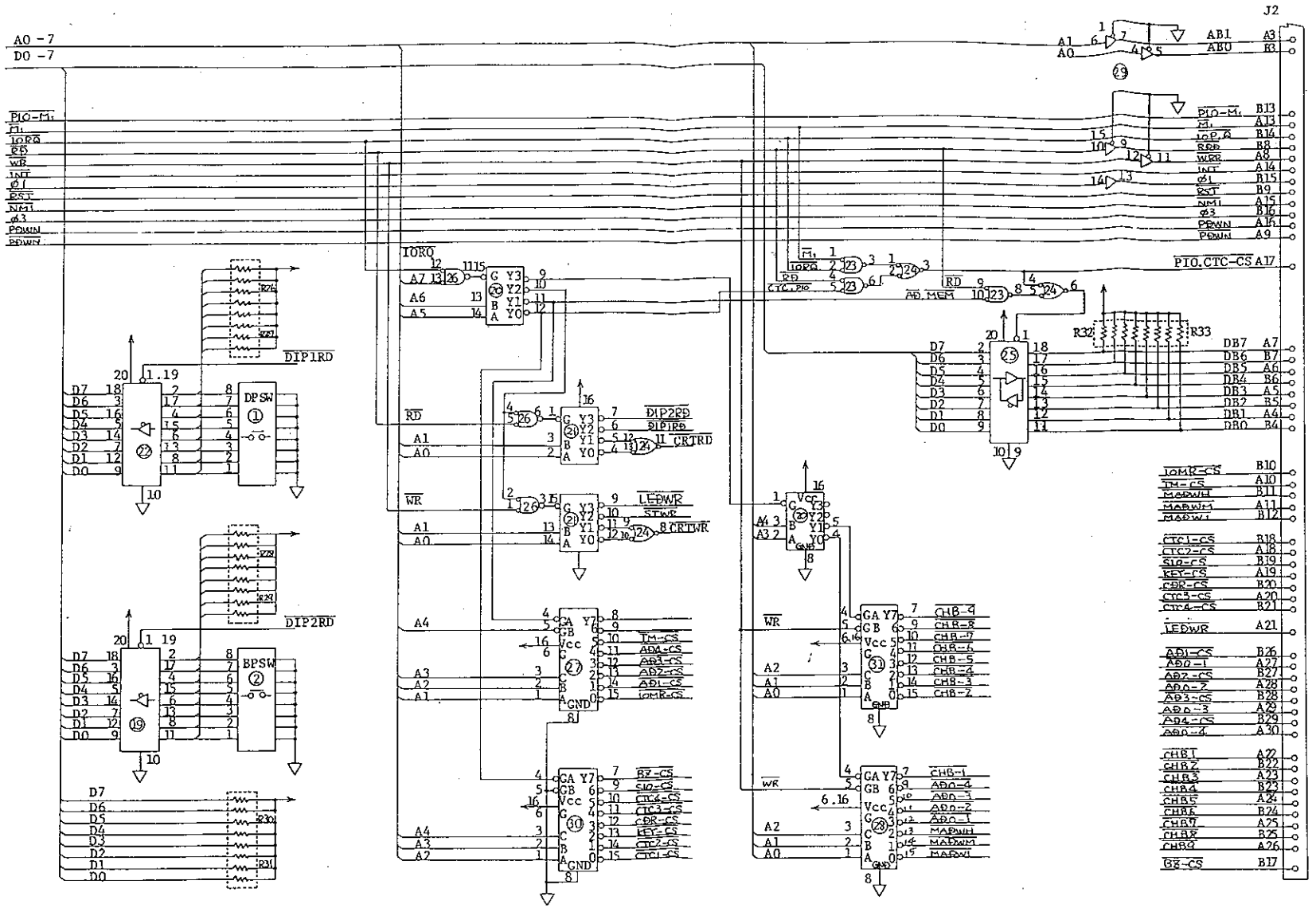
				Model	AD4335
Symbol	Date	By	Revision No.	Description	Body Wiring Diagram 2
				Stock No.	PA: 4335
				Drwg. No.	EC3-00753



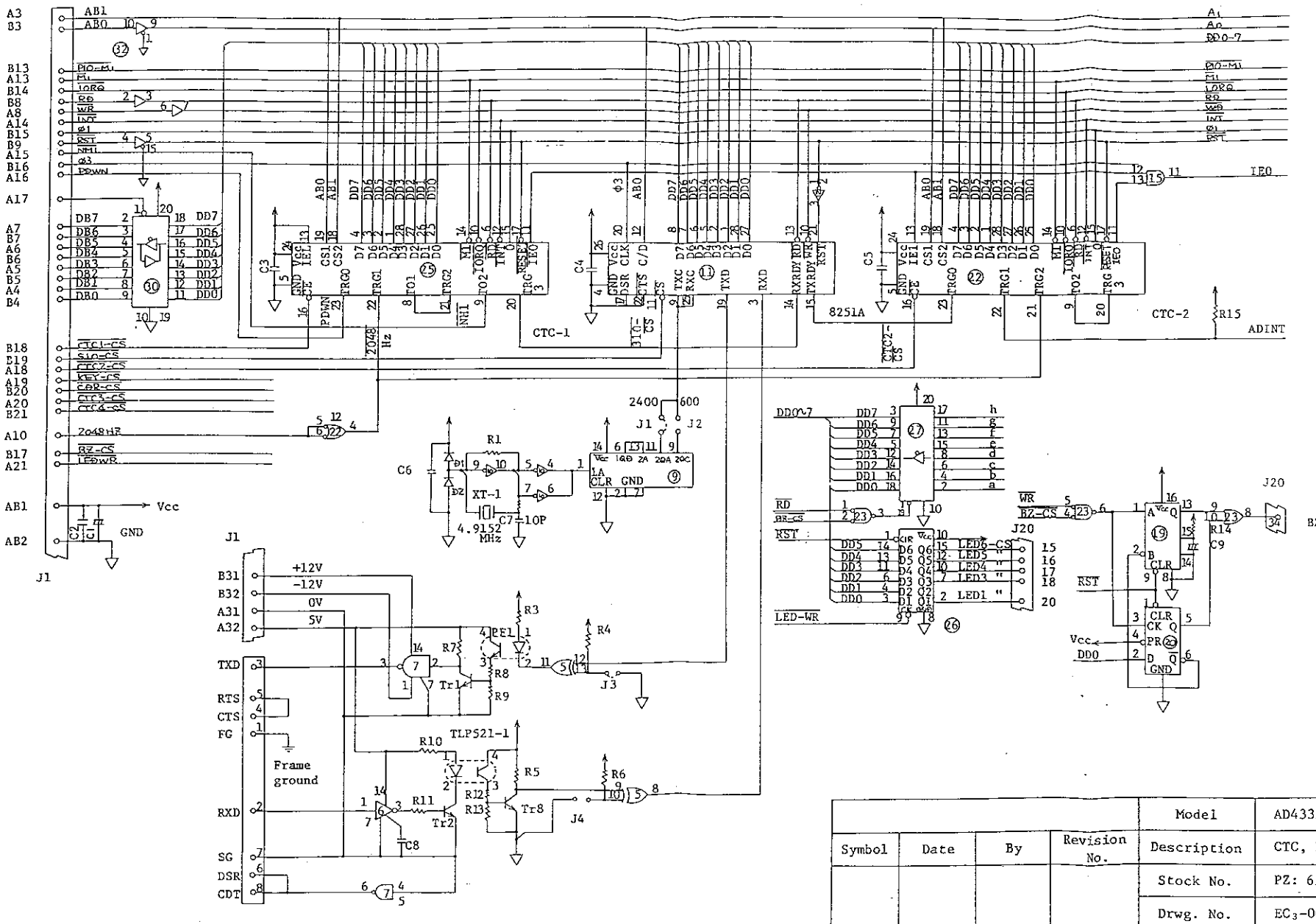
				Model	AD4335
Symbol	Date	By	Revision No.	Description	CPU & VDC Control
				Stock No.	PZ: 617 (1/3)
				Drwg. No.	EC3-00752(1/3)



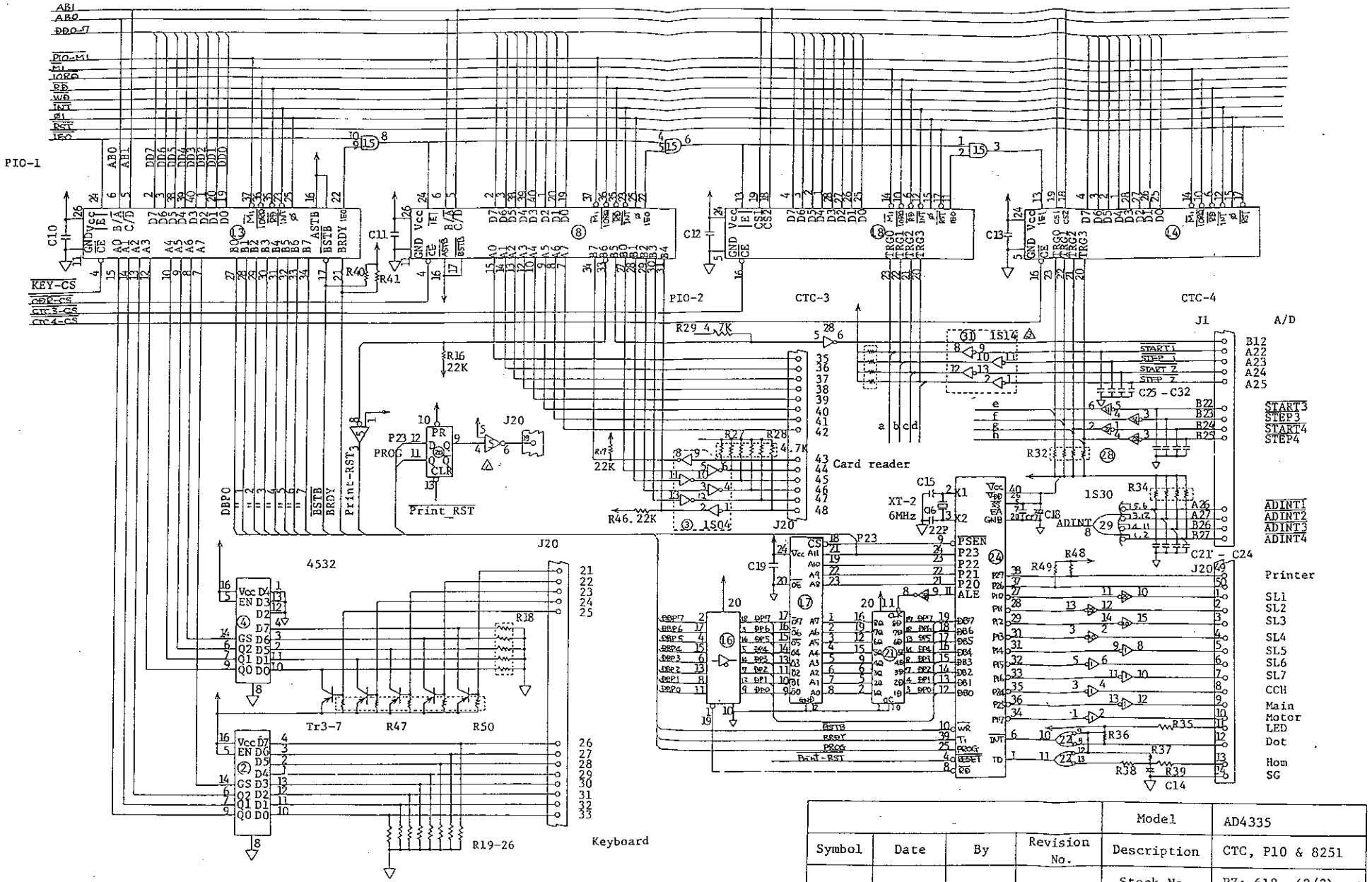
				Model	AD4335
Symbol	Date	By	Revision No.	Description	D-RAM Control
				Stock No.	PZ: 617 (2/3)
				Drwg. No.	EC$_3$-00752(2/3)



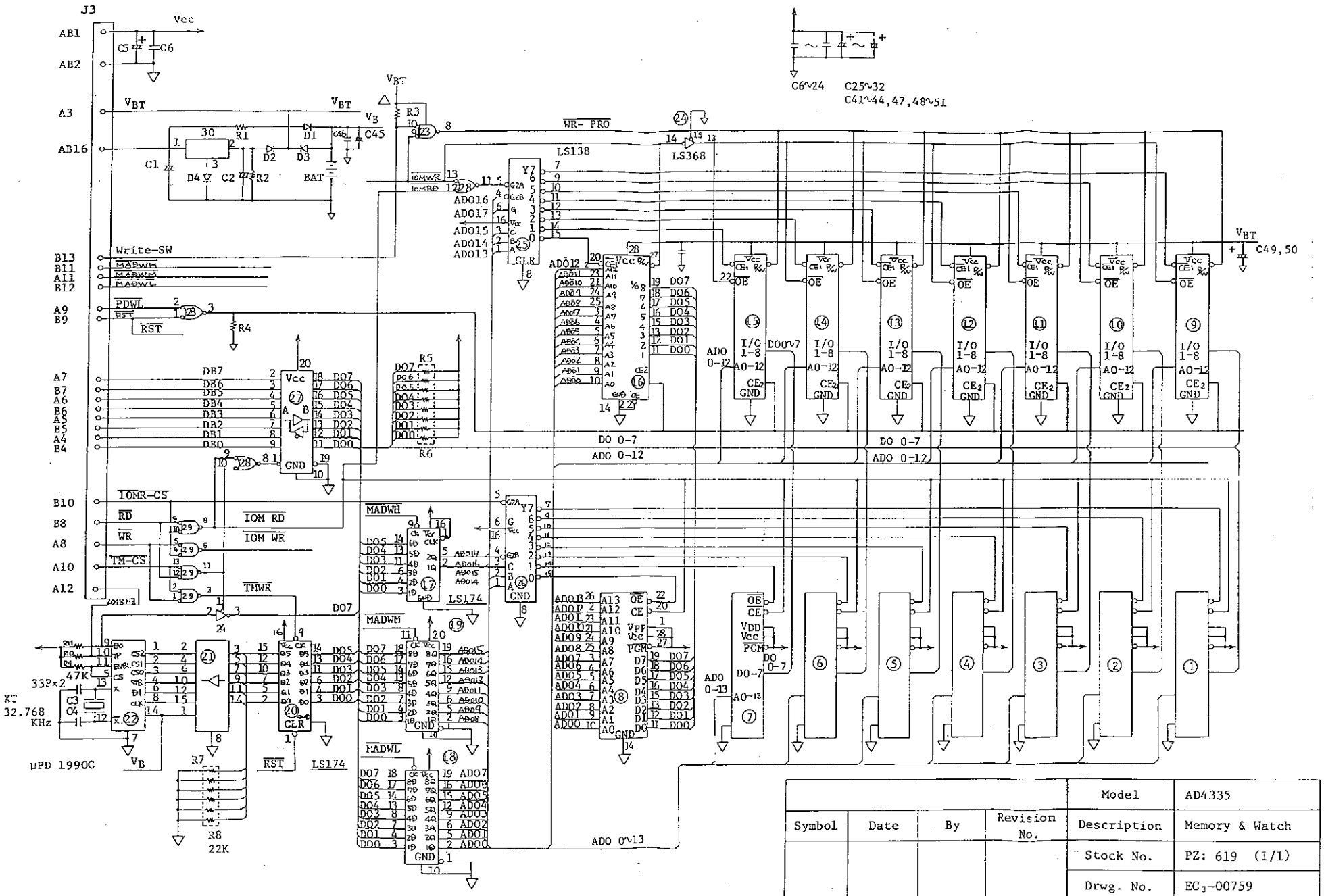
				Model	AD4335
Symbol	Date	By	Revision No.	Description	Dip Read & I/O Select
				Stock No.	PZ: 617 (3/3)
				Drwg. No.	EC_3-00752(3/3)

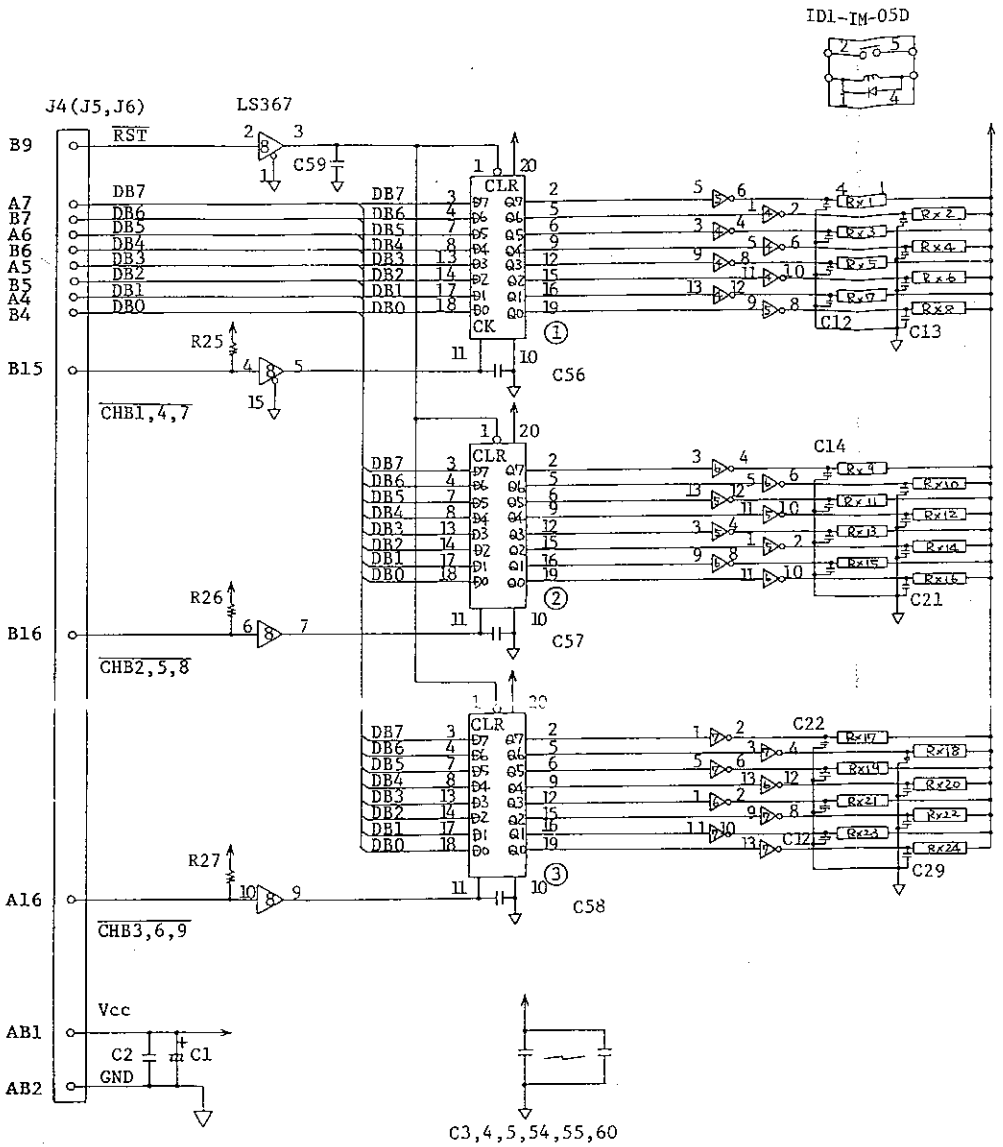


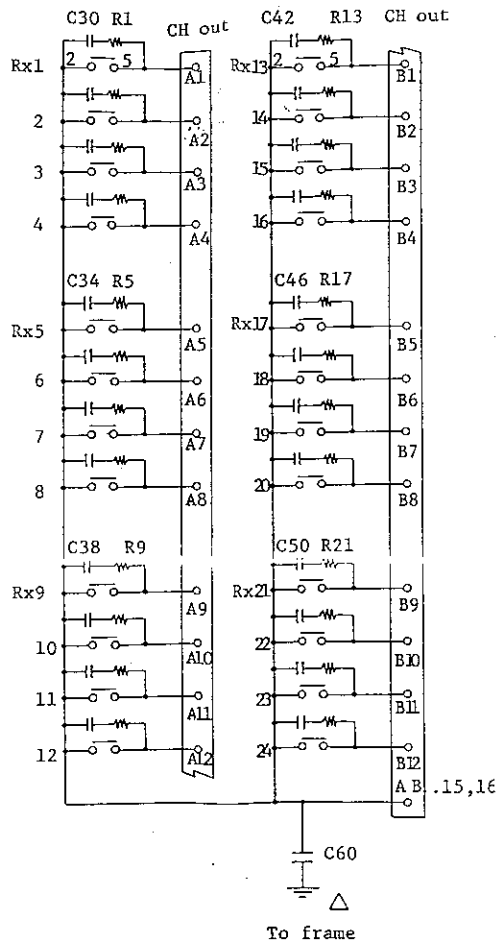
				Model	AD4335
Symbol	Date	By	Revision No.	Description	CTC, P10 & 8251
				Stock No.	PZ: 618 (1/2)
				Drwg. No.	EC$_3$-00758



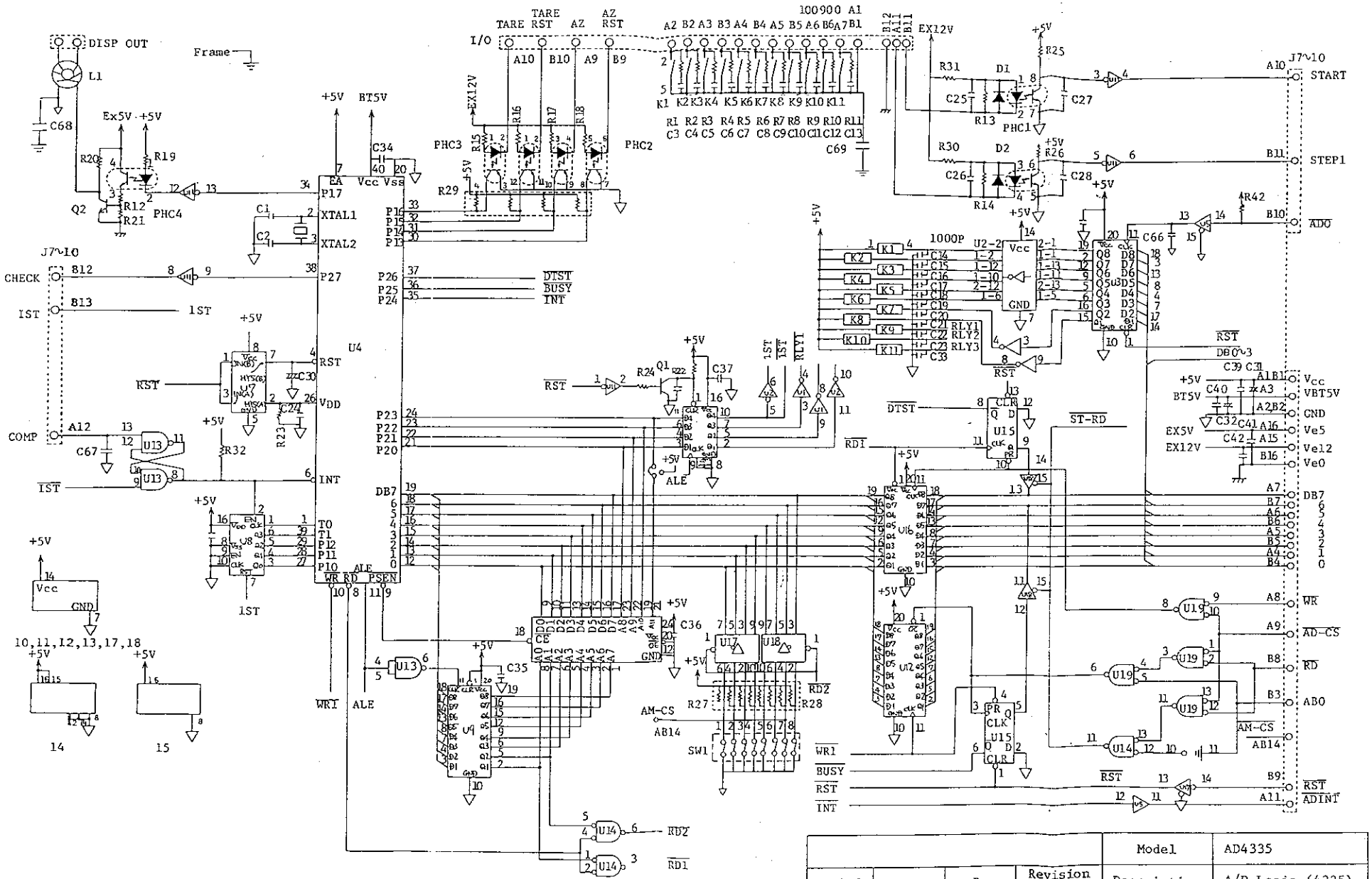
				Model	AD4335
Symbol	Date	By	Revision No.	Description	CTC, P10 & 8251
				Stock No.	PZ: 618 (2/2)
				Drwg. No.	EC_3-00758(2/2)


J3
AB1
AB2
A3
AB16
Vcc
C5
C6
VBT
VB
R1
D1
D2
D3
C45
C1
D4
C2
R2
BAT
R3
WR- PRO
LS138
LS368
ADO16
ADO17
ADO15
ADO14
ADO13
ADO12
C6~24
C25~32
C41~44,47,48~51
C49,50
Write-SW
MADWH
MADWM
MADWL
B13
B11
A11
B12
A9
B9
PDWL
RST
R4
A7
B7
A6
B6
A5
B5
A4
B4
DB7
DB6
DB5
DB4
DB3
DB2
DB1
DB0
R5
R6
DO7
DO6
DO5
DO4
DO3
DO2
DO1
DO0
GND
DO 0-7
ADO 0-12
I/O 1-8
A0-12
CE2
OE
IOMR-CS
B10
RD
B8
WR
A8
TM-CS
A10
A12
IOM RD
IOM WR
TMWR
2048 HZ
LS174
CLR
33P×2
47K
XT
32.768
KHz
μPD 1990C
R7
R8
22K
ADO 0~13
AO~13
VDD
VPP
PGM
Model
AD4335
Description
Memory & Watch
Stock No.
PZ: 619 (1/1)
Drwg. No.
EC3-00759
Symbol
Date
By
Revision No.

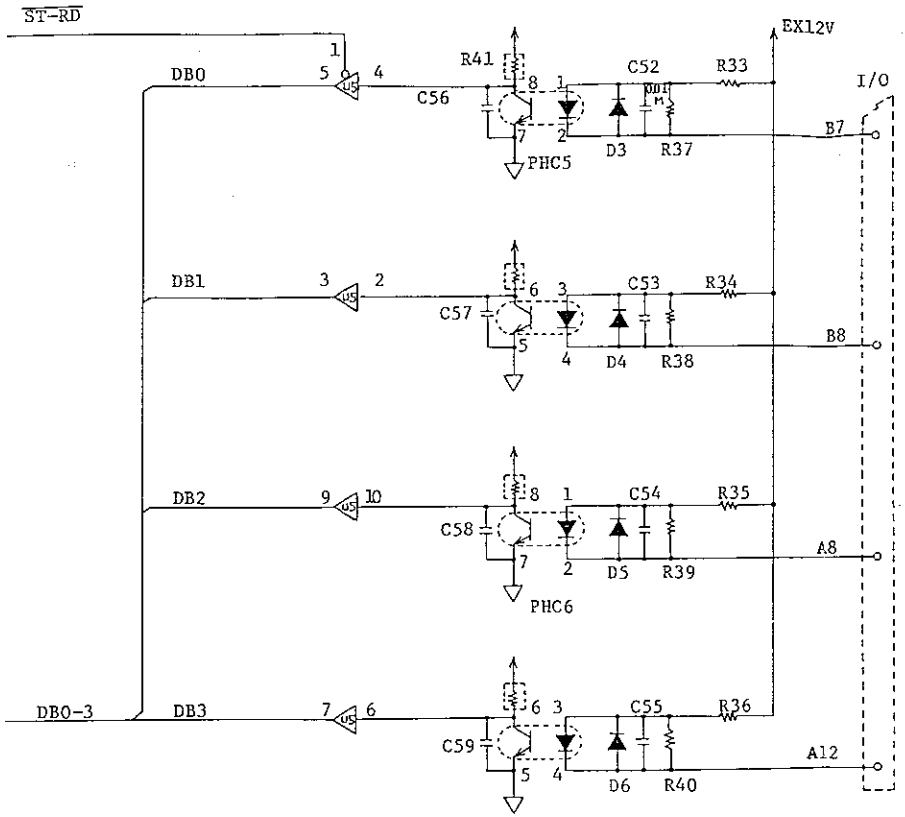




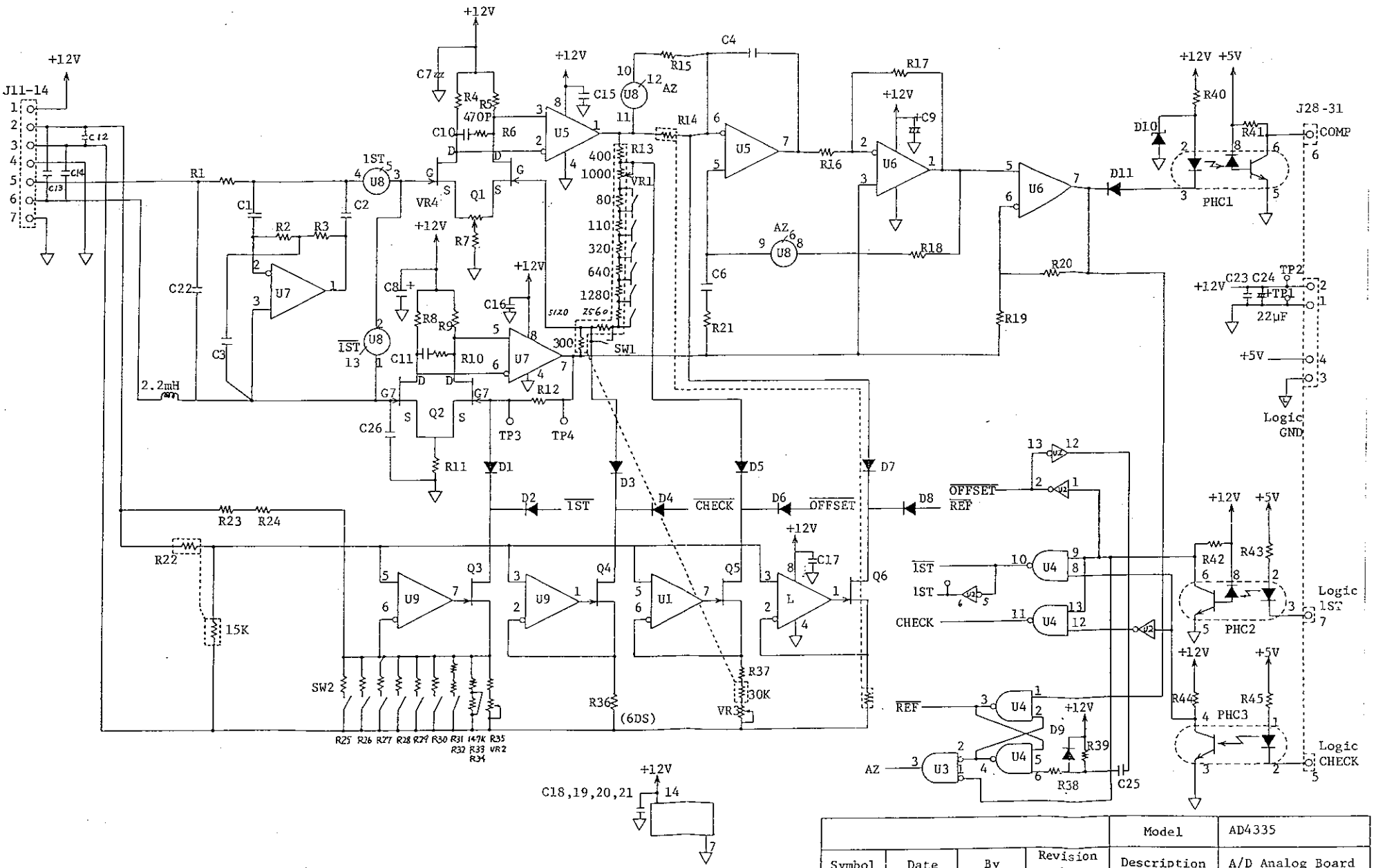
				Model	AD4335
Symbol	Date	By	Revision No.	Description	CH OUT 24 bit
				Stock No.	PZ: ~~624~~ 620 (1/1)
				Drwg. No.	EC3-00760



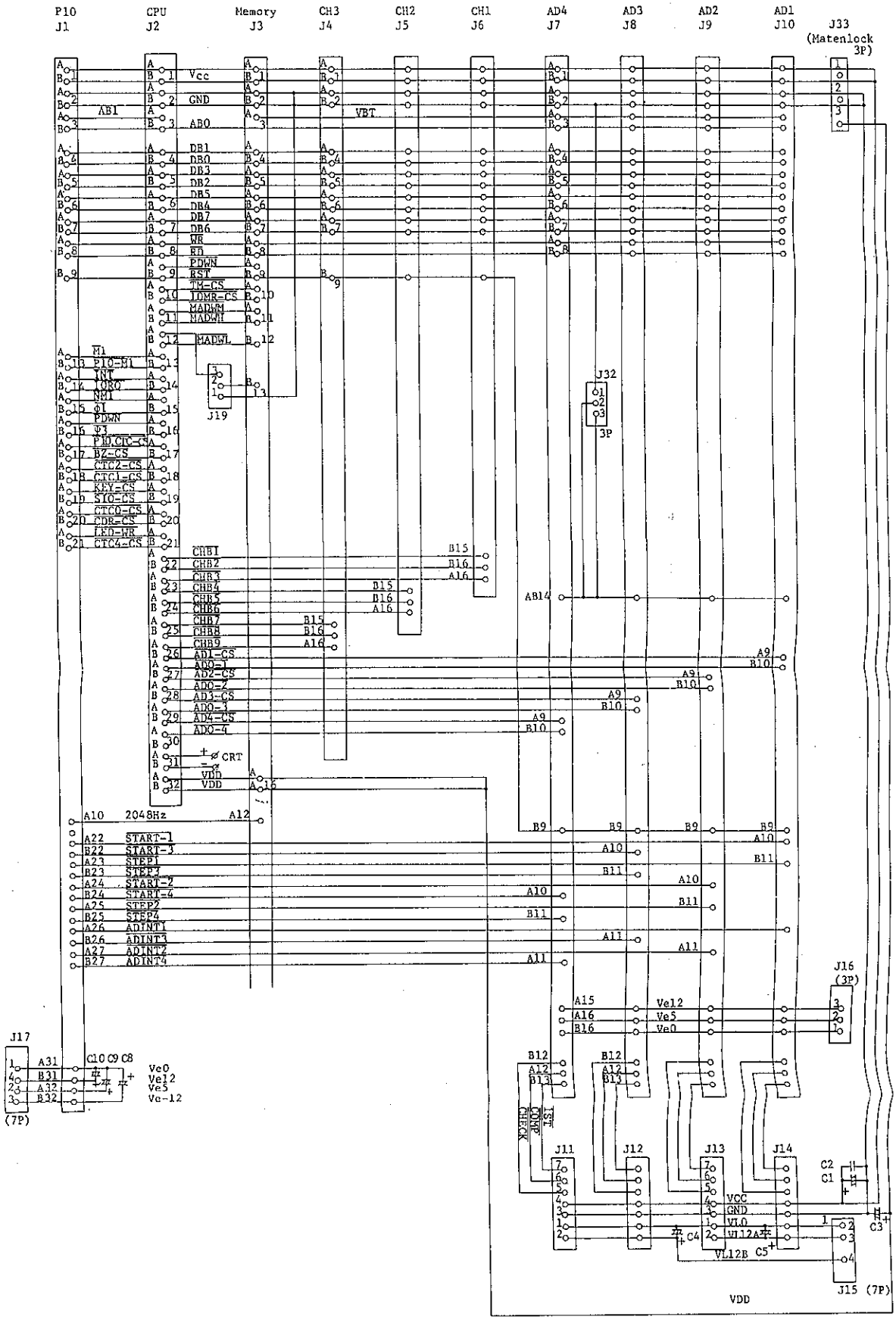
				Model	AD4335
Symbol	Date	By	Revision No.	Description	A/D Logic (4335)
				Stock No.	PZ: 621A
				Drwg. No.	EC$_3$-00755(1/2)



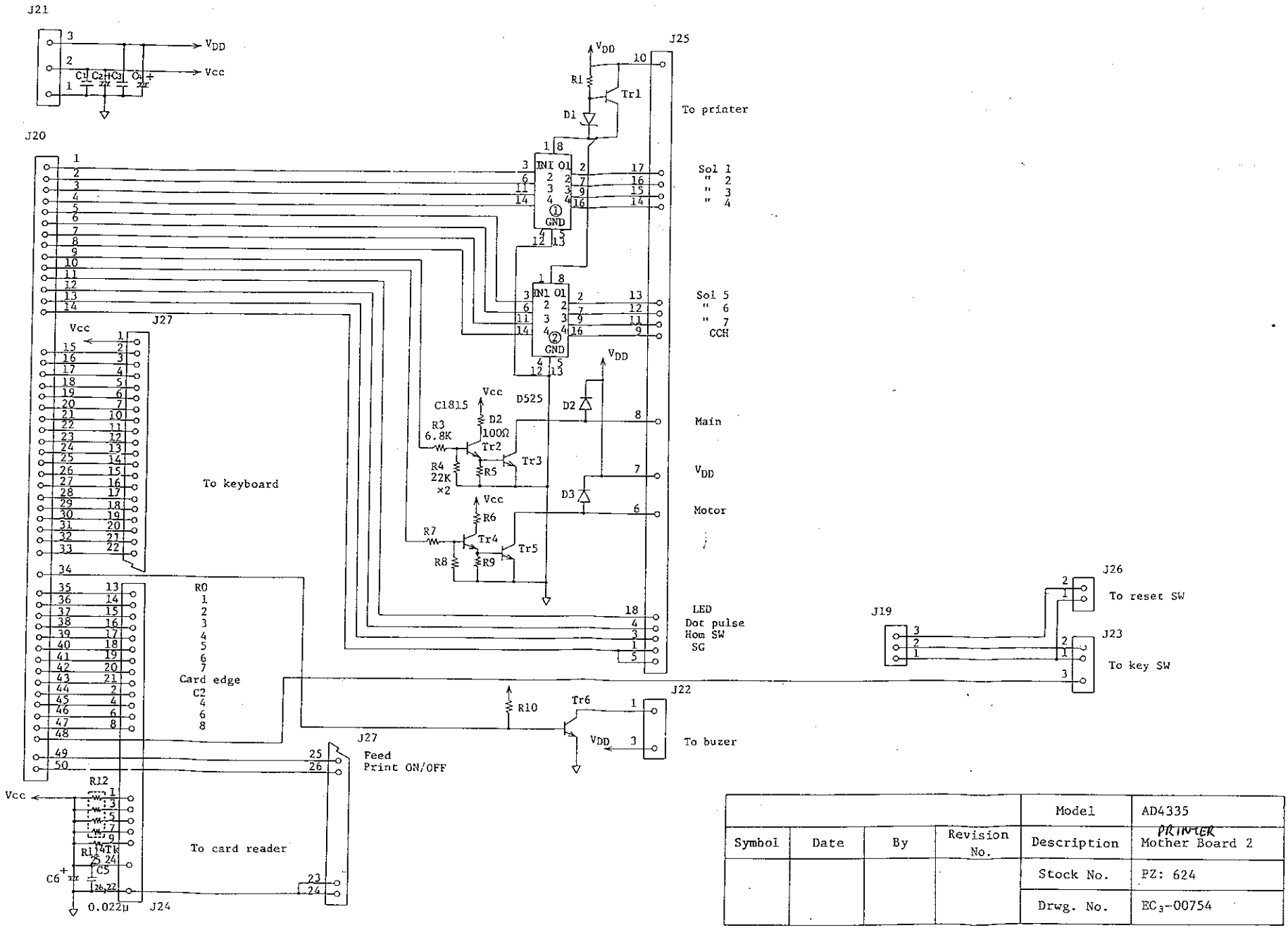
				Model	AD4335
Symbol	Date	By	Revision No.	Description	A/D Logic
				Stock No.	PZ: 621
				Drwg. No.	EC_3-00755(2/2)



				Model	AD4335
Symbol	Date	By	Revision No.	Description	A/D Analog Board
				Stock No.	PZ: 622
				Drwg. No.	EC$_3$-00757

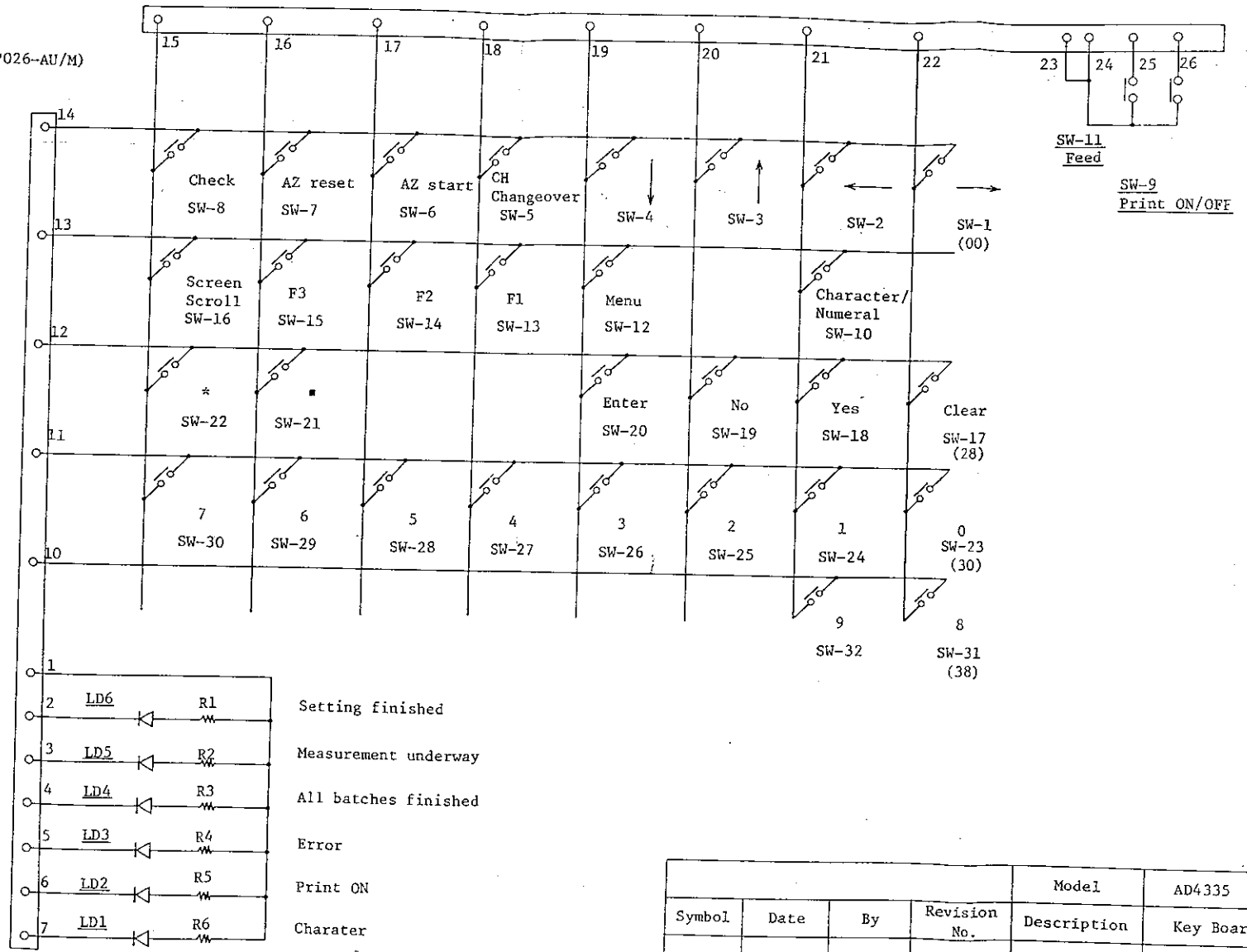


Symbol			
Date			
By			
Revision No.			
Description	Model		
Stock No.	PZ: 623		
Drwg. No.	EC3-00756	Mother Board 1	

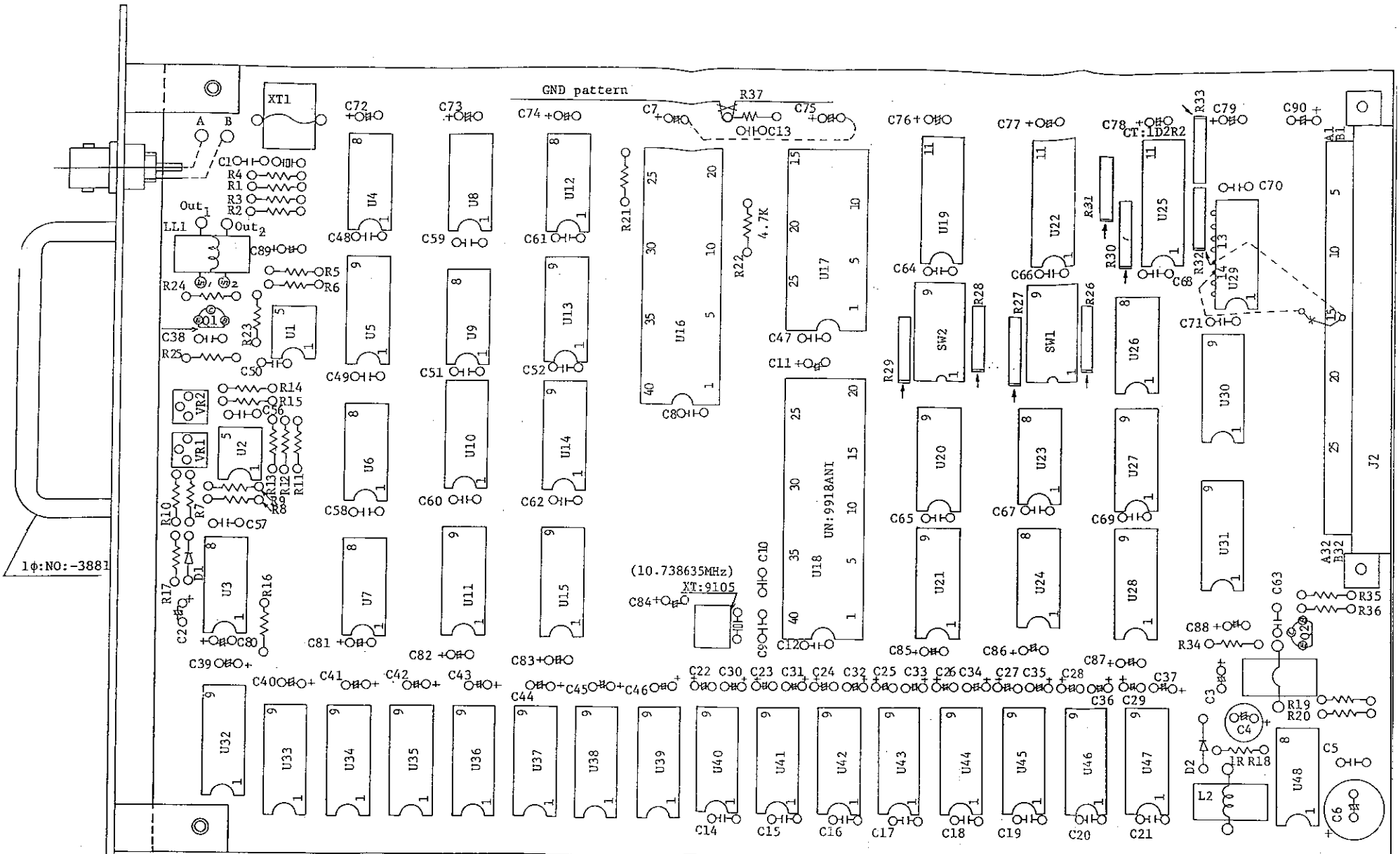


				Model	AD4335
Symbol	Date	By	Revision No.	Description	PRINTER Mother Board 2
				Stock No.	PZ: 624
				Drwg. No.	EC_3-00754

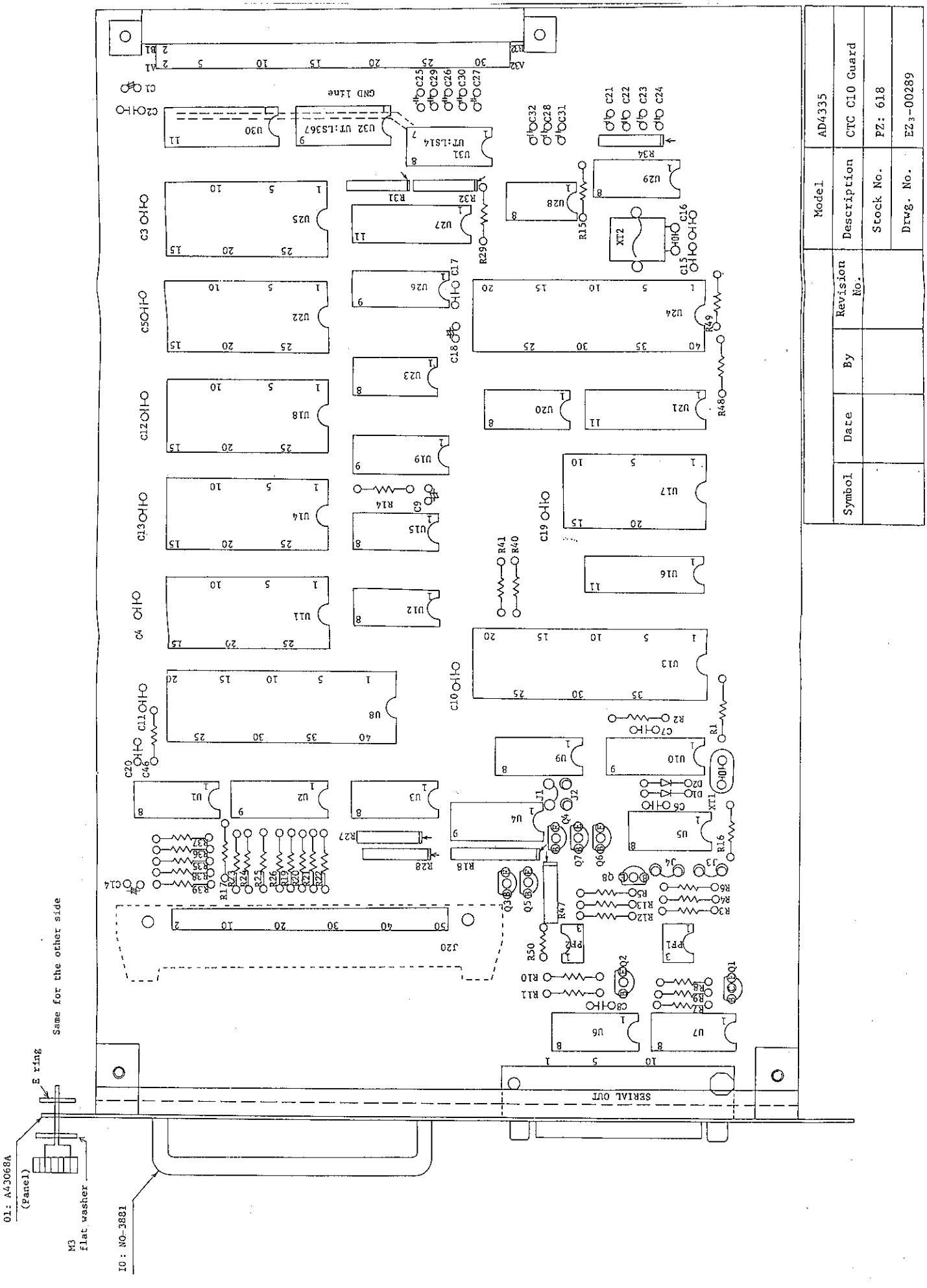
J27 (FCN-704P026-AU/M)

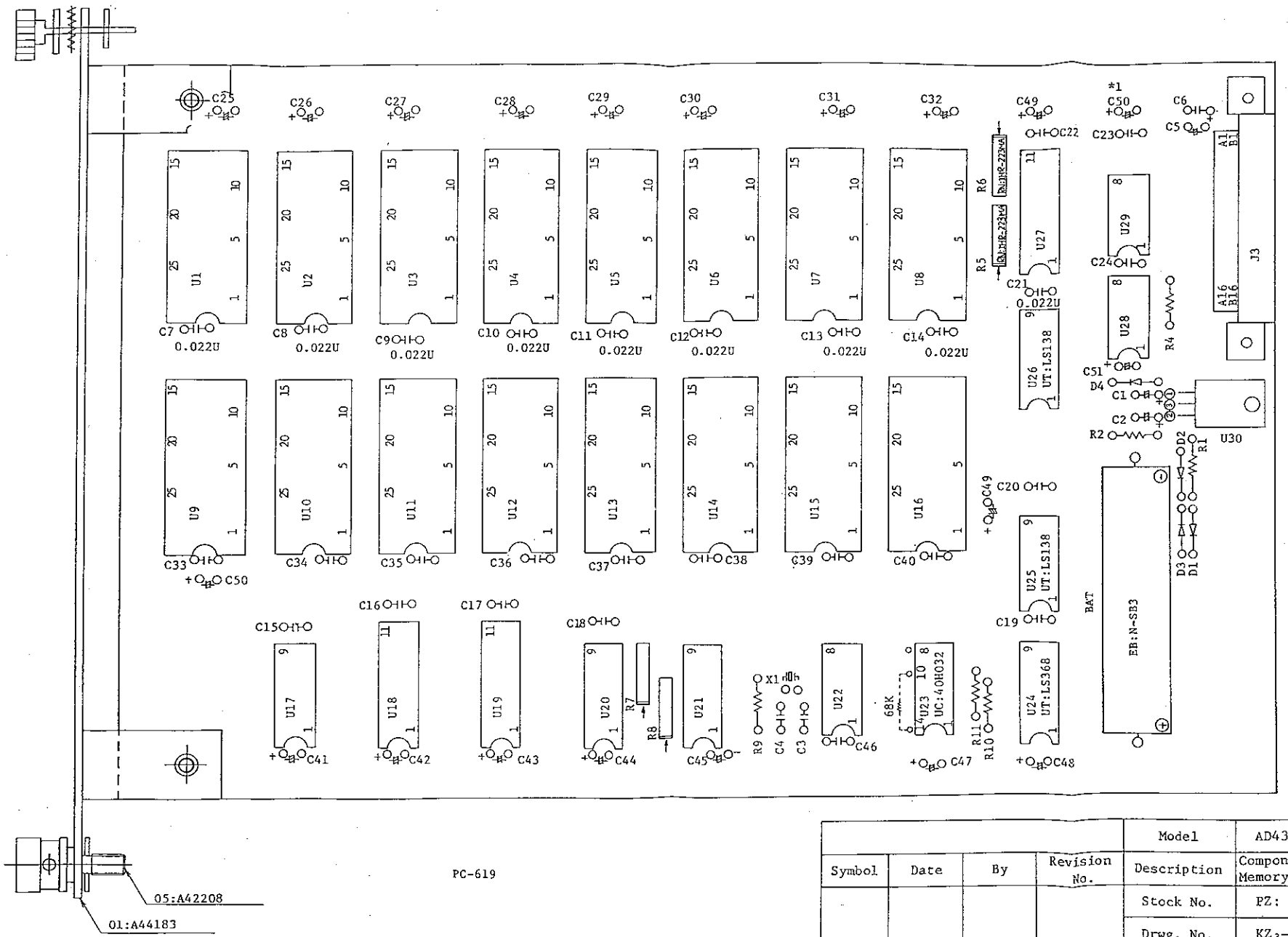


				Model	AD4335
Symbol	Date	By	Revision No.	Description	Key Board(1/1)
				Stock No.	SA: A20391
				Drwg. No.	EC_3-00761



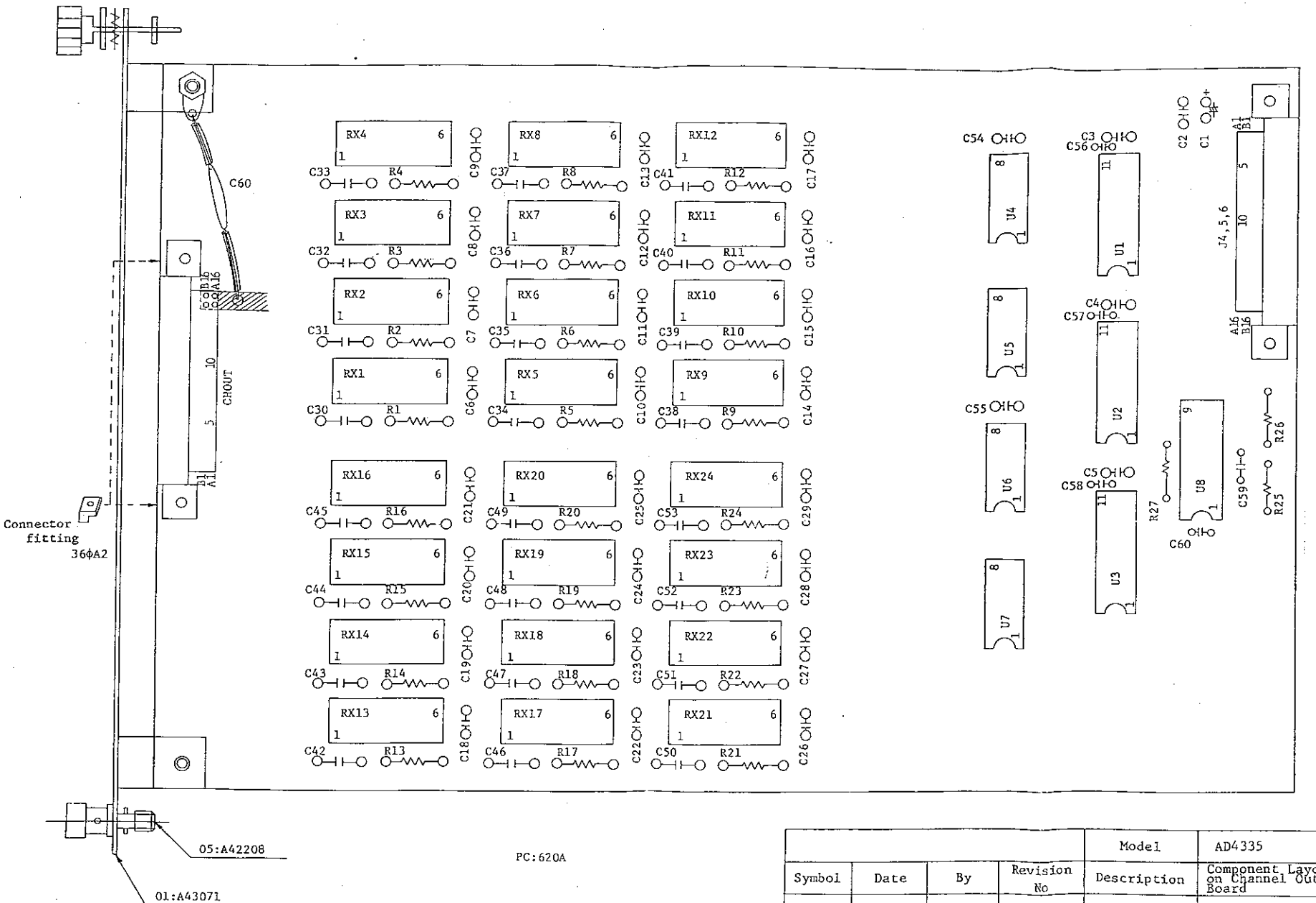
				Model	AD4335
Symbol	Date	By	Revision No.	Description	Component Layout on CPU Board
				Stock No.	PZ: 617
				Drwg. No.	KZ_3-00288


Model
AD4335
Description
CTC C10 Guard
Stock No.
PZ: 618
Drwg. No.
EZ3-00289
Revision No.
By
Date
Symbol
GND line
SERIAL OUT
Same for the other side
E ring
01: A43068A
(Panel)
M3
flat washer
I0: NO-3881



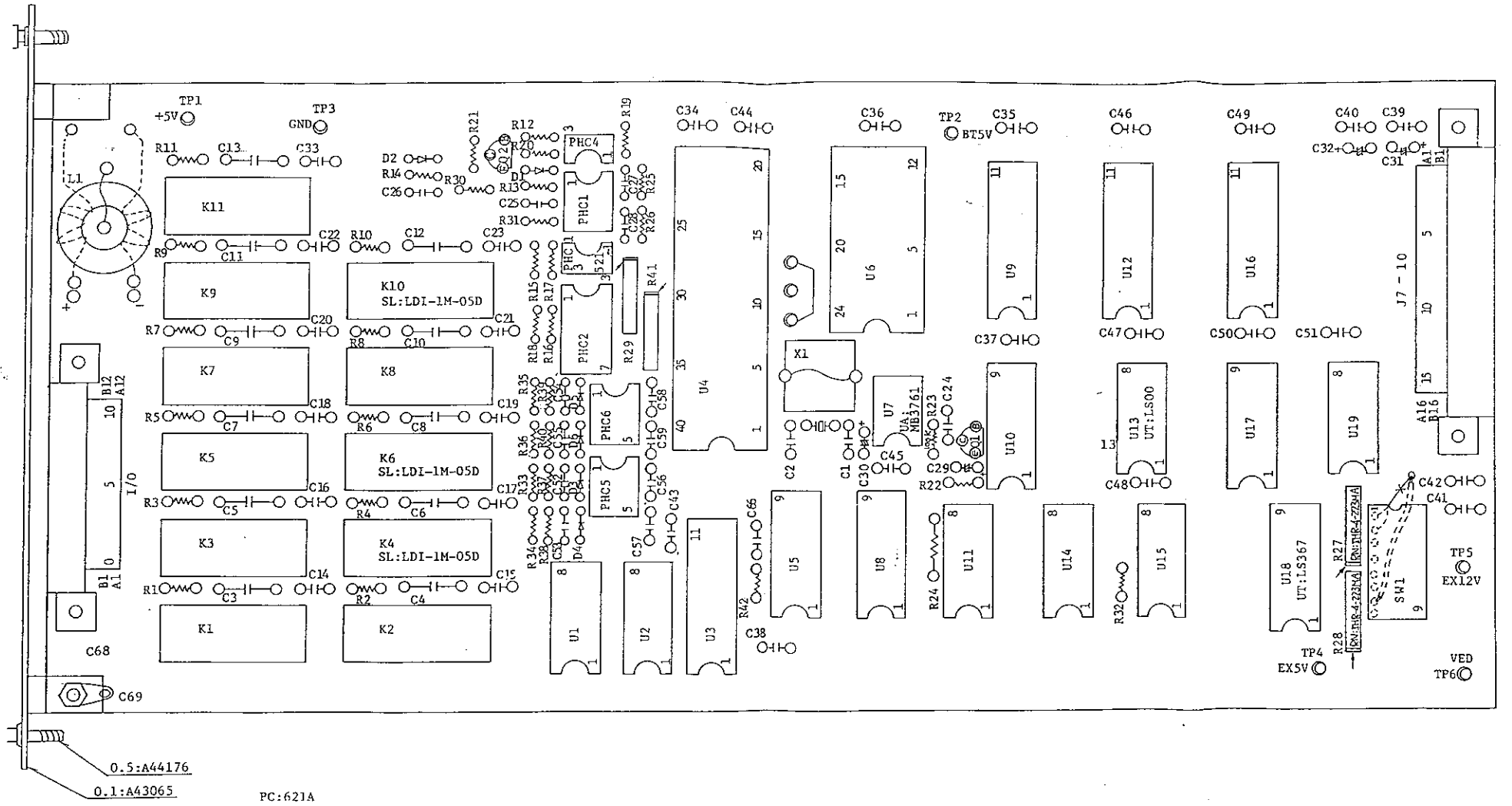
PC-619

				Model	AD4335
Symbol	Date	By	Revision No.	Description	Component Layout on Memory Board
				Stock No.	PZ: 619
				Drwg. No.	KZ_3-00290

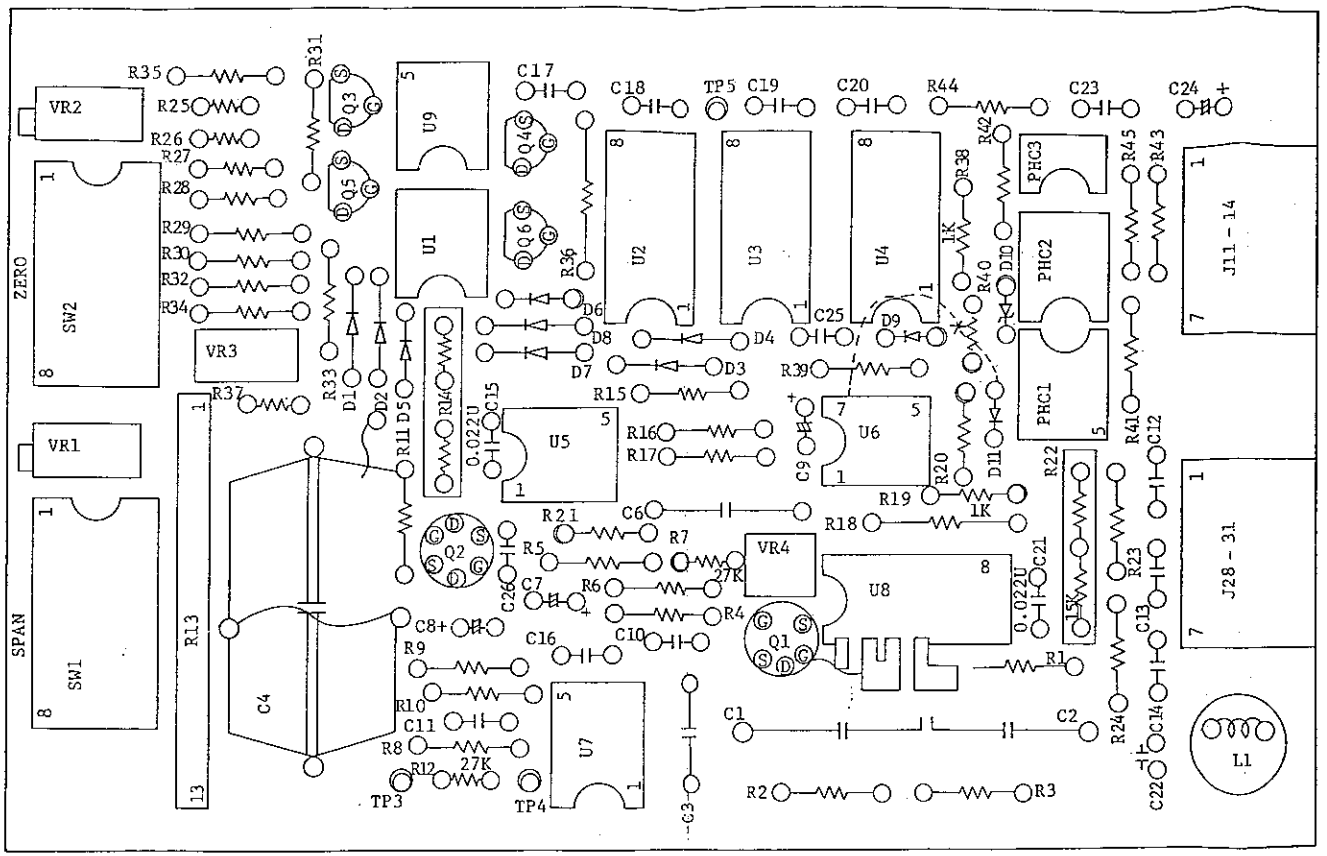


PC:620A

				Model	AD4335
Symbol	Date	By	Revision No	Description	Component Layout on Channel Output Board
				Stock No.	PZ: 620
				Drwg. No.	KZ_3-00291

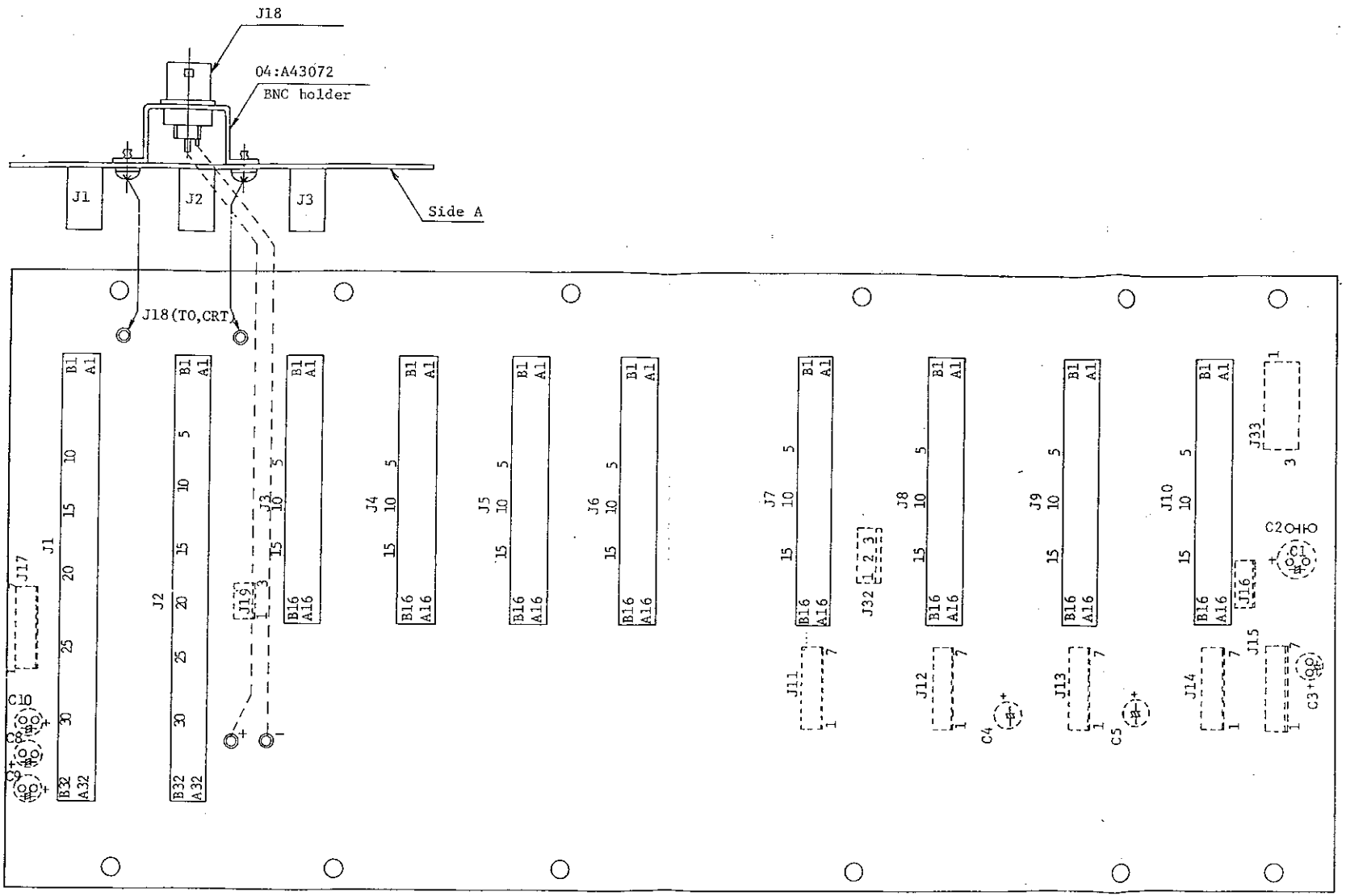


				Model	AD4335
Symbol	Date	By	Revision No.	Description	A/D Logic
				Stock No.	PZ: 621
				Drwg. No.	EZ_3-00296



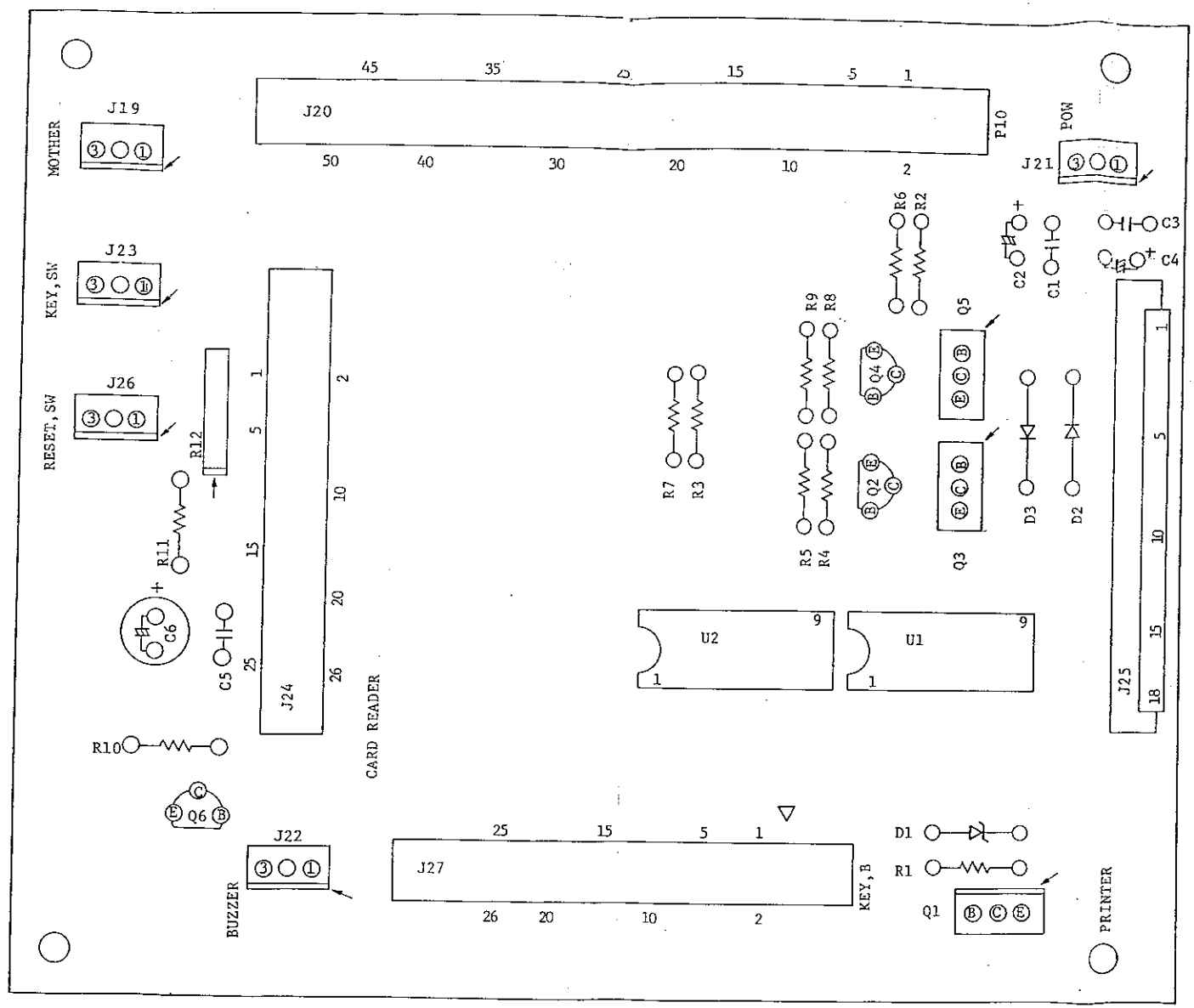
PC 622A

				Model	AD4335
Symbol	Date	By	Revision No.	Description	Component Layout on A/D Analog Board
				Stock No.	PZ: 622
				Drwg. No.	KZ_3-00341



PC:623A

				Model	AD4335
Symbol	Date	By	Revision No.	Description	Component Layout on Mother Board 1
				Stock No.	PZ: 623
				Drwg. No.	KZ_3-00294



PC:624A

				Model	AD4335 Printer.
Symbol	Date	By	Revision No.	Description	Component Layout on Mother Board 2
				Stock No.	PZ: 624
				Drwg. No.	KZ_3-00292