**SHARP**

# SERVICE MANUAL

00ZMZ1E24///E

## RS-232C INTER FACE
(FOR MZ80B, 700, 800)

## MODEL MZ-1E24

CONTENTS



SHARP CORPORATION

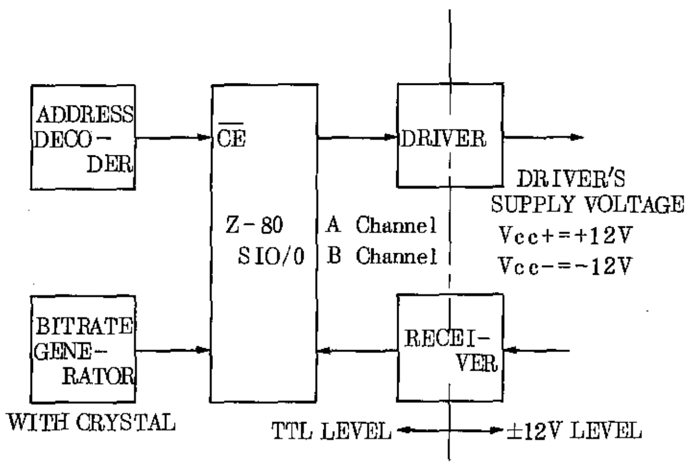
## 1. General

The MZ-1E24 is an RS-232C interface card which can be used for the MZ-700, MZ-800, and MZ-80B.

## 2. Features

- Incorporation of dual channels permits independent data transmission and reception.
- Ten modes of baud rates can be chosen by the jumper on the card which can be set independently for each channel.
- States of connector output signals to the external device can be assigned to the terminal or modem mode using the jumper.
- The following jumper assignment can be attained using the jumper.
  BI mode (MODE 1): MZ-8BI03 compatible.
  ST mode (MODE 2): Sharp standard RS-232C mode.

## 3. Block diagram




## 4. Hardware description

1) Address decoder

From the CPU is issued an 8-bit output for port assign address. Since four successive ports are used with the MZ-1E24, a successive four port addresses are chosen by assigning the high order 6 bits of the 8-bit output using the dip switch.

2) Bit rate generator

The MOTOROLA MC1441 CMOS Bit Generator is used with the external 1.8432MHz crystal oscillator. As ten kinds of baud rates are obtained on the output, the user can select the desired rate.

3) Driver

The SN75188 is used for the line driver. The supply voltages are: VCC+=12V, VCC-=-12V.

4) Receiver

The SN75189A is used for the line receiver. It operated under single supply of 5V.

5) Z-80 SIO/0

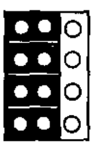
The Z80 SIO/0 is used for the serial I/O drive.

## 5. Jumper block description

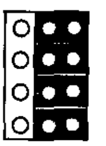
JB-A1: Selection of BI mode* and ST mode* for the channel A.

JB-B1: Selection of BI mode* and ST mode* for the channel B.

All jumpers in the same jumper block must be set to the same mode.



BI ST
BI mode



BI ST
ST mode

Do not make all jumpers connected in otherwise connection.

*BI mode

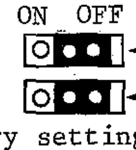
It is the mode compatible with the MZ-8BI03.
It has to be set in this mode when operated under the system software (i.e. DISK BASIC) which supports the MZ-8BI03 to the MZ-80B.

*ST mode

Standard RS-232C compatible mode.
It has to be set in this mode when the MZ-800 or the MZ-700 (operated under DISK BASIC).

JB-A2: Selection of the baud rate for the channel A.
JB-B2: Selection of the baud rate for the channel B.
For detail, refer to Section 7.
JB-A3: Selection of the terminal and modem mode for the channel A.
JB-B3: Selection of the terminal and modem mode for the channel B.
JB-M : Setting up the RS signal

The RS (Request To Send) signal is set to high by installing a jumper chip on the ON side of jumper block JB-M.




Jumper chips should normally be installed in the OFF position.

## 6. Port address assignment

The Z-80 CPU issues an 8-bit output for the port address.
Since four successive ports are used with the MZ-1E24, a successive four port addresses must be selected by assigning the high order 6 bits of the 8-bit address output using the dip switch.

| Dip switch number | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Address bit | $A_2$ | $A_3$ | $A_4$ | $A_5$ | $A_6$ | $A_7$ |
| Factory setup | ON | ON | OFF | OFF | ON | OFF |

| Switch position | Logic level |
|---|---|
| ON | 0 |
| OFF | 1 |

The port addresses, therefore, have been set to B0H, B1H, B2H, and B3H at the factory.

$$\begin{array}{lcccccccc} \text{Address bit} & A_7 & A_6 & A_5 & A_4 & A_3 & A_2 & A_1 & A_0 \end{array}$$

$$\text{Logic level}\quad \underbrace{1\ \ 0\ \ 1\ \ 1}_{B}\ \ \underbrace{0\ \ 0\ \ \times\ \ \times}_{0,1,2,3}$$

"x" represent either 0 or 1.

The address bit A1 is used for selection of the Z-80 SIO channel. The address bit A0 is used for selection of the Z-80 SIO command or data.

| $A_1$ | $A_0$ | Choice |
|---|---|---|
| 0 | 0 | Data, channel A |
| 0 | 1 | Command, channel A |
| 1 | 0 | Data, channel B |
| 1 | 1 | Command, channel B |

•The baud rate must coincide with the specification of the software used.

For the MZ-80B, 700 and 800: B0-B3H

## 7. Port rate setup for each channel

As two channels, A and B, are provided for this card, it is possible to set baud rate independently for each channel.
The desired baud rate must be chosen out of ten baud rates by making short-pin connection on JB-A2 and JB-B2.
The JB-A2 is used for the baud rate assignment of the channel A and the JB-B2 for the channel B.

| Short-pin location | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Baud rate | 75 | 110 | 150 | 300 | 600 | 1200 | 1800 | 2400 | 4800 | 9600 |

Notes:
Never try to insert more than two short-pins at the same time as it may possibly invite a destruction in the IC.
Proper communication would not be enabled, unless the baud rate is identical at both sides.

## 8. Connector signal mode

There are two 9-pin connectors used in this card.

Channel A connector　　　　Channel B connector

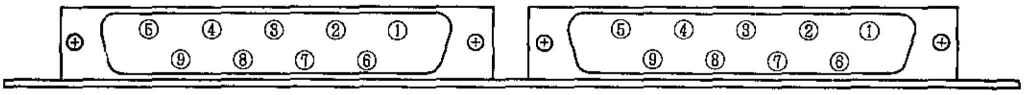



Fig.4-2. Connector pin configuration

Signal assignment on connector pins can be altered by changing jumper block connections, by which the channel can be assigned to either terminal or modem mode.
RS-232C compatible signals are obtained in the terminal and modem mode. That is, binary signals are transferred in the voltage level.

Table 4-3 Channel mode

| Channel / Mode | Channel A | ChannelB |
|---|---|---|
| Terminal mode | Yes | Yes |
| Modem mode | Yes | Yes |

Table 4-4 shows connector pin assignments in each mode.
For the pin number, refer to Table 4-2.

Table 4-4 Pin description

| Connector pin No. | Terminal mode | | Modem mode | |
|---|---|---|---|---|
| 1 | Safety ground | FG | Sefety ground | FG |
| 2 | Transmit data | SD | Receive data | RD |
| 3 | Receive data | RD | Transmit data | SD |
| 4 | Request to send | RS | Clear to send | CS |
| 5 | Clear to send | CS | Request to send | RS |
| 6 | Equipment ready | ER | Data set ready | DR |
| 7 | Data set ready | DR | Equipment ready | ER |
| 8 | Signal ground | SG | Signal ground | SG |
| 9 | N.C | | N.C | |

•Signal description

| Pin No. | Terminal mode | | Modem mode | |
|---|---|---|---|---|
| 1 | Safety ground | FG | Safety ground | FG |
| 2 | Transmit data | SD | Receive data | RD |
| 3 | Receive data | RD | Transmit data | SD |
| 4 | Request to send | RS | N.C | |
| 5 | Clear to send | CS | Ready to receive | RR |
| 6 | Equipment ready | ER | Device ready | DR |
| 7 | Device ready | DR | Equipment ready | ER |
| 8 | Signal ground | SG | Signal ground | SG |
| 9 | Ready to receive | RR | Clear to send | CS |

The following alteration takes place when set to the modem mode.

| BI mode | ST mode |
|---|---|
| 2 ⇄ 3 | 2 ⇄ 3 |
| 4 ⇄ 5 | 5 ⇄ 9 |
| 6 ⇄ 7 | 6 ⇄ 7 |

•It has to be set in the terminal mode when using the acoustic coupler.

•Normally, it is operated in the modem mode when the MZ-1E24 is connected with the RS-232C interface incorporating printer and plotter. However, thorough reading of the instruction manual is required in order to make proper use as there may an exemption.

- To make direct connection with the computer without intervention of the modem, the following cable connection is required by operating the one of sides in the terminal mode and the other side in the modem mode.

1 ——— 1
2 ——— 2
3 ——— 3
4 ——— 4
5 ——— 5
6 ——— 6
7 ——— 7
8 ——— 8
9 ——— 9

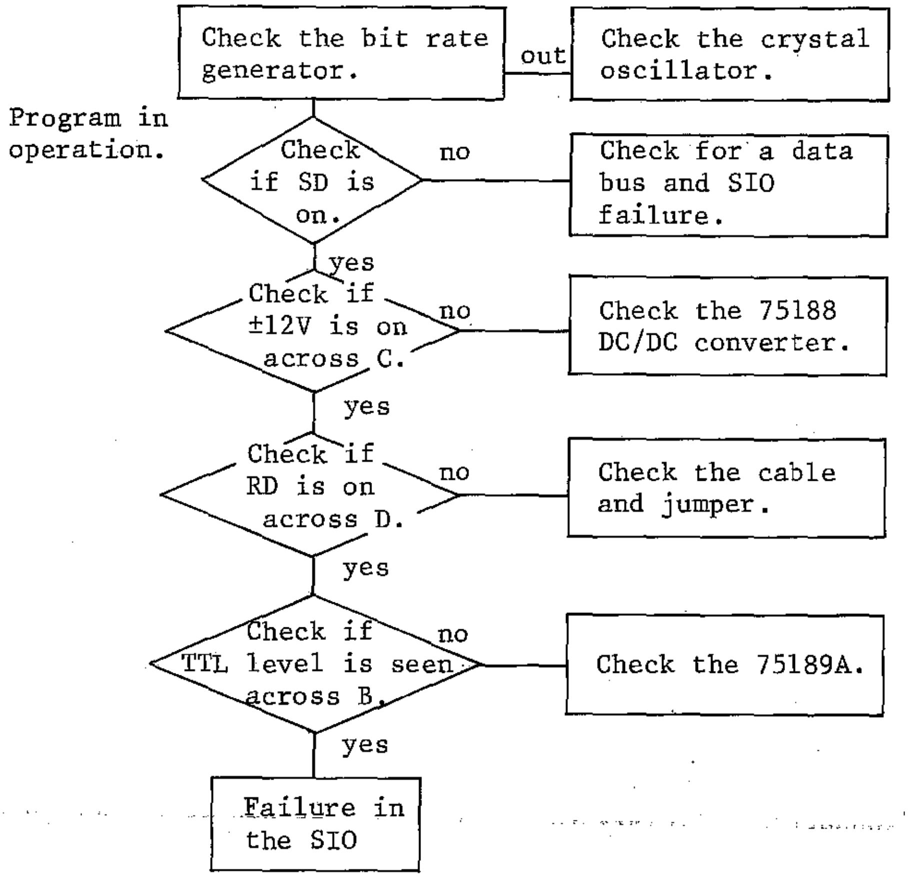
## 9. Troubleshooting

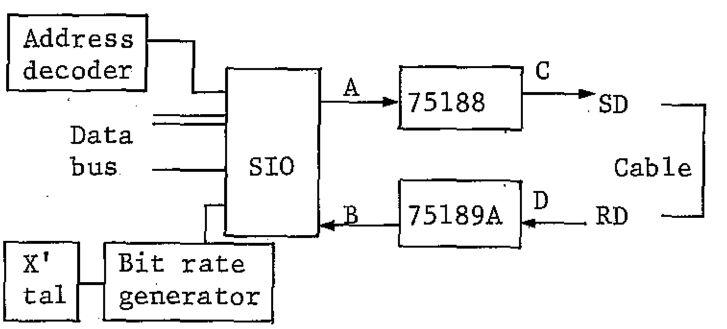
The diagnostic program must be used for troubleshooting (see Paragraph 10).

As the diagnostic program consists of the board test and communication test, the diagnostic program must be operated depending on the trouble phenomenon.

- If the board test has not been completed successfully, there may the following possible cause:
  1. Check for proper supply of the clock (BUSO).
  2. Check for a failure in the dip switch.
  3. Failure in the LS04 or LS266.
  4. Failure in the SIO.

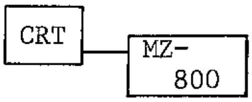
- If the communication test has not been completed successfully, make test in the following sequence.



## 10. Use of the diagnostic program

1. Make the monitor connected with the MZ-800.




2. Insert the diagnostic cassette tape in the MZ-800 and load the diagnostic program.

3. Set the MZ-1E24 to be tested in the following manner:

   1) Dip switch Nos.1, 3, 5...ON
      2, 4, 6...OFF

   2) Set the JB-A3 to the T side, th the JB-B3 to the M side, and the JB-A1, BI to the BI mode.

   3) Set both switch of the JB-M to the OFF side.

   4) Set the JB-A2, B2 to the 1200 mode.

4. Mount the MZ-1E24 to the slot of the MZ-800, and connect the test cable.

5. Enter A8H, which has been already set, for the port address as prompted on the monitor screen.

6. Push the space bar to get the port address on display. The following message will appear if entered correctly.

   PORT NO = AB

7. Turn the dip switches, 2, 4, and 6, to the ON side; and 1, 3, 5 to the OFF side (=54H). Push the CR key. The following message will appear if entered correctly.

   PORT NO = 57

   To perform the communication test, set the dip switches, 5, 2, and 1, to the ON side; and 6, 4, 3 to the OFF side (=80H). Push the CR key. Then, the port No. = B3, F7 is outputted.

8. Next, push the space bar. The following message will appear if entered correctly.

   A TO B OK , B TO A OK

   It will be in a failure if only either side is on display with the control waiting for a command entry.

9. The test has been successful up to Step 8, push the space bar to return to the port test. After changing to the ST mode, repeat the communication test. Also, test the channel A in the M mode and the channel B in the T mode.

•Baud rate test

Apply the universal conter probe to the JB-A2, B2.
Check if the following frequency is observed.

| | | |
|---|---|---|
| 9600 | 153.6K | (Only three digits are effective.) |
| 4800 | 76.8K | |
| 2400 | 38.4K | |
| 1800 | 28.8K | |
| 1200 | 19.2K | |
| 600 | 9600 | |
| 300 | 4800 | |
| 150 | 2400 | |
| 110 | 1760 | |
| 75 | 1200 | |

•Signal level test

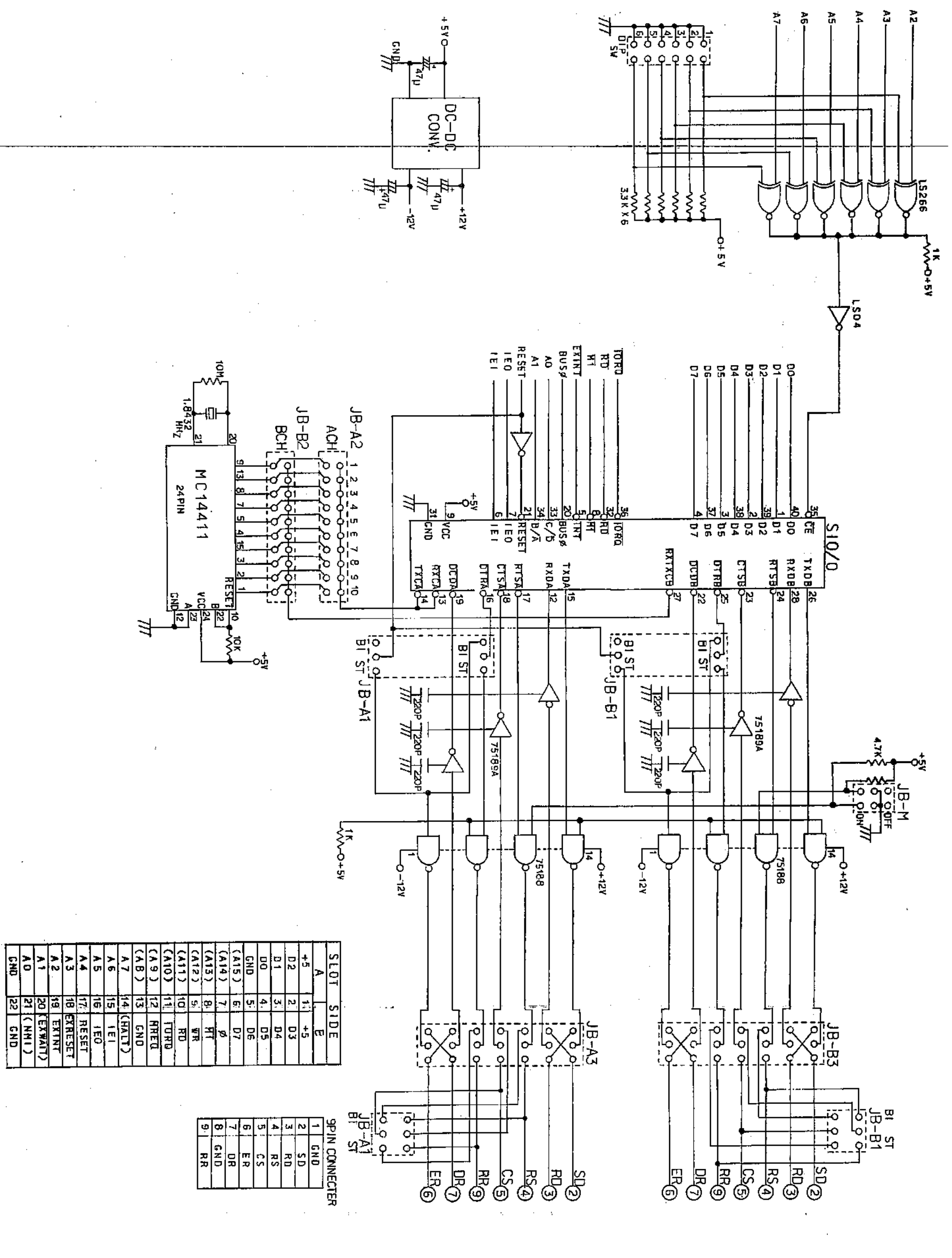
During the communication test, apply the probe to the SD signal jumper block of the JB-A3 and check if ±12V is observed.

•JB-M tests

Apply the probe to the RS signal jumper block of the JB-A3. Check if RS is stable at +12V when the JB-M is ON.

| Parts code | Description | Price rank |
|---|---|---|
| UKOG-1038ACZZ | Diagnostic cassette tape | BB |
| UKOGG1035ACZZ | Test cable | BK |

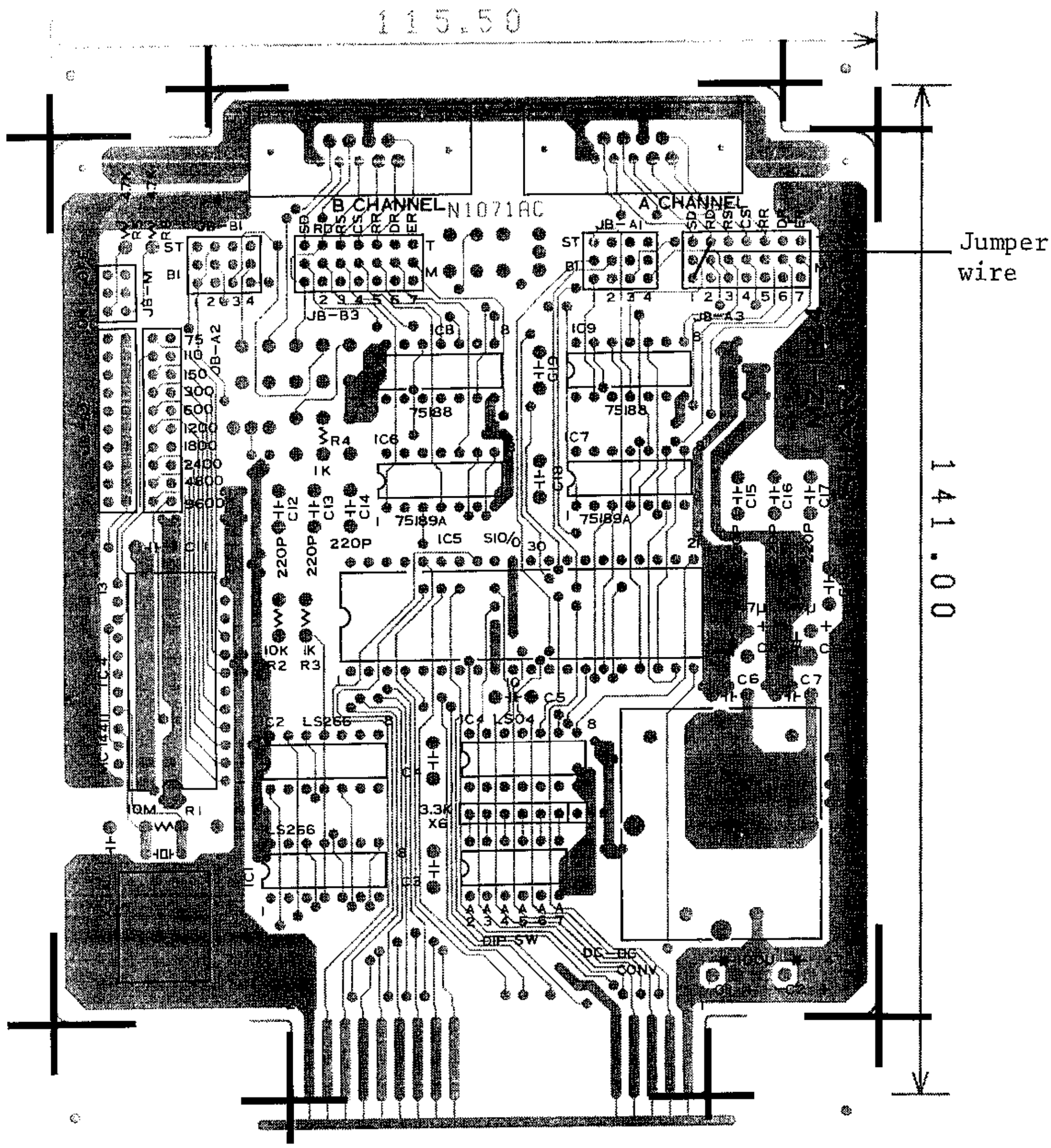
## II. Circuit diagram




| SLOT SIDE A | | SLOT SIDE E |
|---|---|---|
| +5 | 1 | +5 |
| D2 | 2 | D3 |
| D1 | 3 | D4 |
| D0 | 4 | D5 |
| GND | 5 | D6 |
| (A15) | 6 | D7 |
| (A14) | 7 | ø |
| (A13) | 8 | HT |
| (A12) | 9 | WR |
| (A11) | 10 | RD |
| (A10) | 11 | IORQ |
| (A9) | 12 | MREQ |
| (A8) | 13 | GND |
| A7 | 14 | (HALT) |
| A6 | 15 | IEI |
| A5 | 16 | IEO |
| A4 | 17 | RESET |
| A3 | 18 | EXRESET |
| A2 | 19 | EXTNT |
| A1 | 20 | (EXWAIT) |
| A0 | 21 | (NMI) |
| GND | 22 | GND |

| 9PIN CONNECTER | |
|---|---|
| 1 | GND |
| 2 | SD |
| 3 | RD |
| 4 | RS |
| 5 | CS |
| 6 | ER |
| 7 | DR |
| 8 | GND |
| 9 | RR |

Pattern diagram



## 12. Parts list

### 1 Electronic parts

| NO. | PARTS CODE | PRICE RANK | NEW MARK | PART RANK | DESCRIPTION |
|---|---|---|---|---|---|
| 1 | QCNCW1057ACZZ | AB | | C | Connector (Short socket) |
| 2 | QCNCM1058AC06 | AC | | C | Connector (6pin 2line) |
| 3 | QCNCM1058AC20 | AE | | C | Connector (20pin 2line) |
| 4 | QCNCM1060AC12 | AE | | C | Connector (12pin 3line) |
| ~~5~~ | ~~QCNCM1060AC21~~ | ~~AG~~ | | ~~C~~ | ~~Connector (21pin 3line)~~ |
| 6 | QCNCW1061ACZZ | AM | | C | Connector (9pin Sub connector) |
| 7 | QSW-Z1034ACZZ | AH | | B | Dip switch (6P) |
| 8 | RCRSQ1017ACZZ | AP | | B | X-TAL (1.8432MHz) |
| 9 | RMPTC6332QCKB | AC | | B | Block resistor (3.3KΩ×6 1/8W ±10%) |
| 10 | RTRNZ1010ACZZ | AW | | B | DC converter |
| 11 | VCEAAU1AW107Q | AB | | C | Capacitor (10V 100μF 6.5φ×10) |
| 12 | VCEAAU1CW476Q | AB | | C | Capacitor (16WV 47μF) |
| 13 | VCKYPU1HB221K | AB | | C | Capacitor (50WV 220pF) |
| 14 | VCTYPU1NX104M | AB | | C | Capacitor (12WV 0.10μF) |
| 15 | VHiLH0084A/-1 | AW | | B | IC (LH0084A) |
| 16 | VHiMC14411/-1 | AY | | B | IC (MC14411) |
| 17 | VHiM74LS04/-1 | AE | | B | IC (M74LS04P) |
| 18 | VHiM74LS266-1 | AE | | B | IC (M74LS266) |
| 19 | VHiUA1488//-1 | AH | | B | IC |
| 20 | VHiUA1489A/-1 | AH | | B | IC |
| 21 | VRD-ST2EY102J | AA | | C | Resistor (1/4W 1KΩ ±5%) |
| 22 | VRD-ST2EY103J | AA | | C | Resistor (1/4W 10KΩ ±5%) |
| 23 | VRD-ST2EY472J | AA | | C | Resistor (1/4W 4.7KΩ ±5%) |
| 24 | VRD-ST2EY106J | AA | | C | Resistor (1/4W 10MΩ ±5%) |

### 2 Packing & Others

| NO. | PARTS CODE | PRICE RANK | NEW MARK | PART RANK | DESCRIPTION |
|---|---|---|---|---|---|
| 1 | SPAKA1122ACZZ | AH | | D | Packing cushion |
| 2 | SPAKC1657ACZZ | AM | N | D | Packing case |
| 3 | SSAKA0302CCZZ | AA | | D | Vinyl bag (160×200mm) |
| 4 | TSELF1002ACZZ | AA | | D | Label |
| 5 | LANGT1049ACZZ | AE | | C | Angle for PWB |
| 6 | TiNSE1302ACZZ | AY | N | D | Instruction book |
| 7 | XBPSM30P10K00 | AA | | C | Screw (3×10K) |
| 8 | XNESD30-24000 | AA | | C | Nut (3NS) |

SHARP

**SHARP CORPORATION**
Industrial Instruments Group
Quality & Reliability Control Center
492 Minoshocho, Yamatokoriyama,
Nara 639-11, Japan
Feb. 1985 Printed in Japan