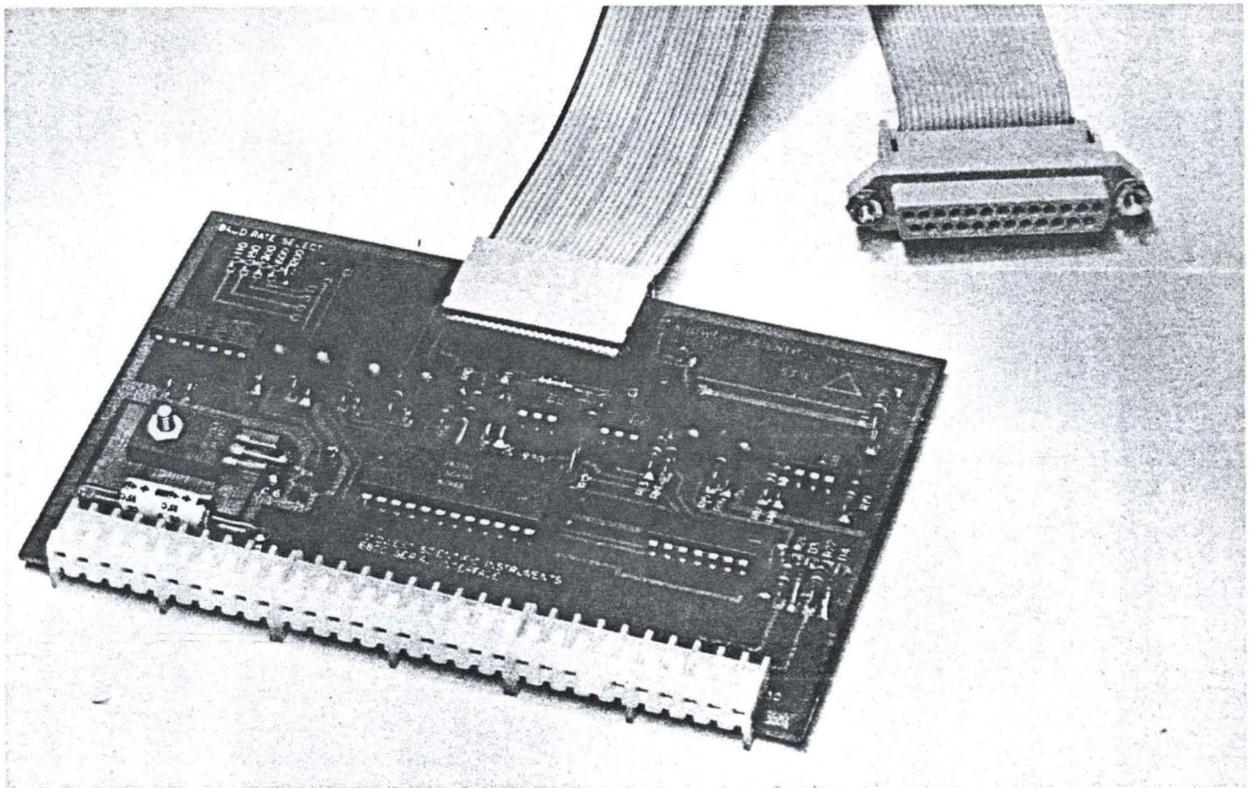# SERIAL INTERFACE
BOARD
MODEL SI-1

Midwest Scientific Instruments, Inc.
Olathe, Kansas

THE MSI SERIAL INTERFACE BOARD, MODEL SI-1

GENERAL DESCRIPTION

The MSI Model SI-1 Serial Interface Board is desigCCd to be compatable with the interface bus of the MSI 6800 or SWTP 6800 computer systems. This interface board uses the Motorola MC-6850 Asychronous Communications Interface Adapter, which allows the computer to communicate with industry standard RS-232-C (or current loop) compatible input and output devices such as CRT terminals, printers, data sets, acoustic couplers, or modems. A current loop input and output, as well as an optically isolated tape reader control, is provided to allow operation with teletype terminals. Most strappable options are available on the DB-25 connector as well as on the interface board itself. All signal lines from the interface board travel to the DB-25 interface connector on the rear panel of the computer by means of a short ribbon cable. The availability of strappable options on the DB-25 interface connector allows different terminals to be plugged into the interface without changing any straps on the interface board itself. Either a teletype terminal, or a CRT terminal, operating at any desired baud rate with desired clock strapping options, may be plugged into the DB-25 connector without alteration of the interface board. By strapping the DB-25 male connector which comes from each I/O device appropriately, any desired option may be selected.

Primary and secondary RS-232-C inputs and outputs, as well as a current loop input and output, are all provided in parallel. Only one of the available inputs may be active at any one time, the remaining inputs must remain in the "MARK" condition.

P.C. BOARD ASSEMBLY INSTRUCTIONS

Before beginning assembly of the P.C. Board, perform the following steps. Referring to the parts list, and the Assembly Drawing No. 100014, carefully check the parts kit in order to properly identify each component and to make sure that all the necessary parts have been included.

Next, carefully examine the P.C. Board itself for any flaws or defects. A magnifying glass is helpful in identifying the presence of any hairline shorts between foils, incomplete etching of the board, or breaks in a foil. Such defects are rare but a careful preliminary examination is very worthwhile. Any defects should be corrected before beginning assembly of the board.

We recommend using a 30 watt soldering iron for all assembly. Use only solder having a resin core, never use any type of acid based solders. A 60/40 or 63/37 alloy is recommended.

Care should be taken when soldering transistors and integrated circuits, as over heating of the leads can destroy the device. Also be careful to orient the device correctly before soldering.

IC sockets may be used if desired. However, use only a high quality socket such as the Texas Instruments Low Profile Version. Inexpensive sockets can often cause more problems than they solve.

The PC board has been silk screened to show the proper placement of all major components. Refer also to the Serial Interface Assembly Drawing No. 100014 for correct placement and orientation of all components.

ASSEMBLY PROCEDURE

( ) Install IC5, the 7805 voltage regulator, Item No. 28, on the PCB, using a 4-40 BHM screw, lock washer, and hexnut, ITEMS 34, 35, and 36. No heat sink is required.

( ) Install IC1, IC2, IC3, IC4, and IC7, on the PCB. Solder into position. If sockets are being used for these components, then solder the sockets in the appropriate positions.

( ) Solder a 24 pin socket in position J1.

( ) Solder resistors R-1 thru R-23 on the printed circuit board.

( ) Identify the two 12 volt zener diodes (1N4742) D3 and D4. Install these on the PC board, solder into position. Be careful to note the correct orientation of the diode by observing the banded end.

( ) Identify two 1N4003 diodes, D1 and D2, install these on the printed circuit board in the appropriate positions. Be careful to observe the correct orientation of these diodes by observing the banded ends. Solder.

( ) Identify capacitors C1, C2, C3, and C4 and install these capacitors in the appropriate positions on the printed circuit board. Solder.

( ) Identify the electrolytic capacitor, C5, and install on the printed circuit board just below the 7805 voltage regulator. Be careful to note the polarity of this capacitor. Solder into position.

( ) Identify three PNP transistors, 2N3638, and install them in positions Q1, Q3, and Q5. When installing these transistors, leave the body of each transistor standing approximately 3/8 inch above the surface of the printed circuit board to allow access to the components which lie underneath the body of the transistor. Be careful to orient the transistors correctly. Solder. (These transistors may be labelled 5T3638).

( ) Identify three NPN transistors, 2N3565, and install these in positions Q2, Q4, and Q6. When installing these transistors, leave the body of each transistor standing approximately 3/8 inch above the surface of the printed circuit board to allow access to components which lie underneath. (These transistors may be labelled 5T3565).

( ) Solder the MC-6850 ACIA chip at position IC6.

( ) Install three 10 pin Molex female connectors on the bottom edge of the printed circuit board. The main body of the connectors should be on the component side of the circuit board. Be sure each connector is seated flat on the front surface of the board and has been seated firmly against the edge of the board before soldering. Usually, these connectors can be installed more easily if the end terminals are soldered into position first while carefully holding the connector in position. Then solder the remaining terminals.

( ) If the SI-1 interface is to be used on PORT 0 of the MSI 6800 Computer, to communicate with the system control terminal, then install jumper wires at positions #6-8 and #5-7 on the P.C. Board.
    If the interface is used in an application where RTS and DCD signal lines are needed, then do not install the above jumpers.

( ) If the interface is to be used in current loop configuration with a teletype terminal, refer to the Teletype Connection Diagram for the correct strapping and connection configuration.

( ) Solder a jumper at the appropriate position (JU-1 through JU-5) in order to select the desired baud rate. Alternatively, the desired baud rate may be selected by the installation of a jumper on the DB-25 connector. refer to the Serial Interface Schematic Diagram, Drawing No. 100010.

( ) Upon completion of P.C. Board assembly, carefully examine the board for the presence of any solder splashes, solder bridges, or shorts between adjacent pads on the board. These must be carefully removed before proceeding with checkout of the board. A magnifying glass greatly aids in the detection of such defects. If available, excess flux may be removed from the board with trichlorethylene. This also makes the detection of defects much easier.

( ) Locate the plastic keying pin and insert into the index position of the bottom edge female connector. This pin will prevent the circuit board from being accidentally plugged in backwards or with the pins offset.

TABLE 1

STRAPPABLE OPTIONS FOR SI-1 INTERFACE

PCB PAD or JUMPER No.	DB-25 PIN No.	IDENTIFICATION
1-2	17-18	IRQ Interrupt Enable
3-4*	---	Secondary RS-232 Input Enable
5-7	---	Ground DCD Input
6-8	---	Ground CTS Input
9-10**	---	Current Loop Rec'd Data Enable
JU-1	23-10	110 Baud Clock
JU-2	23-11	150
JU-3	23-12	300
JU-4	23-13	600 (9600)
JU-5	23-15	1200
	23	ACIA Clock Input

*Note if jumper 3-4 is installed, then the secondary RS-232 input (PIN 16 of DB-25) as well as the primary RS-232 input (PIN 3 of DB-25) must be held in the "MARK" condition (-12v) while the other input is active.

**If jumper 9-10 is installed then the current loop input must be held in "Closed Loop" (a "MARK") condition in order for either of the RS-232 inputs to be active.

SERIAL INTERFACE STRAPPABLE OPTIONS

Many strappable options are provided on the SI-1 Serial Interface Board, most of which are available on the DB-25 connector for selection by the particular terminal which is in use. These options are listed in Table 1.

INTERRUPT ENABLE JUMPER

By installing a jumper between PADS 1 and 2 on the printed circuit board, or between PINS 17 and 18 of the DB-25 connector, the interrupt enable function has been selected. Normally this jumper is not used when the SI-1 is being used as the control interface on PORT 0 of the MSI 6800 Computer. However, if the user desires to have interrupt driven I/O, then this option is available. In order to utilize interrupt driven I/O, the ACIA must also be programmed appropriately. Refer to the section covering operation of the ACIA for additional discussion of this option.

RS-232 INPUTS AND OUTPUTS

The SI-1 Interface Card has two RS-232 outputs as well as inputs which are referred to as primary and secondary. Both RS-232 outputs are active at all times, however, only one RS-232 input may be active at any one time. Normally only the primary RS-232 received data input (PIN 3 of the DB-25 connector) is active. In some instances, such as the use of a parallel tape cassette interface on the control port, both primary as well as secondary RS-232 data inputs maybe used. In order to select this option, a jumper must be installed between PADS 3 and 4 on the printed circuit board.

With the use of this jumper, the unused RS-232 received data input must remain in the "MARK" condition at all times while data is being received on the other. This may be achieved by making sure that the input device remains in the "MARK" condition or alternatively the inactive input may be strapped to -12 volts (PIN 22 of DB-25 connector).

CURRENT LOOP INPUT AND OUTPUT

A current loop input and output are also provided on the SI-1 Serial Interface Card. The current loop output is active at all times, however, the current loop input operates in parallel with the primary and secondary RS-232 received data inputs. Data may be received on only one of the three possible inputs at any given time. In order to select the current loop input, install a jumper between PADS 9 and 10 of the printed circuit board. When the current loop option has been selected, it is necessary that both of the RS-232 received data inputs be held in the "MARK" condition during the time the data is being received on the current loop input. This may be accomplished by making sure that the RS-232 inputs are connected to a terminal which remains in the "MARK" condition or alternatively the inputs must be strapped to -12 volts, (available on PIN 22 of the

DB-25 connector). If the current loop option has been selected and data is to be received on an RS-232 input then it is necessary that the current loop input remain in the "MARK" condition (closed loop condition). This may be achieved by proper connection to a teletype terminal or alternatively PINS 9 and 22 of the DB-25 connector must be jumpered together in order to close the loop.

CLEAR TO SEND (CTS) And DATA CARRIER DETECT (DCD) INPUTS
        RS-232C inputs are provided for both DCD and CTS on the SI-1 Serial Interface Board. When the board is used as the control interface on PORT 0 of the MSI 6800 Computer, both of these inputs must be strapped to ground by installation of jumpers between PINS #6 and #8 and between PINS #5 and #7 on the printed circuit board. If the SI-1 interface is to be used with a data set or modem then these inputs may be used and the jumpers must be removed for proper operation.

BAUD RATE SELECTION
        Five jumpers are provided to allow the selection of baud rates from 110 to 9600 baud or an external clock option, provided by the terminal, may also be selected. The baud rate selection is accomplished by installing a jumper at one of the following positions on the printed circuit board:

JU1	110 Baud
JU2	150 Baud
JU3	300 Baud
JU4	600 (9600 Baud)
JU5	1200 Baud

        The MSI CPU card is strapped so as to provide a 9600 baud clock on the line labeled 600 baud. Alternatively, the clock option or baud rate selection may be accomplished by installing jumpers between appropriate pins of the DB-25 connector as shown in Table 1.
        Refer to the Serial Interface Schematic Diagram, Drawing No. 100010 for additional information on strapping options.

THEORY OF OPERATION
        The SI-1 Serial Interface Board employs the Motorola MC 6850 Asychronous Interface Adapter. The 6850 ACIA, IC-6, communicates directly with the data bus of the computer and also communicates with the read/write line, interrupt line, phase 2 clock, and the least significant address line. Baud rate clock signals are brought to the interface card by the mother board. The clock signals are derived from the baud rate generator located on the CPU card.

        Power is furnished to the SI-1 Serial Interface Board by a 7805 voltage regulator, IC-5, which furnishes +5 volts to the board. Two 12 volt zener diodes (1N4742) D3 and D4 are used to supply +12 and -12 volts to the board.

The SI-1 Serial Interface provides two RS-232 data outputs and a current loop output. These outputs all operate in parallel. Three received data inputs are also provided, two RS-232 and one current loop input. These inputs are also connected in parallel and only one of the three may be active at any given time. The two unused inputs must remain in the "MARK" condition during the time the data is being received on the third. A REQUEST TO SEND output is available both as an RS-232 level as well as an optically isolated output which can be used as a reader control signal for a teletype terminal. The current loop input and output circuits are also optically isolated.

The SI-1 Interface uses an RS-232 interface receiver chip, IC-1, to convert between incoming RS-232 levels and TTL levels which are accepted by the 6850 ACIA chip. Outgoing RS-232 levels are generated by use of a transistor network which converts between the TTL level and the RS-232 output levels.

<center>TELETYPE CURRENT LOOP CONNECTIONS</center>

If the SI-1 interface is to be used with a teletype terminal, the TTY must first be configured for 20 ma current loop, full duplex operation.

Most TTY terminals can be strapped to this configuration by moving wires on the terminal block (right rear corner of the TTY) to the positions shown below:

TERMINAL NO.	WIRE DESCRIPTION
1	1 White
2	1 Black
3	1 Gray and 1 White/Red
4	1 Green and 1 Red
5	1 White/Blue and 1 Brown/Yellow
6	1 White/Yellow and 1 White/Black
7	1 White/Yellow and 1 Red/Green
8	1 Black/Green
9	1 Violet and 1 Yellow

In addition, the blue wire must be moved from the 750 ohm tap to the 1450 ohm tap on the power resistor behind the power supply, inside the TTY.

INSTALLATION OF TTY READER CONTROL

The MSIBUG Monitor Software is designed to automatically control the tape reader of a TTY terminal by either control codes or the reader control line. If the TTY is equipped with automatic reader control then the reader control line is not needed. However, if the TTY has a manual tape reader, then the reader control line may be used to control a relay (which must be installed in the TTY by the user) which in turn controls the tape reader.

In order to install the reader control modification, the following components are required:

1 ea   reed relay 12 V, 600 ohm coil (P-B JR-1005)
1 ea   470 ohm 1/2 watt resistor
1 ea   0.1 mfd 600 vdc capacitor
1 ea   1N5060 diode
1 ea   2.5" x 3.8" vector board

Using the parts shown above construct the circuit shown in the section covering "UPGRADING A TELETYPE FOR AUTOMATIC READER/PUNCH OPERATION". The LINE and LOCAL lines must be connected to the LINE/OFF/LOCAL SWITCH as shown. The relay coil is controlled by the reader control line on the SI-1 interface board.

2.50"

3.80"

1/2"

.80"

Relay

1 8" Dia. Holes

COMPONENT BOARD

Terminal

To
3 E4

CC12

B   12

2

BRN

Open
this
Wire

B   11
CC 11

J   F2

110 VAC
Input

2

Local

Off

Line

L1

Local

470Ω
½ W

0.1µF
600 V

NC

NO

RC

Component Board
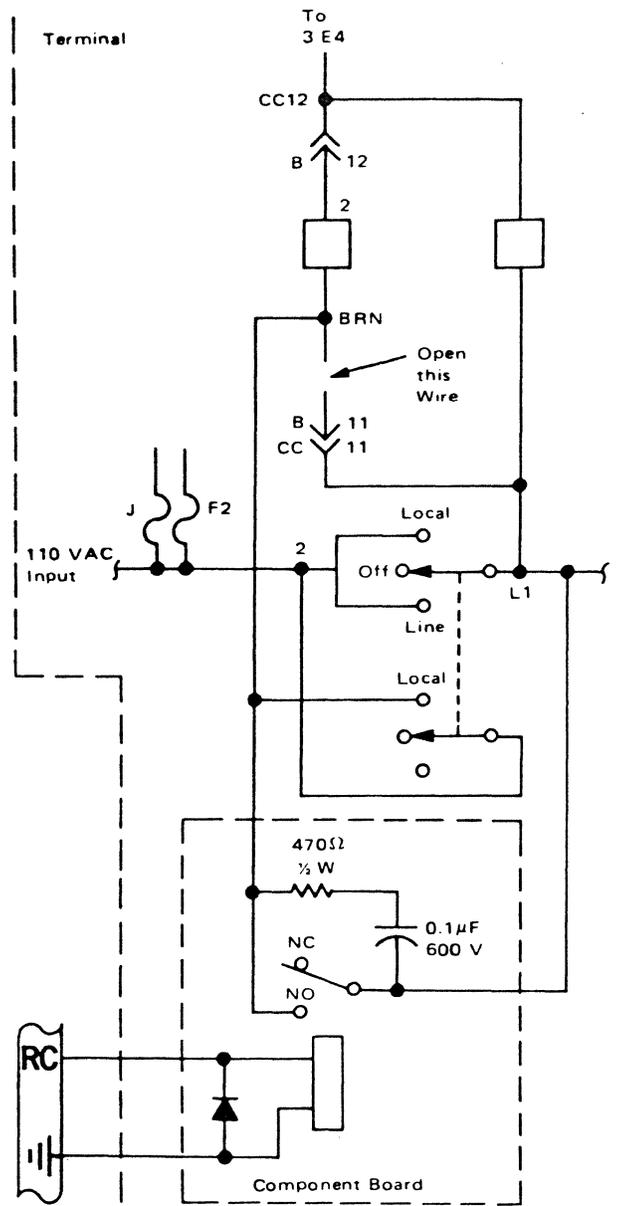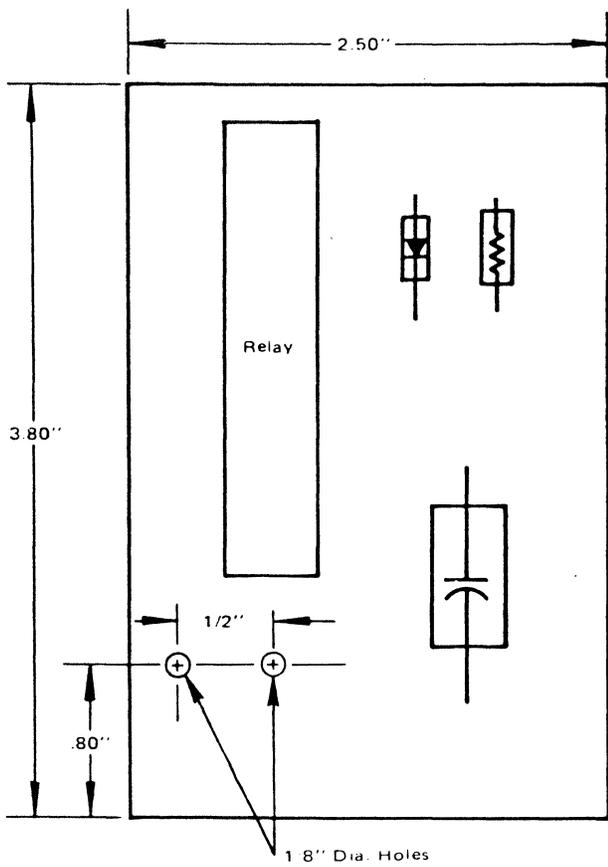
TTY Terminal Schematic Incorporating
Automatic Reader Control

Upgrading a Teletype for
Automatic Reader/Punch Operation

SERIAL INTERFACE CHECKOUT PROCEDURE

The preferred procedure for checkout of circuit boards is to have a computer system available containing known good boards, except for the board under test. Of course this is not always possible.

( )   First, carefully examine the completed circuit board for the presence of any solder splashes or solder bridges between pads of I.C. sockets, or particularly, between a pad and a foil passing between pads. These locations having very close clearances are most vulnerable to such faults. Any defects of this type must be carefully removed before proceeding.

( )   Place the circuit board into the computer system at I/O Port 0, if the interface is to be used to communicate with the system control terminal. Be certain that the index slug has been installed in order to prevent the circuit board from being accidentally plugged in backwards.

( )   Apply power to the system. Using a voltmeter, or an oscilloscope if available, check the output of the 7805 voltage regulator in order to ascertain that a full 5 V.D.C., free of any ripple, is present.

( )   Refer to the RS-232-C or the Current Loop Connection Diagram and connect a terminal to the system as shown. Be sure that the baud rate selection strap has been properly positioned, either on the board or the DB-25 connector, for the terminal in use. With power applied to the system, pressing the reset button on the front panel should cause an asterisk (*) to be printed on the terminal as the prompt character. The MSI-BUG monitor should now accept input character commands through the interface.

( )   If the system does not respond properly, and the system is known to be good except for the interface board, then double check the board again for shorts between adjacent foils and pads. If none can be found, then the interface should be placed on a different I/O Port in order to enter a test program for the interface. Suggested test programs are included. Using these programs, and an oscilloscope, the fault must be located.

```
00010                          NAM     ACIATST1
00020                   *
00030                   *MIDWEST SCIENTIFIC INSTRUMENTS INC.
00040                   *
00050                   * THIS ACIA TEST PROGRAM INITIALIZES
00060                   * AN ACIA ON PORT 5 AND CONTINUOUSLY
00070                   * TRANSMITS THE CHARACTER U.
00080                   *
00090 0100                     ORG     $100
00100       F528        ACIAC  EQU     $F528      PORT 5 CONTROL WORD
00110       F529        ACIAD  EQU     $F529      PORT 5 DATA WORD
00120 0100 86 13        START  LDA A   #$13       INITIALIZE ACIA
00130 0102 B7 F528             STA A   ACIAC
00140 0105 86 11               LDA A   #$11
00150 0107 B7 F528             STA A   ACIAC
00160 010A 86 55        PRINT  LDA A   #'U        LOAD A U
00170 010C F6 F528      CHECK  LDA B   ACIAC      CHECK TRANSMITTER
00180 010F 57                  ASR B              DATA REGISTER EMPTY
00190 0110 57                  ASR B
00200 0111 24 F9               BCC     CHECK
00210 0113 B7 F529             STA A   ACIAD      SEND CHARACTER
00220 0116 20 F2               BRA     PRINT      GO BACK AND DO AGAIN
00230                          END


00010                          NAM     ACIATST2
00020                   *
00030                   *MIDWEST SCIENTIFIC INSTRUMENTS INC.
00040                   *
00050                   * THIS ACIA TEST PROGRAM ACCEPTS A
00060                   * CHARACTER FROM AN ACIA ON PORT 5
00070                   * AND ECHOES IT BACK.
00080                   *
00090 0100                     ORG     $100
00100       F528        ACIAC  EQU     $F528      PORT 5 CONTROL WORD
00110       F529        ACIAD  EQU     $F529      PORT 5 DATA WORD
00120 0100 86 13        START  LDA A   #$13       INITIALIZE ACIA
00130 0102 B7 F528             STA A   ACIAC
00140 0105 86 11               LDA A   #$11
00150 0107 B7 F528             STA A   ACIAC
00160 010A B6 F528      WAIT   LDA A   ACIAC      WAIT FOR CHARACTER
00170 010D 47                  ASR A              CHECK RECEIVER
00180 010E 24 FA               BCC     WAIT       DATA REGISTER FULL
00190 0110 B6 F529             LDA A   ACIAD      GET CHARACTER
00200 0113 84 7F               AND A   #$7F
00210 0115 F6 F528      CHECK  LDA B   ACIAC      CHECK TRANSMITTER
00220 0118 57                  ASR B              DATA REGISTER EMPTY
00230 0119 57                  ASR B
00240 011A 24 F9               BCC     CHECK
00250 011C B7 F529             STA A   ACIAD      SEND CHARACTER BACK
00260 011F 20 E9               BRA     WAIT       GO BACK GET ANOTHER CHARACTER
00270                          END
```

TOTAL ERRORS 00000

ENTER PASS : 1P,2P,2L,2T

DB-25
CONNECTOR
TO CRT
TERMINAL

DB-25
CONNECTOR
TO SI-1

7		7	GND – LOGIC COMMON
3		2	TD – RS-232 TRANSMITTED DATA (CPU ➤ CRT)
2		3	RD – RS-232 RECEIVED DATA (CRT ➤ CPU)

OPTIONAL
BAUD RATE
SELECTION STRAP

| 23 | CI – CLOCK INPUT TO ACIA |
| 15 | 1200 BAUD CLOCK |

OPTIONAL
TO SECONDARY
RS-232 DEVICE

| 14 | STD – SECONDARY RS-232 TRANSMITTED DATA |
| 16 | SRD – SECONDARY RS-232 RECEIVED DATA |
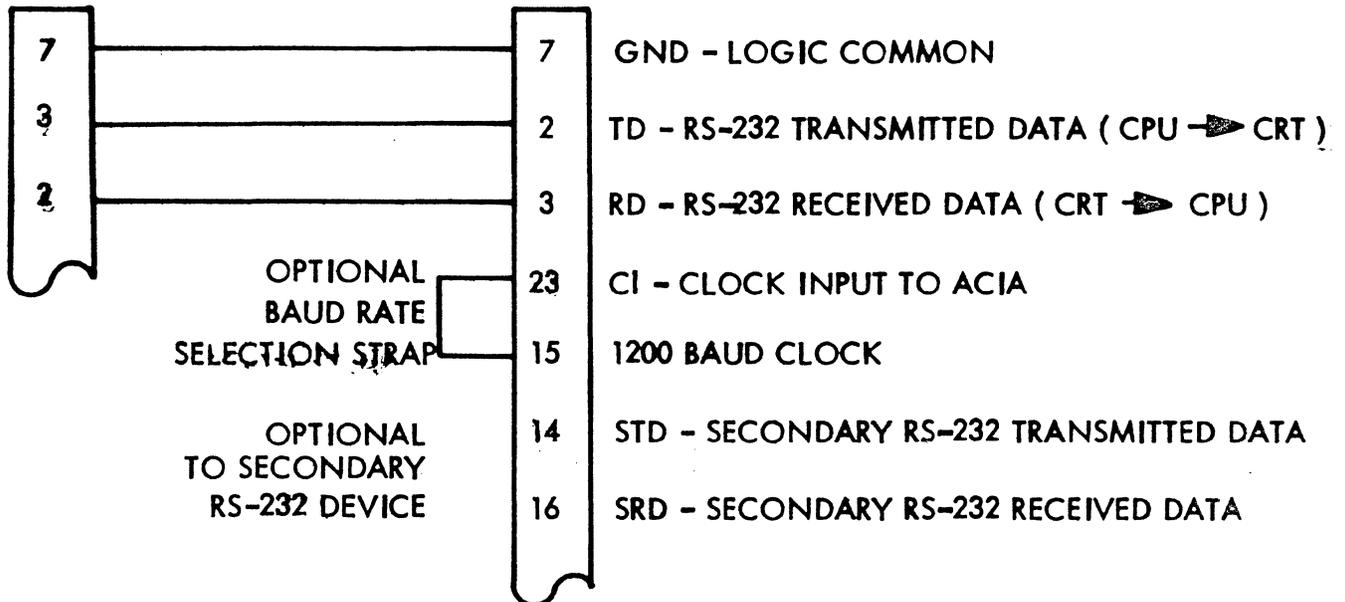
RS-232 CONNECTION DIAGRAM

**TELETYPE
I/O TERMINAL
STRIP**

**DB-25
CONNECTOR
TO SI-1**

9

8

7   TELETYPE PRINTER   23   CI – CLOCK INPUT TO ACIA

6   10   110 BAUD CLOCK

5   24   TDC – CURRENT LOOP TRANSMITTED DATA

4   TELETYPE COMMON   3   RD – RS-232 RECEIVED DATA

3   TELETYPE KEYBOARD   22   –12V

2   9   RDC – CURRENT LOOP RECEIVED DATA

1

19   TELETYPE READER CONTROL (IF USED)
SRTS–RC – SECONDARY REQUEST TO SEND
         OUTPUT FOR READER CONTROL
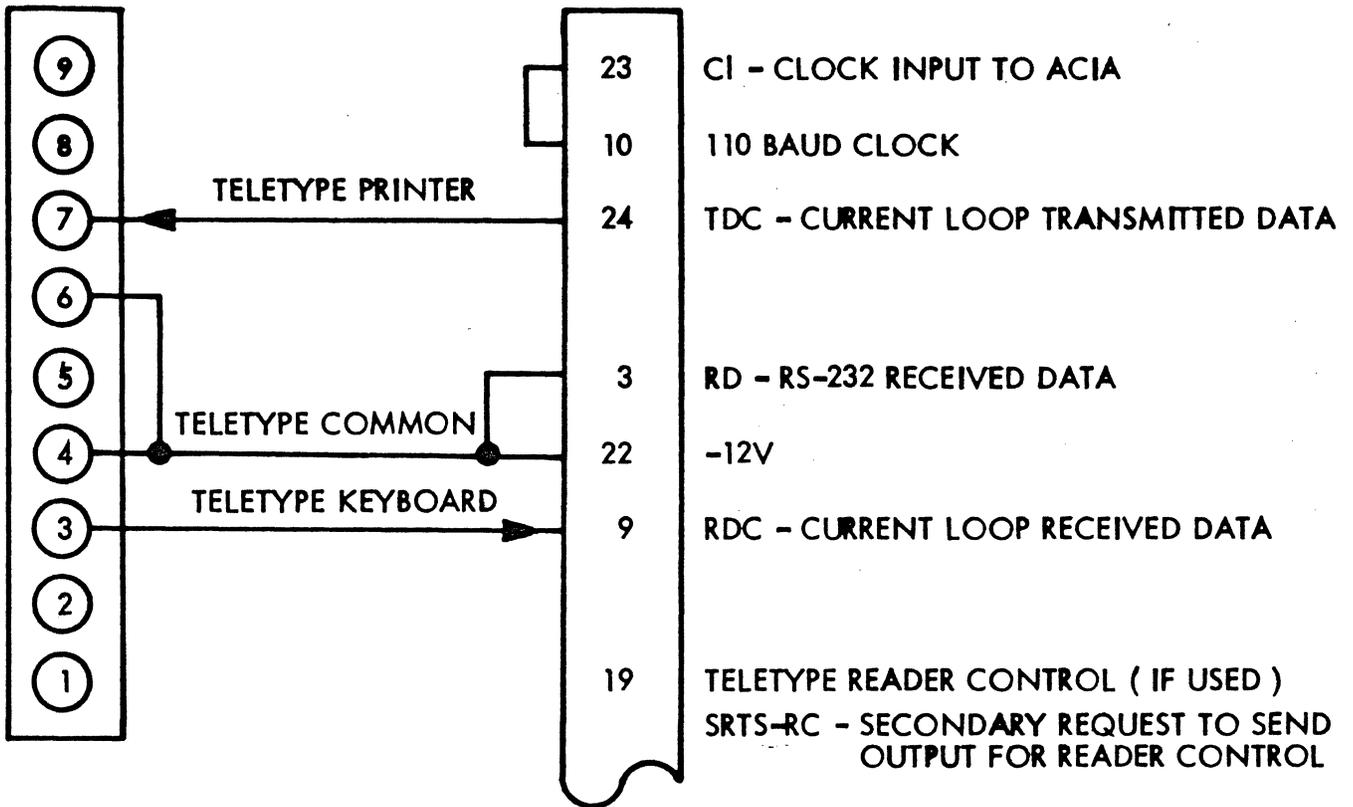
TELETYPE CONNECTION DIAGRAM

MSI 6800 COMPUTER, SI-1, SERIAL INTERFACE

PARTS LIST

ITEM NO.	QUANTITY	DESCRIPTION	REFERENCE DESIGNATION	MSI PART NO.
1	1	PCB, SI-1, Serial Interface		978
3	2	RESISTOR, 100	R21,R22	008
4	4	RESISTOR, 680	R2,R18,R19,R20	018
5	3	RESISTOR, 2.7K	R3,R7,R14	025
6	3	RESISTOR, 4.7K	R6,R10,R17	028
7	2	RESISTOR, 6.8K	R13,R23	030
8	3	RESISTOR, 10K	R5,R9,R16	032
9	3	RESISTOR, 47K	R4,R8,R15	039
10	1	RESISTOR, 330,1/2W	R1	065
11	1	RESISTOR, 820,1W	R11	063
12	1	RESISTOR, 1.1K,1W	R12	066
14	3	CAP.,Disc,.01uf,25V	C2,C3,C4	156
15	1	CAP.,Disc,.0.1uf,25V	C1	159
16	1	CAP.,Electro.,25uf,25V	C5	177
18	2	DIODE, 1N4003	D1,D2	102
19	2	DIODE, 1N4742,Zener,12V	D3,D4	107
21	3	TRANSISTOR,2N3565,NPN	Q2,Q4,Q6	117
22	3	TRANSISTOR,2N3638,PNP	Q1,Q3,Q5	119
24	1	IC, 1489	IC1	410
25	3	IC, 4N33	IC2,IC3,IC4	467
26	1	IC, 6850	IC6	396
27	1	IC, 7405	IC7	206
28	1	IC, 7805, +5V Regulator	IC5	495
30	1	SOCKET, 24 Pin	J1	707
32	3	CONNECTOR, 10 Pin, F.G.		1043
34	1	KEYING PIN, Molex		1051
35	1	SCREW, 4-40 x 3/8", B.H.M.		716
36	1	NUT, 4-40, Hex		714
37	1	WASHER, #4, I.T.L.		744
38	1	ASSY., I/O Ribbon Cable	(P1/DB-25)	1449

Note: All resistors are in ohms, $\pm$ 10%, 1/4W unless
otherwise specified.

MSI 6800 COMPUTER SCHEM, SI-1, SERIAL INTERFACE

30 PIN CONNECTOR

Signal	Pin
+8V UNREG	8
+8V UNREG	9
GND	25
GND	26
+15V UNREG	27
−15V UNREG	28
RSØ	21
DØ	19
D1	18
D2	17
D3	16
D4	15
D5	14
D6	13
D7	12
R/W̄	10
Ø2	11
SELECT	1
ĪRQ	22
110	3
150	4
300	5
600	6
1200	7
RESET	2

IC5 7805
IC6 6850

BAUD RATE SELECT JU1 JU2 JU3 JU4 JU5
110 150 300 600 1200

DB-25 / J1 P1

J1	P1	DB-25	Description
1	1	14	STD — SECONDARY RS-232 TRANSMITTED DATA
24	24	2	TD — RS-232 TRANSMITTED DATA
11	11	24	TDC — CURRENT LOOP TRANSMITTED DATA
6	6	19	SRTS-RC — SECONDARY REQUEST TO SEND OUTPUT FOR READER CONTROL
22	22	4	RTS — RS-232 REQUEST TO SEND OUTPUT
17	17	9	RDC — CURRENT LOOP RECEIVED DATA
23	23	3	RD — RS-232 RECEIVED DATA
3	3	16	SRD — SECONDARY RS-232 RECEIVED DATA
21	21	5	CTS — RS-232 CLEAR TO SEND INPUT
18	18	8	DCD — RS-232 DATA CARRIER DETECT INPUT
4	4	17	IRQ — INTERRUPT ENABLE JUMPER
5	5	18	
10	10	23	CI — CLOCK INPUT TO ACIA
16	16	10	110
15	15	11	150
14	14	13	300 — BRS — BAUD RATE SELECTION
13	13	12	600
2	2	15	1200
12	12	25	RES — MPU RESET LINE
7	7	20	DTR — DATA TERMINAL READY
20	20	6	DSR — DATA SET READY
9	9	22	−12V
8	8	21	GND — LOGIC COMMON
19	19	7	
			(UNUSED)

UNUSED IC PINS

IC TYPE	REF DES	PIN NO.
1489	IC1	2,5,9,12
7405	IC7	8 THRU 13

NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS ARE IN OHMS ±10%, 1/4 W.
[2] 1489 IS INTERCHANGEABLE WITH 75189.

Midwest Scientific Instruments
Olathe, Kansas

TITLE: MSI 6800 COMPUTER SCHEM, SI-1, SERIAL INTERFACE
DWG NO. 100010   REV 1

* MIDWEST SCIENTIFIC INSTRUMENTS

DB-25

P1

BAUD RATE SELECT

IC6

FOR CONN. PIN 24

REF

ITEM	QTY	PART NUMBER	DESCRIPTION	REF DES	MSI P.N.
38	I		ASSY, I/O RIBBON CABLE (P1/DB-25)		1449
36	I		WASHER, #4, I.T.L.		744
35	I		NUT, 4-40, HEX		714
34	I		SCREW, 4-40X3/8,BHM		716
33	I		KEYING PIN, MOLEX		1051
32	3		CONNECTOR,10 PIN,F, G		1043
30	I		SOCKET, 24 PIN	J1	707
28	I	7805	IC,+5V REGULATOR	IC5	495
27	I	7405	IC	IC7	296
26	I	6850	IC	IC6	396
25	3	4N33	IC	IC2,IC3,IC4	467
24	I	[2] 1489	IC	IC1	410
22	3	2N3638	TRANSISTOR, PNP	Q1,Q3,Q5	119
21	3	2N3565	TRANSISTOR, NPN	Q2,Q4,Q6	117
19	2	1N4742	DIODE, ZENER .12V	D3,D4	107
18	2	1N4003	DIODE	D1,D2	102
16	I		CAP,ELECTRO, 25UF, 25V	C5	177
15	I		CAP, DISC, .01 UF, 25V	C1	159
14	3		CAP, DISC,.01UF, 25V	C2,C3,C4	156
12	I		RESISTOR,1.1K,±10%,I W	R12	066
11	I		RESISTOR, 820,±10%,I W	R11	063
10	I		RESISTOR,330,±10%,1/4W	R1	065
9	3		RESISTOR,47K,±10%,1/4W	R4,R8, R15	039
8	3		RESISTOR,10K,±10%,1/4W	R5, R9, R16	032
7	2		RESISTOR, 6.8 K,±10%, 1/4W	R13, R23	030
6	3		RESISTOR,4.7K,±10%,1/4W	R6, R10,R17	028
5	3		RESISTOR,2.7K,±10%,1/4W	R3, R7, R14	025
4	4		RESISTOR,680,±10%,1/4W	R2,R8,R19,R20	018
3	2		RESISTOR,100,±10%,1/4W	R21,R22	008
I	I		PCB, SI-1, SERIAL INTERFACE		978

PARTS LIST

[2] 1489 IS INTERCHANGEABLE WITH 75189.

I. ALL RESISTORS ARE IN OHMS.

NOTES: UNLESS OTHERWISE SPECIFIED