Assembly Instructions ACIA Interface

Introduction

The Dual ACIA Interface is a 5 1/4″ x 3 1/2″ double sided, plated thru hole board which interfaces a serial device to the Microprocessor system. It may be jumper configured to operate serially from 110 to 9600 baud and is RS 232C compatible. Complete interrupt control of the interface is under software control thru the user's program. All data input/output is made thru a ten-pin connector installed along the top edge of the board. Power for the board is supplied by a +5V voltage regulator and has a current consumption of approximately 0.2A.

The first stage of assembly is for a single port interface with TX-data, RX-Data, and RTS. The CTS signal can added if desired.

The board was designed as dual serial in a 4 address locations. This does not work for with on a 6800 with the SWTBUG monitor ROM. SWTBUG detects this configuration as a MP-C interface. SWTBUG can be modified or the I/O select from another port can be used. The card will work in a 6809 system as a 4 address locations or 16 address locations with a simple modification.

PC Board Assembly

NOTE: Since all of the holes on the PC board have been plated thru, it is only necessary to solder the components from the bottom side of the board. The plating provides the electrical connection from the "BOTTOM" to the "TOP" foil of each hold. Unless otherwise noted it is important that none of the connections be soldered until all of the components of each group have been installed on the board. This makes it much easier to interchange components if a mistake is made during assembly. Be sure to use a low wattage iron (not a gun) with a small tip. Do not use acid core solder or any type of paste flux. We will not guarantee or repair any kit on which either product has been used. Use only the solder supplied with the kit or a 60/40 alloy resin core equivalent. Remember all of the connections are soldered on the bottom side of the board only. The plated-thru holes provide the electrical connections to the top foil.

( ) Before installing any parts on the circuit board, check both sides of the board over carefully for incomplete etching and foil "bridges" or "breaks". It is unlikely that you will find any but should there be one especially on the "TOP" side of the board it will be very hard to locate and correct after all of the components have been installed on the board.

( ) Install the 24 pin IC socket in location Z2. The notch the socket indicates pin 1. The notch should point to the top or the left. Solder only two pins on opposite corners. Inspect the sockets to see that they are straight and flush with the board. You can solder the rest of the pins now.

( ) Install 14 pin IC sockets (Z5 and Z6)in prototyping area as shown below. Using the location shown will make the wiring easier.

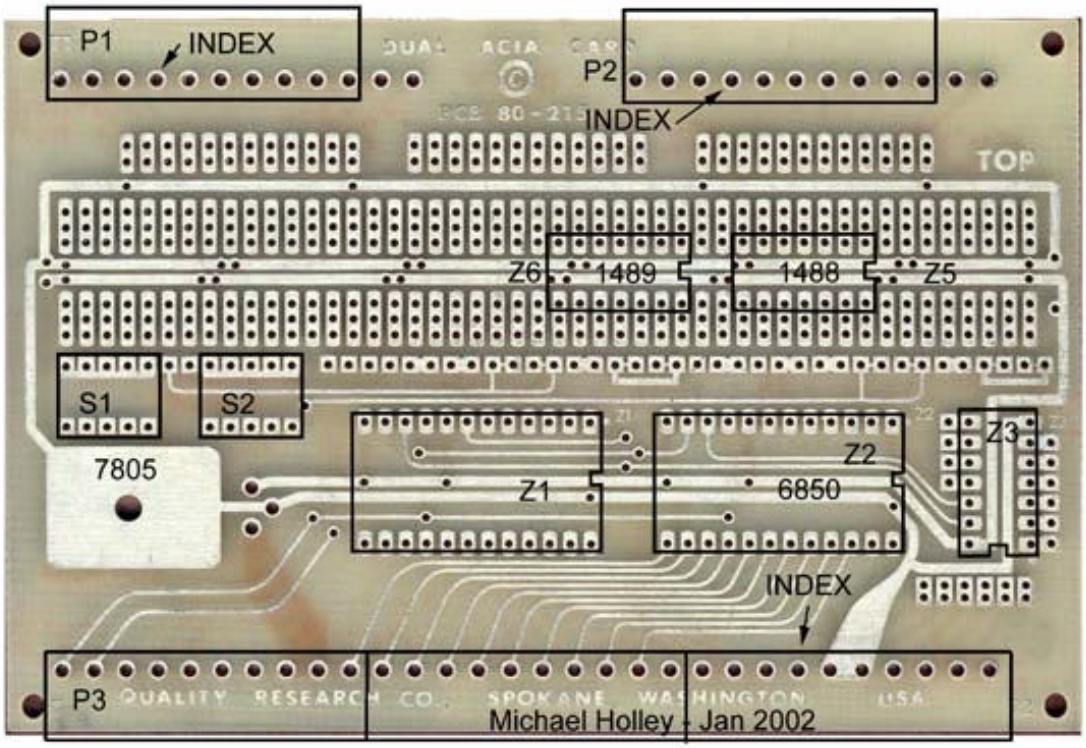
( ) If you are building a dual ACIA version install a 24 pin IC socket in Z1 and a 14 pin IC socket in location Z3.

( ) Install the 5 position dip switch at location S2. Switch position 1 should be to the left. (For a dual ACIA version also install S1.) Solder.

( ) Starting from one end of the circuit board install each of the three, 10 pin Molex female edge connectors along the lower edge of the board. These connectors must be inserted from the "TOP" side of the board and must be pressed down firmly against the circuit board so that each pin extends completely into the holes on the circuit board. Not being careful here will cause the board to either wobble and/or be crooked when plugging it into the mother board. It is suggested that you solder only the two end pins of each of the three connectors until all have been installed at which time if everything looks straight and rigid you should solder the as yet unsoldered pins.

( ) Insert the small nylon indexing plug into lower edge connector on the seventh pin from the right edge (below Z2). This prevents the board from being accidentally plugged in incorrectly.

( ) Install a 10 pin female edge connector at P2 (for dual ACIA also install P1). Insert the indexing plug into the forth hole from the left. (This is the same location as the SWTPC MP-S and MP-C interface cards.)



( ) Install integrated circuit Z5 (7805)on the circuit board. This component must be oriented so its metal face is facing the circuit board and is secured to the circuit board with a #4 - 40 x 5/16" screw, lock-washer and nut. A heat sink is optional. The three leads of the integrated circuit must be bent down into each of their respective holes. Solder.

( ) Attach the two bypass capacitors to the board. Solder.

( ) Install the diodes (1N4742) on the board. The diodes must be turned so the banded end corresponds with that shown on the component layout drawing. Solder.

( ) Install the resistors (R1 and R2) on the board. Solder.

( ) Install the bare wire jumpers from the 1488 pins 9, 10, 12 and 13 to the tie point row. (Show in black.)

( ) Install bare wire jumpers from the 1488 and 1489 chips pin 7 to ground.

( ) Install a bare wire jumper from the 1489 to +5V.

( ) Install a bare wire jumper from pin 1 of the top connector to ground.

( ) Install bare wire jumpers from top of D1 and D2 to ground.

( ) Install a wire from +16V to the top of R1.

( ) Install a wire from -16V to the top of R2.

( ) Install a wire from junction R1 and D1 to the 1488 pin 14.

( ) Install a wire from junction R2 and D2 to the 1488 pin 1.

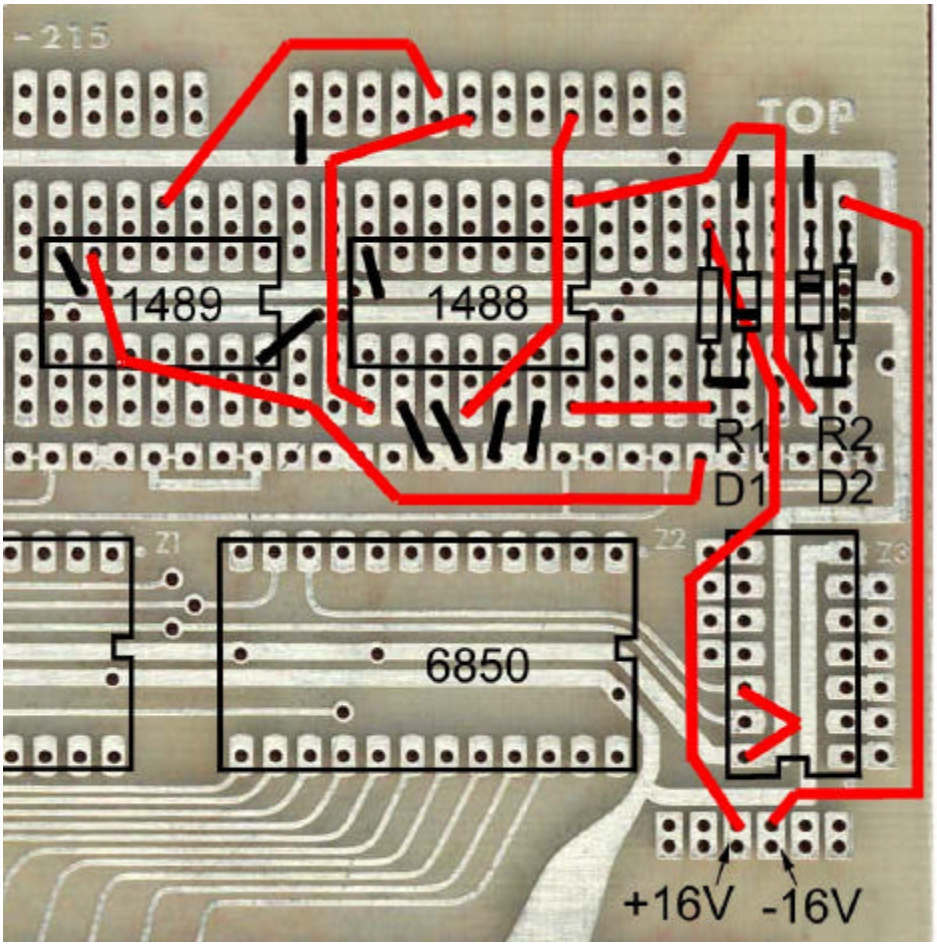
( ) Install a wire from Z2-CST on the tie point row to the 1489 pin 6.

( ) Install a wire from the 1489 pin 4 to top connector pin 5.

( ) Install a wire from the 1488 pin 8 to top connector pin 6.

( ) Install a wire from the 1488 pin 11 to top connector pin 9.

( ) If you are building a single ACIA version install a wire from Z3 pin 14 to Z3 pin 12.



( ) Insert a MC6850 IC into socket Z2. Pin 1 is to the upper right.

( ) Insert a MC1488/75188 IC into socket Z5. Pin 1 is to the upper right.

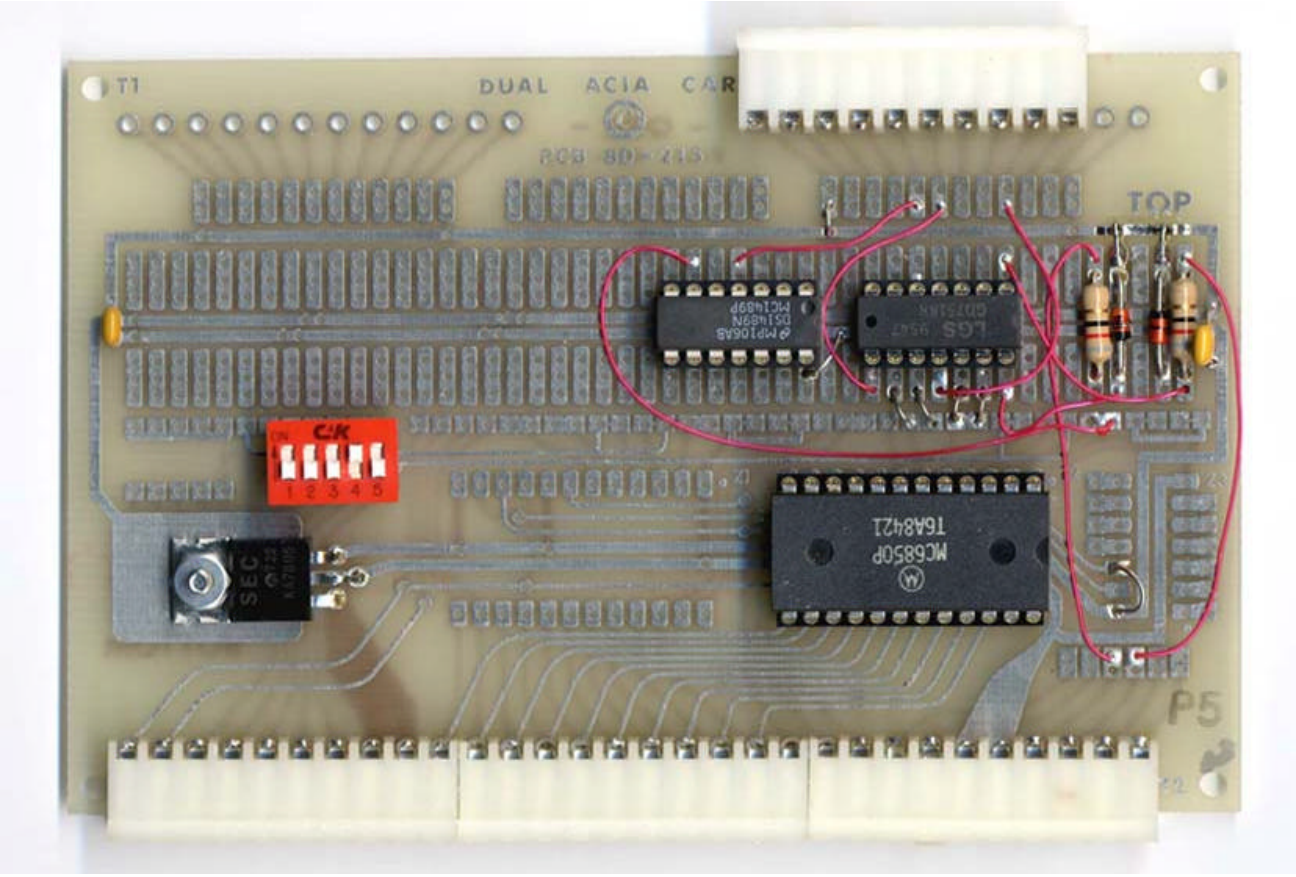
( ) Insert a MC1489/75189 IC into socket Z6. Pin 1 is to the upper right.

( ) If you are building a dual ACIA version do not install Z1 or Z3 at this time. If a socket is in location Z3 jumper pins 14 to 12 with a short length of bare wire.

( ) Now that all of the components have been installed on the board, double check to make sure all have been installed correctly in their proper location.

( ) Check very carefully to make sure that all connections have been soldered. It is very easy to miss some connections when soldering which can really cause some hard to find problems later during checkout. Also look for solder "bridges" and "cold" solder joints which are another common problem.

Since the ACIA circuit board now contains a MOS device it is susceptible to damage from severe static electrical sources. One should avoid handling the board any more than necessary and when you must, avoid touching or allowing anything to come into contact with any of the conductors on the board.



Second ACIA Assembly

After the single ACIA board is tested the second ACIA can be finished.

( ) Install a bare wire jumper from pin 1 of the top connector to ground.

( ) Install a wire from the 1489 pin 10 to top connector pin 5.

( ) Install a wire from the 1488 pin 6 to top connector pin 6.

( ) Install a wire from the 1488 pin 3 to top connector pin 9.

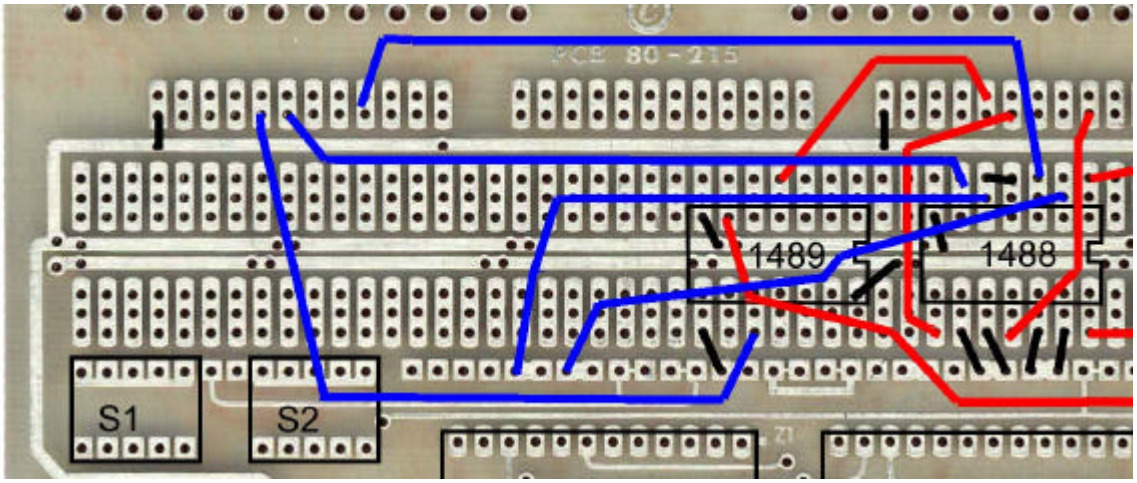
( ) Install the bare wire jumper from the 1489 pin 8 to the tie point row. (Z1 Pin 2 RX Data.)

( ) Install a wire from Z1-TX Data on the tie point row to the 1488 pins 4 and 5.

( ) Install a wire from Z1-RTS on the tie point row to the 1488 pin 2.

( ) Insert a 74LS04 IC into socket Z3. Pin 1 is to the bottom right.

( ) Insert a MC6850 IC into socket Z1. Pin 1 is to the upper right.



RS-232 Pin Definitions

Pin	Name	Full Name	Description
1	FG	Frame Ground	Also known as protective ground. This is the chassis ground connection between DTE and DCE
2	TD	Transmitted Data	Data send by the DTE.
3	RD	Received Data	Data received by the DTE.
4	RTS	Request To Send	Originated by the DTE to initiate transmission by the DCE.
5	CTS	Clear To Send	Send by the DCE as a reply on the RTS after a delay in ms, which gives the DCEs enough time to energize their circuits and synchronize on basic modulation patterns.
6	DSR	Data Set Ready	Originated by the DCE indicating that it is basically operating (power on, and in functional mode).
7	SG	Signal Ground	The reference ground between a DTE and a DCE. Has the value 0 VDC.
8	DCD	Data Carrier Detect	A signal send from DCE to its DTE to indicate that it has received a basic carrier signal from a (remote) DCE.
15	TC	Transmitter Clock	Timing signals used by the DTE for transmission, where the clock is originated by the DTE and the DCE is the slave.
17	RC	Receiver Clock	Timing signals used by the DTE when receiving data
20	DTR	Data Terminal Ready	Originated by the DTE to instruct the DCE to setup a connection. Actually it means that the DTE is up and running and ready to communicate.
22	RI	Ring Indicator	A signal from the DCE to the DTE that there is an incoming call (telephone is ringing). Only used on switched circuit connections.

DTE - Data Terminal Equipment (Terminal or Computer acting as a terminal)
DCE - Data Communications Equipment (Modem or Computer)

Input/Output (I/O) Connector Wiring

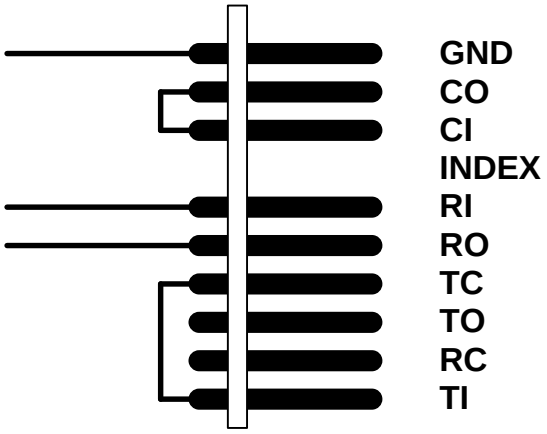
A connector wired for a MP-S or MP-C can be used with QRC ACIA.

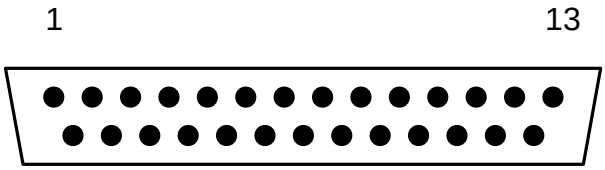
Pin	MP-S / MP-C	QRC ACIA
1	Ground	Ground
2	Clock Out	Optional Clock Out
3	Clock In	Optional Clock In
4	Index	Index
5	RS232 In	RX Data
6	RS232 Out	TX Data
7	TTY Common	Open
8	TTY Out	Open
9	Reader Control	RTS
10	TTY In	CTS

The SWTPC MP-S and MP-C serial interfaces were for both RS-232 and 20mA Teletype. Since nobody has a Teletype anymore this “feature” was ignored. A more important feature is flow control using RTS and CTS.

Typical SWTPC MP-S and MP-C Interface Wiring

Molex Pin	Connection
GND	To DB-25 Pin 1 and 7
CO	Loop to CI
CI	Loop to CO
RI	To DB-25 Pin 2
RO	To DB-25 Pin 3
TC	Loop to TI
TO	No Connect
RC	No Connect
TI	Loop to TC





DB-25 Female Connector Rear

Pin	Signal	Description	Connection
1	GND	Protective Ground	To Molex GND
2	TXD	Transmit Data	To Molex TX Data
3	RXD	Receive Data	To Molex RX Data
4	RTS	Ready To Send	To Molex RTS
5	CTS	Clear To Send	To Molex CTS
6	DSR	Data Set Ready	Loop to 8 and 20
7	GND	Signal Ground	To Molex GND
8	CD	Carrier Detect	Loop to 6 and 20
20	DTR	Data Terminal Ready	Loop to 6 and 8

