

SCELBI COMPUTER CONSULTING, INC.

ASSEMBLY INSTRUCTIONS - SCELBI CARD #: 1101-

DBB & OUTPUT CARD

DESCRIPTION

THE SCELBI 1101- DBB & OUTPUT CARD CONTAINS MEMORY ADDRESS AND STATE CONTROL LATCHES AND LOGIC FOR SELECTING BANKS OF MEMORY WORDS. IN ADDITION THE CARD CONTAINS MULTIPLEXING LOGIC FOR SELECTING OUTPUT PORTS. WHILE THE CARD IS CAPABLE OF SELECTING 16 DIFFERENT OUTPUT PORTS, IF IT IS INSTALLED IN A STANDARD SCELBI-8H CHASSIS ONLY EIGHT OF THE OUTPUT PORTS WILL BE MADE AVAILABLE TO THE I/O CONNECTORS ON THE CHASSIS.

KIT ASSEMBLY

YOU SHOULD HAVE THE ASSEMBLY DRAWING (1101A) BEFORE YOUR WORK AREA FOR READY REFERENCE. THIS DRAWING SHOWS THE EXACT LOCATION OF EACH PART ON THE BOARD.

AS YOU PERFORM EACH STEP MAKE A CHECK IN THE BOX PROVIDED TO THE RIGHT OF EACH INSTRUCTION AS A MEANS OF REMEMBERING WHERE YOU ARE IN THE ASSEMBLY PROCESS.

WORK SLOWLY AND CAREFULLY. MAKE SURE THE CORRECT COMPONENT IS INSERTED IN THE PROPER LOCATION AND THAT IT IS ORIENTED IN THE RIGHT MANNER. THIS IS ESPECIALLY IMPORTANT WITH INTEGRATED CIRCUITS, DIODES, AND OTHER POLARITY SENSITIVE COMPONENTS. COMPONENTS INCORRECTLY INSTALLED CAN BE CATASTROPHICALLY DAMAGED WHEN POWER IS APPLIED. IT IS BETTER TO TAKE A FEW EXTRA MINUTES DURING THE ASSEMBLY PROCESS TO ENSURE YOU ARE PROCEEDING CORRECTLY THAN TO HURRY AND HAVE TO TRY AND FIND AN ERROR AT A LATER TIME - POSSIBLY AFTER IRREVERSIBLE DAMAGE HAS OCCURED! A CAREFUL ASSEMBLER WILL BE ABLE TO COMPLETE THIS BOARD IN ONE TO TWO HOURS.

NOTES ON SOLDERING

USE A GOOD GRADE ROSIN-CORE SOLDER OF A TYPE INTENDED FOR USE WITH ELECTRONIC CIRCUITS. A SMALL 30 - 50 WATT SOLDERING IRON WITH A NARROW TIP SHOULD BE USED. DO NOT APPLY HEAT ANY LONGER THAN NECESSARY TO ALLOW THE SOLDER TO THOROUGHLY FLOW AROUND THE COMPONENT LEAD AND INTO THE HOLE SURROUNDING THE LEAD. THE 1101- P.C. BOARD HAS "PLATED-THROUGH" HOLES WHICH MEANS THAT THE CIRCUIT FOIL EXTENDS DOWN THROUGH EACH HOLE WHERE AN ELECTRICAL CONNECTION IS MADE TO ENSURE THAT ALL CONTACTS ARE GOOD. FOR SUCH "PLATED-THROUGH" HOLES, THE PROPER AMOUNT OF SOLDER HAS BEEN APPLIED WHEN THE SOLDER HAS JUST STARTED TO "CLIMB UP" THE COMPONENT LEAD ON THE OTHER SIDE OF THE BOARD FROM WHICH THE SOLDER IS APPLIED. NORMALLY SOLDERING SHOULD BE DONE FROM THE SIDE OPPOSITE TO THAT ON WHICH THE COMPONENTS

MOUNT. AFTER EACH JOINT HAS BEEN SOLDERED CHECK TO ENSURE THAT THERE ARE NOT ANY SOLDER SHORTS TO ADJACENT CIRCUITRY.

## INSTALLATION OF INTEGRATED CIRCUITS

NOTICE: WHEN INSTALLING INTEGRATED CIRCUITS MAKE SURE THAT EACH I.C. IS PROPERLY POSITIONED. PIN #1 ON AN I.C. NORMALLY HAS A SMALL DOT (OR DEPRESSION) NEXT TO IT ON THE BODY OF THE CHIP. THE LOCATION OF THIS DOT WHEN THE I.C. IS INSTALLED SHOULD BE THE SAME AS THAT SHOWN ON THE ASSEMBLY DRAWING. IF A MARKER CAN NOT BE FOUND ON AN I.C. THEN MAKE SURE THAT THE END OF THE INTEGRATED CIRCUIT WITH A DEPRESSION OR COLORED-IN AREA IS POSITIONED THE SAME AS INDICATED ON THE ASSEMBLY DRAWING. ALL INTEGRATED CIRCUITS ON THE SCLEBI 1101- CARD MOUNT ON THE CARD SO THAT THEY ARE ORIENTED IN THE SAME DIRECTION. WHEN INSTALLING AN I.C. MAKE SURE THAT ALL OF THE PINS ON THE PACKAGE GO THROUGH THE PROPER HOLES IN THE P.C. BOARD (IT MAY BE OCCASSIONALLY NECESSARY TO STRAIGHTEN A PIN ON AN I.C.) AND THAT THE BODY OF THE I.C. IS FLUSH TO THE BOARD SURFACE. ONCE THE INTEGRATED CIRCUIT HAS BEEN INSTALLED SEVERAL OF THE PINS PROTRUDING THROUGH THE BOARD SHOULD BE BENT AGAINST THE FOIL ON THE BACK SIDE OF THE CARD SO THAT THE COMPONENT WILL BE HELD IN POSITION PRIOR TO THE TIME IT IS SOLDERED. WHEN IT IS TIME TO SOLDER THE COMPONENTS TURN THE CARD OVER SO THAT THE COMPONENTS ARE FACING DOWN AND CAREFULLY SOLDER EACH I.C. PIN TO ITS FOIL PAD.

- ( ) INSTALL TWO TYPE 7400 INTEGRATED CIRCUIT IN THE LOCATIONS LABELED ON THE ASSEMBLY DRAWING AS: Z13 & Z16A. WHEN THE I.C. HAS BEEN INSTALLED TURN THE CARD OVER AND SOLDER THE PINS ON THE I.C. TO THEIR FOIL PAD.
- ( ) INSTALL FOUR TYPE 7402 INTEGRATED CIRCUITS AT THE LOCATIONS SPECIFIED FOR Z1, Z2, Z4 AND Z5. THEN SOLDER THE PINS OF THE INTEGRATED CIRCUITS TO THE CARD.
- ( ) INSTALL AND SOLDER TWO TYPE 7416 INTEGRATED CIRCUITS AT THE LOCATIONS SHOWN FOR Z10 AND Z16.
- ( ) INSTALL AND SOLDER TWO TYPE 7417 INTEGRATED CIRCUITS AT THE LOCATIONS SHOWN FOR Z3 AND Z15.
- ( ) INSTALL AND SOLDER FOUR TYPE 7442 INTEGRATED CIRCUITS AT THE LOCATIONS SHOWN FOR Z11, Z12, Z14 AND Z17.
- ( ) INSTALL AND SOLDER FOUR TYPE 7475 INTEGRATED CIRCUITS AT THE LOCATIONS SHOWN FOR Z6, Z7, Z8 AND Z9.

### SPECIAL NOTE ABOUT LOCATING POSITIONS OF DISCRETE COMPONENTS ON THE PRINTED CIRCUIT CARD

SCLEBI PRINTED CIRCUIT CARDS HAVE NUMEROUS HOLES IN THE BOARD MATERIAL THAT ARE LINED WITH A CONDUCTIVE MATERIAL AND THAT ARE SIMPLY USED TO CONNECT CIRCUIT FOIL PATHS FROM ONE SIDE OF THE CARD TO THE OTHER SIDE. THESE HOLES ARE OFTEN TERMED "FEED-THROUGH" HOLES. IN ADDITION TO THE "FEED-THROUGH" HOLES THERE ARE ALSO HOLES PROVIDED FOR THE LEADS OF DISCRETE COMPONENTS TO PASS THROUGH AND THUS ALLOW ATTACHMENT OF SUCH COMPONENTS TO THE CARD AND ASSOCIATED CIRCUITRY. (THESE HOLES ALSO SOMETIMES SIMULTANEOUSLY SERVE AS "FEED-THROUGH"

(THESE HOLES ALSO SOMETIMES SIMULTANEOUSLY SERVE AS "FEED-THROUGH" HOLES.) THE DISTINCTION BETWEEN HOLES THAT SIMPLY SERVE AS "FEED-THROUGH" HOLES AND THOSE THAT ARE FOR COMPONENT LEADS CAN BE MADE BY OBSERVING THE SIZE OF THE FOIL PAD THAT SURROUNDS A HOLE. HOLES FOR THE LEADS OF DISCRETE COMPONENTS ALWAYS HAVE LARGER FOIL PADS AROUND THEM THAN THE PLAIN "FEED-THROUGH" HOLES. THIS IS IMPORTANT TO REMEMBER WHEN INSTALLING DISCRETE COMPONENTS AS SOMETIMES A PLAIN "FEED-THROUGH" HOLE MAY BE CLOSE TO A HOLE THAT THE LEAD OF A DISCRETE COMPONENT IS SUPPOSED TO GO THROUGH. AN ADDITIONAL AID TO DISCERNING THE PROPER HOLE(S) FOR 1/4 WATT RESISTOR LEADS IS TO REMEMBER THAT THE HOLES FOR 1/4 WATT RESISTOR LEADS ARE ALWAYS SPACED 1/2 INCH APART.

### INSTALLATION OF RESISTORS

NOTICE: TO PREPARE RESISTORS FOR MOUNTING ON THE P.C. CARD USE A PAIR OF NEEDLE POINT PLIERS TO BEND EACH LEAD PERPENDICULAR TO THE BODY OF THE RESISTOR AT A POINT 1/8 OF AN INCH AWAY FROM WHERE THE LEAD JOINS THE RESISTOR BODY. THE BENDING OF THE TWO LEADS SHOULD BE IN THE SAME DIRECTION SO THAT THE PREPARED RESISTOR HAS THE SHAPE OF A "U" WITH THE BODY OF THE RESISTOR FORMING THE BASE OF THE "U" AND THE TIPS OF THE "U" (FORMED BY THE LEADS) BEING 1/2 AN INCH APART. WHEN THIS HAS BEEN DONE THE RESISTOR'S LEADS WILL BE SPACED TO INSERT READILY IN THE HOLES ON THE P.C. CARD FOR RESISTORS. WHEN INSTALLING A RESISTOR, THE TWO LEADS ARE INSERTED IN THE APPROPRIATE HOLES AND THE LEADS PULLED FROM THE BACK OF THE BOARD UNTIL THE RESISTOR BODY IS PULLED UP NEXT TO THE P.C. BOARD. THE LEADS ARE THEN BENT OVER ON THE BACK SIDE OF THE CARD AND THE EXCESS LEAD MATERIAL CUT OFF LEAVING ABOUT 1/16 OF AN INCH OF THE LEAD AGAINST THE FOIL PAD. AFTER THE EXCESS LEAD HAS BEEN TRIMMED OFF THEN THE REMAINING 1/16 INCH OF LEAD IS SOLDERED TO ITS FOIL CONNECTION PAD.

IT IS ALSO IMPORTANT TO ENSURE THAT THE PROPER RESISTOR VALUE IS INSTALLED AT EACH LOCATION. RESISTOR VALUES ARE "COLOR-CODED" BY THREE COLOR BANDS ON THE BODY OF THE RESISTOR AND THE SEQUENCE OF THE COLORS (STARTING FROM THE BAND NEAREST ONE END OF THE RESISTOR AND READING TOWARDS THE MIDDLE) ARE GIVEN FOR EACH VALUE OF RESISTOR USED ON A CARD. ONLY THE FIRST THREE COLOR BANDS ARE USED TO DENOTE THE ACTUAL VALUE - ANY EXTRA BANDS ON A RESISTOR CAN BE IGNORED BY THE ASSEMBLER AS THEY ARE USED TO DESIGNATE PARAMETERS OTHER THAN THE ACTUAL RESISTOR VALUE.

- ( ) INSTALL FIFTY-FOUR 1 K-OHM (BRN-BLK-RED) 1/4 WATT RESISTORS AT THE LOCATIONS SHOWN ON THE ASSEMBLY DRAWING FOR R1 THROUGH R52, AS WELL AS R54 AND R55.

### INSTALLATION OF CAPACITORS

- ( ) INSTALL A 10 MFD ELECTROLYTIC CAPACITOR IN THE POSITION LABELED ON THE ASSEMBLY DRAWING FOR C2. BE CERTAIN THAT THE POSITIVE (+) END OF THE CAPACITOR IS ORIENTED IN THE SAME DIRECTION AS THAT SHOWN ON THE DRAWING (AND INDICATED ON THE P.C. CARD). AFTER THE CAPACITOR IS INSTALLED BEND THE LEADS DOWN ONTO THEIR FOIL PADS ON THE BACK SIDE OF THE BOARD AND TRIM OFF THE EXCESS LEAD LEAVING ABOUT 1/16TH OF AN INCH TO BE SOLDERED TO THE FOIL. THEN SOLDER EACH CAPACITOR LEAD TO ITS FOIL CONNECTION POINT.
- ( ) INSTALL THREE .1 UFD DISK CAPACITORS IN THE POSITIONS LABELED ON THE ASSEMBLY DRAWING AS: C1, C4 AND C5. TRIM THE LEADS AND

SOLDER THE CAPACITORS IN PLACE.

- ( ) INSTALL AND SOLDER IN PLACE TWO .02 UFD DISK CAPACITORS AT THE LOCATIONS IDENTIFIED ON THE ASSEMBLY DRAWING FOR C3 AND C6.

#### INSTALLATION OF FUSE CLIPS

- ( ) INSTALL THE TWO P.C. MOUNTING FUSE CLIPS IN THE POSITIONS SHOWN TO HOLD F1. INSERT THE TWO TABS ON THE BASE OF EACH CLIP INTO THE HOLES PROVIDED FOR EACH CLIP, BEND THE TABS SLIGHTLY AGAINST THE FOIL ON THE OTHER SIDE OF THE BOARD TO HOLD THEM IN PLACE AND THEN SOLDER EACH TAB TO THE FOIL. ENSURE THAT THE CLIPS LINE UP SO THAT A FUSE WILL SEAT PROPERLY WHEN INSTALLED.
- ( ) INSTALL A 1.0 AMP TYPE 8AG FUSE IN THE FUSE CLIPS FOR F1.

#### INITIAL INSPECTION AND TESTING

- ( ) AT THIS TIME CAREFULLY INSPECT BOTH SIDES OF THE BOARD TO ASCERTAIN THAT THERE ARE NOT ANY SOLDER SHORTS BETWEEN P.C. FOIL LANDS. BE ESPECIALLY OBSERVANT ON THE COMPONENT SIDE OF THE CARD AROUND THE I.C. PINS. REMOVE ANY SOLDER SHORTS THAT MIGHT BE FOUND.

- ( ) USE AN OHM METER TO MAKE THE FOLLOWING MEASUREMENTS:

METER BETWEEN PINS A1 AND A3 OF THE CARD CONNECTOR - AND THEN REVERSE THE METER LEADS TO OBTAIN A SECOND READING. THE READING IN BOTH DIRECTIONS SHOULD BE GREATER THAN FIVE (5) OHMS. (ONE READING WILL BE TYPICALLY 3 TO 6 TIMES HIGHER THAN THE OTHER). IF THE READING(S) ARE LESS THAN 5 OHMS LOOK FOR SOLDER SHORT(S) BETWEEN THE +5 VOLT SUPPLY LINES AND THE COMMON RETURN LINES ON THE CARD.

#### FINAL TESTING

FINAL TESTING OF THE CARD MUST BE DONE WHEN THE CARD IS INSTALLED IN A SCELBI-8H MINI-COMPUTER SYSTEM. FINAL TESTING IS DESCRIBED IN DETAIL IN THE ASSEMBLY AND TESTING INSTRUCTIONS FOR THE SCELBI-8H MINI-COMPUTER CARD SET WHICH IS PROVIDED TO CUSTOMERS WHO PURCHASE SCELBI-8H MINI-COMPUTER CARD SETS. CUSTOMERS WHO HAVE PURCHASED TYPE 1101- BOARDS FOR OTHER TYPES OF SYSTEMS MAY DEVISE THEIR OWN FINAL CHECK-OUT PROCEDURES, OR MAY RETURN THE ASSEMBLED BOARD TO SCELBI COMPUTER CONSULTING, INC. FOR FINAL TESTING AT A MODEST FEE.