SCELBI COMPUTER CONSULTING, INC.

ASSEMBLY INSTRUCTIONS - SCELBI CARD #: 1103-

RAM MEMORY CARD

DESCRIPTION

THE SCELBI 1103- RAM MEMORY CARD HOLDS UP TO 1K OF MOS RAM MEMORY. THESE CARDS ARE INTENDED TO SERVE AS THE MAIN MEMORY ELEMENTS IN A SCELBI-8H MINI-COMPUTER. THE CARD CONSISTS OF UP TO 32 TYPE 1101 MOS STATIC MEMORY INTEGRATED CIRCUITS. EACH I.C. SERVES TO HOLD 1 BIT OF INFORMATION IN AN ADDRESS BLOCK OF 256 WORDS. EIGHT I.C.S OPERATING IN PARALLEL THERE-BY PROVIDE 256 FULL WORDS OF MEMORY FOR A SCELBI-8H MINI-COMPUTER. THE CARD CAN BE PROVIDED WITH 8, 16, 24, OR 32 MEMORY CHIPS AND CAN THUS PROVIDE BLOCKS OF 256, 512, 768, OR 1024 WORDS OF MEMORY. A PARTLY POPULATED CARD CAN BE UPGRADED IN BLOCKS OF 256 MEMORY WORDS BY ADDING GROUPS OF EIGHT RAM I.C.S WITH THEIR ASSOCIATED CIRCUITRY.

NOTE

WHEN UPGRADING 1103- CARDS CUSTOMERS ARE ADVISED TO PURCHASE SCELBI 1103- MEMORY EXPANDER KITS WITH PROPERLY CERTIFIED COMPONENTS. SCELBI MEMORY ELEMENTS ARE THOROUGHLY TESTED BEFORE BEING SUPPLIED TO CUSTOMERS. THE USE OF COMPONENTS NOT SUPPLIED BY SCELBI COMPUTER CONSULTING, INC., ON A 1103- RAM MEMORY BOARD WILL IMMEDIATELY INVALIDATE ANY WARRANTEE CURRENTLY IN EFFECT ON THE ENTIRE SCELBI-8H COMPUTER SYSTEM AS THESE COMPONENTS DIRECTLY INTERFACE WITH, AND ARE DIRECTLY RESPONSIBLE FOR THE PROGRAMMED OPERATION OF A SCELBI-8H COMPUTER SYSTEM.

KIT ASSEMBLY

YOU SHOULD HAVE THE ASSEMBLY DRAWING (1103A) 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 1103- 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: THE FOLLOWING FOUR STEPS DETAIL THE INSTALLATION OF THE RAM MEMORY INTEGRATED CIRCUITS FOR AN 1103- BOARD SUPPLIED WITH 1,024 WORDS OF MEMORY (32 MEMORY CHIPS.) IF YOU PURCHASED A BOARD WITH ONLY 256 WORDS OF MEMORY THEN ONLY THE FIRST STEP APPLIES. IF YOU PURCHASED 512 WORDS OF MEMORY THEN PERFORM THE FIRST TWO STEPS. FOR 768 WORDS OF MEMORY DO STEPS ONE THROUGH THREE.

( ) INSTALL EIGHT TYPE 1101 INTEGRATED CIRCUITS IN THE LOCATIONS LABELED ON THE ASSEMBLY DRAWING AS: Z1 - Z8. MAKE SURE EACH I.C. IS PROPERLY POSITIONED. PIN #1 ON THE I.C. HAS A SMALL DOT 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. MAKE SURE ALL 16 PINS OF THE I.C. GO THE PROPER HOLES IN THE P.C. BOARD (IT MAY BE OCCASSIONALLY NECESSARY TO STRAIGHTEN A PIN ON AN I.C.) AND THAT THE I.C. IS FLUSH TO THE BOARD SURFACE. ONCE THE I.C. HAS BEEN INSTALLED SEVERAL OF THE PINS SHOULD BE BENT AGAINST THE FOIL ON THE BACK SIDE OF THE CARD SO THAT THE COMPONENT WILL BE HELD IN POSITION WHILE THE REMAINING CHIPS ARE INSTALLED. WHEN ALL EIGHT CHIPS HAVE BEEN INSERTED, TURN THE CARD OVER AND CAREFULLY SOLDER EACH I.C. PIN TO ITS FOIL PAD.

( ) INSTALL ANOTHER EIGHT TYPE 1101 INTEGRATED CIRCUITS IN THE LOCATIONS DESIGNATED AS Z9 - Z16. SOLDER THE PINS ON THIS GROUP TO THEIR FOIL PADS.

( ) INSTALL THE NEXT EIGHT TYPE 1101 INTEGRATED CIRCUITS IN THE DESIGNATED LOCATIONS FOR Z17 - Z24. WHEN THE COMPONENTS HAVE BEEN MOUNTED SOLDER THE LEADS.

( ) INSTALL AND SOLDER THE REMAINING EIGHT TYPE 1101 INTEGRATED CIRCUITS IN THE POSITIONS CALLED OUT ON THE ASSEMBLY DRAWING AS Z25-Z32.

INSTALLATION OF CAPACITORS

( ) INSTALL THE EIGHT .1 UFD CAPACITORS IN THE POSITIONS LABELED ON THE ASSEMBLY DRAWING AS: C9, 10, 11, 12, 13, 14, 15 & 16. AS EACH 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 1/16 OF AN INCH TO BE SOLDERED TO THE FOIL. WHEN ALL EIGHT CAPACITORS HAVE BEEN INSTALLED TURN THE BOARD OVER AND SOLDER EACH CAPACITOR LEAD TO ITS FOIL PAD CONNECTION POINT.

( ) INSTALL THE EIGHT .02 UFD CAPACITORS IN THE POSITIONS LABELED ON THE ASSEMBLY DRAWING AS: C1, C2, C3, C4, C5, C6, C7 & C8. TRIM THE LEADS AS BEFORE AND SOLDER THE COMPONENTS IN AFTER ALL EIGHT HAVE BEEN MOUNTED.

INSTALLATION OF FUSE CLIPS AND FUSES

( ) INSTALL THE FOUR P.C. MOUNTING FUSE CLIPS IN THE POSITIONS SHOWN TO HOLD F1 AND F2. 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.

( ) IF YOU PURCHASED A BOARD WITH 32 MEMORY CHIPS INSTALL A 1 AMP #8AG FUSE IN THE FUSE CLIPS FOR F1 AND F2. IF THERE ARE ONLY 24 MEMORY CHIPS ON YOUR BOARD THEN F1 AND F2 SHOULD BE 3/4 AMP FUSES. A BOARD WITH 16 MEMORY CIRCUITS SHOULD HAVE 1/2 AMP FUSES, AND A BOARD WITH JUST EIGHT CHIPS SHOULD HAVE 1/4 AMP FUSES. KITS ARE NORMALLY SUPPLIED WITH THE PROPER FUSE FOR THE NUMBER OF MEMORY CHIPS PURCHASED.

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:

NOTE: DURING THE NEXT TWO OHM METER TESTS WAIT SEVERAL SECONDS AFTER THE METER PROBES HAVE BEEN APPLIED TO THE TEST POINTS BEFORE OBTAINING A READING TO ALLOW THE BY-PASS CAPACITORS TO REACH STEADY-STATE CONDITIONS.

METER BETWEEN PINS A1 AND A3 OF THE CARD CONNECTOR - AND THEN REVERSE THE METER LEADS TO OBTAIN A SECOND READING.

THE READING IN ONE DIRECTION SHOULD BE HIGHER THAN 500 K OHMS. IN THE OTHER DIRECTION THE READING SHOULD BE GREATER THAN 10 OHMS. IF THE READING IN BOTH DIRECTIONS SHOULD BE LESS THAN 10 OHMS LOOK FOR SOLDER SHORT(S) BETWEEN THE +5

VOLT SUPPLY LINES AND THE COMMON RETURN LINE ON THE CARD.

NOW REPEAT THE ABOVE READINGS BETWEEN PINS A3 AND A5 OF THE CARD CONNECTOR. IF THE READING SHOULD BE LESS THAN 10 OHMS IN BOTH DIRECTIONS LOOK FOR SOLDER SHORT(S) BETWEEN THE -9 VOLT SUPPLY LINES AND THE COMMON RETURN LINES ON THE CARD.

THEN REPEAT THE PROCEDURE BETWEEN PINS A1 AND A5 OF THE CARD CONNECTOR. IF THE READING SHOULD BE LESS THAN 10 OHMS IN BOTH DIRECTIONS LOOK FOR SOLDER SHORT(S) BETWEEN THE +5 VOLT AND -9 VOLT SUPPLY LINES. (SUCH SOLDER SHORTS ARE MOST LIKELY TO OCCUR BETWEEN PINS 4 AND 5 OF THE INTEGRATED CIRCUITS.)

( ) CONTINUE WITH THE FOLLOWING OHM METER CHECKS:

PLACE ONE LEAD OF THE METER ON PIN 5 OF INTEGRATED CIRCUIT Z1. PLACE THE OTHER LEAD ON PIN 11 OF Z1. THE READING SHOULD BE GREATER THAN 10 OHMS. IF IT IS NOT, LOOK FOR SOLDER SHORT(S) BETWEEN PIN 5 OF EACH I.C. AND THE P.C. FOIL THAT RUNS ACROSS THE CARD BUSSING PIN 11 OF THE INTEGRATED CIRCUITS TOGETHER.

PLACE ONE LEAD ON PIN 6 OF Z1 AND THE OTHER ON PIN 7 OF THE SAME I.C.. THE READING SHOULD BE MUCH GREATER THAN 10 OHMS. IF IT IS LESS THAN 10 OHMS LOOK FOR SOLDER SHORT(S) BETWEEN PINS 6 AND 7 ON ALL OF THE INTEGRATED CIRCUITS.

SIMILARLY, TAKE READINGS BETWEEN PIN 6 OF Z1 AND PIN 11 OF Z1. IF THE READING INDICATES SHORT CONDITIONS CHECK FOR SOLDER BETWEEN PINS 6 OF THE INTEGRATED CIRCUITS AND THE P.C. FOIL THAT RUNS ACROSS THE CARD CONNECTING TO PIN 11 ON THE CHIPS.

DO THE SAME MEASUREMENT BETWEEN PIN 7 OF Z1 AND PIN 11 OF Z1. IF SHORTING CONDITIONS ARE FOUND - CHECK FOR SOLDER BETWEEN THE P.C. FOIL RUNS THAT CONNECT TO PIN 7 AND THOSE THAT CONNECT TO PIN 11.

IT IS ALSO ADVISABLE TO REPEAT THE PROCEDURE BETWEEN PINS 7 AND 9 OF Z1. TAKE APPROPRIATE STEPS TO REMOVE ANY SHORTS BETWEEN THE FOIL BUSSES FOR PINS 7 AND 9 IF THE METER READING INDICATES A SHORTED CONDITION.

( ) THE LAST GROUP OF OHM METER CHECKS WILL INDICATE WHETHER ANY MEMORY ELEMENTS MAY HAVE BEEN DAMAGED BY EXCESSIVE SOLDERING HEAT. IF A READING INDICATES SUCH A POSSIBILITY, MAKE A NOTE OF THE CONDITION. THE FINAL DETERMINATION OF THE CARD'S OPERATIONAL INTEGRITY CAN ONLY BE ASCERTAINED BY OPERATIONAL TESTS THAT ARE PERFORMED WHEN THE CARD IS INSTALLED IN A SCELBI-8H MINI-COMPUTER. SATISFACTORY PASSING OF THIS (AND THE PREVIOUS TESTS) TEND TO INDICATE THAT THE CARD WILL OPERATE NORMALLY WHEN ACTUALLY INSTALLED IN A SCELBI-8H MINI-COMPUTER SYSTEM.

PLACE THE OHM METER ON A SCALE MEASURING 1000 OHMS PER DIVISION OR HIGHER. TURN THE CARD OVER SO THAT THE COMPONENT SIDE IS FACING DOWN. PLACE ONE LEAD ON PIN AA OF THE CARD CONNECTOR. PLACE THE OTHER LEAD ON PIN AH OF THE CARD CONNECTOR. RECORD THE METER READING. NOW SWAP THE METER LEADS AND RECORD THE NEW READING. BOTH READINGS SHOULD BE HIGHER THAN 10 K OHMS AND ONE OF THE READINGS SHOULD BE GREATER THAN 250 K OHMS. REPEAT THE SAME MEASUREMENTS BETWEEN PIN AA AND EACH OF THE FOLLOWING PINS ON THE CARD CONNECTOR: AJ, AK, AL, AM, AN, AP, AND AR.

FINAL TESTING

( ) CONGRADULATE YOURSELF!

AT THIS POINT YOU HAVE COMPLETED THE ASSEMBLY AND INITIAL TESTING OF YOUR 1103- RAM MEMORY BOARD. FINAL TESTING OF THE CARD MUST BE DONE WHEN THE CARD IS INSTALLED IN A SCELBI-8H MINI-COMPUTER SYSTEM. FINAL TESTING OF THE CARD, UNDER COMPUTER CONTROL 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 THE SCELBI 1103- RAM MEMORY BOARD 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.