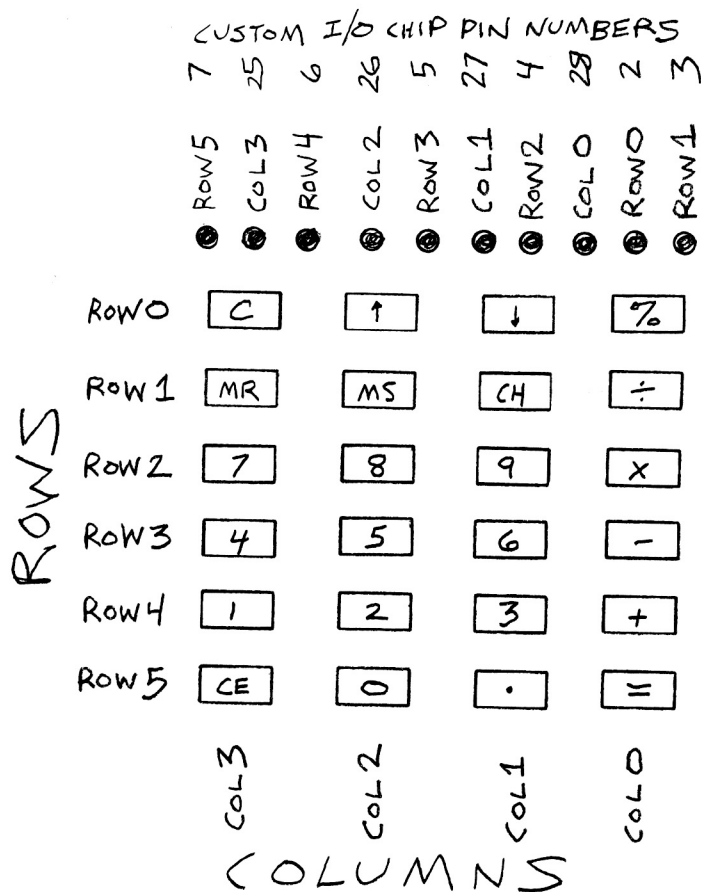


# KEYPAD REPAIR

HAVE A KEY ON YOUR KEYPAD THAT DOESN'T FUNCTION OR IS BROKEN? WITH CARE AND PATIENCE, THE KEYPAD IS FIXABLE.

## KEYPAD LAYOUT

BELOW IS A LAYOUT OF THE KEYPAD, TO THE LEFT ARE THE ROW NUMBERS AND BELOW ARE THE COLUMN NUMBERS. ABOVE THE KEYPAD LAYOUT ARE THE 10 CONNECTIONS TO THE MOTHERBOARD. EACH CONNECTION IS LABELED WITH ITS CORRESPONDING ROW OR COLUMN NUMBER. AT THE VERY TOP ARE THE CUSTOM I/O CHIP PIN NUMBERS THAT EACH OF THE 10 CONNECTIONS ARE WIRED TO.



## KEY NOT FUNCTIONING

YOU CAN SIMULATE THE PRESSING OF A KEY BY MOMENTARILY SHORTING THE KEY'S CORRESPONDING ROW AND COLUMN NUMBER AT THE MOTHERBOARD CONNECTIONS. FOR EXAMPLE, KEY 8 IS ROW2 AND COL2.

YOU CAN ALSO CHECK THE FUNCTIONING OF ANY KEY USING AN OHMMETER. FOR KEY 3, PLACE (OR CLIP ON) THE OHMMETER'S LEADS AT ROW4 AND COL1. WHEN YOU PRESS KEY 3, THE OHMMETER SHOULD READ NEAR ZERO OHMS.

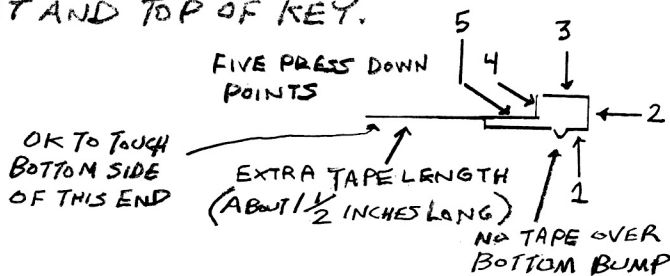
FIRST, TEST FOR AN INTERMITTENT CONNECTION FROM KEYPAD TO MOTHERBOARD USING AN OHMMETER. REMOVE THE 4 SCREWS, AT THE BOTTOM OF THE MOTHERBOARD, THAT FASTEN THE KEYPAD TO THE MOTHERBOARD. SLIDE OUT THE ENTIRE KEYPAD/CASSETTE CONNECTOR FROM THE KEYPAD MEMBRANE. SECURE AN OHMMETER'S TEST LEADS WITH ALLIGATOR CLIPS TO A ROW AND COLUMN USED BY THE DISFUNCTIONING KEY. TEST THE ENTIRE ROW AND COLUMN PRESSING AND HOLDING DOWN EACH KEY WHILE JIGGLING THE KEYPAD MEMBRANE UP AND DOWN. WATCH YOUR OHMMETER FOR AN INDICATION THERE IS A BAD CONNECTION. IF YOU FIND AN INTERMITTENT CONNECTION, CHECK THE SOLDER JOINTS AND RE-SOLDER IF NECESSARY. IF YOU FIND NO INTERMITTENT CONNECTION, THERE'S A PROBLEM INSIDE THE KEYPAD MEMBRANE. MAKE SURE YOUR OHMMETER TEST LEADS ARE SECURELY CLIPPED ON AND NOT LOOSE, WHEN JIGGLING THE MEMBRANE, SO YOU DON'T GET A FALSE READING.

A BAD CONNECTION IN THE KEYPAD MEMBRANE IS FIXABLE. CAREFULLY, PEEL AWAY THE OUTER COVERING OF THE MEMBRANE. YOU WILL EVENTUALLY SEE 6 COPPER OVERLAYS. EACH OVERLAY IS CONNECTED TO A ROW AT ONE POINT. IF A ONE POINT CONNECTION IS BROKEN, THE BREAK IS SOLDERABLE. CHECK UNDERNEATH EACH COPPER BUTTON FOR A CLEAN CONTACT. USE A PIECE OF MASKING TAPE TO HOLD DOWN A COPPER OVERLAY, KEEPING THE TAPE  $\frac{1}{16}$ " AWAY FROM THE LEFT AND RIGHT SIDES OF THE WHITE PLASTIC PLATFORM. REMEMBER, THOSE SIDES SLIDE INTO THE BOTTOM OF THE KEYPAD. ONCE YOU POSITION AND TAPE DOWN AN OVERLAY, CHECK IF ITS FUNCTIONING PROPERLY WITH AN OHMMETER. REPEAT FOR ALL 6 ROWS. WHEN YOU'RE CONVINCED ALL KEY BUTTONS ARE FUNCTIONING, YOU CAN PLACE 2" WIDE DUCT TAPE OVER THE MASKING TAPE, TOP TO BOTTOM AND BEND THE DUCT TAPE AROUND THE FRONT AND UNDERNEATH THE WHITE PLASTIC PLATFORM. CHECK BUTTONS AGAIN WITH AN OHMMETER. SOLDER THIS BUTTON ASSEMBLY TO THE MOTHERBOARD AND CHECK FUNCTIONALITY AGAIN WITH AN OHMMETER. CHECK ALL 10 CONNECTIONS WITH OHMMETER, TO EACH CORRESPONDING I/O CUSTOM CHIP PIN SHOWN ON THE ABOVE DRAWING.

BROKEN KEY

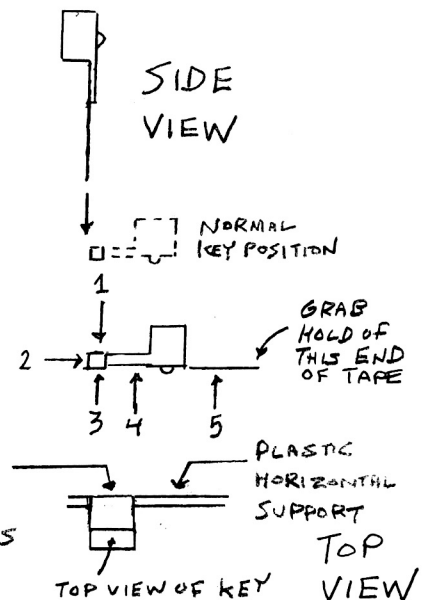
SURPRISINGLY, A BROKEN KEY IS AN EASY FIX. NOW, YOU COULD TRY GLUEING THE KEY BACK, BUT THE KEY MUST REMAIN FLEXIBLE SO YOU CAN PUSH IT DOWN. ANOTHER SOLUTION, DESCRIBED BELOW, WORKS VERY WELL. USE A TRIMMED PIECE OF BLACK ELECTRICAL TAPE TO HOLD THE KEY IN PLACE. THE KEYPAD OVERLAY AND WHITE PLASTIC PLATFORM WILL KEEP THAT KEY SECURELY IN PLACE.

THE HARD PART OF THE FIX IS TO REMOVE THE GOLD KEYPAD OVERLAY WITHOUT BENDING OR DAMAGING IT. USE A VERY SMALL THIN FLAT EDGE SCREWDRIVER OR UTILITY KNIFE BLADE TO DETACH THE OVERLAY. ONCE THE OVERLAY IS REMOVED, UNSCREW THE ENTIRE KEYPAD/CASSETTE CONNECTOR FROM THE MOTHERBOARD AND SLIDE IT OUT FROM THE KEYPAD MEMBRANE. CUT A PIECE OF ELECTRICAL TAPE THE WIDTH OF THE KEY AND AVOID TOUCHING THE BOTTOM OF ONE END WITH YOUR FINGERS. WRAP THE UNTOUCHED END OF TAPE AS SHOWN BELOW AND USE A FLAT EDGE SCREW DRIVER AND YOUR FINGERS TO POSITION AND PRESS DOWN THE TAPE AROUND THE FRONT AND TOP OF KEY.



WRAP TAPE AND POSITION/PRESS TAPE AROUND KEY BEGINNING WITH BOTTOM FRONT SHOWN AS POINT 1. DO NOT TOUCH ADHESIVE SIDE OF TAPE WITH YOUR FINGERS.

POSITION KEY VERTICALLY OVER ITS NORMAL POSITION ON THE KEYPAD. THEN MOVE IT DOWN SO THE ADHESIVE SIDE OF THE TAPE IS BEHIND THE HORIZONTAL PLASTIC THAT SUPPORTS THE KEYS. POSITION THE KEY IN ITS NORMAL POSITION WHILE WORKING AND PRESSING THE TAPE AROUND THE BACK OF THE HORIZONTAL SUPPORT AND BOTTOM OF KEY. AVOID TOUCHING THE ADHESIVE SIDE, THAT MAKES CONTACT WITH THE SUPPORT AND BOTTOM OF KEY. USE FLAT EDGE SCREW DRIVER TO PRESS TAPE DOWN. IT'S OK IF THE TAPE EXTENDS BEYOND THE FRONT OF THE KEY.



TAPE GOES BEHIND AND AROUND THE HORIZONTAL CROSS SUPPORT

ONCE THE KEY IS POSITIONED AND TAPED ONTO THE KEYPAD, IT MAY SEEM LIKE A FLIMSY ATTACHMENT. BUT, WHEN THE KEYPAD IS SLID BACK ONTO THE KEYPAD MEMBRANE AND THE GOLD KEYPAD OVERLAY ATTACHED, THE TAPED KEY WILL BE VERY SECURE AND FLEXIBLE. USE TRIMMED DOUBLE-STICK TAPE TO RE-ATTACH THE GOLD KEYPAD OVERLAY TO THE KEYPAD. DON'T GLUE IT ON. YOU MAY WANT TO REMOVE THE OVERLAY AGAIN IN THE FUTURE.