Use extreme care when handling the exposed mother board. Do not let any metal parts come in contact with underside when operated out of the case. Do not let polyethylene, nylon, or other static producing materials come in contact with board. Pay particular attention to "close call" short situations on re-installation.

-PRECAUTIONS-

1. Do not wear nylon clothes. Work in a static free environment, preferrably grounded.
2. When operated out of case, short across C-6 before further handling. (power must be disconnected !)
3. Check to be sure metal bushings in bottom shield pan do not short across any foils. (Many different style boards and shields) (insulate any stinkers) (throw away fish paper foil combination and use something else)
4. Check on-off sw. for center lead that extends beyond board edge. (shorts to shield pan)
5. Check 5v. heat sink for good mechanical contact, and the clearance between spring clip and board foils.

PARTS: *=installed on mother board

2-680 Ω resistors
*3-47 Ω resistors
2-2N4401 transistors
*1-74S74 dual JK IC
*1-7416 hex inverter IC
*1-P.C.B. Kludge
1-Insulator
Approx. 12" bare wire
Spaghetti tubing
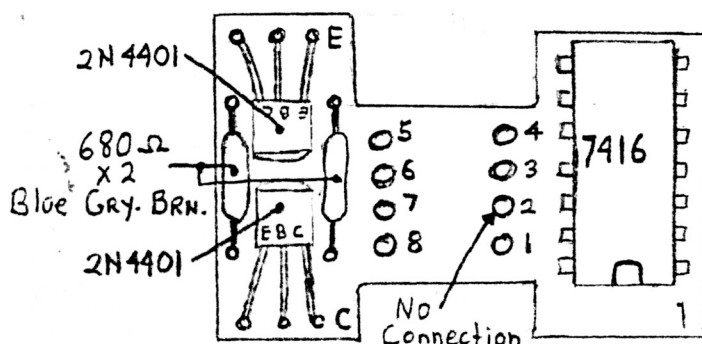
1. KLUDGE BOARD ASSEMBLY
    a. install 680 Ω resistors and solder
    b. Install 2N4401 Xsistors, bend over flat against board and solder. {observe polarity}
    c. Install 7416 I.C. and solder{observe polarity}
    d. Inspect carefully for solder shorts, and set aside.
2. BALLY UNIT DISSASSEMBLY -- Dissassemble in clean area
    a. Remove 5 phillips screws from bottom and seperate top case from bottom. Throw screws in top case-set aside.
    b. Pull off R.F. modulator{metal box on left}and power plug {the polarity may be ignored}
    c. Remove 4 phillips screws in corners of board{2-on nylon spacers}
    d. Lift out shielded board and flip over. Remove 4 phillips self tapping screws from keypad cassete assembly. Slide the assembly off of the keypad by grasping bottom of keypad{where connected to board}and pulling out like a drawer. {HINT — while you have this apart you may want to re-inforce eject bar assy. {red} with epoxy and metal washers on cass. holder itself.}
    e. Remove U-clips holding on top shield, and remove top shield. { Bend back metal tabs in back, on bottom pan }
    f. Some boards are secured to bottom shield pan with machine screws on bushings. Remove these if this is the case. Otherwise remove board and push out snap rivets that secure the fish paper and foil to bottom of board. {My suggestion is to just leave this out and use something else to insure insulation from bottom shield pan. Like a piece of cardboard cut out for screw holes etc. Note, this type of assy. has small springs which are to make contact with grounded portions of the board only. The fish paper foil has been notorious for blowing boards due to I.C. pins shorting on assembly, to the foil which is very difficult to see, and is unnecessary shielding anyway.}
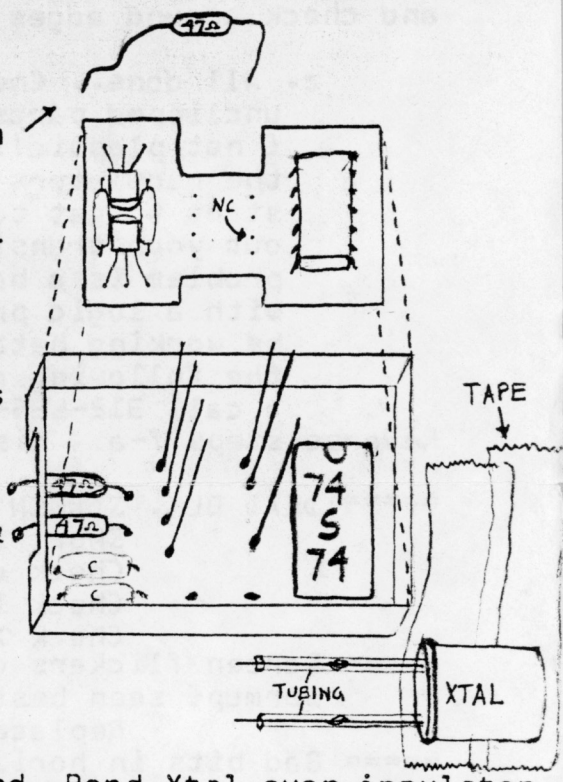
110 v. Side ← eh!
120 to 150 ma. A.c.
NOMINAL

If higher —
and diodes feel hot
or are schottkies, are old and
grey — Retire them.
If still over 155-60
Check out P.S. or you'll burn out
your Xformer!
≈ -15 v. D.C.

Nice!

(No CASS. or L.P.)

A.C. voltages
w/respect to gnd.
≈15.7
≈24
≈15.7

Across Pins
A.C. volts
35 v.
9.6 v.

RF. MODULATOR

Sound Center f

Sound Tank

CH 3
CH 4 f adj. carrier

P.S.

~8.6 v. D.C.
~5 v. D.C.

PIN 1 RAMS
~5 v.

Jumper Resistor 47Ω
(Check for proper Reg.)

HEAT SINK
Q1
JUMPER

LINE FILTER

J1

KEY BOARD

U18 DATA
CLOCK IN 9,10
VIDEO OUT 16 THR
8 THR
(INV!)

Cut out for shield here

U23
DATA OUTS PIN 14

PIN 9 RAMS +5v
U24
U25 U26 U27

PIN 8 RAMS
4096 + 15v.
4015 + 12v.
To Pin 6
To Pin-12

U28
S.W.E.
U29 U30 U31

U17 ADDRESS

U19 I.O.

S1
J2
J3

GND.

CLOCK OUT
Pin 1 up
Note

XTAL SHIELD
Replace
with
74S74
(high speed)

PUT IN 47Ω S SHIELD

U20
74LS174

S2 Reset

U22
74LS171

U21
74LS174

TAKE OUT
PUT IN
JUMPER-P

Delete Resistor

Leave Blank

U2
OR (4)2K

U1
ROM (18K)

J6

This may have been done already, or —
Board may be laid out, eliminating these two parts

U4

U14
74LS10

TO W.E.
RAMS PIN 3

~7.7 v.
volt D.C.

C6
10,000 uf

GND.

~21 v.
C1
1,500 uf

P.S. Jumper
Due to thin foil arrange-
ment that runs around board under the
Reset sw. to Filter cap (actually .3Ω!)

U10
DP8304

U4LS02

U4LS257

NO CONN. PIN 2

U7 Z-80

U5
74LS367

If you're working on a salvage
board — make sure write enable on RAMS
are connected here — Some boards Require a jumper.

U13
74LS10

U3

U6
74LS04

U12
74LS00

J4
J5
J7 L.P.

U11
U4S02

Dissassembly cont.--

g. Bend keypad back out of way and remove the clock cover. It may
   be soldered on, requiring a heavy duty soldering iron to remove.
   {40w. or more}
h. Remove 74LS74-U-16, 82Ω resistors-R-12&13, Crystal-Y1, and 75361 driver
   If solder doesn't co-operate--add some fresh solder with a <u>clean</u>
   iron , to re-flow and add rosin. If it still gives you problems
   you may have to clip leads and pull out remaining stubs while
   heating then.
i. At this point it is advisable to make a continuity check from
   bottom to top foils to insure integrity of plated thru holes.
   {where necessary}If any have been damaged , repair by pushing
   a thin piece of wire thru hole, soldering to the top foils, and
   cutting off the excess.

3. KLUDGE INSTALLATION and MODIFICATIONS
   a. Install 47 resistors in clock. Note
      some shields have cut-out where resistor
      leads pass thru. If so, bend leads as shown
      to facilitate installation.
   b. Install 74S74--{observe polariy}
   c. If you had unassembled kludge kit, install
      7-pieces of bare wire{approx. 1¼" ea.}
      from back of board. Make a slight bend
      in it to prevent it from falling thru,
      and solder. Check for good conn. to top
      foils. Locate wires thru kludge bd. holes
      and slide down all the way. Solder care-
      fully to top foils, and cut off excess.
   d. If you have assembled kludge, simply
      install as shown, applying enough heat
      to bottom of board to cause solder to
      flow around pins to top foils.
   e. Extend crystal leads to 1" by solder-
      ing on bare wire. Take care not to stress
      leads going into Xtal or they may break
      off. Insulate with spaghetti tubing and
      wrap with tape as shown. Re-install Xtal
      and place insulator on top of kludge board. Bend Xtal over insulator
      and re-install cover if desired.{ not necessary }
   f. Install the remaining 47Ω resistor across R-1. And make
      modification to boards with resistor and capacitor as shown on
      parts layout.{eliminate R - jump C} see △
   g. Cut out the top shield around the data chip and remove the two
      pieces of aluminum securing them directly to each other. Press
      this onto top of data chip and secure edges with silicone caulk.
      { make sure there is plenty of white (BeO) heat sink compound in
      the middle }   o Kludge Pin #'s + Schematic for test points
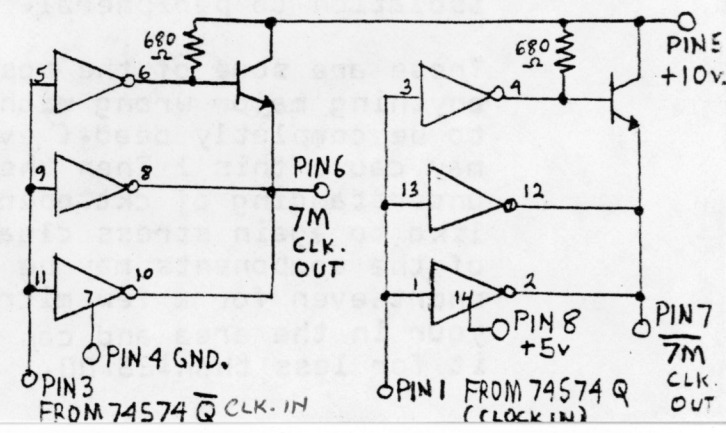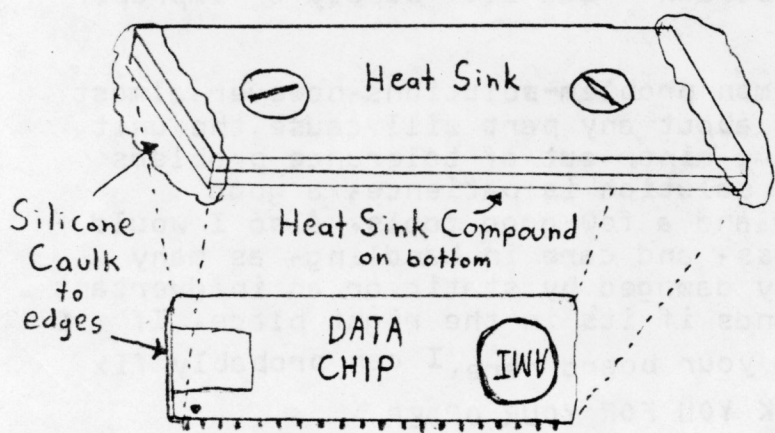
If you are installing a new black data chip , here are
a few interesting items;

> The grey data chips throw the horizontal off to
> the right side of the screen. They also have a
> lower input impedance to the clock,and make the
> numbers on calculator look like bold type before
> its ready to go.{ bad shifters }The black one
> cures these and other problems,and will last
> forever { well maybe }

When removing old chip,take care not to crack any parts around it.
When re-installing new one make sure all pins are in perfect alignment
before grasping between thumb and forefinger of both hands on edges,and
applying slow,even pressure.Be carefull!! If any pins bend under the
chip it aint gonna work.Be sure its facing the right way, {pin 1 to left}
and check around edges of socket to make sure all pins have mated properly.

> z. All done.. Check bottom of board for stray metal pieces,
> unclipped parts, etc.Place board on clean insulating material.
> { not plastic!! } { paper }.Place finger on diodes,plug on
> the modulator, and apply the power to check it out. If the diodes
> start to get too hot, unplug connector immeditly or you will burn
> out your transformer.If your board worked before, chances are the
> problem is a bad connection to a top foil.Check for clock output
> with a logic probe or scope. { see part layout } All should
> be working better than ever,however if you have any problems,check
> the following guide and all P.S. voltages.Or feel freeto give me
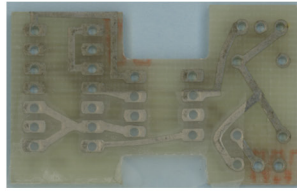> a call 312-635-0859 --Ask for Larry.

Reverse steps f-a , disassembly to re-install board in case.

===== DEAD BLK. SCREEN   {usually bad RAM}
> Short in power supply, check all voltages as shown.
> Check clock output to data chip.
> Check D.O.'s on RAMS{ use LP-1 Probe or equiv. }
> Check Xformer output

===== Screen flickers or glitters with lines of bits especially after
warmup{ seen best on checkmate }
> Replace both DM81LS95 & 74LS174

===== Bad bits in horiz. fashion 74LS174

===== Bad bits singly or vertically in same spot or when reset button is
held down . BAD RAM Heat each with soldering iron till one makes
more bits appear on screen, Thats the one. { not too hot } 25w. 15sec.

===== Player No. 1 Controlls more than one function--Bad I.O. chip

===== High res. lines flickering and rolling-- Bad Address chip

===== Expand jack doesnt function properly with peripherals--74LS04

===== Some cartridges dont work--Z-80 or address chip{pin may be dislocated

===== Gunfighter goes to top of screen and stays there-- short in I.O.sec-
tion. Check diodes. Remove J-2 and check for shorts under jack.

===== Thick lines or color bands on screen-- Bad 10v. supply or improper
isolation to peripheral.

These are some of the most common problem-solutions,however,almost
anything major wrong with just about any part will cause the unit
to be completly dead.{ even some minor out of tolerance problems
may cause this } Then the only solution is patience, a good
understanding of ckt.operation,and a few good tools. Also I would
like to again stress cleanliness, and care in handling, as many
of the components may be easily damaged by static or an inadvertant
short,even for a few microseconds if its in the right place. If
your in the area and can bring your board here,I can probably fix
it for less than$25.00.

THANK YOU FOR YOUR ORDER
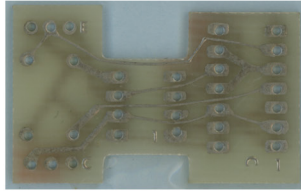
Kludge Board (Component Side)

Kludge Board (Solder Side)