512 K EXPANSION MEMORY CARD FOR 9640 : MODIFY IT YOURSELF!
          Paolo Bagnaresi, Italy, Jan. 16th, 1989

HOW TO MODIFY YOUR 512 K MYARC MEMORY EXPANSION CARD AND MAKE IT
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WORK WITH THE GENEVE COMPUTER
=============================
If you have:
- a Myarc 9640/Geneve computer
- and a Myarc 512 K Expansion Memory originally released for the
  TI-99/4A, now collecting dust in a shelf, .
- then now you can modify it and enjoy half a Meg of additional
  memory on your 9640 computer.

Even if you already have your card modified by Myarc itself, you
may want to read this document. Some cards badly modified by
Myarc have already been released (mine for example) and yours
may as well be one of them!
If you aren't able to understand why a new peripheral added to
your system doesn't work, then you may want to check this
document. You may find out that a Horizon Ram Disk doesn't work
just because Myarc hasn't properly modified the 512 K card you
plugged in several months ago (this happened to me too), or that
your Horizon Ram Disk works only with the Myarc Floppy Disk
Controller (and not with the CorComp). And, again, the culprit
was the 512 K (yet another bug).

WARNING: CARD VERSIONS THIS PROJECT APPLIES TO

I don't know how many different versions of the 512 K card have
been released by Myarc. I know for sure there are at least 2
versions of them. This project is good for both of them.
Obviously, the two versions have some differences. Since there
isn't any serial number or a name on the Printed Circuit Board,
it's not easy to tell the one from the other by simply looking
at a label. Let's then call them Version A and Version B. I will
tell the differences between Version A and Version B later on,
at STEP 6.
But what if the version you have is neither A nor B? There isn't
much I can do about it: chances are that YOU WILL END UP WITH A
CARD THAT WILL NOT WORK!

Why this document then? It is intended only for those who are
not willing to send their cards to the Myarc Service Department
and wait some months to have them back.
We in Europe suffer from the distance, the time and the money
needed to get anything accomplished by Myarc. This is why I
think some people in Europe, and maybe in some other foreign
countries as well, will go ahead and try to execute this
project, in spite of all the risks that it entails.

DISCLAIMER

Any unauthorized modification carried out on your 512 K card may
invalid the warranties provided by Myarc. No warranty is
provided with this document, that you should not assume to be
surely correct or suitable to the card version you own. You also
are warned that any temporary or permanent damage caused to your
system by the execution of the project shown in this document
may be due to the unsuitability of the project to your
particular case. Neither any responsibility will arise nor any
liability, obligation will ever be ascribed to .....
     Aw'rite guys, enough of this stuff.... if you don't want to
risk, give up.

TECHNICAL SKILL REQUIRED

The person who can succesfully carry out this project is a
normal computer user with a minimum dexterity: he knows how
to handle a soldering iron, has already undertaken some minor
electronic projects, understands IC pin counting method and does
not get confused about pin counting when flipping over a printed
circuit board. Really, if you honestly feel you don't qualify,
please give up and get the work done by Myarc: it's much safer,
since a drawing of the project is not provided.
It's better to feel sorry now than to feel sorry later on, when
a white cloud of smoke comes out of your beloved 512 K card
(unlikely, but possible if you connect some ICs to the +/-12
Volts unregulated supply).

WHAT YOU WILL HAVE TO DO

     You will have to cut some traces on the printed circuit
board (PCB) and add some wires (jumpers) here and there. That's
all.

LAST WARNING

The changes you are about to operate on the 512 K card are
somewhat FINAL. After the modifications have been performed,
your Myarc 512 K will not be able to work within a truly
TI-99/4A system any longer. If you planned to switch the card
between a Geneve system and a TI-99/4A system, then THIS PROJECT
IS NOT FOR YOU!
     In order to restore the card to its previous conditions
(i.e. to make it work again with TI-99/4A), you will have to
undo whatever you might have done, i.e. resolder back the cut
traces and unsolder all the added wires. Although feasible, it's
not practical.
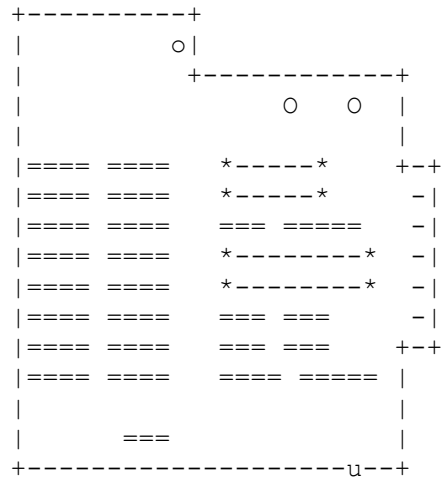   Start this project only if you plan to use the card
exclusively in the Geneve enviroment.

STEP 1 - EQUIPMENT
          1 Soldering pencil.
          1 roll of fine (20 awg) rosin core solder.
          1 foot of fine (30 awg) wire wrap wire.
          1 1N4148 diode.
          1 Sharp pointed knife.
          1 Water-resistant, soft-tip, black pen.
          1 Multimeter, optional.

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STEP  2 - Remove clamshell from the Myarc 512 K Printed Circuit
          Board (PCB).

STEP  3 - Place the PCB on a table, with the component side
          upwards, the connector at your right hand side hand
          side and the protruding LED toward your chest.

          This is what you should see:

          +----------+
          |        o|
          |         +------------+
          |             O   O   |
          |                     |
          |==== ====   *-----*    +-+
          |==== ====   *-----*    -|
          |==== ====   === =====   -|
          |==== ====   *--------*  -|
          |==== ====   *--------*  -|
          |==== ====   === ===     -|
          |==== ====   === ===    +-+
          |==== ====   ==== ===== |
          |                       |
          |       ===             |
          +-------------------u--+

          COMPONENT DESCRIPTION
          ---------------------
          You should now see:
          - 16 memories on your left hand side, divided into 2
            equal rows of 8 memory each, "U1" through "U8" and
            "U9" through "U16" . Each memory has 18 pins and may
            be named either 4464, or 50464, or 41464, or 81464 or
            similar.  They are all 256 Kbit (64K x 4 bit) DRAMs.
          - 2 +5 Volts voltage regulators (7805), named "VR1" and
            "VR2", at right upper corner, fastened with nuts and
            bolts to the PCB.
          - 4 electrolitic capacitors, near the above 7805.
          - 1 Eprom (2764, 8K x 8 bits), the large and only 28
            pin IC that is now in the upper half of the PCB, near
            the four electrolitic capacitors: it should be named
            "U26".
          - 1 74LS139 (Dual 2 to 4 line Decoder/Demultiplexer), a
            16 pin chip, named "U24", placed just below the
            Eprom "U26".
          - 1 74LS245 (Octal bus tranceiver with 3 state output),
            a 20 pin chip named "U25", placed just at right of
            the 74LS139 "U24".
          - 1 TMS4500A (Dynamic Ram Controller), a 40 pin chip
            named "U23", placed just below the 74LS139 "U24" and
            the 74LS245 "U25".
          - 1 74LS74 (or similar) (Dual D-Type, Positive Edge
            Triggered Flip-Flop with Preset and Clear), a 14 pin
            chip named "U19", placed just below and to the left
            of the TMS4550A "U23".
          - 1 74LS11 (Triple 3 Input AND Gates), a 14 pin chip
            named "U22", placed just below and to the right of
            the TMS4500A "U23".
          - 1 74LS74 (or similar) (Dual D-Type, Positive Edge
            Triggered Flip-Flop with Preset and Clear), a 14 pin
            chip named "U18", placed just below the 74LS74 "U19".
          - 1 74LS04 (Hex Inverters), a 14 pin chip named "U21",
            placed just below the 7411 "U22".
          - 1 74HCT259 (Eight Bit Addressable Latches), a 14 pin
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chip named "U17", placed just below the second 74LS74
"U18".
- 1 PAL12L6 (Programmable Logical Array), a 20 pin chip
  named "U20", placed just below the 74LS04 "U21".
- 1 74LS00 (Quadruple 2 Input Positive NAND Gates), a
  14 pin chip named "U27", placed below the 4464 memory
  chip columns "U9" - "U16".
- 1 3.579545 MHz quartz, placed below the PAL12L6
  "U20".

STEP 4 - CHECK THE COMPONENTS

           You are required to check at all the components listed
           in STEP 3 and to compare them with the components you
           have in your own card. If they do not match, even on
           only one element, stop this project since you may own a
           card version different from those this project applies
           to.
           Also, give up the modification if you come across any
           difference between your card and the decriptions
           of the cards reported later on in this document.
           Myarc has used either the "LS" type or the "HCT" type
           of the ICs on the PCB. If this is the only difference
           you find in your card, then go ahead.

STEP 5 - THE 60 PIN CONNECTOR

           The card has a 60 pin connector, that is used when you
           want to insert it in the Peripheral Expansion Box
           (PEB). ODD pin #s (1 though 59) are located on the
           "Solder Side" of the PCB, and EVEN pin #s (2 through
           60) are located on the "Component Side" of the PCB.
           Thus, each side of the board has 30 pins. The
           numeration starts from the four electrolitic capacitors
           side (lower numbers) and goes up toward the LED side
           (higher numbers).

           If you look carefully at the 60 pin connector, you will
           notice that all the used pins are connected to the
           "Solder Side" of the PCB by the means of small
           elliptical solder pads. Therefore, the "Solder Side"
           of the PCB gives all the 60 possible contacts. Later
           on, when you will be required to run a jumper, let's
           say, from pin xx of the IC yy to connector pin # zz,
           and pin # zz happens to be on the "Component Side", you
           can solder the wire to the correspondent pad in the
           "Solder Side" of the PCB, thus avoiding messing wires
           running from one side of the PCB to the other.

           Therefore, I would advise you to mark rigth away, with
           the help of a water-resistant soft-tip black pen, the
           correspondent numbers of all the following pins on the
           elliptical solder pads ON THE "SOLDER SIDE":
           - 4 (READY).
           - 56 (MEMEN.A*).
             — 54 (WE.A*).

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STEP  6 - CARD VERSION A AND VERSION B
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          Version A of the is the card that:.
          - hasn't any 1N4148 diode connected to PIN 4 (READY) of
            the 60 pin connector.
          - has only 2 solder holes (terminators) in the
            following jumpers: J2, J3, J5, J6.

          Version B of the is the card that:
          - has one 1N4148 diode connected to PIN 4 (READY) of
            the 60 pin connector. The diode is not identified on
            the PCB by a white mark as all the other
            components are, because it had been added later on.
            The diode is placed near the resistor "R5".  If you
            have the 60 pin connector at your right hand side and
            the LED pointing toward your chest, then you'll see,
            near the 60 pin connector edge and from left to
            right: 2 diodes marked "D2", a resistor marked "R5",
            and finally the unmarked 1N4148 we are talking about.
          - has 3 solder holes (terminators) in the
            following jumpers: J2, J3, J5, J6. The third hole is
            not inscribed in the white ellipse maarked on the PCB
            that identifies the jumper. Rather, it is often cut
            through by the white ellipse itself.

STEP  7 - THE 2764 EPROM.
          --------------
          The 2764 Eprom "U26" should be socketed (if not, give
          up this entire project and send the card to Myarc: it's
          too difficult to remove a 28 pin soldered IC without
          doing any damage to the PCB).  Remove the Eprom, with
          the help of a flat screwdriver, by prying alternatively
          on the two short sides of the IC. Keep the Eprom for
          any future need.

STEP  8 - IC PIN COUNTING METHOD.
          ----------------------
          For those who are not familiar with the counting method
          of the IC pins, I will give this short explanation:
          put an IC on a table, so that the pins are touching the
          table surface. Now look down at the IC from above (you
          should see the component number written on top of the
          IC): this way of looking at the IC is called "TOP
          VIEW". You will see a notch (or a dot) on the IC
          surface; starting from there, and going in a
          counterclockwise direction, the first pin you will find
          is pin # 1, next pin is pin # 2, and so on until you
          get to the last pin (which is again near the notch from
          where you started the count).
          Example:


             14 13 12 11 10  9  8
             -=-===============-
             |                 |
             o     TOP VIEW    |
             |                 |
             -=-===============-
              1  2  3  4  5  6  7


          Later on in this project, when you will be instructed
          to act on a certain pin # on the "Solder Side" of the
          PCB, you will have to locate that pin # on the
          "Component Side" of the PCB, and then you'll flip over
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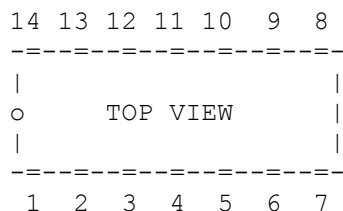
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                  the PCB, keeping track of where that pin sticks out in
                  the "Solder Side".

        STEP  9 - CUT TRACES
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                  Now comes the difficult part. With the sharp knife, you
                  should cut some traces on the PCB. It is important that
                  the kife is really sharp, so that the thin copper
                  traces will suffer little from the physical strain.

                  If you have doubts, this is the right time to give up
                  this project, since the card hasn't been damaged yet.
                                              .
                  TRACES TO BE CUT ON THE TOP SIDE ("COMPONENT SIDE")
                  ---------------------------------------------------
                  Keep the 60 pin connector at your right, so that the
                  LED points toward your chest. Then proceed as follows:
                  .
                  a) TMS4500A ("U23"): cut trace leading to PIN 1 (CLK).
                  b) TMS4500A ("U23"):  "    "     "    to PIN 5 (ALE).
                  c) TMS4500A ("U23"):  "    "     "    to PIN 8 (ACR).
                  d) 74LS11   ("U22"):  "    "     "    to PIN 10.
                  e) 74LS11   ("U22"): cut trace running BETWEEN PIN 5
                                       and PIN 6 .
                  f) PAL12L6  ("U20"): cut trace NEXT ON THE RIGTH of PIN
                                       11. This trace will connect to PIN
                                       9 of PAL12L6, by passing
                                       underneath the PAL itself.
                  g) 74LS259 ("U17"):  cut trace leading to PIN 5. If
                                       there are 2 traces leading to PIN
                                       5, then cut the one on the right.
                  h) 74LS259 ("U17"):  cut trace leading to PIN 6. If
                                       there are 2 traces leading to PIN
                                       6, then cut the one on the right.
                  h) 74LS259 ("U17"):  cut trace running BETWEEN PIN 7
                                       and PIN 8 .

                  TRACES TO BE CUT ON THE BOTTOM SIDE ("SOLDER SIDE")
                  ---------------------------------------------------
                  i) PAL 12L6 ("U20"): cut trace leading to PIN 9.
                  j) 74LS11   ("U22"): cut trace connecting PIN 9
                                       and J5 terminator.
                  k) 74LS11   ("U22"): cut trace connecting PIN 8
                                       and J5 terminator.
                  l) 74LS11   ("U22"): cut trace connecting PIN 14
                                       and PIN 9 (ACW) of TMS4500A
                                       ("U23").
                  m) 74LS259  ("U17"): cut trace leading to PIN 7.

        STEP 10 - INSERT JUMPERS (BOTTOM SIDE).
                  ----------------------------
                  Now you will have to insert a short jumper in the
                  following jumper holes : "J1", "J2", "J3", "J5" and
                  "J6". It is best to previously heat and suck off the
                  solder so that you can insert easily the jumper.

                  A) - "J1", "J2", "J5", "J6"
                        - Card Version A: run a jumper so as to connect
                                          the two holes enclosed by the
                                          white ellipse identifying the
                                          Jumper number (J1,J2,J5,J6).
                        - Card Version B: run a jumper so as to connect
                                          the two holes enclosed by the
                                          white ellipse identifying the
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                           Jumper Number (J1,J2,J5,J6).
                           Leave the third hole
                           pertaining to the Jumper
                           Number unconnected.
   B) - "J3" - Card Version A: run a jumper so as to
                           connect the two holes enclosed
                           by the white ellipse
                           identifying "J3".
             - Card Version B: run a jumper so that all the
                           three holes of "J3" are
                           electrically connected
                           together.
   C) - PAL12L6 ("U20")   : short together PIN 9 and PIN
                           10.
   D) - 74LS11  ("U22")   : run a bridge so as to shorten
                           PIN 10 and PIN 11 together. Be
                           careful, there is a trace
                           running between Pin 10 and Pin
                           11: don't short this trace as
                           well, but leave it
                           electrically insulated from
                           Pin 10 and Pin 11.


CREATE THE NEXT LONG JUMPERS WITH AN INSULATED WIRE.
----------------------------------------------------

   E) - Card Version B : skip to step F)
      - Card Version A :
        1) - Solder a 1N4148 diode to PIN 2  of TMS4500A
             ("U23"). The 1N4148 diode has a black band on
             itself. It is the lead next to this black
             band that has to be soldered to PIN 2 of the
             TMS4500A.
             Now solder a wire to the other end of the
             1N4148 diode.
        2) - Now cut the free end of the wire so that it
             is long enough to reach the solder pad
             pertaining to PIN 4 (READY) on the 60 Pin
             Connector Edge to the PEB. You marked this
             pad at STEP 5 (see above).
        3) - Solder the free end of wire to the above
             solder pad.
   F) - 74LS139   ("U24") : run an insulated jumper so as
                           to connect PIN 1 of the
                           74LS139 with PIN 8 (ACR) of
                           TMS4500A ("U23").
   G) - TMS4500A  ("U23") : run an insulated jumper so as
                           to connect PIN 5 (ALE) of
                           TMS4500A with the solder pad
                           pertaining to PIN 56 (MEMEN)
                           on the 60 Pin Connector Edge
                           to the PEB.
   H) - 74LS00    ("U27") : run another insulated jumper
                           so as to connect the solder
                           pad pertaining to PIN 56
                           (MEMEN, on the 60 Pin
                           Connector Edge to the PEB)
                           with PIN 12 of the 74LS00
                           ("U27").
   I) - TMS4500A  ("U23") : run an insulated jumper so as
                           to connect the solder pad
                           pertaining to PIN 54 (WE, on
                           the 60 Pin Connector Edge to
                           the PEB) with PIN 9 (ACW) of
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the TMS4500A ("U23").
        J) - 74LS11   ("U22") : run an insulated jumper so as
                                 to connect PIN 8 of 74LS11
                                 with PIN 1 (CLCK) of TMS4500A
                                 ("U23").
        K) - 74LS11   ("U22") : run an insulated jumper so as
                                 to connect PIN 9 of 74LS11
                                 with PIN 11 of the 74LS74
                                 ("U19"). This 74LS74 is the
                                 one that is right below the
                                 TMS4500A ("U23").
        L) - PAL12L6   ("U20") : run an insulated jumper so as
                                 to connect the solder pad
                                 pertaining to PIN 43 (A0, on
                                 the 60 Pin Connector Edge to
                                 the PEB) with PIN 4 of PAL12L6
                                 ("U20").
        M) - 74LS11   ("U22") : run an insulated jumper so as
                                 to connect PIN 4 of 74LS11
                                 with the solder pad located
                                 between PIN 1 and PIN 2 of
                                 PAL12L6 ("U20"). This last
                                 solder pad will lead, on the
                                 "SOLDER SIDE", to one of the
                                 two terminators of "J2"
                                 JUMPER.
STEP 11 - Your hard work is finished. Check well all the cuts
          and all the connections you've made. Once you're sure
          they are all correct, reinsert the PCB in the
          clamshells. Close the clamshells and insert the card
          in the PEB.
          If you are a religiuos person, this is the rigth time
          to put into practice what you've learned when you were
          a boy.

          If you are an atheist, well, you know no one will be
          listening to you up there. So, simply save your time
          and pass directly to STEP 12.

STEP 12 - Power on the PEB. SYSTEM/SYS should load smoothly.
          TEST A) -
          Execute the CHKDSK command from DOS environment.
          Without Expansion Memory the CHKDSK command should
          give you "557056 bytes of Total Memory".

          With Expansion Memory the CHKDSK command should give
          you "1048576 bytes of Total Memory".

          CHKDSK is not capable of identifying addressing
          problems with the 512 K card. There is another DOS
          command that will really use the additional memory,
          the DISKCOMP command, and this is the command you
          should now use.

          TEST B) -
          Execute the DISKCOMP command from DOS environment.
          Without Expansion Memory the DISKCOMP command should
          eat up about 128 sectors for each pass.
          With Expansion Memory, instead, the DISKCOMP command
          should eat up about 896 sectors for each pass.

          DISKCOMP Command must not crash. If it does, either
          you've done something wrong with cutting traces or
          adding jumpers, or the 512 K card version you have

is different from the ones described in this document.

If the second case is true, you should restore all the
cut traces, eliminate all the added jumpers, make sure
the card works again in the TI-99/4A environment and
send it to Myarc.

If the first case is true, don't panic. Double check
again all the work you've done, thinking well about
pin counting (it's easy to get confused when flipping
over the PCB).

But, if everything works all right, you know for sure
you've done a hell of a good work!

THIS PROJECT HAS BEEN ALREADY TESTED

The modifications explained in this file have been already
carried out by a third person. After finishing this text file,
my friend Massimo Cariboni was able to succesfully modify his
old 512K Myarc to work with Geneve computer. He carried out the
needed modifications by only following this text file.

During the experiment, the original new 512 K cards we recently
got from Texaments have been purposedly kept away from him. In
this way he could not check his work with the new card; the only
lead he could follow was this plain text file.

Also, he played no role in writing this text file, so that he
could not try to remember what I meant with my writing. It has
been a kind of a "single blind" experiment.

Finally, while the new card we had from Texaments were type "B",
the old card already in his possession was type "A" (a diode had
to be added).

THE FOLLOWING PARAGRAPHS WILL TELL YOU WHY I STARTED THIS
PROJECT. I DID NOT PLANNED TO..... BUT I HAD TO.
IF YOU DO NOT READ THEM, YOUR CARD WILL WORK WELL ANYWAY...

HOW THE WHOLE STORY BEGAN

     In September 1988 my friend Massimo Cariboni and I received
one Myarc 512 K Expansion Memory each from Texaments, NY. Steven
Lamberti, President of Texaments, said that these two cards were
the very first ones to be delivered from Myarc to the Geneve
customers. The two cards showed 9 additional wires run across
the board (jumpers), 1 diode 1N4148 added, several traces cut and
an empty Eprom socket.
We had been previously anticipated by Mr. Lamberti that these
card were a simple upgrade of old Myarc 512 K, originally built
for the TI-99/4A computer. Therefore, the jumpers and the cuts
were no suprise to us.
     However, we soon run into troubles.

ADDRESSING PROBLEM

     First off, we had a problem with MDOS that would recognize
the 512 K added to the system, but would crash on simple tasks
such as the DISKCOMP command. A quick inspection with a modified
Debugger showed that the new 512 K card would respond at the >80
- >BF memory bank addresses. However, whatever was written in
the fist >80 - >9F banks would also be read back from the >A0
->BF banks. It seemed that the card was lacking a decoding of
the most significant address, so that it could not distinguish
the first 256 K from the second 256 K. A phone call from Mr.
Pierre Garoche, 1 Residence Le Terres Rouges, 91120 Palaiseau,
France, helped solving the problem. AMC line, Pin 48 in the
connector of the Peripheral Expansion Box (PEB), was not
connected with the pin 34 (CA7 line) of the TMS 4500A Dram
Controller. A simple soldering in the J3 jumper solved the
situation (see above at STEP 10-B). .
     Now MDOS would operate properly. DISKCOMP and all the other
MDOS commands that take advantage of the increased memory size
would not fail or crash the system any longer.

HORIZON RAM DISK - CORCOMP DISK CONTROLLER PROBLEM

A second problem showed up as soon as I solved the first. When
using the CorComp Floppy Disk Controller (FDC) the Horizon Ram
Disk (HRD) would not operate properly. However, the problem
disappeared after replacing the CorComp FDC with a Myarc FDC.
Why that??? After all, the HRD would work perfectly with the
CorComp FDC and without the Myarc 512K Memory Expansion. I could
not possibly think of the CorComp FDC as the culprit.
Rather, it seemed that a signal, generated inside the Myarc 512K
would propagate into the other cards. I wanted to know what was
this signal. So, I decided to cut all the traces to the 60 Pin
connector, one after the other, until the HRD problem
disappeared. After cutting the MEMEN trace the problem vanished.
Then I looked carefully at the circuit pertaining to the MEMEN
pin and I found out that a 74LS74 output was still linked to
MEMEN. Since MEMEN is a signal that has to be generated
exclusively by the TMS 9995, the solution was easy: I cut that
trace as well. This trace runs from Pin 9 of the 74LS74 (U19)
to pin 5 of TMS 4500A (U23). After the cut the problem with the
HRD disappeared completely!

ADDRESSING MODE OF TI-99/4A

     In the PEB the are 19 address lines. Only 16 of them (A0
through A15) are used by the TI-99/4A, the other 3 lines (AMA,
AMB, AMC) are not used (they are brougth to a logical high state
by a pull-up resistor.
16 lines can directly address only 64 K bytes: this is the
addressing limit of the TI-99/4A.
     In TI-99/4A the Myarc 512 K card was used almost
exclusively as a Ram Disk and/or Printer Spooler. To my
knowlegde, only the Myarc 128K OS - Advanced Basic Level IV
could partially take advantage of the increased memory size.
     The Ram Disk/Printer Spooler was operated by the software
of a 2764 Eprom placed inside the 512 K card.
     The Eprom would bank-in the requested memory segment (bank
of >2000 bytes) via the CRU lines (and not via the AMA, AMB,
AMC lines). The CRU base address was >1000 and some decoding
of the CRU lines were necessary in order to select the proper
memory bank.

ADDRESSING MODE IN GENEVE COMPUTER

    In Geneve computer, the AMA, AMB and AMC lines are really
used as 3 additional address lines. The total 19 lines now can
directly address a maximum of 512 K.

Also, in the Geneve computer, the 512 K card is not operated via
the CRU lines. Banking is still used, but it occurs directly
according to the status of the 19 address lines.

A CLOSING THOUGHT

    I apologize in advance for any kind of error that this
document may be plagued with, english errors and technical
errors. While the first ones should be forgiven (I am an italian
who speaks Italian, English has been learned without a formal
school), I am sure like hell you are not willing to pardon the
technical ones. Ok, be warned that I am not a hardware guru.
What I wrote, however simple, was to the best of my knowledge.
    A last (and alarming) warning: it has been reported that
Myarc itself has having problems with converting to Geneve old
512 K cards. It has to do with chip types, probably speed:
some cards have chips that do not perform up to the standard
required by the Geneve computer. May be memory chips or TTL
chips. As a consequence, I cannot foresee if you will end up
with a working 512 K! Got it?.

A last thing: please share your knowledge! If you find a way to
improve this text file, plase feel free to do so! Simply sedn
this your new version to me, either on disk or on paper, so that
I will be able to share it with others once again. It's like an
endless chain, you know......

I will appreciate any of the following: .
- a) Improved english writing. It really important to be clear
     if you want others to profit from your writing. .
- b) Added or modified technical explanations. .
- c) Modification to the hardware project. In this case you must
     be really sure that what you've done it is not harmful in
     any way to the computer. .

Have fun, (it's not a joke!)

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