

Upgrading the Mark5A to Mark5B

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1.1	06-05-2007	P. de Vicente	version in english. Mark5 I/O board upgrade
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1. Introduction

We describe the process we followed at the Centro Astronómico de Yebes (CAY) from the Observatorio Astronómico Nacional (OAN) to upgrade from a Mark5A to a Mark5B. The Mark5B is a VSI compatible equipment and requires installing a new Mark5 I/O board. We also describe the upgrade of the motherboard, microprocesor, RAM memories and serial disk so that the equipment be prepared for e-VLBI.

2. Hardware upgrade

The following parts were withdrawn from the Mark5A:

- Mark 5A I/O panel. In the Mark5A standard equipments this panel is external and attached to its rear part. If the equipment is to be installed in a rack the extra depth has to be taken into account to avoid a collision with the rear door of the rack. At the OAN the rack was 900 cm depth and this was not enough since the Mark5A cables were hitting against its back door. We moved this panel to the upper cover and made a hole to pass through the cables. The Mark 5B does not need this board, so the hole was closed with an aluminium plate at the workshop of the Centro Astronómico de Yebes.

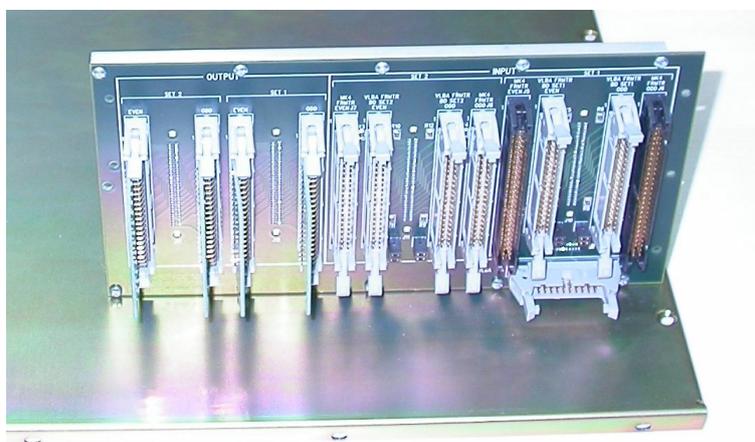


Figura 1: Rear view of the withdrawn Mark5A panel

This panel used several specific cables to connect it to the VLBA and Mark4 formatters. The Mark5B cannot be connected to these formatters since they are not VSI compatible. Therefore all these cables were withdrawn.

- Mark 5A I/O interface board. This board is a PCI board inside the Mark5. The cables mentioned before were attached to this board.

To remove the panel and the board, we removed the upper cover, cut the plastic ring that passed along the black handle and hold the board sticked to the rear bus board and unscrewed the board from the external rear of the box, as happens with PCI boards on standard PC boxes.



Figura 2: View of the withdrawn Mark5A I/O board with the cables which were connected to the Mark5A panel.

We installed the following parts:

- Auxiliary plate with three connectors. It is a metallic plate with three coaxial SMB connectors and their cables. Two of them allow to monitor the signals: “DOT Monitor” and “ROT Monitor”. These cables are connected to connectors J29 and J30 respectively on the Mark5B I/O interface board. The input signal “ALT1PPS” is connected to connector J31.

The cables are connected exerting a small pressure. There is no need to screw. It is convenient to make these connections before inserting the Mark5B I/O interface board into the PCI bus.

- Mark5B I/O interface board. This board is inserted into the PCI bus, in the same slot the Mark 5A I/O board was. The FPDP cable from the StreamStore board has to be connected to connector J1 on the Mark5 IO interface board. Connector J27, at the rear of box, is a VSI input and is used to inject the VSI signal coming from a VSI compatible source (for example, a modified Mark4 formatter, or a digital BBC). Connector J28 is a VSI output and is used for Mark5Bs at the correlators.

Figure 3 shows the Mark5 interface I/O board with the coaxial cables to the auxiliary plate.

- LEDs front panel. It is a panel with one 8 LEDs board and a metal plate with letters on it. First connect the flat 10 wire cable to its connector on the LED board. The flat cable has a red wire which indicates position 1. The LED board has a female connector with an arrow mark which indicates position 1. Both the cable and the LED board should match position 1. See Figure 4.

To mount the LED panel it is necessary to unmount the two side handles of the box; see 5. Below each handle there are 4 screws that hold the Mark5 black front panel. There are also two screws on the lower cover of the Mark5 box, and two screws behind the filter on the front panel. All of them have to be removed. The panel moves pulling gently but it

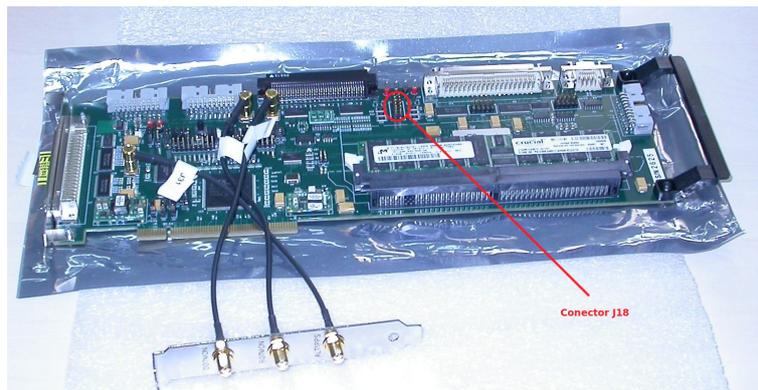


Figura 3: View of the Mark 5B I/O interface with the monitor cables before mounting it on its definitive location. We show connector J18, where the flat cable to the LED panel is connected.



Figura 4: View of LED board, the black plate and the flat 10 wire cable

is impossible to withdraw it completely because the cables for the on/off switch on the lower right corner are very difficult to unmount. Figure 5 is a composite which shows the unmounting process. The screws that have to be removed are marked in red.

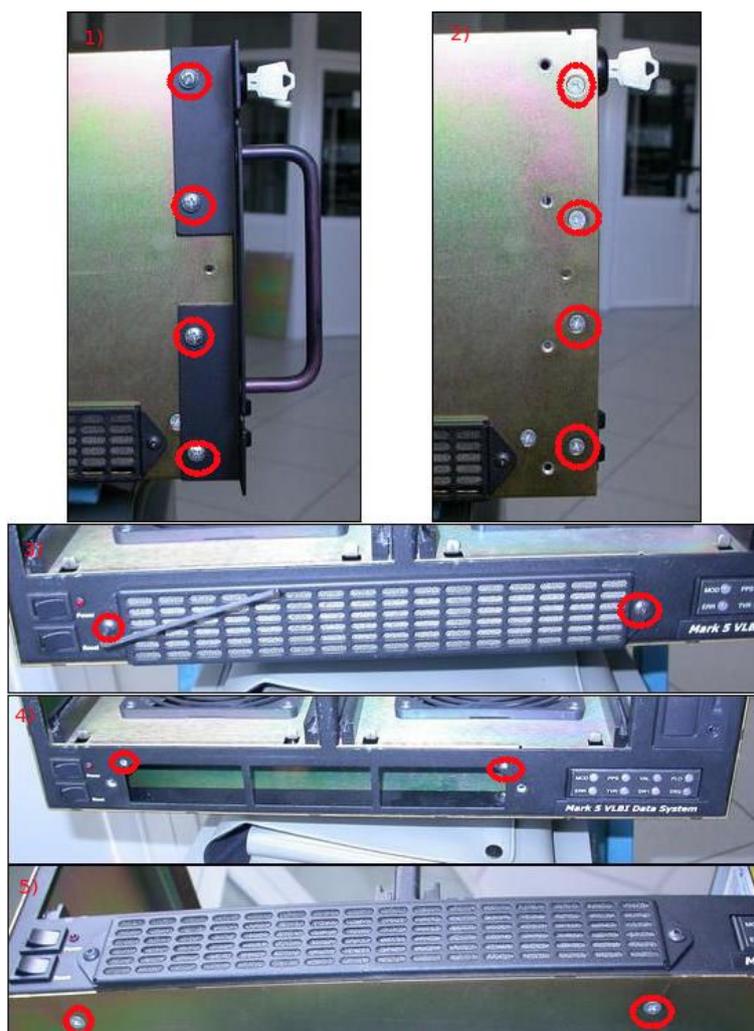


Figura 5: View of different parts of the Mark5B while unmounting it to install the LEDs' panel. The screws that have to be removed are marked in red. The sequence has been ordered with numbers on the left top corner.

The lower right corner of the Mark5 front panel has a black plate with 4 holes along which pass 4 long screws that go from the inner surface to the inside of the equipment. The 4 screws are soldered to the front panel and cannot be withdrawn. The black plate is attached to the screws with bolts on the inner face of the Mark5 front panel. To remove the plate it is necessary to use a small tool and relieve and remove the bolts. Once the plate is out, one has to insert the new black plate with letters, passing the long screws along the holes. Then insert the board with the LEDs and the flat 10 wire cable attached to it. The other end of this cable has to go to connector J18 on the Mark5B I/O interface board.

Aldrich (2006) shows a figure where position 1 of the connector is clearly indicated.

Once the flat 10 wire cable is connected to both ends the black LED panel has to be fixed to the Mark5 front pannel with the bolts. The final view is on figure 6 as seen from upwards. In that image one can see the two top screws and its bolts and the flat cable.



Figura 6: View of the front LED panel from upwards. Two long screws and its bolts can be seen. There are 4 screws in total. On the right the flat cable.

3. Upgrade of the motherboard, power supply and RAM memory

We replaced the motherboard, microprocessor, RAM memory and disk. The motherboard size needs to be such that it fits in the box, can be screwed to it and, as along as possible, the PCI boards remain in the same place as the original ones. This replacement transforms the Mark5B in a more powerful PC prepared for e-VLBI.

The new components are described below:

- Motherboard. Intel Brandon SE7520BD2SATAD2. This board requires two Xeon microprocessors with a 604 socket. This board is used by Conduant, MPIfR and JIVE for the new Mark5B's.
- Microprocessor. Two 3.2GHz 2MB 800MHz FSB Xeon. To avoid problems these processors should be bought together with the heatsinks and its fans. The recommended part number is BX80546KG3200FA - where the 'A' at the end stands for "Active" fan cooling. In case the processors are bought only with the heatsinks, it will be necessary to buy fans and heatsinks to which the fans can be attached to. This was our case. We purchased a SWIFTECH MCX-VPRO. This part has a heatsink composed of high conductivity aluminium helicoidal pins and a fan capable of 1950 rpm and with noise of 23 dBa.
- 2GB RAM memory in two pieces: PC3200 400MHz DDR2 ECC Reg CL3 dimm. We bought two Kingston Valueram KVR400D2D8R3/1G.
- 1 SATA 2 Disk. SATA 3 disks will not boot using Linux 2.4.27 or 2.6.8 as required by the current Mark5B OS. In fact kernels higher than 2.6.21 are needed for SATA 3 disks.

- Power supply. It was necessary to install a new power supply since the new motherboard requires an 8 pin CPU power connector and a 24 pin connector for the main motherboard. The chosen model was BQT P6-PRO 850W. Characteristics for this power supply are summarized below:

DC output	+3.3 V	+5 V	+12 V1	+12 V2	+12 V3	+12 V4	-12 V	+5V5B
Max. out. current	24 A	35 A	20 A	20 A	20 A	20 A	0.8 A	3 A
Max. comb. power	180 W		648 W				20 W	

Cuadro 1: DC output specifications. Taken from the manufacturer.

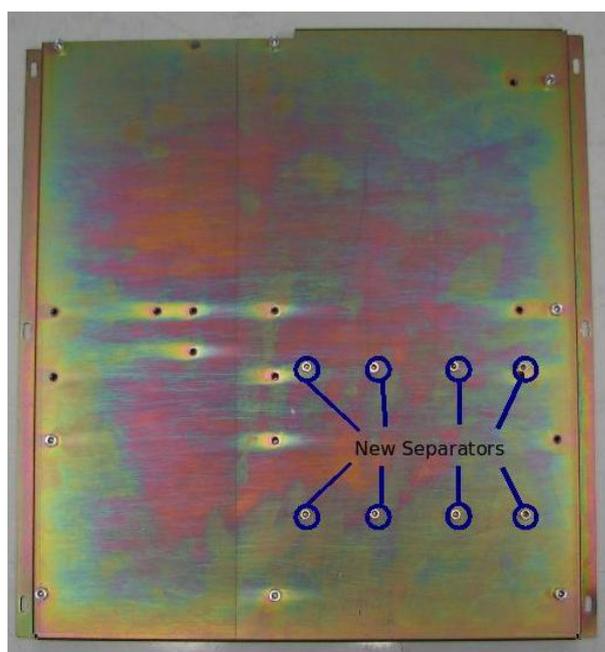


Figura 7: View of the lower plate where the main CPU board sits. New separators were installed where it indicated with blue circles. They serve to screw the two processors and its heatsinks. The empty holes indicate the separators used by the previous motherboard and now no longer necessary. The steps on the right and left sides of the plate are used to attach this plate to the lower part of the Mark5B rack.

Prior to unplugging the eight flat cables from the Streamstor board and the chassis back-plane, we tagged each flat cable with a water proof pen. Usually each cable has associated an increasing consecutive number. We also took some photographs to spot where and how the cables were plugged on each board. In order to extract the board it is necessary to remove the hard disk and its aluminium support first.

The old board was unscrewed and removed from its lower plate. The lower plate is attached to the lower part of the rack and stands ~ 1 cm above it. The right and left borders have a step which is used as holder for the eight screws that fix it to the rack. This plate was unscrewed

and taken out to remove the aluminium separators that are not needed and to mount new ones where the new plate requires them. In order not to bend the plate when pressing the processors on top of sockets, the board comes with a rubber bump that we cut to reduce its height so that it matched the height of the aluminium separators. There is an empty space in the board specially prepared for this aim. The new screws fix the board to the plate at 8 different places. There are also 8 more separators and screws used to fix the two processors with its heatsinks and fans to the plate. The separators have metric size. Figure 7 shows the new holes where the separators were placed.

Finally the heatsinks together with the fans were installed on top of the processors. It was necessary to cut the springs and push them strongly to get a good contact between them and the processors. Figure 8 shows the mounting process on one shot.

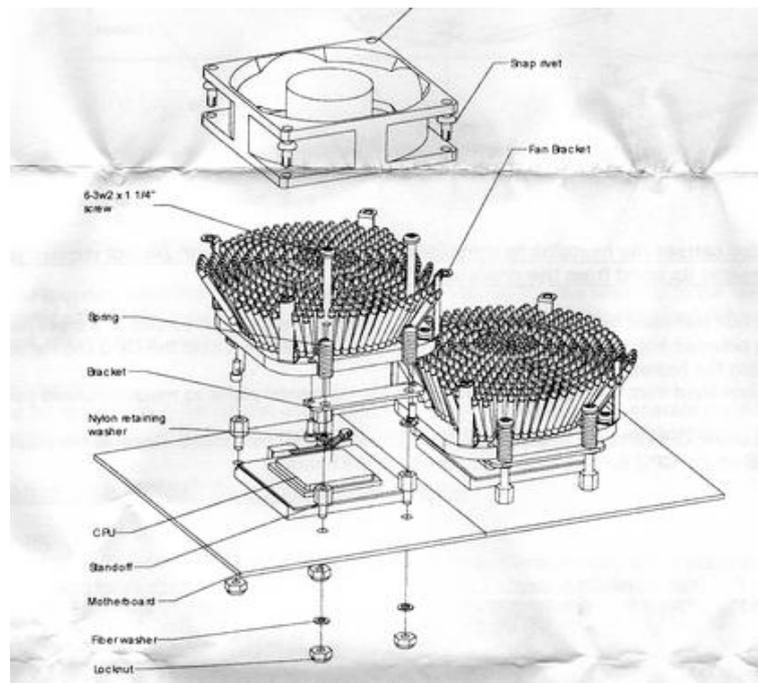


Figura 8: *Mounting the heatsinks. Image taken from the manufacturer.*

Once the board was screwed on to the plate, the aluminium plate that surrounds the IO connectors (ethernet, VGA, USB, RS232 ...) was mounted. On its inner face we mounted an adhesive soft foil which acts as an electromagnetic screen. The soft side is towards the inner side of the box. The lower plate together with the main board were inserted into the rack. Since the space is very narrow it was necessary to dismount the rear part of the rack and tilt it partially towards the outside. Once the board and its supporting plate were on place the rear part of the rack was screwed again. The lower plate was screwed to the bottom of the rack. This is a difficult operation since the plate covers part of the holes and there is hardly space for a screwdriver.

The cables from the reset button, the power LED and the power switch were connected to the Front Panel Header connector on the board. See figure 9 for the schematics of the connector and its location on the motherboard. Table 2 summarizes the connections. Cables were fitted

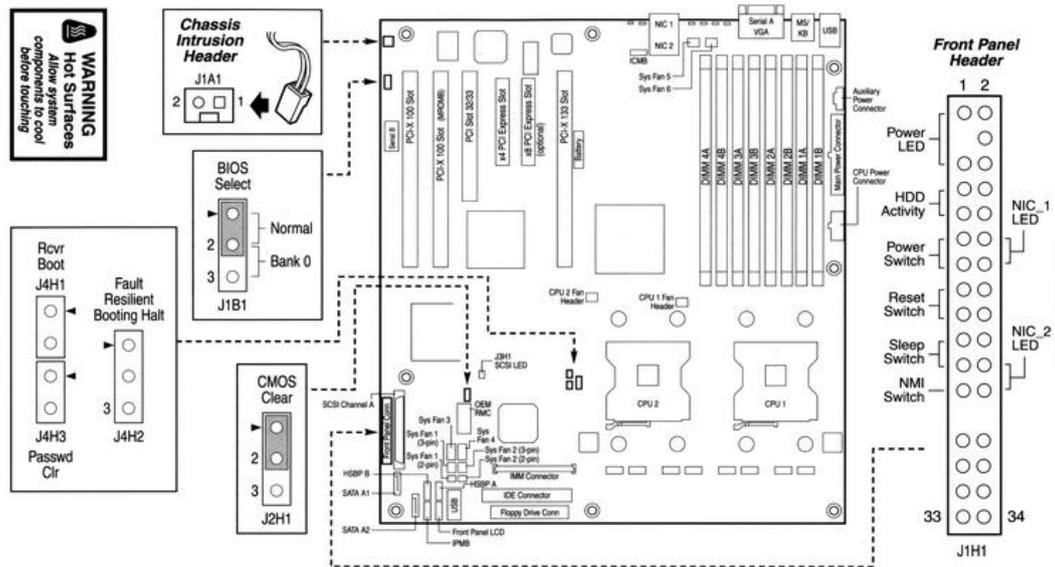


Figure 9: Schematics of the motherboard. Image taken from the manufacturer.

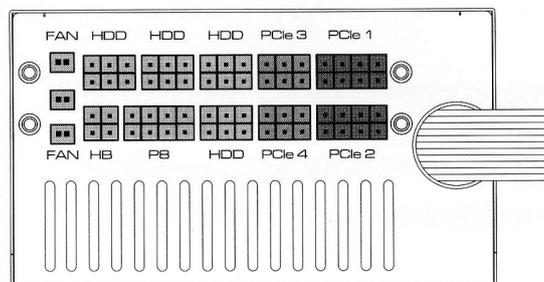


Figure 10: Power supply schematics showing the available sockets. Image taken from the manufacturer.

together with plastic ties on adhesive mounts on the wall of the rack.

Signal Pair	Red wire	Black wire
Power LED	Pin 1	Pin 5
Power Switch	Pin 11	Pin 13
Reset Switch	Pin 15	Pin 17

Cuadro 2: *Connections in the Front Pannel Header connector of the motherboard.*

The StreamStor board was inserted into the PCI-X 133 Slot and then we connected the 8 flat cables from the Mark5 chassis backplane. Later, the Mark 5A I/O interface board was inserted into the PCI Slot 32/33. See Figure 9 to see where the PCI slots are located on the motherboard. In the new board the distance between the two slots is larger than in the old board, since in between there are two PCI Express slots. This required to use a longer FPDP cable from the StreamStore board to connector J1 on the Mark5 I/O interface board. Finally cables to the Mark5 I/O interface board were connected according to the instructions on section 2 of this report.

The power supply was replaced by a new one with the same dimensions. The new power supply provides plenty of cables and connectors. On one of its faces it has a number of connectors (see figure 10). Table 3 summarizes the conexions for each output.

The green connector on the Mark5 chassis backplane provides power for the Mark5 disk packs. It has three inputs for +12 V, one input for +5 V and three inputs for ground. To provide the maximum power every pin gets two wires from 2 different outputs of the power supply. We have used red cables for +5 V and green ones for +12 V, following the same convention as the power supply manufacturer.

Power Supply output	Target	Connector
FAN	—	
HDD	Hard Disk	
MB	—	
HDD	DVD	
PB	motherboard	8 pin +12 V
HDD	Chasis Backplane	Green connector +5 V
HDD	Chasis Backplane	Green connector +5 V
PCIE4	Chasis Backplane	Green connector 3 x +12 V
PCIE3	Chasis Backplane	Green connector 3 x +12 V
PCIE2	—	
PCIE1	—	
Common	motherboard	24 pin +5 V

Cuadro 3: *Connections from the power supply. They are listed downwards (left to right) to upwards as seen on the lateral face of the power supply. All conexions to the chassis backplane connector were done using plain cables without end connectors.*

The final task was to replace the CD by a DVD. The data cable is an IDE that goes to its socket on the motherboard (see schematics on Figure 9 to spot its location). The support tray for the hard disk was installed and a SATA 2 disk was screwed on top of it. The data cable was inserted in the SATA A1 connector in the motherboard.

Figure 11 shows an upper view of the Mark5B once all the upgrade was finished. When possible and to prevent cluttering, the cables are tied using adhesive mounts on the inner faces of the rack.



Figura 11: Image of the Mark5B once the upgrade was completed.

4. Upgrade of the Mark5 OS and software

The current recommended Mark5 OS is a Debian Sarge Linux distribution. Haystack provides a customized distribution which should ease the installation. Previous to the installation

some work had to be performed with the PC BIOS. First the clock was set to UTC from the BIOS menu.

Once this was set up we booted the Mark5B from a CD which contains the Mark5B OS system for Debian Sarge. The default BIOS setup follows this boot order and takes some time to perform each step:

1. Intel BIOS Boot. Takes 20 seconds. During this time if F2 is pressed it is possible to enter the BIOS
2. Yukon PXE. In this phase the PC delays for 15 seconds.
3. Ethernet GE boot. The PC tries to boot from the network and spends 45 seconds here.
4. EFI boot manager. It takes 10 seconds to complete this step. Then the procedure waits for the operator to select an option from a list. In order to boot from the CD one should choose: "Legacy Boot".

Installation was performed using two CDs obtained at the TWG meeting in Haystack during the first week of May 2007 and following the instructions published in http://www.haystack.mit.edu/tech/vlbi/mark5/downloads/Upgrade_notes_a.pdf. The automatic installation procedure did not complete successfully, possibly because it uses a route to the stable Debian version (now "Etch" instead of Sarge) for security updates which breaks the process. When the procedure requests a method for Apt, it is necessary to insert CD number 2 into the DVD and select CD in the menu list. The procedure will connect to Internet to retrieve the updated packages from the security repository and this will fail. To overcome this situation it is necessary to enter `aptitude` type `U`, `u`, and `g`. This sequence of keystrokes will download some packages and install them. The `locales` package will be installed and will request the selection of an environment. We chose `es_ES@euro`. From this item it is necessary to perform manually the installation of `exim`. Once the procedure finishes, file `/etc/apt/sources.list` should be changed replacing "stable" by "sarge". Then it is necessary to use `aptitude` and update the list of packages (type keystroke `U`), upgrade (type keystroke `u`) and install new packages (type keystroke `g`).

The installation of the X-Window system does not complete successfully either. To complete it, select packages `x-window-system-core` and `xterm` and install them. In order to have a window environment file `/etc/apt/sources.list` should be modified previously to use repositories in Internet. If not the only available window manager is `twm`. We changed the repositories and installed KDE.

There are newer CDs at the Haystack FTP which might solve the problems described in the two previous paragraphs.

The linux kernel by default installed is 2.4.27-3-386, but we updated to 2.4.27-3-686 which is better suited for the installed processors.

Once the OS installation was complete and in order to reduce the boot time and to make the boot automatic without the assistance of a human operator, the boot order was modified. By default the system tries to boot from the PXE, the network, the hard disk and finally the CD or DVD. The boot order was modified according to this list:

1. 3M-WDC WD800JD-60J.
2. PM TEAC DV-W516GC.
3. IBA GE Slot 0720 V.
4. B5 D0 Yukon PXE.
5. EFI Boot manager.

Mark5B software is installed by running from root script `MakeMark5` which is not available at Haystack FTP and therefore is included as an appendix at the end of this report. This script creates *oper* and *jball* accounts, its `.cshrc` and `.login` files, forces usage of *tcsh*, compiles all control programs and installs them.

To fully complete the installation it is necessary to create the `mk5b` kernel module. This requires changing line 2 from file `/usr/local/mk5b-intr/src/ccm` with the adequate kernel headers. In our case the line was:

```
gcc -c -Wall -O2 -g -DMK5B_DEBUG -I/usr/src/kernel-headers-2.4.27-3-686/include mk5b.c &
```

and run the following commands

```
cd /usr/local/mark5-intr/src
./ccm
mk5breg
```

This module should be loaded each time the Mark5B is booted. If not the Mark5B program will not start correctly. Correct load of the module should produce the following log, which can be easily inspected using `dmesg`:

```
mk5b: irq = 18
mk5b: memory page: 0xf6be6000
mk5b: dim id is 5b80
mk5b: registered module, major=253
mk5b: version 1.0 (compiled on Oct 31 2007) loaded
```

Finally we tested the software by running `Mark5B`:

```
Mark5B &
```

```
Mark5B inBoard() ERROR: XLRSetDBMode() returned error
Mark5B inBoard() ERROR: XLRSetDBMode() returned error
Mark5B inBoard() ERROR: XLRSetDBMode() returned error
Mark5B Ready. End with EndM5B, please
```

If debugging is required, `Mark5B` should be run with the following params:

```
Mark5B -m0 -f0 &
```

Troubleshoot notes:

- If the Mark5b is rebooted the modules will not be loaded and the Mark5b will fail to be operated correctly.

The `MakeMark5` script creates file `/etc/rc.local` which intends to load the `streamstor` and `mk5b` kernel modules on boot. This solution, however, does not work in Debian and should be installed this way:

```
cp /etc/rc.local /etc/init.d/mark5bInit
update-rc.d mark5bInit start 98 S . stop 98 0 6 .
```

After running `update-rc` links in directories `/etc/rcS.d`, `/etc/rc0.d` and `/etc/rc6.d` will be created.

- All Mark5b programs require the `oper` account to run using a `tcsh` shell and not a `bash` one. Typically `ssopen` will fail and `Mark5b` will exit complaining about being unable to open a file if using a `bash` shell.

It is absolutely necessary that `.login` is executed always when logging into the `oper` account, however this does not happen if one opens a console and several tabs. To avoid this problem `.login` can be sourced from `.cshrc` like this:

```
source .login
```

`.login` provides the correct environment variables and `PATH` for the Mark5b control programs under `tcsh`.

- When `Mark5b` is executed previous to `ssopen` startup, the program will take 1 minute to fully start. `ssopen` also needs 1 minute to complete.
- When the `Mark5b` program is being executed and the VSI input is correctly connected to the VSI4 sampler module, the 1 PPS red light blinks once per second. This is not an error and indicates that the system is receiving 1 PPS from the VSI source.

5. Appendix

```
#!/bin/bash
# MakeMark5
# Starting from generic Linux, make a Mark-5 software installation.
# This must be executed by root. And you'll need Internet access
# to Haystack to download the tarball.
# This version should work on either RedHat or Ubuntu.
# (Remember bash, not tcsh.) Revised: 2005 May 26, JAB
#
# Debug pause after each line:
# function pause { echo -n "." ; read ; }
# trap pause DEBUG
```

```
#
echo " Check: Must be root: "
if [ `id -u` != 0 ] ; then
    echo " You must be root to run MakeMark5. Sorry. "
    exit -1
fi
#
echo " Making a login for oper: "
/usr/sbin/useradd -m -p '$1$pFgccZGg$zgsSQL3qA6Cpba0PwUD70' \
    -g users -s /bin/tcsh oper
chmod 0755 ~oper
#
echo " Making a login for jball: "
/usr/sbin/useradd -m -p '$1$NGfJHjfd$Rp9Fj8ub9ZNO9SK23gMs6/' \
    -g users -u 501 -s /bin/tcsh jball
chmod 0755 ~jball
#
echo " Creating the following directories: "
mkdir -v -m 0755 /home/streamstor
mkdir -v -m 0755 ~jball/bin
mkdir -v -m 0755 ~jball/C
mkdir -v -m 0755 ~jball/F
mkdir -v -m 0755 ~jball/Mark5
mkdir -v -m 0755 /var/dir
#
echo " Creating file /var/dir/Mark5A: "
cd /var/dir
touch Mark5A
chmod 0644 Mark5A
#
echo " Creating the following symbolic links: "
cd /home/streamstor
ln -s linux Sdk
cd ~oper
ln -s ~jball/bin .
ln -s ~jball/C .
ln -s ~jball/F .
ln -s ~jball/Mark5 .
cd ~jball/C
ln -s /home/streamstor/Sdk/include/sc_api.h .
ln -s /home/streamstor/Sdk/include/xlrapi.h .
ln -s /home/streamstor/Sdk/include/xlrtypes.h .
ln -s /home/streamstor/Sdk/lib/libssapi.a .
cd ~jball/bin
ln -s /home/streamstor/Sdk/util/sslog .
ln -s /home/streamstor/Sdk/util/ssflash .
ln -s /home/streamstor/Sdk/util/ssopen .
```

```

ln -s /home/streamstor/Sdk/util/sstest .
#
echo " Copying the following .chsrc file into both ~oper and ~jball: "
cat << '..End..' > ~oper/.chsrc
#
# Generic .chsrc
# This version for Linux
# Revised: 2002 February 21, JAB
# setenv HZ 100
alias wh who /var/log/wtmp
alias www cd /home/httpd/html
alias tq /usr/sbin/ntpq -p
# The stuff prior to this line should get executed on
# remote shell from some other computer.
if ( $?prompt == 0 ) exit
echo "csh on `hostname` (`uname`) is executing $HOME/.chsrc "
unset autologout
# echo HZ is $HZ
echo PATH is $PATH
# set hname = $HOST:r
# set hn = $hname:r
# unset hname
set hname = `hostname`
set dname = `dnsdomainname`
set hn = `basename $hname $dname`
unset hname dname
if ( $?LOGNAME == 1 ) then
    set prompt = "$LOGNAME@${hn}[\!]% "
else if ( $?USER == 1 ) then
    set prompt = "$USER@${hn}[\!]% "
else
    set prompt = "`whoami`@`hostname`[\!]% "
endif
stty erase "^?" ; echo "erase set to ^? "
set history = 15 ; echo history set to $history
set cdpath = ~ ; echo cdpath set to $cdpath
echo Working directory is `pwd`
date '+ %Y %B %d (%A) %R %Z'
echo " "

..End..
cp ~oper/.chsrc ~jball/.chsrc
#
echo " Copying the following .login file to both ~oper and ~jball: "
cat << '...End...' > ~oper/.login
#
# Generic .login revised: 2002 May 20, JAB

```

```

# This version for Linux.
# source /etc/cshrc
echo "csh on `hostname` (`uname`) is executing $HOME/.login "
# `hostname` doesn't seem to work on gauss
echo "tty is: " `tty`
if ( $?TERM == 1 ) then
  echo "TERM is $TERM (but may be changed below)"
endif
setenv PATH :$HOME/bin:/bin:/usr/bin:/usr/local/bin:/usr/bin/X11
if ( `tty` == '/dev/console' ) then
# setenv PATH $PATH':/usr/bin/X11'
  setenv DISPLAY `hostname` :0 ; echo DISPLAY set to $DISPLAY
  setenv TERM AT386-M
else if ( $?TERM == 0 ) then
  setenv TERM vt100
else if ( $TERM == 'unknown' ) then
  setenv TERM vt100
endif
set term = $TERM
# setenv MANPATH /usr/share/man:/usr/local/man
# setenv PAGER "more -s"
setenv PAGER "less -s"
setenv NNTPSERVER news.mit.edu
setenv STREAMSTOR_BIB_PATH /home/streamstor/Sdk/bib
setenv SS /home/streamstor/Sdk
tput init
echo "tput longname is: " `tput longname`
stty kill "^X" ; echo Kill set to control-X
stty intr "^C" ; echo Intr set to control-C
stty echoe ; echo Echoe set on
echo PATH set to $PATH
ps -l ; w
echo HOME is $HOME ... Directory of `pwd` is:
ls -al
date '+          %Y %B %d (%A) %R %Z'

...End...
chown -R oper.users ~oper
cp ~oper/.login ~jball/.login
chown -R jball.users ~jball
#
echo " Appending the following onto /etc/services: "
cd /etc
mv services services.dist
cat services.dist - << '....End....' > services
# Local services
m4crate          2600/tcp          # Mark-4 Crates

```

```

m4crate          2600/udp          # Mark-4 Crates
m4taplib         2610/tcp          # Mark-4 Tape Library
m4taplib         2610/udp          # Mark-4 Tape Library
m5drive         2620/tcp          # Mark-5 Drives
m5drive         2620/udp          # Mark-5 Drives
m5data          2630/tcp          # Mark-5 Data
m5data          2630/udp          # Mark-5 Data
m4msgd          2680/tcp          # Mark-4 Messaging
m4msgd          2680/udp          # Mark-4 Messaging

```

```

.....End.....

```

```

chmod --reference=services.dist services
#
echo " Appending the following onto rc.local: "
cd /etc
if [ -d rc.d ] ; then
    cd rc.d
fi
# (On Ubuntu, there is no rc.d directory, but that's OK)
if [ ! " -a rc.local " ] ; then
    # No rc.local, so make one:
    echo "#!/bin/bash " > rc.local
    chmod 0755 rc.local
fi
mv -f rc.local rc.local.dist
cat rc.local.dist - << '.....End.....' > rc.local
#
# Added 2002 February 5, JAB:
echo "Loading module windrvr6 for StreamStor "
# /home/streamstor/Sdk/driver/wdreg /lib/modules/misc/windrvr.o
/sbin/insmod windrvr6
chmod 0666 /dev/windrvr6
chmod 0666 /dev/ttyS0
# Revised 2003 July 09, JAB:
echo "Setting the clock from NTP "
/usr/sbin/ntpdate -b -p 8 -u gauss

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.....End.....

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chmod 0755 rc.local
#
echo " Reseting time daily using cron: "
cd /etc/cron.daily
echo "#!/bin/bash" > ntpdate
echo "/usr/sbin/ntpdate -b -p 8 -u gauss " >> ntpdate
chmod 0755 ntpdate
#
echo " Creating /etc/hardware_id (with dummy contents): "

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cd /etc
echo "mark5-XX" > hardware_id
chmod 0444 hardware_id
#
echo " Downloading the Mark-5 tarball from Haystack into /tmp: "
cd /tmp
rm -f Mark5A.tar.gz
rm -f Mark5A.tgz
# /usr/bin/ncftpget ftp://web.haystack.edu/dist/mark5/Mark5A.tgz
/usr/bin/wget ftp://web.haystack.edu/dist/mark5/Mark5A.tgz
if [ $? != 0 ] ; then
    echo " Some ERROR. You must have Internet access to Haystack. Sorry. "
    exit -2
fi
echo " Unzipping and untarring this tarball: "
/bin/tar xzvpP --same-owner -f Mark5A.tgz
if [ $? != 0 ] ; then
    echo " Some ERROR. Something must be done about this. "
    exit -3
fi
echo " Doing a Jungo driver re-installation: "
cd /home/streamstor/linux/driver/redist
rm -fr LINUX*
./configure
make clean
make
make install
if [ $? != 0 ] ; then
    echo " ERROR: The Jungo driver re-installation seems to have failed. "
    exit -4
fi
echo " (You may ignore the warning about \"will taint the kernel\") "
chmod 0666 /dev/windr6
echo " Recompile all Mark-5-associated programs: "
cd ~jball/bin
./cc5A
echo " ##### Now check for any errors noted above ##### "
echo " The following manual operations remain to be done: "
echo " Substitute a local NTP server instead of gauss in the last lines of "
echo " /etc/rc.d/rc.local or /etc/rc.local and /etc/cron.daily/ntpdate . "
echo " Write this machine's official name (i.e., mark5-nn) into "
echo " /etc/hardware_id (e.g., \"echo mark5-nn > /etc/hardware_id\"). "
echo " Change the root password to match this machine's official name. "
echo " If you don't have any error messages, then Mark5A should be ready. "
echo " Logout as root and login as oper (!), "
echo " and then run the prescribed suite of tests on this machine. "

```

Referencias

- [1] Aldrich W., Haystack Obs. Mark5 Memo, 2006
- [2] BQT-P6-PRO User Manual, 2007
- [3] Intel Server Boards SE7520BD2VD2. Fast mounting instructions, 2007
- [4] MCX-VPro Heatsink. Mounting instructions, 2007